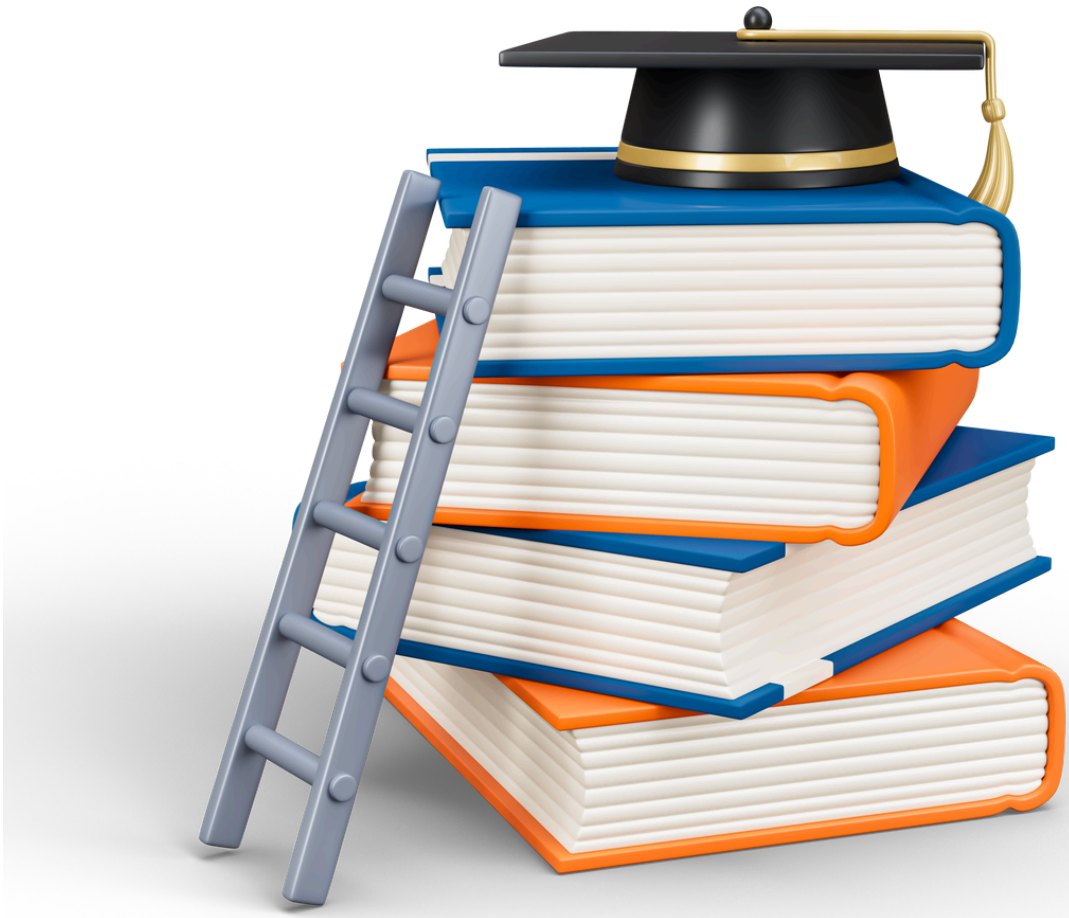
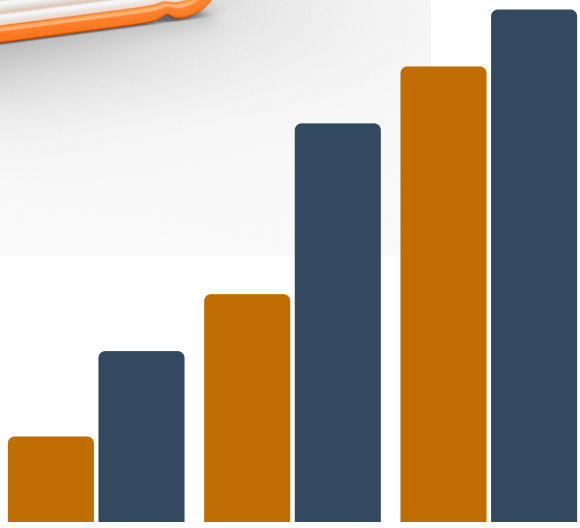
RESEARCH METHODOLOGY

IN THE AGE OF ARTIFICIAL INTELLIGENCE





by Justin I. Gachigo, Ph.D.

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PREFACE

This handbook will provide a guide for tax practioners by elaborating further on the international tax as it relates to the practice of the profession in Kenya and worldwide.

Chapter One, which introduces key concepts such as the characteristics and types of research, research topic development, and the formulation of research objectives.

Chapter Two delves into the literature review process, covering empirical and theoretical literature, conceptual frameworks, and study variables.

Chapter Three explores research methodology, guiding the reader through research philosophies, design selection, sampling techniques, and data collection methods.

Chapter Four focuses on data analysis and presentation, including various statistical tests, hypothesis testing, and model specification techniques.

Chapter Five cover the principles of integrity, plagiarism prevention, and proper citation practices

Chapter Six highlights the role of artificial intelligence in research writing, discussing its benefits, challenges, and ethical implications

Chapter Seven provides a structured approach to proposal and thesis development, detailing each component of academic research writing

CHAPTER ONE: FUDAMENTALS OF RESEARCH

Introduction

Research is a systematic and methodical process aimed at discovering new information, validating existing knowledge, or developing new theories. It is fundamental to the advancement of knowledge in various fields, including science, technology, medicine, social sciences, and humanities. Research is a process to discover new knowledge to find answers to a question. According to (Thyer, 2001), "the word research is composed of two syllables, re and search. re is a prefix meaning again, anew or over again search is a verb meaning to examine closely and carefully, to test and try, or to probe. Together they form a noun describing a careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles. “As per the Merriam-Webster Online Dictionary, the word research is derived from the Middle French "recherché", which means "to go about seeking", the term itself being derived from the Old French term "recerchier," a compound word from "re-" + "cerchier", or "sercher", meaning 'search’. The earliest recorded use of the term was in 1577. Research is a structured enquiry that utilizes acceptable scientific methodology to solve problems and create new knowledge that is generally applicable.

The word research has two parts re (again) and search (find) which denote that we are taking up an activity to look into an aspect once again or we want to look for some new information about something e.g. Front Office Executive has to learn about the facilities, timings, key features of products and services available at the hotel if one wants to become a wonderful sales professional other than being a host. "All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention" is a famous Hudson Maxim in context of which the significance of research can well be understood.

Clifford Woody states that research comprises defining and redefining problems, formulation of hypothesis; collection, organizing and evaluation of data; and reaching conclusions. Here it is emphasized that all research must be systematic and logical to arrive at expected outcome. D. Slesinger and M. Stephenson in the Encyclopedia of Social Sciences Research define research as "The manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of

an art." The authors have a different view of research as they suggest that it can be taken up by modifying, challenging and changing; available knowledge either to prove a process being appropriate or to develop it in entirety (Clifford, 1927).

IMPORTANCE OF RESEARCH

No matter what career field you're in or how high up you are, there's always more to learn. The same applies to your personal life. No matter how many experiences you have or how diverse your social circle, there are things you don't know. Research unlocks the unknowns, lets you explore the world from different perspectives, and fuels a deeper understanding. In some areas, research is an essential part of success. In others, it may not be absolutely necessary, but it has many benefits. Here are ten reasons why research is important:

Research expands your knowledge base

The most obvious reason to do research is that you'll learn more. There's always more to learn about a topic, even if you are already well-versed in it. If you aren't, research allows you to build on any personal experience you have with the subject. The process of research opens up new opportunities for learning and growth.

Research gives you the latest information

Research encourages you to find the most recent information available. In certain fields, especially scientific ones, there's always new information and discoveries being made. Staying updated prevents you from falling behind and giving info that's inaccurate or doesn't paint the whole picture. With the latest info, you'll be better equipped to talk about a subject and build on ideas.

Research helps you know what you're up against

In business, you'll have competition. Researching your competitors and what they're up to helps you formulate your plans and strategies. You can figure out what sets you apart. In other types of research, like medicine, your research might identify diseases, classify symptoms, and come up with ways to tackle them. Even if your "enemy" isn't an actual person or competitor, there's always some kind of antagonist force or problem that research can help you deal with.

Research builds your credibility

People will take what you have to say more seriously when they can tell you're informed. Doing research gives you a solid foundation on which you can build your ideas and opinions. You can speak with confidence about what you know is accurate. When you've done the research, it's much harder for someone to poke holes in what you're saying. Your research should be focused on the best sources. If your "research" consists of opinions from non-experts, you won't be very credible. When your research is good, though, people are more likely to pay attention.

Research helps you narrow your scope

When you're circling a topic for the first time, you might not be exactly sure where to start. Most of the time, the amount of work ahead of you is overwhelming. Whether you're writing a paper or formulating a business plan, it's important to narrow the scope at some point. Research helps you identify the most unique and/or important themes. You can choose the themes that fit best with the project and its goals.

Research teaches you better discernment

Doing a lot of research helps you sift through low-quality and high-quality information. The more research you do on a topic, the better you'll get at discerning what's accurate and what's not. You'll also get better at discerning the gray areas where information may be technically correct but used to draw questionable conclusions.

Research introduces you to new ideas

You may already have opinions and ideas about a topic when you start researching. The more you research, the more viewpoints you'll come across. This encourages you to entertain new ideas and perhaps take a closer look at yours. You might change your mind about something or, at least, figure out how to position your ideas as the best ones.

Research helps with problem-solving

Whether it's a personal or professional problem, it helps to look outside yourself for help. Depending on what the issue is, your research can focus on what others have done before. You might just need more information, so you can make an informed plan of attack and an informed

decision. When you know you've collected good information, you'll feel much more confident in your solution.

Research helps you reach people

Research is used to help raise awareness of issues like climate change, racial discrimination, gender inequality, and more. Without hard facts, it's very difficult to prove that climate change is getting worse or that gender inequality isn't progressing as quickly as it should. The public needs to know what the facts are, so they have a clear idea of what "getting worse" or "not progressing" actually means. Research also entails going beyond the raw data and sharing real-life stories that have a more personal impact on people.

Research encourages curiosity

Having curiosity and a love of learning take you far in life. Research opens you up to different opinions and new ideas. It also builds discerning and analytical skills. The research process rewards curiosity. When you're committed to learning, you're always in a place of growth. Curiosity is also good for your health. Studies show curiosity is associated with higher levels of positivity, better satisfaction with life, and lower anxiety.

CHARACTERISTIC OF RESEARCH

Research is a scientific approach of answering a research question, solving a research problem, or generating new knowledge through a systematic and orderly collection, organization, and analysis of data with the ultimate goal of making the findings of research useful in decision-making. Creswell (1994,) It is a systematic and organized effort to investigate a specific problem that needs a solution. Research is not only undertaken to solve the existing problem of but also contribute to the formation of knowledge. Thus it is a knowledge building process. It can be undertaken to fulfil different purposes. Basically research is undertaken to generate new knowledge, to solve the existing problems in the work setting, and to build up new theory, with its certain research process. There are different steps in research: sensing a problem, problem identification, theoretical framework, hypothesis formulation, research design, data collection, data analysis, and refinement of theory. A good research has certain characteristics: systematic, empirical, logical, replicable and purposive. These should be fulfilled for a scientific research. The types of research methodology

depend on the context, assumptions, paradigms and perspectives to study a phenomenon. It provides systematic and scientific and orderly work plan to complete the research. There are certain techniques and methods too to accomplish the job of good research. Thus research is creative and strategic process with its certain framework to search the new dimension of knowledge and solve the current problems. Below are detailed characteristics of research:

Systematic Approach

It means that research is structured with specified steps to be taken in a specified sequence in accordance with the well-defined set of rules. Systematic characteristic of the research does not rule out creative thinking but it certainly does reject the use of guessing and intuition in arriving at conclusions. Research follows a structured process, including defining a problem, reviewing literature, designing a study, collecting data, analyzing results, and drawing conclusions. Each step in the research process is carefully planned and executed to ensure consistency and reliability.

Empirical Nature

It implies that research is related basically to one or more aspects of a real situation and deals with concrete data that provides a basis for external validity to research results. Research relies on empirical evidence, which means it is based on observed and measured phenomena. Data is collected through direct or indirect observation, experimentation, or surveys. Research findings are verifiable through replication and scrutiny by others.

Replicability

This characteristic allows research results to be verified by replicating the study and thereby building a sound basis for decisions. Kothari & Grant (2014,). Research should be replicable by other researchers using the same methods. This helps to confirm the validity and reliability of the findings. Clear and detailed documentation of methods and procedures allows for replication.

Purposive

Research must have a focus or a specific purpose. It is essential for the effective and meaningful research. Research without purpose leads the study nowhere Pant (2009,) the purpose of research influences the activities of researcher.

Generalization

Generalization refers to the ability to apply the results to a large portion of the population. In the research term, it simply means how far the finding of research can be applied to the large population. Researcher generally chooses a small sample termed as target population out of whole large population for his analysis and research purpose. This target population is the representative of the whole population and in the same say, sample findings are also termed as the findings of the whole population. Research is called generalizable if the findings of the sample can be applied to any portion or sample of the whole population.

Cyclical Nature

Research process is cyclical in nature. It starts with a research question defining the main aim of research project and also ends with different question arising out of research conclusion. Many times findings of the research bring several new questions in the mind of people.

Controlled Conditions

In experimental research, conditions are controlled to isolate the effect of the independent variable on the dependent variable, minimizing the influence of extraneous variables. Consistent procedures and conditions are maintained throughout the research to ensure accuracy.

Objectivity

Researchers strive to remain objective and unbiased, avoiding personal or subjective influences on the research process and interpretation of results. Ensuring that the tools and methods used are reliable (consistent results) and valid (accurately measure what they are intended to measure).

Precision and Accuracy

Research requires precise measurements and descriptions of variables, conditions, and findings. Careful attention to detail ensures that the research is accurate and that findings are credible.

Logical Reasoning

This implies that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out research. Induction is the process of reasoning from a part to the whole whereas deduction is the process of reasoning from some. This implies that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out research. Induction is the process of reasoning from a part to the whole whereas deduction is the process of reasoning from some premise to a conclusion which follows from that very premise. In fact, logical reasoning makes research more meaningful in the context of decision making. Research employs logical reasoning to interpret data and draw conclusions. This involves both inductive reasoning (generalizing from specific observations) and deductive reasoning (testing hypotheses based on general principles). Logical analysis and interpretation of data are fundamental to reaching sound conclusions.

Originality

Research contributes new knowledge, ideas, or insights. It can either build on existing knowledge or explore uncharted areas. Research should provide original findings or perspectives that advance understanding in the field.

Ethical Considerations

Ethical guidelines govern the conduct of research, ensuring respect for participants, integrity in data collection and reporting, and responsibility in the dissemination of findings. Participants' rights and privacy are protected through informed consent and confidentiality agreements.

Documentation and Communication

Research findings are documented in a clear, detailed, and transparent manner, often through reports, publications, or presentations. Research is often subjected to peer review, where other experts in the field evaluate its quality and validity before publication.

TYPES OF RESEARCH

Research can be categorized in various ways based on its purpose, methodology, and the nature of the data. Here are the primary types of research:

1. **By Purpose**

    a) Basic (fundamental or pure) research is driven by a scientist's curiosity or interest in a scientific question. The main motivation is to expand man's knowledge, not to create or invent something. There is no obvious commercial value to the discoveries that result from basic research.

    b) Applied Research- At its core, applied research is oriented towards identifying practical solutions to specific problems. Its primary objective is not just to add to the existing knowledge base but to leverage that knowledge to develop solutions, innovations, or interventions that can be directly applied in the real world.

2. **By Nature of Data**

    c) Qualitative Research- Qualitative research involves collecting and analyzing non-numerical data (e.g., text, video, or audio) to understand concepts, opinions, or experiences. It can be used to gather in-depth insights into a problem or generate new ideas for research

    d) Quantitative Research- Quantitative research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations

    e) Mixed Methods Research- A mixed methods research design is a procedure for collecting, analyzing, and "mixing" both quantitative and qualitative research and methods in a single study to understand a research problem.

3. **By Research Design**

    f) **Descriptive Research**- Descriptive research aims to accurately and systematically describe a population, situation or phenomenon. It can answer what, where, when and how questions, but not why questions

g) **Exploratory Research-** Descriptive research aims to accurately and systematically describe a population, situation or phenomenon. It can answer what, where, when and how questions, but not why questions

h) **Explanatory Research-** Explanatory research is a method developed to investigate a phenomenon that has not been studied or explained properly. Its main intention is to provide details about where to find a small amount of information.

i) **Experimental Research-** Experimental research is a study conducted with a scientific approach using two sets of variables. The first set acts as a constant, which you use to measure the differences of the second set. Quantitative research methods, for example, are experimental.

j) **Correlational Research-** Correlational research is a type of non-experimental research method in which a researcher measures two variables and understands and assesses the statistical relationship between them with no influence from any extraneous variable

k) **Longitudinal Research-** In a longitudinal study, researchers repeatedly examine the same individuals to detect any changes that might occur over a period. Longitudinal studies are a type of correlational research in which researchers observe and collect data on several variables without trying to influence those variables

l) **Cross-Sectional Research-** A cross-sectional study is a type of research design in which you collect data from many different individuals at a single point in time. In cross-sectional research, you observe variables without influencing them.

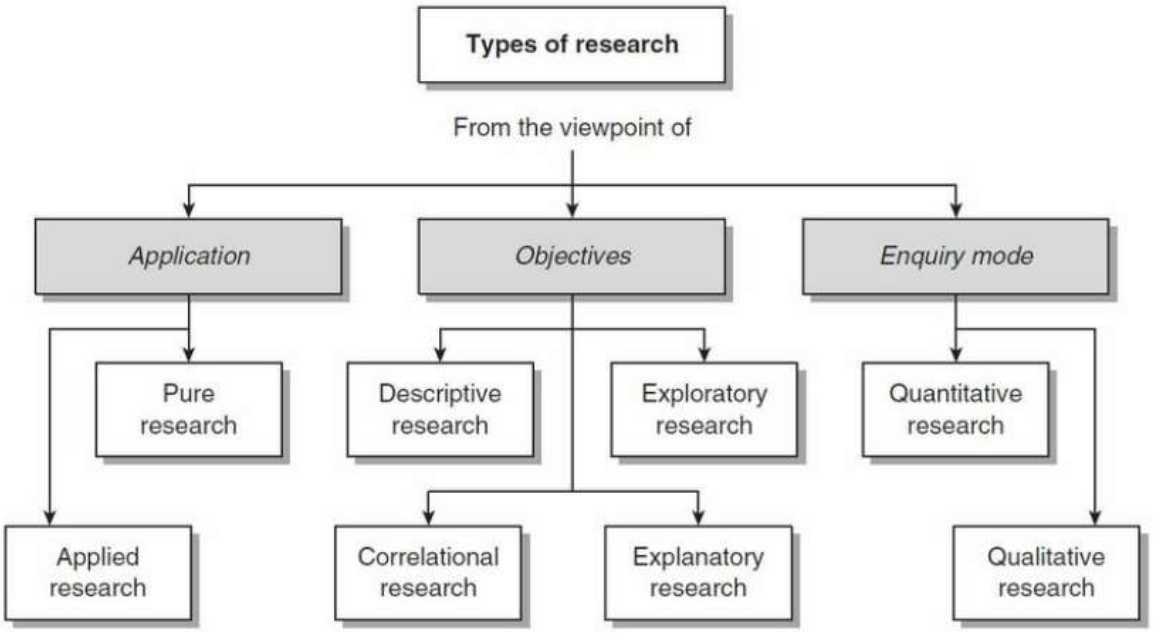
4. **By Disciplinary Focus**

m) **Scientific Research-** Scientific research is the systematic investigation of scientific theories and hypotheses. A hypothesis is a single assertion, a proposed explanation of something based on available knowledge, for something yet to be explained. One that is subject to further experimentation.

n) **Social Science Research-** Social research is research conducted by social scientists following a systematic plan. Social research methodologies can be classified as quantitative and qualitative.

o) **Humanities Research-** In the humanities, the products of research are predominantly intellectual and intangible, with the results contributing to an academic discipline and also informing other disciplines, a process which often effects individual or social change over time.

Figure 1: Types of research



Source:Kumar, 2011

RESEARCH TOPIC DEVELOPMENT

Developing a research topic is a critical first step in the research process. It involves identifying a specific area of interest, narrowing it down to a manageable scope, and framing it into a researchable question. Here are the steps and considerations for developing a strong research topic:

1. **Identify Your Area of Interest**

a) Passion and Curiosity**:** Choose a topic that you are passionate about and curious to explore. This will keep you motivated throughout the research process.
b) Relevance: Ensure the topic is relevant to your field of study or the current trends and issues in your discipline.

2. **Conduct Preliminary Research**

c) Literature Review: Conduct a brief literature review to understand the existing research on your topic. Identify gaps, controversies, and unanswered questions.
d) Sources: Use academic journals, books, reputable websites, and other scholarly sources to gather information.
e) Scope: Determine the breadth and depth of available information. A topic with too much or too little information might need to be adjusted.

3. **Narrow Down Your Topic**

f) Specificity: Narrow your broad area of interest to a specific aspect that is manageable within your resources and time constraints.
g) Focus: Choose a specific population, geographical area, time period, or theoretical framework to focus your research.
h) Feasibility: Consider the availability of data, resources, and time required to study the topic thoroughly.

4. **Formulate a Research Question**

i) Clarity: Ensure your research question is clear and concise.
j) Complexity: It should be complex enough to require detailed investigation, not answerable with a simple yes or no.
k) Researchable: Ensure the question can be addressed through empirical methods or theoretical analysis.

5. **Evaluate Your Research Question**

l) Significance: Consider the importance and impact of your research question. How will it contribute to your field?
m) Originality: Ensure your question addresses a gap or offers a new perspective on existing research.
n) Practicality: Assess whether you have the means (time, resources, access to data) to research the question effectively.

6. **Refine and Finalize Your Topic**

o) Feedback: Seek feedback from peers, mentors, or experts in your field. They can provide valuable insights and help you refine your question.
p) Revision: Be prepared to revise your research question based on feedback and further consideration.
q) Confirmation: Ensure that your final topic aligns with your research goals and the requirements of your academic or professional context.

Example Process of Developing a Research Topic

a) Identify Your Area of Interest: Broad Interest: Climate change.
b) Conduct Preliminary Research: Review current studies on climate change impacts, mitigation strategies, and policy responses. Identify gaps such as the impact of climate change on specific industries or regions.
c) Narrow Down Your Topic**:**

- Focus: Impact of climate change on agriculture.
- Specific Aspect: Adaptation strategies for small-scale farmers in a particular region (e.g., Sub-Saharan Africa).

d) Formulate a Research Question**:**

- Initial Question: How does climate change affect agriculture?
- Refined Question: What adaptation strategies can small-scale farmers in Sub-Saharan Africa employ to mitigate the impacts of climate change on crop yields?

e) Evaluate Your Research Question**:**

- Significance: Addresses a critical issue affecting food security.
- Originality: Limited studies on specific adaptation strategies for small-scale farmers in this region.
- Practicality: Consider if you have access to necessary data and resources.

f) Refine and Finalize Your Topic**:**

- Seek feedback from experts in climate science and agriculture.
- Finalize Topic: "Adaptation Strategies for Small-Scale Farmers in Sub-Saharan Africa to Mitigate Climate Change Impact on Crop Yields."

QUALITIES OF A GOOD RESEARCH TOPIC

To make sure your research topic is researchable, you will have to consider the following:

1. Length of your research topic. It should neither be too short nor too long. Schools, for example, usually have thesis writing regulations and may define the number of words to use but I would recommend a research topic of 7 to 15 words.
2. A general rule is that your research topic should be precise, meaningful and unambiguous. In other words, it should be attractive, expressive and parsimonious.
3. A research topic should also be simple enough for your readers to understand. Keep in mind that you are writing to an audience that goes beyond your field of study.

4. Avoid abbreviation(s) in a research topic. A reader may find it difficult to know the full meaning of the abbreviation(s) . For example, CC in a topic such as "Using CC to promote social cohesion" could mean Creative Commons or Cameroon Cup etc.
5. I would also recommend you always write your research topic in SENTENCE CASE. Avoid writing in all capital letters or capitalizing each word except otherwise stated.
6. A research topic should be well-defined. If a research topic is not well-defined, it will make it difficult for you to frame your research questions, objectives and hypotheses.
7. A 'good' research topic should address a problem in the society and in most cases, it should be a contemporary issue that is well-founded.

SOURCES OF RESEARCH TOPIC

When researching a topic, it's crucial to use a variety of sources to ensure a comprehensive understanding and to add credibility to your work. Here are several types of sources you can use for a research topic:

1. Academic Journals: Academic journals are a valuable source of research topics. They publish articles on various subjects, providing insights into current research trends and gaps in knowledge. Reading articles in your field of interest can help you identify potential research topics.
2. Conference and symposium: Attending conferences and symposia related to your field can expose you to cutting-edge research and emerging topics. Networking with experts and discussing their work can inspire new research ideas.
3. Government and Organization Reports: Official documents and research reports from governmental or non-governmental organizations.
4. Websites and Online Resources: Information from reputable websites, often more current but must be critically evaluated for credibility.
5. Data and Statistics: Raw data and statistical analysis useful for empirical research.
6. Interviews and Personal Communications: First-hand accounts and insights from experts or participants.

7. Professional Associations: Professional associations often publish newsletters, journals, and reports that highlight current issues and research needs in a specific field. These publications can provide valuable insights into potential research topics.
8. Social Media and Online Communities: Engaging with social media platforms and online communities related to your field can expose you to discussions, debates, and emerging trends. Participating in these platforms can help you identify research topics that are relevant and of interest to the community.
9. Literature Reviews: Conducting a literature review is an effective way to identify research gaps and potential topics. By reviewing existing studies, you can identify areas that have not been extensively explored or areas where conflicting findings exist.

SOURCES OF A RESEARCH IDEA

The sources of research ideas are virtually endless. They range from casual observation to systematic research. However, they can be seen as falling into three broad categories: experience, theory, and applied issues. The sources of research ideas are virtually endless. They range from casual observation to systematic research. However, they can be seen as falling into three broad categories: experience, theory, and applied issues.

Experience

Your everyday experience and observations of what goes on around you are a rich source of research ideas. Some of these observations may be unsystematic and informal. For example, after reading a newspaper article about a terrorist attack, you may begin to wonder how people who have to live with terrorism every day cope. Subsidiary questions might also come to your mind, such as: Do men and women cope differently with terrorism? Do adults adjust better than children? General questions like these can be translated into viable research questions. Other observations may be more systematic and formal. For example, after reading a journal article for a class, you may begin to formulate a set of questions raised by the article. These too could serve as the foundation of a viable research study.

Unsystematic Observation

One of the most potent sources of research ideas is curiosity about the causes or determinants of commonplace, everyday behavior. You make a helpful suggestion to a friend, and she angrily rebukes you. Why? Perhaps she just found out she did not get the job that she wanted badly. Is this the cause, or is it something else? Or you study all week for an important exam, and the test results show you did very well. Although initially you feel good, the emotion soon passes, and you find yourself falling into a deep depression. What caused this seemingly strange shift in your emotions? Such observations can provide the basis for a research project. Casual observation of animal behavior also can lead to research ideas.

Systematic Observation

Systematic observation of behavior is another powerful source of research ideas. In contrast to casual observation, systematic observation is planned. You decide what you are going to observe, how you are going to observe it, and how you will record your observations. Your own systematic observations of real world behavior can provide the basis for a research idea. Consider the work of JeanPiaget (1952). Piaget spent many an hour systematically observing the behavior of his own children at home and other children on playgrounds. These observations helped lay the foundation for his comprehensive theory of cognitive development.

Theory

A theory is a set of assumptions about the causes of behavior and rules that specify how those causes act. Designed to account for known relationships among given variables and behavior, theories can also be a rich source of research ideas. Theories can lead to the development of research questions in two ways. First, a theory allows you to predict the behavior expected under new combinations of variables. For example, terror management theory (Solomon, Greenberg, & Pyszczynski, 1991) suggests that when you become aware that you live in an unpredictable world in which your existence could end at any moment, you get scared and experience “terror.” The theory also predicts that you develop a variety of strategies to cope with your mortality as a way of managing the terror.

Applied Issue

Often research ideas arise from the need to solve practical problems. Applied research is problem oriented whereas basic research is aimed toward building basic knowledge about phenomena. You might design an applied research study to develop interventions to help people cope with terrorism.

PROBLEM STATEMENT

A well-defined problem statement is crucial as it guides the research by focusing on the issue to be addressed. It should be clear, concise, and specific, providing a context for why the research is important. Here's a structured approach to developing a strong problem statement:

To write a research problem statement, you should:

a) Identify the general area of interest: Start by identifying the general area of research that interests you.
b) Define the specific problem: Narrow down the general area of interest to a specific problem or issue.
c) Explain the significance of the problem: Provide context for the problem by explaining why it is important to study and what gap in current knowledge or understanding it fills.
d) Provide a clear and concise statement: State the problem in a clear and concise manner, making sure to use language that is easily understood by your intended audience.
e) Use a scientific and objective tone: The problem statement should be written in a neutral and objective tone, avoiding any subjective language and personal bias.

QUALITIES OF A GOOD RESEARCH PROBLEM

a) Clarity-The problem statement should be clear and easy to understand. Write it in a way that is accessible to both experts and non-experts in the field.
b) Specificity-The statement should be specific and clearly define the problem or issue that the research project aims to address. It should be narrow enough to be manageable, but broad enough to be of interest to others in the field.

c) Significance-The statement should explain why the problem is important and what gap in current knowledge or understanding it fills. It should provide context for the research project and help to justify its importance.
d) Relevance-The statement should be relevant to the field of study and address an issue that is currently of concern to researchers.
e) Research questions-The statement should include a set of research questions that the research project aims to answer in order to address the problem or issue.
f) Research objectives-The statement should include a set of specific and measurable objectives that the research project aims to achieve.
g) Scope-The statement should define the specific population, setting, or context that the research project will focus on.
h) Theoretical framework-The statement should provide an overview of the theoretical concepts and principles that inform the research project.
i) Research design-The statement should provide an overview of the research methodologies. This will be useful collect and analyze data in order to address the research questions and objectives.

RESEARCH OBJECTIVES

Research objectives are specific, clear, and concise statements that outline what the research intends to achieve. They guide the direction of the study and help in measuring its success. Here's a structured approach to developing strong research objectives:

Characteristics of Good Research Objectives

a) Specific**:** Clearly define what you aim to accomplish.
b) Measurable: Ensure that the outcomes can be measured or assessed.
c) Achievable: Set realistic goals that can be accomplished within the scope of the study.
d) Relevant: Align the objectives with the research problem and its significance.
e) Time-bound: Specify the timeframe within which the objectives should be achieved.

Types of Research Objectives

a) General Objectives: Broad statements that define the overall goal of the research.
b) Specific Objectives: Detailed, focused statements that break down the general objective into manageable parts.

Formulating Research Objectives

a) Start with the General Objective: This should encapsulate the main aim of your research in a broad sense.
b) Break Down into Specific Objectives-Divide the general objective into smaller, specific tasks or goals.
c) Ensure each specific objective is aligned with the overall aim and contributes to achieving it.

CHAPTER TWO: LITERATURE REVEIW

Empirical Literature Review

An empirical literature review, also known as a systematic literature review is a critical component of research that focuses on gathering, evaluating, and synthesizing existing research studies and empirical evidence relevant to a particular topic or research question. Rather than drawing information from theories or beliefs, empirical research relies on observations and measurements to arrive at conclusions (Eke, C, 2022). Below is a sample of a summary of literature review;

Figure 2: Summary of literature review

Author(s)	Country	Focus of the Study	Main Findings	Limitations (Research Gaps)	How Gaps were Addressed in the Current Study
Suehiro (2002)	Thailand	Bank's restructuring and risk management.	There was improvement in NPL after the bank's restructuring.	-Only one aspect of risk management was analyzed. -The moderating role of institutional characteristics was not considered.	-Three aspects of risk management were analyzed. -The moderating effect of institutional characteristics was being considered.
Worldbank (2003)	U.S.A	Bank Concentration and Financial performance	Acquisitions and mergers have a favorable impact on financial success.	-The study was conducted in a developed context. -Moderating and intervening variables were not tested.	-This study was done in a local developing context. -Moderating and intervening effect of institutional characteristics and risk management was being considered.
Umoren and Olokoyo, 2007	Nigeria	Mergers and acquisitions and their effects on financial performance	Mergers and acquisitions lead to improvement in commercial bank financial performance.	-Moderating and intervening variables were not tested. -Financial performance was measured based on Earnings.	-Moderating and intervening effect of regulatory policies and institutional characteristics considered. -The study used ROE to measure financial performance while this study used ROA with a larger sample size.
Kioko (2010)	Kenya	Firm size and financial performance	-Firm size do not affect financial performance	-Inconsistent results	-Empirical testing of firm effect on financial performance
Fatima and Shehzad (2014)	Pakistani	Mergers and financial performance of banks in Pakistani	Mergers and acquisition do not lead to improvement in commercial bank financial performance	-The study was conducted in a developed context. - Moderating and intervening variables were not tested	This study was done in a local developing context. -Moderating and intervening effect of institutional characteristics and risk management was being considered.
Sulub (2014)	Sudan	Firm charectersitics and operanization	Firm charectersitics and operanization	-Intervention effect was not investigated	-The intervention effect of risk management will be considered.

STEPS IN CONDUCTING LITERATURE REVIEW

A literature review is a systematic process of identifying, analyzing, and synthesizing existing research to provide a comprehensive understanding of a specific topic. It is an essential part of academic research, offering insights into existing knowledge, identifying gaps, and providing a foundation for future inquiries. This essay outlines the detailed steps involved in conducting an effective literature review, ensuring rigor and depth in the analysis.

The first step in conducting a literature review is defining its purpose and scope. A clear understanding of why the review is being conducted is crucial, as it guides the entire process. For instance, a literature review might aim to explore trends, justify a research question, or identify gaps in a field. Once the purpose is established, the scope must be defined by setting boundaries around the timeframe, geographical focus, or specific themes to be covered. This step also involves formulating research questions that will guide the review. For example, a research question might be, “What is the current state of artificial intelligence adoption in healthcare?” These questions determine the direction and focus of the literature search.

The second step is searching for relevant literature. This involves identifying keywords and phrases derived from the research question. For instance, a review on artificial intelligence in healthcare might use keywords like "artificial intelligence," "machine learning," "healthcare technology," and "clinical decision support." Boolean operators such as AND, OR, and NOT can refine search results, ensuring relevance. Reliable academic databases, including Scopus, PubMed, and IEEE Xplore, provide access to peer-reviewed articles, while grey literature sources like government reports and conference proceedings add depth. Advanced search techniques, including filters for publication date, language, and document type, help narrow down results. Throughout this process, maintaining a log of keywords and databases ensures the search is systematic and reproducible.

Screening and selecting studies is the next step. This involves setting clear inclusion and exclusion criteria. For example, a review might include studies published after 2015 and exclude non-academic sources or articles with poor methodologies. Titles and abstracts are initially screened to assess relevance, followed by a full-text review of shortlisted articles. Quality assessment is critical

at this stage to ensure the inclusion of robust studies. Factors like methodological rigor, sample size, and clarity of findings help determine the reliability of a study.

Once relevant studies are selected, organizing the literature becomes crucial. Articles can be grouped by themes, methodologies, or outcomes to identify patterns and relationships. A literature matrix is a helpful tool for summarizing key aspects of each study, including the author(s), year, title, methodology, key findings, and relevance. For instance, a matrix might reveal common themes in the application of AI for disease diagnosis and treatment. Reference management tools such as Mendeley, Zotero, and EndNote streamline the organization of sources, ensuring that citations are accurate and easily retrievable.

The next step involves analyzing and synthesizing the literature. This requires identifying recurring themes, trends, and gaps in the research. For example, a review might reveal a consensus on the benefits of AI in diagnostic accuracy but highlight a lack of studies on its ethical implications. Contradictions in findings should also be addressed, with possible explanations such as differences in methodologies or study contexts. By comparing and contrasting studies, researchers can provide a nuanced understanding of the topic, integrating insights to form a cohesive narrative.

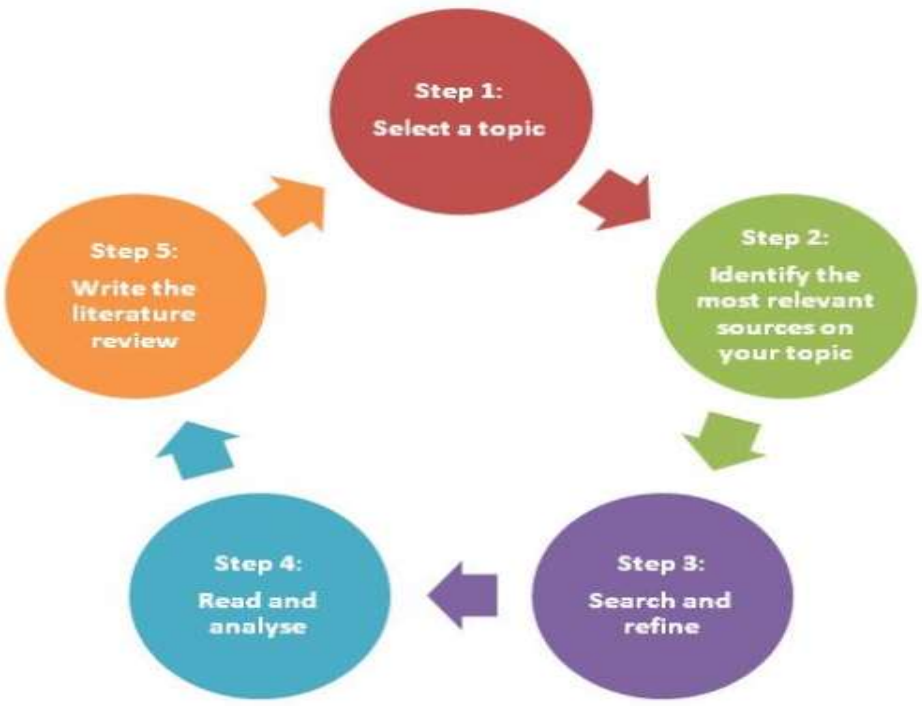
Writing the literature review is a critical step that requires clarity and logical structure. The introduction should outline the purpose, scope, and significance of the review, providing context for the reader. The body of the review can be organized thematically, chronologically, or methodologically, depending on the research question and findings. For instance, a thematic structure might divide sections into “AI in Diagnosis,” “AI in Treatment,” and “Challenges of AI in Healthcare.” Each section should discuss patterns, gaps, and significant findings, supported by evidence from the reviewed studies. The conclusion should summarize key insights, highlight research gaps, and suggest directions for future research.

The final step is revising and finalizing the review. Editing for clarity and coherence ensures that the arguments flow logically. Citations and references must adhere to a specific style guide, such as APA, MLA, or Chicago, to maintain academic integrity. Proofreading eliminates errors in grammar, spelling, and formatting. Seeking feedback from peers or mentors can provide additional perspectives, enhancing the quality of the review.

Various tools and techniques can aid in conducting an effective literature review. Search tools like Google Scholar Alerts and Semantic Scholar help researchers stay updated on new publications. Reference management software streamlines citation organization, while analysis tools like NVivo assist in qualitative synthesis. Visualization techniques, such as thematic maps and citation networks, can represent relationships between studies, making complex information more accessible.

In conclusion, conducting a literature review is a systematic and iterative process that requires careful planning and execution. By defining a clear purpose and scope, searching and selecting relevant literature, organizing and synthesizing findings, and writing a structured review, researchers can contribute valuable insights to their field. This process not only deepens understanding but also lays the groundwork for meaningful and impactful research (Open Al, 2024).

Figure 3: Literature Review Process Overview



Source: (UNISA, 2024)

PURPOSE OF LITERATURE REVIEW IN AN EMPHIRICAL STUDY

A literature review in empirical research studies provides a comprehensive and systematic overview of existing published research and scholarly works related to the topic under investigation. This serves several important purposes:

Contextualization: It helps researchers place their study within the context of existing knowledge and identify gaps or areas where further research is needed.

Identification of Theoretical Frameworks: A literature review aids in identifying relevant theories and concepts that can inform the research design and data analysis in empirical studies.

Methodological Guidance: It offers insights into prior studies' methodologies and research methods, helping researchers make informed decisions about their own data collection and analysis techniques.

Hypothesis Development: It can assist in formulating research hypotheses and research questions based on the existing literature.

Validation of Research Question: By reviewing the literature, researchers can ensure that their research questions or hypotheses have not been adequately addressed in prior studies.

Identification of Variables: It helps identify key variables and factors examined in previous research, which can guide the selection of variables in the new study.

THEORETICAL LITERATURE REVIEW

A theoretical literature review explores and evaluates existing theories, concepts, models, and frameworks relevant to a research topic or question. Unlike an empirical literature review that focuses on studies and data, a theoretical literature review examines theoretical contributions and debates within a field of study. The theoretical literature review helps to establish what theories already exist, the relationships between them, to what degree the existing theories have been investigated, and to develop new hypotheses to be tested.

CONCEPTUAL FRAMEWORK

A conceptual framework is a structure that outlines the key concepts, variables, relationships, and assumptions underlying a research study. It serves as a theoretical model that guides the research process by providing a framework for understanding and interpreting the data. Here's a detailed explanation of what a conceptual framework entails and how to develop one:

Components of a Conceptual Framework

Concepts: These are abstract ideas or mental representations of phenomena. Concepts are defined and operationalized (i.e., made measurable) within the framework.

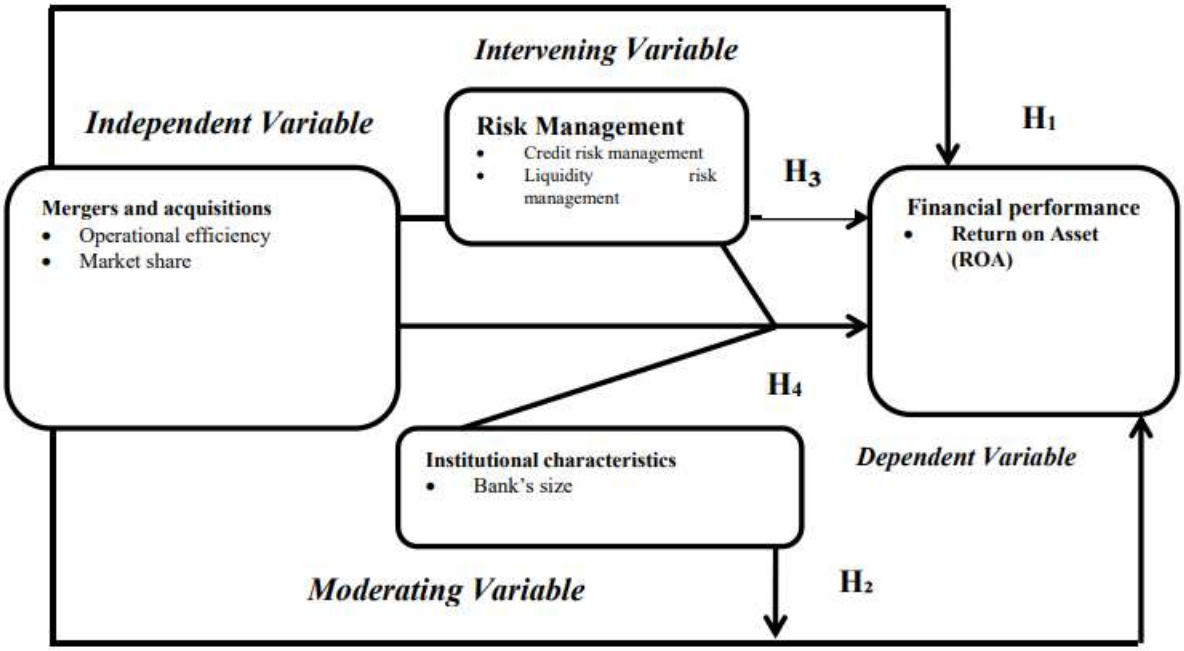
Variables: Variables are measurable attributes or properties that can vary and are studied in research. They can be independent variables (causes or predictors) and dependent variables (outcomes or effects).

Relationships: Relationships describe how variables are connected or related to each other. These relationships can be hypothesized based on theory or previous research.

Assumptions: Assumptions are underlying beliefs or propositions that guide the construction of the framework. They may be implicit or explicit and influence the interpretation of data and findings.

The following is an example of a conceptual framework;

Figure 4: Conceptual framework overview



Source: Author: 2024

STUDY VARIABLES

In the realm of scientific research, variables play an essential role in shaping the framework of a study. Variables are measurable elements that represent the characteristics, conditions, or phenomena researchers aim to examine. They form the foundation for exploring relationships, testing hypotheses, and drawing meaningful conclusions. To conduct effective research, it is crucial to understand the types of variables and their distinct roles in the investigative process.

The two primary types of variables in research are independent variables and dependent variables. The independent variable is the element that researchers manipulate or change to observe its impact on another variable. It serves as the presumed cause in a cause-and-effect relationship. For instance, in a study examining the effect of training programs on employee productivity, the training program would be the independent variable. On the other hand, the dependent variable represents the outcome or effect being measured in the study. It is influenced by the independent

variable and reflects the results of the manipulation. In the same study, the level of employee productivity would serve as the dependent variable.

In addition to independent and dependent variables, controlled variables, also known as constants, play a vital role in research. These are factors that researchers intentionally keep consistent throughout the study to ensure that the observed effects are attributable solely to the independent variable. For example, in a study on employee productivity, work hours and team size might be controlled to eliminate their influence on the results.

Extraneous and confounding variables introduce additional complexity to research. Extraneous variables are factors other than the independent variable that could influence the dependent variable if not carefully managed. For instance, in the employee productivity study, external economic conditions or individual motivation levels might act as extraneous variables. Confounding variables, a subset of extraneous variables, are particularly problematic because they are correlated with both the independent and dependent variables, potentially distorting the findings. For example, in the same study, age could act as a confounding variable if older employees inherently perform differently, thereby affecting the relationship between training and productivity.

Moderator and mediator variables further refine the understanding of relationships between variables. Moderator variables influence the strength or direction of the relationship between the independent and dependent variables. For example, in a study on the effectiveness of a training program, gender might moderate the impact, with varying effects on male and female employees. Mediator variables, on the other hand, explain the mechanism through which an independent variable affects a dependent variable. For instance, in a study exploring the relationship between job satisfaction and productivity, employee engagement could act as a mediator, providing insight into how job satisfaction translates into improved performance.

Measurement variables can also be categorized based on the nature of the data they represent. Categorical variables include nominal and ordinal variables. Nominal variables, such as gender or type of business, categorize data without implying order, while ordinal variables, like customer satisfaction ratings, have a meaningful order but lack consistent intervals. Continuous variables,

which encompass interval and ratio variables, can take any value within a range. Interval variables, such as temperature measured in Celsius, have ordered values with consistent intervals but no true zero point. Ratio variables, such as income or weight, possess consistent intervals and a true zero point, making them highly versatile for analysis.

To illustrate these concepts, consider a study investigating the impact of tax incentives on small business growth. In this context, the independent variable would be the tax incentives provided, while the dependent variable could be the business growth measured by revenue or market share. Controlled variables might include industry type and geographic location, ensuring that variations in these factors do not confound the results. Extraneous variables, such as economic conditions or competitor actions, would need to be managed to preserve the integrity of the study.

In conclusion, research variables are the backbone of any scientific inquiry, enabling researchers to structure their studies and analyze relationships effectively. By understanding the types and roles of variables, researchers can design studies that minimize bias, control for extraneous factors, and provide reliable insights. Whether exploring the effects of policy changes, behavioral interventions, or technological advancements, the thoughtful identification and management of variables remain central to advancing knowledge in any field (Open AI. (2024).

RESEARCH HYPOTHESIS

A research hypothesis is a fundamental element of scientific inquiry, forming the basis upon which studies are designed and conducted. It is a specific, testable prediction about the relationship between two or more variables, serving as a guiding statement for researchers. The hypothesis bridges the gap between theory and empirical evidence, allowing researchers to explore whether their predictions hold true in the real world. Its formulation follows a logical progression from identifying a research problem to conducting a thorough review of relevant literature and defining the variables to be studied.

There are two main types of hypotheses: the null hypothesis and the alternative hypothesis. The null hypothesis (denoted as H_0) posits that there is no relationship or effect between the variables being investigated. It serves as the default assumption that researchers seek to challenge or

disprove. For example, in a study examining tax compliance rates among businesses in urban and rural areas, the null hypothesis might state, "There is no significant difference in tax compliance rates between businesses in urban and rural areas."

In contrast, the alternative hypothesis (denoted as H_1 or H_a) suggests that there is a relationship or effect between the variables. This hypothesis represents the prediction the researcher aims to support through evidence. In the same study on tax compliance, the alternative hypothesis could state, "Businesses in urban areas have higher tax compliance rates than those in rural areas." Together, these hypotheses create a framework for testing and analyzing the research question.

Formulating a research hypothesis involves several critical steps. The process begins with identifying a research question, which often arises from an observed phenomenon, a gap in existing literature, or a practical problem that needs resolution. A comprehensive review of prior studies is essential to understand what has been established and to identify areas that warrant further investigation. Researchers then define their variables, ensuring clarity about which factors will be manipulated (independent variables) and which will be measured (dependent variables). Finally, the hypothesis is written as a clear and concise statement that articulates the predicted relationship between the variables, ensuring that it is testable using empirical methods.

The strength of a research hypothesis lies in its ability to be tested and either supported or refuted through data. For example, consider a study on the impact of tax incentives on small business growth. A researcher might formulate the null hypothesis as "Tax incentives have no impact on the growth of small businesses," while the alternative hypothesis would be "Tax incentives significantly enhance the growth of small businesses." Such hypotheses not only provide direction for the research but also set the stage for data collection and analysis, allowing researchers to draw meaningful conclusions based on their findings.

In conclusion, a research hypothesis is an indispensable tool in scientific research, guiding the investigative process and linking theoretical concepts with empirical evidence. By clearly defining the relationship between variables and ensuring testability, researchers can design robust studies that contribute to knowledge and understanding in their fields. Whether exploring the effects of

tax policies, environmental changes, or technological advancements, the hypothesis remains a cornerstone of rigorous and impactful research (Open AI. (2024).

CHAPTER THREE: RESEARCH METHODOLOGY

Introduction

Research methodology refers to the systematic process of planning, conducting, and evaluating research. It encompasses the techniques, procedures, and tools used to gather and analyze data to address research questions or objectives. Here's an overview of the key components and considerations in research methodology:

Research Philosophy

Research involves answering questions, and the approach utilized is based on paradigms, philosophical assumptions, and distinct methods or procedures. Researchers' approaches are influenced by their worldviews which comprise their beliefs and philosophical assumptions about the nature of the world and how it can be understood. These ways of thinking about the world are known as research paradigms, and they inform the design and conduct of research projects. A paradigm constitutes a set of theories, assumptions, and ideas that contribute to one's worldview and approach to engaging with other people or things. It is the lens through which a researcher views the world and examines the methodological components of their research to decide on the methods to use for data collection and analysis

Research philosophy refers to the set of beliefs, assumptions, and principles that guide the research process. It underpins the choices researchers make about their approach to conducting research, including the methodology they employ, how data is collected and analyzed, and the interpretation of findings (Carson et al., 2001).Perry et al. (1999) explains the relationship among the researcher, the techniques that he employs and the truth or reality that he seeks. That which the researcher seeks to discover is called ontology and is essentially the reality. Epistemology is the link between the reality and the research or a way of learning or knowing. Methodology is the technique employed by the researcher to find out the reality.

Key Elements of Research Philosophy

Research paradigms consist of four philosophical elements: axiology, ontology, epistemology, and methodology. These four elements inform the design and conduct of research projects and a

researcher would have to consider the paradigms within which they would situate their work before designing the research (JameCook University-Australia, 2024).

Ontology

Ontology is defined as how reality is viewed (nature of reality) – accurately captured as an entity or entities. It is the study of being and describes how the researcher perceives reality and the nature of human engagement in the world. It is focused on the assumptions researchers make to accept something as true. These assumptions aid in orientating a researcher's thinking about the research topic, its importance and the possible approach to answering the question. It makes the researcher ask questions such as:

- What is real in the natural or social world?
- How do I know what I know?
- How do I understand or conceptualize things?

Epistemology

Epistemology is the branch of philosophy that deals with the study of knowledge and belief. It describes the ways knowledge about reality is acquired, understood, and utilised. This paradigm highlights the relationship between the inquirer and the known –what is recognised as knowledge. Epistemology is important because it helps to increase the researcher's level of confidence in their data. It influences how researchers approach identifying and finding answers while conducting research. In considering the epistemology of research, the researcher may ask any of the following questions:

- What is Knowledge?
- How do we acquire knowledge and what are its limits?
- Is it trustworthy? Do we need to investigate it further?
- What is acceptable knowledge in our discipline?

Methodology

Methodology is the strategy or action plan that informs the choice and use of methods within the context of a particular research paradigm. The term methodology refers to the study design, methods, and procedures employed in a well-planned investigation to find answers. Examples include data collection, survey instruments, participants, and data analysis. In considering the methodology, researchers would ask the questions:

- How do I find out more about this reality?
- What approaches or methodology shall I use to obtain the data that will enable me to answer my research question?

Axiology

Axiology refers to the researcher's understanding of values and their role in research. It examines values, deals with issues of right and wrong and measures the level of development and types of perceptual biases. Axiology explains the role and importance of the research process, considers the values researchers assign to their research, and guides their pursuit of knowledge. It makes the researcher consider the following questions:

- What should be done to uphold and respect the rights of each participant?
- What ethical principles will you follow during your research?
- What are the cultural and intercultural issues to be considered in the research?
- How can I conduct the research ins a respectful manner?
- How can we minimised or reduce risk during the research?

Figure 5: The Research Paradigm by Bunmi Malau-Aduli and Faith Alele

Source: Business research methodology, 2024

Significance of Research Philosophy

a) Guides Research Design: Helps researchers make informed decisions about the design, methods, and procedures that align with their philosophical stance.
b) Ensures Consistency: Provides a coherent framework that ensures consistency throughout the research process, from formulation of research questions to interpretation of findings.
c) Addresses Research Bias: Encourages researchers to acknowledge and mitigate biases that may arise from their philosophical assumptions.
d) Enhances Rigor: By grounding research in a clear philosophical foundation, enhances the rigor, validity, and reliability of research findings.

The Choice of Research Philosophy

Choosing a research philosophy for a research project involves understanding the different philosophical perspectives and their implications on research. It is important to consider one's own perceptions and beliefs about knowledge and reality, as well as the research problem at hand. The choice of research philosophy should not be methodologically led, but rather consequential to the researcher's philosophical stance and the phenomenon being investigated. Different research paradigms and philosophies, such as positivism, interpretivism, pragmatism, and realism, offer distinct approaches to research.

The philosophical approach chosen should align with the research design and methodology, allowing the researcher to match philosophy, methodology, and the research problem. Factors such as personal background, cultural issues, and the nature of the research topic should also be taken into consideration. By understanding the distinctions and advantages of different philosophical approaches, researchers can make informed decisions about the most appropriate research philosophy for their project

The choice between positivist and interpretivist research philosophies or between quantitative and qualitative research methods has traditionally represented a major point of debate. However, the latest developments in the practice of conducting studies have increased the popularity of pragmatism and realism philosophies as well. Moreover, as it is illustrated in table below, there are popular data collection methods associated with each research philosophy (Business research methodology, 2024).

Table 1: Data collection Method associated with research philosophies

Pragmatism	Positivism	Realism	Interpretivism	
Popular data collection method	Mixed or multiple method designs, quantitative and qualitative	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative

Source: (Business Research Methodology, 2024).

MAIN RESEARCH PHILOSOPHIES

There are four main trends of research philosophy that are distinguished and discussed in the works by many authors: the positivist research philosophy, interpretivist research philosophy, pragmatist research philosophy, and realistic research philosophy.

Positivism research philosophy

As a philosophy, positivism adheres to the view that only "factual" knowledge gained through observation (the senses), including measurement, is trustworthy. In positivism studies the role of the researcher is limited to data collection and interpretation in an objective way. In other words, the researcher is an objective analyst, and she distances herself from personal values in conducting the study. In these types of studies research findings are usually observable and quantifiable.

Positivism depends on quantifiable observations that lead to statistical analyses. It has been a dominant form of research in business and management disciplines for decades. It has been noted that "as a philosophy, positivism is in accordance with the empiricist view that knowledge stems from human experience. It has an atomistic, ontological view of the world as comprising discrete, observable elements and events that interact in an observable, determined and regular manner".

Moreover, in positivism studies the researcher is independent form the study and there are no provisions for human interests within the study. Crowther and Lancaster (2008) argue that as a

general rule, positivist studies usually adopt deductive approach, whereas inductive research approach is usually associated with a phenomenology philosophy. Moreover, positivism relates to the viewpoint that researcher needs to concentrate on facts, whereas phenomenology concentrates on the meaning and has provision for human interest.

Researchers warn that "if you assume a positivist approach to your study, then it is your belief that you are independent of your research and your research can be purely objective. Independent means that you maintain minimal interaction with your research participants when carrying out your research." In other words, studies with positivist paradigm are based purely on facts and consider the world to be external and objective.

The five main principles of positivism research philosophy can be summarized as the following:

1. There are no differences in the logic of inquiry across sciences.
2. The research should aim to explain and predict.
3. Research should be empirically observable via human senses. Inductive reasoning should be used to develop statements (hypotheses) to be tested during the research process.
4. Science is not the same as the common sense. The common sense should not be allowed to bias the research findings.
5. Science must be value-free and it should be judged only by logic.

The following Table 1 illustrates ontology, epistemology, axiology and typical research methods associated with positivism research philosophy:

Table 2: Ontology, epistemology, axiology and typical research methods associated with positivism research philosophy

Ontology	Epistemology	Axiology	Typical methods
Real, external, independent	Scientific method Observable and measurable facts	Value-free research	Typically deductive, highly structured, large samples, measurement, typically quantitative method of analysis, but a range of data can be analysed
One true reality (universalism)	Law-like generalizations	Researcher is detached, neutral and independent of what is researched	
Granular (things)	Numbers		
Ordered	Causal explanation and prediction as contribution	Researcher maintains objective stance	

Source: (Business research methodology, 2024).

Science as an Underlying Ground for Positivism

Positivism often involves the use of existing theory to develop hypotheses to be tested during the research process. Positivist researchers tend to use highly structured research methodology in order to allow the replication of the same study in the future. Science can be specified as a cornerstone in positivism research philosophy. Specifically, positivism relies on the following aspects of science.

1. Science is deterministic. Scientific approach is based on the assumption that X causes Y under certain circumstances. The role of researcher when following the scientific approach is to discover specific nature of cause-and-effect relationships.

2. Science is mechanistic. Mechanical nature of scientific approach can be explained in a way that researchers develop hypotheses to be proved or disproved via application of specific research methods. This leads to the fact that

3. Science uses method. Chosen methods are applied mechanically to operationalize theory or hypothesis. Application of methodology involves selection of sample, measurements, analysis and reaching conclusions about hypotheses.

4. Science deals with empiricism. In other words, science only deals with what can be seen or measured. From this perspective, science can be assessed as objective.

Shortcomings of Positivism

Firstly, positivism relies on experience as a valid source of knowledge. However, a wide range of basic and important concepts such as cause, time and space are not based on experience. There might be many additional factors that have impacted research findings and positivism research philosophy fails to acknowledge the effect of these factors.

Secondly, positivism assumes that all types of processes can be perceived as a certain variation of actions of individuals or relationships between individuals.

Thirdly, adoption of positivism in business studies and other studies can be criticized for reliance on status quo. In other words, research findings in positivism studies are only descriptive, thus they lack insight into in-depth issues.

Interpretivism research philosophy

Interpretivism, also known as interpretivist, involves researchers to interpret elements of the study, thus interpretivism integrates human interest into a study. Accordingly, "interpretive researchers assume that access to reality (given or socially constructed) is only through social constructions such as language, consciousness, shared meanings, and instruments". Development of interpretivist philosophy is based on the critique of positivism in social sciences. Accordingly, this philosophy emphasizes qualitative analysis over quantitative analysis.

Interpretivism is "associated with the philosophical position of idealism, and is used to group together diverse approaches, including social constructivism, phenomenology and hermeneutics; approaches that reject the objectivist view that meaning resides within the world independently of consciousness". According to interpretivist approach, it is important for the researcher as a social

actor to appreciate differences between people. Moreover, interpretivism studies usually focus on meaning and may employ multiple methods in order to reflect different aspects of the issue.

In general, interpretivist approach is based on the following beliefs:

1. Relativist ontology. This approach perceives reality as intersubjectively that is based on meanings and understandings on social and experiential levels.

2. Transactional or subjectivist epistemology. According to this approach, people cannot be separated from their knowledge; therefore, there is a clear link between the researcher and research subject.

The use of interpretivism approach in business studies involves the following principles as suggested by Klein and Myers (1999)

1. The Fundamental Principle of the Hermeneutic Circle.
2. The Principle of Contextualization
3. The Principle of Interaction between the Researchers and the Subjects
4. The Principle of Abstraction and Generalization
5. The Principle of Dialogical Reasoning
6. The Principle of Multiple Interpretations
7. The Principle of Suspicion

Advantages and Disadvantages of Interpretivism

Main disadvantages associated with interpretivism relate to subjective nature of this approach and great room for bias on behalf of researcher. Primary data generated in interpretivist studies cannot be generalized since data is heavily impacted by personal viewpoint and values. Therefore, reliability and representativeness of data is undermined to a certain extent as well.

On the positive side, thanks to adoption of interpretivism, qualitative research areas such as cross-cultural differences in organizations, issues of ethics, leadership and analysis of factors impacting leadership etc. can be studied in a great level of depth. Primary data generated via Interpretivism

studies might be associated with a high level of validity because data in such studies tends to be trustworthy and honest.

Realism research philosophy

Realism research philosophy relies on the idea of independence of reality from the human mind. This philosophy assumes of a scientific approach to the development of knowledge. Realism can be divided into two groups: direct and critical.

Direct realism, also known as naive realism, can be described as "what you see is what you get". In other words, direct realism portrays the world through personal human senses.

Critical realism, on the other hand, argues that humans do experience the sensations and images of the real world. According to critical realism, sensations and images of the real world can be deceptive and they usually do not portray the real world.

Table below illustrates the ontology, epistemology, axiology and research methods associated with critical realism research philosophy.

Table 3: Ontology, epistemology, axiology and research methods associated with critical realism research philosophy

Ontology	Epistemology	Axiology	Typical methods
Stratified/layered (the empirical, the actual and the real) External, independent Intransient Objective structures Causal mechanisms	Epistemological Relativism Knowledge historically situated and transient Facts are social Constructions Historical causal explanation as contribution	Value-laden research Researcher acknowledges bias by world views, cultural experience and upbringing Researcher tries to minimise bias and errors Researcher is as objective as possible	Retroductive, in-depth historically situated analysis of pre-existing structures and emerging agency. Range of methods and data types to fit subject matter

Source: (Business research methodology, 2024).

Pragmatism research philosophy

Pragmatism research philosophy accepts concepts to be relevant only if they support action. Pragmatics "recognized that there are many different ways of interpreting the world and undertaking research, that no single point of view can ever give the entire picture and that there may be multiple realities".

Positivism and interpretivism are two extreme mutually exclusive paradigms about the nature and sources of knowledge. Many dissertation topics fall broadly within one of these two main paradigms. At the same time, there is an occasional need for seasoned researchers to "modify their philosophical assumptions over time and move to a new position on the continuum". The modified philosophical assumptions are adapted by pragmatic researchers, who usually happen to be experienced researchers(Saunders, Lewis, & Thornhill, 2009).

As a philosophical underpinning for mixed methods studies, the pragmatism focuses attention on the research problem in social science research and then uses pluralistic approaches to derive knowledge about the problem (Cherryholmes, 1992). Pragmatism is intuitively appealing, largely because it avoids the researcher engaging in what they see as rather pointless debates about such concepts as truth and reality. Under the paradigm, "you study what interests you and is of value to you, study in the different ways in which you deem appropriate and use the results in ways that can bring about positive consequences within your value system (Tashakkori & Teddlie, 1998).

Pragmatism's primary advantage lies in its emphasis on evaluating beliefs and ideas through their practical applications and tangible outcomes. This approach fosters a dynamic and results-oriented mindset that can be particularly beneficial in the domain of social justice.

A comparison of the four research philosophies based on Ontology, Epistemology, Axiology and Data collection techniques most often used is provided in Table 4 below:

Table 4: Comparison of Research Philosophies used in Management Research

	Positivism	**Realism**	**Interpretivism**	**Pragmatism**
Ontology: The researcher's view of the nature of reality or being	External, objective and independent of social actors	Is objective, Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: The researcher's view regarding what constitutes acceptable knowledge	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: The researcher's view of the role of values in research	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of vie
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

Source: Saunders et al. (2009)

Developing and Articulating Research Philosophy

1. Reflection**:** Reflect on your own beliefs and assumptions about the nature of reality and knowledge.
2. Alignment**:** Ensure alignment between your research philosophy, research questions, and chosen methodology.
3. Justification**:** Clearly justify your philosophical stance in your research proposal or thesis, explaining how it informs your approach to conducting research.

RESEARCH DESIGN

A research design is a blueprint for conducting the study with maximum control over factors that may interfere with the validity of the findings (Burns & Grove, 2010). According to Trochim (2005), research design "provides the glue that holds the research project together". A design is used to structure the research, to show how all the major parts of the research project work together to try to address the central research questions. Research designs can be grouped into three main types: exploratory, descriptive, and explanatory (Bhattacherjee, 2012). Research design is the framework that outlines the structure of a study, including the research questions, data collection methods, and analysis techniques. It provides a systematic approach to conducting research and ensures that all aspects of the study are carefully planned and executed. A well-planned research design helps ensure that your methods match your research aims, that you collect high-quality data, and that you use the right kind of analysis to answer your questions, utilizing credible sources. This allows you to draw valid, trustworthy conclusions.

When embarking on a research project, researchers must carefully consider the design they will employ. The design chosen will shape the entire study, from the data collection process to the analysis and interpretation of results. Let's explore some of the most common types of research design in more detail.

Exploratory Research Design

An exploratory research design is a valuable means of finding out „what is happening; to seek new insights; to ask questions and to assess phenomena in a new light" (Robson & McCartan, 2016). The design is useful to clarify the understanding of a problem, for example if the researcher is

unsure of the precise nature of the problem. The three principal ways of conducting exploratory research include a search of the literature: interviewing „experts“ in the subject and conducting focus group interview.

Bhattacherjee (2012) states that exploratory designs are often used in new areas of inquiry, where the goals of the research are to scope out the magnitude or extent of a particular phenomenon, problem, or behavior; to generate some initial ideas (or “hunches”) about that phenomenon, or to test the feasibility of undertaking a more extensive study regarding that phenomenon. Adams & Schvaneveldt, 1991 liken exploratory design to the activities of the traveler or explorer with the advantage flexibility and adaptability to change. They argue that in conducting exploratory research, the researcher must be willing to change direction because of new data that appear and new insights that occur. They argue that the flexibility inherent in exploratory research does not mean absence of direction to the enquiry, it simply means that the focus is initially broad and becomes progressively narrower as the research progresses.

Correlational research design

Correlational research design is a non-experimental study. The main purpose of correlational research design is to understand the relationship between two variables that are closely related to each other. Here, two groups of variables are involved, and no assumptions are made. Instead, statistical and analysis methods are used to understand the relationship between both variables.

The relationship between the variables can be either positive or negative and is ranged between negative 1 and positive 1 through correlation coefficient. If the values lean toward negative 1, the relationship is negative. If the values lean toward positive 1, the relationship is considered positive.

Descriptive Research Design

Burns and Grove (2003) define descriptive research as a design to provide a picture of a situation as it naturally happens. The design may be used to justify current practice and make judgment and also to develop theories. Robson and McCartan (2016) state that the objective of a descriptive research is to portray an accurate profile of persons, events or situations. A descriptive design can be an extension of, or a forerunner to, a piece of exploratory research or, more often, a piece of explanatory research. It is necessary to have a clear picture of the phenomena on which you wish

to collect data prior to the collection of the data. Descriptive designs in management and business research should be thought of as a means to an end rather than an end in itself. Descriptive design is likely to be a precursor to an explanatory study design, known as descriptor-explanatory studies (Saunders et al., 2009).

Diagnostic research design

In diagnostic design, the researcher is looking to evaluate the underlying cause of a specific topic or phenomenon. This method helps one learn more about the factors that create troublesome situations.

This design has three parts of the research:

1) Inception of the issue
2) Diagnosis of the issue
3) Solution for the issue

Explanatory Research Design

An explanatory design involves studies that establish causal relationships between variables (Saunders et al., 2009). The emphasis of an explanatory design is to study a situation or a problem to explain the relationships between variables. This design attempt to clarify how and why there is a relationship between two or more aspects of a situation or a phenomenon. Zikmund et al.,(2013) suggest that the degree of uncertainty about the research problem determines the research design. The table below provides a summary of degree of problem definition and possible situations that would be appropriate for each of the three research designs.

Table 5: Degree of Uncertainty and Research Design

	Exploratory Research	**Descriptive Research**	**Explanatory Research**
Degree of Problem Definition	Key variables not defined	Key variables are defined	Key variables and key relationships are defined
Possible Situations	"Quality of service is declining and we don't know why." "Would people be interested in our new product idea?" "How important is business process reengineering as a strategy?"	"What have been the trends in organisational downsizing over the past ten years?" "Did last year's product recall have an impact on our company's share price?" "Has the average merger rate for financial institutions increased in the past decade?"	"Which of two training programs is more effective for reducing labour turnover?" "Can I predict the value of energy stocks if I know the current dividends and growth rates of dividends?" "Do buyers prefer our product in a new package?"

Source: Zikmund etal.,(2013)

Characteristics of research design

A proper design sets your study up for success. Successful research studies provide insights that are accurate and unbiased. You'll need to create a survey that meets all of the main characteristics of a design. There are four key characteristics:

1. Neutrality: When you set up your study, you may have to make assumptions about the data you expect to collect. The results projected in the research should be free from research bias and neutral. Understand opinions about the final evaluated scores and conclusions from multiple individuals and consider those who agree with the results.

2. Reliability: With regularly conducted research, the researcher expects similar results every time. You'll only be able to reach the desired results if your design is reliable. Your plan should indicate how to form research questions to ensure the standard of results.
3. Validity: There are multiple measuring tools available. However, the only correct measuring tools are those which help a researcher in gauging results according to the objective of the research. The questionnaire developed from this design will then be valid.
4. Generalization: The outcome of your design should apply to a population and not just a restricted sample. A generalized method implies that your survey can be conducted on any part of a population with similar accuracy.

POPULATION

Cooper and Schindler (2003) define population as an entire group of individuals, events or objects having common characteristics that conform to a given specification. The study population is not limited to the human population only. It is a set of aspects that have something in common. They can be objects, animals, measurements, etc., with many characteristics within a group. For example, suppose you are interested in the average time a person between the ages of 30 and 35 takes to recover from a particular condition after consuming a specific type of medication. In that case, the study population will be all people between the ages of 30 and 35.

Types of Population

There are different types of population. They are:

Finite Population

The finite population is also known as a countable population in which the population can be counted. In other words, it is defined as the population of all the individuals or objects that are finite. For statistical analysis, the finite population is more advantageous than the infinite population. Examples of finite populations are employees of a company, potential consumer in a market.

Infinite Population

The infinite population is also known as an uncountable population in which the counting of units in the population is not possible. Example of an infinite population is the number of germs in the patient's body is uncountable.

Existent Population

The existing population is defined as the population of concrete individuals. In other words, the population whose unit is available in solid form is known as existent population. Examples are books, students etc.

Hypothetical Population

The population in which whose unit is not available in solid form is known as the hypothetical population. A population consists of sets of observations, objects etc that are all something in common. In some situations, the populations are only hypothetical. Examples are an outcome of rolling the dice, the outcome of tossing a coin.

SAMPLING

Sampling in research refers to the process of selecting a subset of individuals or cases from a larger population to represent it in a study. It is crucial for ensuring that research findings are valid, reliable, and generalizable. A sample is a subset of individuals from a larger population. Sampling means selecting the group that you will collect data from in your research (Creswell, 2006).

Importance of Sampling

1. Representativeness: Ensures that the selected sample accurately reflects the characteristics of the larger population from which it is drawn.
2. Generalizability: Allows researchers to generalize findings from the sample to the broader population, enhancing the external validity of the study
3. Efficiency: Maximizes the use of resources (time, money, effort) by focusing data collection efforts on a manageable subset of the population.
4. The time factor- a sample may provide needed information quickly.

5. Inaccessibility (associated with cost or time or just access) of some of the population e.g. prisoners, people with severe mental illness, disaster survivors etc.
6. Destructiveness of the observation e.g. to determine the quality of a fuse and whether it is defective, it must be destroyed. Therefore, if you tested all the fuses, all would be destroyed.
7. Accuracy and sampling i.e. a sample may be more accurate than a sloppily conducted census.

SAMPLING METHODS

There are two major types of sampling methods: probability and non-probability sampling.

1. Probability sampling, also known as random sampling, is a kind of sample selection where randomization is used instead of deliberate choice. Each member of the population has a known, non-zero chance of being selected.
2. Non-probability sampling techniques are where the researcher deliberately picks items or individuals for the sample based on non-random factors such as convenience, geographic availability, or costs.

Probability sampling methods

There's a wide range of probability sampling methods to explore and consider. Here are some of the best-known options.

1. Simple random sampling

With simple random sampling, every element in the population has an equal chance of being selected as part of the sample. It's something like picking a name out of a hat. Simple random sampling can be done by anonymizing the population – e.g. by assigning each item or person in the population a number and then picking numbers at random.

Pros: Simple random sampling is easy to do and cheap. Designed to ensure that every member of the population has an equal chance of being selected, it reduces the risk of bias compared to non-random sampling.

Cons: It offers no control for the researcher and may lead to unrepresentative groupings being picked by chance.

2. Systematic sampling

With systematic sampling the random selection only applies to the first item chosen. A rule then applies so that every nth item or person after that is picked.

Best practice is to sort your list in a random way to ensure that selections won't be accidentally clustered together. This is commonly achieved using a random number generator. If that's not available you might order your list alphabetically by first name and then pick every fifth name to eliminate bias, for example.

Next, you need to decide your sampling interval – for example, if your sample will be 10% of your full list, your sampling interval is one in 10 – and pick a random start between one and 10 – for example three. This means you would start with person number three on your list and pick every tenth person.

Pros: Systematic sampling is efficient and straightforward, especially when dealing with populations that have a clear order. It ensures a uniform selection across the population.

Cons: There's a potential risk of introducing bias if there's an unrecognized pattern in the population that aligns with the sampling interval.

3. **Stratified sampling**

Stratified sampling involves random selection within predefined groups. It's a useful method for researchers wanting to determine what aspects of a sample are highly correlated with what's being measured. They can then decide how to subdivide (stratify) it in a way that makes sense for the research.

For example, you want to measure the height of students at a college where 80% of students are female and 20% are male. We know that gender is highly correlated with height, and if we took a

simple random sample of 200 students (out of the 2,000 who attend the college), we could by chance get 200 females and not one male. This would bias our results and we would underestimate the height of students overall. Instead, we could stratify by gender and make sure that 20% of our sample (40 students) are male and 80% (160 students) are female.

Pros: Stratified sampling enhances the representation of all identified subgroups within a population, leading to more accurate results in heterogeneous populations.

Cons: This method requires accurate knowledge about the population's stratification, and its design and execution can be more intricate than other methods.

4. Cluster sampling

With cluster sampling, groups rather than individual units of the target population are selected at random for the sample. These might be pre-existing groups, such as people in certain zip codes or students belonging to an academic year.

Cluster sampling can be done by selecting the entire cluster, or in the case of two-stage cluster sampling, by randomly selecting the cluster itself, then selecting at random again within the cluster.

Pros: Cluster sampling is economically beneficial and logistically easier when dealing with vast and geographically dispersed populations.

Cons: Due to potential similarities within clusters, this method can introduce a greater sampling error compared to other methods.

Non-probability sampling methods

The non-probability sampling methodology doesn't offer the same bias-removal benefits as probability sampling, but there are times when these types of sampling are chosen for expediency or simplicity. Here are some forms of non-probability sampling and how they work.

1. Convenience sampling

People or elements in a sample are selected on the basis of their accessibility and availability. If you are doing a research survey and you work at a university, for example, a convenience sample might consist of students or co-workers who happen to be on campus with open schedules who are willing to take your questionnaire.

This kind of sample can have value, especially if it's done as an early or preliminary step, but significant bias will be introduced.

Pros: Convenience sampling is the most straightforward method, requiring minimal planning, making it quick to implement.

Cons: Due to its non-random nature, the method is highly susceptible to biases, and the results are often lacking in their application to the real world.

2. Quota sampling

Like the probability-based stratified sampling method, this approach aims to achieve a spread across the target population by specifying who should be recruited for a survey according to certain groups or criteria.

For example, your quota might include a certain number of males and a certain number of females. Alternatively, you might want your samples to be at a specific income level or in certain age brackets or ethnic groups.

Pros: Quota sampling ensures certain subgroups are adequately represented, making it great for when random sampling isn't feasible, but representation is necessary.

Cons: The selection within each quota is non-random and researchers' discretion can influence the representation, which both strongly increase the risk of bias.

3. Purposive sampling

Participants for the sample are chosen consciously by researchers based on their knowledge and understanding of the research question at hand or their goals.

Also known as judgment sampling, this technique is unlikely to result in a representative sample, but it is a quick and fairly easy way to get a range of results or responses.

Pros: Purposive sampling targets specific criteria or characteristics, making it ideal for studies that require specialized participants or specific conditions.

Cons: It's highly subjective and based on researchers' judgment, which can introduce biases and limit the study's real-world application.

4. Snowball or referral sampling

With this approach, people recruited to be part of a sample are asked to invite those they know to take part, who are then asked to invite their friends and family and so on. The participation radiates through a community of connected individuals like a snowball rolling downhill.

Pros: Especially useful for hard-to-reach or secretive populations, snowball sampling is effective for certain niche studies.

Cons: The method can introduce bias due to the reliance on participant referrals, and the choice of initial seeds can significantly influence the final sample.

Mixed-Methods Sampling

Combines both probability and non-probability sampling techniques to take advantage of their respective strengths in qualitative and quantitative research. Mixed-methods data are integrated and analyzed using both quantitative and qualitative methods to provide a comprehensive and complementary understanding of the research problem. Sampling techniques for mixed-methods data depend on the type, timing, and priority of the data collection and analysis. Concurrent sampling involves selecting quantitative and qualitative samples independently and

simultaneously, allowing for comparison and triangulation of the findings, but requiring more resources and coordination. Sequential sampling involves selecting quantitative and qualitative samples sequentially and dependently, allowing for exploration and explanation of the findings, but introducing delay and inconsistency. Multiphase sampling involves selecting quantitative and qualitative samples across multiple phases of a long-term or complex research project, allowing for adaptation and refinement of the research design, but requiring more planning and management.

Factors to consider during sampling

Choosing to undertake sample-based surveys is based primarily on the recognition that complete enumeration through census-based surveys imposes huge costs that are both unsustainable and unnecessary if the nature and methods of statistical sampling are properly considered. Such considerations include understanding of:

1. the reasons for and objectives of sampling.
2. the relationship between accuracy and precision.
3. the reliability of estimates with varying sample size.
4. the determination of safe sample sizes for surveys.
5. the variability of data.
6. the nature of stratification and its impact on survey cost.
7. the risks posed by biased estimates.

Sampling frame

A sampling frame is a list of every element in your population. It is a comprehensive list of everyone or anything you wish to learn. In a simple random sampling, every unit from the sampling frame has an equal probability of being drawn and appearing in the sample. This collection of units is called the sampling frame. The frame of the sample and the population of interest should, ideally, match.

Sample Size

In statistics, the sample size is the measure of the number of individual samples used in an experiment. For example, if we are testing 50 samples of people who watch TV in a city, then the sample size is 50. The sample size is defined as the number of observations used for determining the estimations of a given population. The size of the sample has been drawn from the population. Sampling is the process of selection of a subset of individuals from the population to estimate the characteristics of the whole population. The number of entities in a subset of a population is selected for analysis.

Small Sample Size

Sometimes the sample size can be very small. When the sample size is small (n < 30), we use the t distribution in place of the normal distribution. If the population variance is unknown and the sample size is small, then we use the t statistic to test the null hypothesis with both one-tailed and two-tailed, where;

$t=X^{-}-\mu sn$

Large Sample Size

Generate for more accurate estimates but large sample size might cause difficulties in interpreting the usual tests of significance, and the same problem may arise in case of very small sample size. Thus, neither too large nor too small sample sizes help research projects.

Formula

The sample size formula for the infinite population is given by:

$S=Z2P(1-P)C2$

Where,

S = Sample Size
Z = Z -Value
P = Percentage of Population
C = Confidence interval

When the sample input or data is obtained, and the sample mean $\bar{x}$ is calculated, the sample mean obtained is different from the population mean μ. This difference between the population mean and the sample mean can be considered as an error E, which is the maximum difference between the observed sample mean and the true value of the population mean.

$E=Z\alpha 2(\sigma n)$

The above-given formula can be solved for n, which can be used to determine the minimum sample size.

Therefore, the formula to find the minimum sample size is given by

$n=(Z\alpha 2\sigma E)2$

Solved Example

Question:

Assuming the heights of students in a college campus are normally distributed with a standard deviation = 5 in, find the minimum size required to construct a 95% confidence interval for mean with a maximum error = 0.5 in.

Solution:

Given: E = 0.5 in, σ = 5 and α = 1 – 0.95 = 0.05

Therefore, $Z_{\alpha/2} = Z_{0.025} = 1.96$

The formula to find the minimum sample size is

$n=(Z\alpha 2\sigma E)2$

Now, substitute the given values in the sample size formula, we get

$n=(1.96(5)0.5)2=384.16$

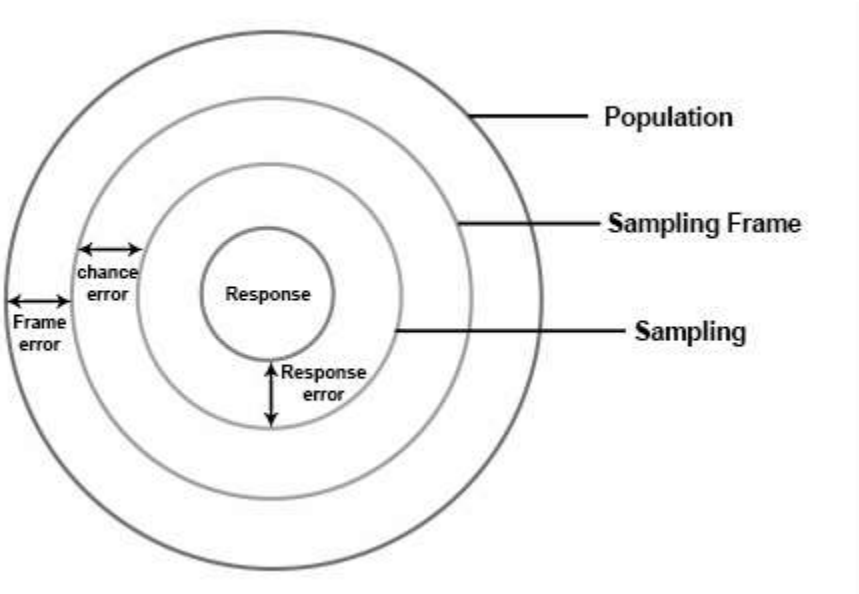
Therefore, rounding this value up to the next integer, the minimum sample space required is 385.

Sampling error

Sampling error is defined as the amount of inaccuracy in estimating some value, which occurs due to considering a small section of the population, called the sample, instead of the whole population. It is also called an error. Sample surveys consider the study of a tiny segment of a population, so, there is always a particular amount of inaccuracy in the information obtained. This inaccuracy can be defined as error variance or sampling error.

The concept of sampling error can be understood from the following diagram:

Figure 6: Sampling error flow pictorial



Source: Researcher

From the above diagram

Sampling Error = (Response Error) + (Frame Error) + (Chance Error)

Sampling Error Formula

The measure of the sampling error can be calculated for particular sample size and design. This measure is termed as the correctness of the sampling plan. Sampling error is also due to the concept called sampling bias. This error is considered a systematic error.

The formula to find the sampling error is given as follows:

If N is the sample size and SE is the sampling error, then

Sampling Error, S. E = (1/√ N) 100

Reduction of sampling error

There are two methods by which this sampling error can be reduced. The methods are

1. Increasing sample size
2. Stratification

Increasing Sample Size

From a population, we can select any sample of any size. The size depends on the experiment and the situation. If the size of the sample increases, the chance of occurrence of the sampling error will be less. There will be no error if the sample size and the population size coincide. Hence, sampling error is in inverse proportion to the sample size.

Stratification

If all the population units are homogeneous or the population has the same characteristic feature, it's very easy to get a sample. The sample can be taken as a representative of the entire population. But if the population is not homogeneous (i.e population with the different characteristic features); it is impossible to get a perfect sample. In such conditions, to get a better representative, the sample design is altered. The population is classified into different groups called strata, that contain similar units. From each of these strata, a sub-sample is selected in a random manner. Thus, all the groups are defined in the sample, the sampling error is reduced. Hence, the sub-sample size from each stratum is in proportion with the stratum size.

Let us see a sampling error example:

Assume that the size of the population is 1000, out of which 600 are men, and 400 are women, select 100 members.

Stratum	Size	Sample for each Stratum
1	$N_1 = 600$	$n_1 = (100 \times 600)/1000 = 60$
2	$N_2 = 400$	$n_2 = (100 \times 400)/1000 = 40$
	N = 600+400 = 1000	n = 60 +40 =100

Sample Size Formula for Infinite and Finite Population

We should know that the sample size that we are taking from the population, will not hold good for the whole sample. We have a level of confidence and margin of error to calculate that the sample size is accurate or not. Confidence level helps describe how sure you are that the results of the survey hold true or accurate.

The sample size for an infinite (unknown) population and for a finite (known) population is given as:

Formulas for Sample Size (SS)	
For Infinite Sample Size	$SS = [Z^2p\ (1 - p)]/\ C^2$
For Finite Sample Size	$SS/\ [1 + \{(SS - 1)/Pop\}]$

Where,

- *SS* = Sample size
- *Z* = Given *Z* value
- *p* = Percentage of population
- *C* = Confidence level
- *Pop* = Population
-

Sample Size Formula Example

Question: Find the sample size for a finite and infinite population when the percentage of 4300 population is 5, confidence level 99 and confidence interval is 0.01?

Solution:

Z = From the z-table, we have the value of confidence level, that is 2.58 by applying given data in the formula:

SS=(2.58)2×0.05×(1−0.05)0.012=316

Sample size for finite population

=3161+316−14300=294

New SS = 294

DATA COLLECTION

Data is a collection of facts, figures, objects, symbols, and events from different sources**.** Organizations collect data using various methods to make better decisions. Without data, it would be difficult for organizations to make appropriate decisions, so data is collected from different audiences at various times. For example, an organization must collect data on product demand, customer preferences, and competitors before launching a new product. If data is not collected beforehand, the organization's newly launched product may fail for many reasons, such as less demand and inability to meet customer needs.

Data Collection Techniques

Data collection techniques refer to the methods and procedures used to gather information or data for research purposes. The choice of data collection technique depends on the research questions, objectives, methodology, and the nature of the data being sought. Data collection methods encompass a variety of techniques and tools for gathering quantitative and qualitative data. These methods are integral to the data collection and ensure accurate and comprehensive data acquisition.

Quantitative data collection methods involve systematic approaches, such as

- Numerical data,
- Surveys, polls and
- Statistical analysis
- To quantify phenomena and trends.

Conversely, qualitative data collection methods focus on capturing non-numerical information, such as interviews, focus groups, and observations, to delve deeper into understanding attitudes, behaviors, and motivations. Combining quantitative and qualitative data collection techniques can enrich organizations' datasets and gain comprehensive insights into complex phenomena. Effective utilization of accurate data collection tools and techniques enhances the accuracy and reliability of collected data, facilitating informed decision-making and strategic planning.

Importance of Data Collection Methods

Data collection methods play a crucial role in the research process as they determine the quality and accuracy of the data collected. Here are some major importance of data collection methods.

1. Quality and Accuracy: The choice of data collection technique directly impacts the quality and accuracy of the data obtained. Properly designed methods help ensure that the data collected is error-free and relevant to the research questions.
2. Relevance, Validity, and Reliability: Effective data collection methods help ensure that the data collected is relevant to the research objectives, valid (measuring what it intends to measure), and reliable (consistent and reproducible).
3. Bias Reduction and Representativeness: Carefully chosen data collection methods can help minimize biases inherent in the research process, such as sampling or response bias. They also aid in achieving a representative sample, enhancing the findings' generalizability.
4. Informed Decision Making: Accurate and reliable data collected through appropriate methods provide a solid foundation for making informed decisions based on research findings. This is crucial for both academic research and practical applications in various fields.

5. Achievement of Research Objectives: Data collection methods should align with the research objectives to ensure that the collected data effectively addresses the research questions or hypotheses. Properly collected data facilitates the attainment of these objectives.
6. Support for Validity and Reliability: Validity and reliability are essential to research validity. The choice of data collection methods can either enhance or detract from the validity and reliability of research findings. Therefore, selecting appropriate methods is critical for ensuring the credibility of the research.

TYPES OF DATA COLLECTION METHODS

The choice of data collection method depends on the research question being addressed, the type of data needed, and the resources and time available. Data collection methods can be categorized into primary and secondary methods.

1. Primary Data Collection Methods

Primary data is collected from first-hand experience and is not used in the past. The data gathered by primary data collection methods are highly accurate and specific to the research's motive.

Primary data collection methods can be divided into two categories: quantitative and qualitative.

Quantitative Primary Data Collection Methods

Quantitative techniques for market research and demand forecasting usually use statistical tools. In these techniques, demand is forecasted based on historical data. These methods of primary data collection are generally used to make long-term forecasts. Statistical analysis methods are highly reliable as subjectivity is minimal.

1. Time Series Analysis: A time series refers to a sequential order of values of a variable, known as a trend, at equal time intervals. Using patterns, an organization can predict the demand for its products and services over a projected period.

2. Smoothing Techniques: Smoothing techniques can be used in cases where the time series lacks significant trends. They eliminate random variation from the historical demand, helping identify patterns and demand levels to estimate future demand.
The most common methods used in smoothing demand forecasting are the simple moving average and weighted moving average methods.

3. Barometric Method: Also known as the leading indicators approach, researchers use this method to speculate future trends based on current developments. When past events are considered to predict future events, they act as leading indicators.

Qualitative Primary Data Collection Methods

Qualitative data collection methods are especially useful when historical data is unavailable or when numbers or mathematical calculations are unnecessary. Qualitative research is closely associated with words, sounds, feelings, emotions, colors, and non-quantifiable elements. These techniques are based on experience, judgment, intuition, conjecture, emotion, etc.

Quantitative methods do not provide the motive behind participants' responses, often don't reach underrepresented populations, and require long periods of time to collect the data. Hence, it is best to combine quantitative methods with qualitative methods.

1. Surveys: Surveys collect data from the target audience and gather insights into their preferences, opinions, choices, and feedback related to their products and services. Most survey software offers a wide range of question types. You can also use a ready-made survey template to save time and effort. Online surveys can be customized to match the business's brand by changing the theme, logo, etc. They can be distributed through several channels, such as email, website, offline app, QR code, social media, etc.

You can select the channel based on your audience's type and source. Once the data is collected, survey software can generate various reports and run analytics algorithms to discover hidden insights. A survey dashboard can give you statistics related to response rate, completion rate, demographics-based filters, export and sharing options, etc. Integrating survey builders with

third-party apps can maximize the effort spent on online real-time data collection. Practical business intelligence relies on the synergy between analytics and reporting, where analytics uncovers valuable insights, and reporting communicates these findings to stakeholders.

2. Polls: Polls comprise one single or multiple-choice question. They are useful when you need to get a quick pulse of the audience's sentiments. Because they are short, it is easier to get responses from people. Like surveys, online polls can be embedded into various platforms. Once the respondents answer the question, they can also be shown how their responses compare to others'.

Interviews: In this method, the interviewer asks the respondents face-to-face or by telephone.

3. Interviews: In face-to-face interviews, the interviewer asks a series of questions to the interviewee in person and notes down responses. If it is not feasible to meet the person, the interviewer can go for a telephone interview.

4. Delphi Technique: In the Delphi method, market experts are provided with the estimates and assumptions of other industry experts' forecasts. Based on this information, experts may reconsider and revise their estimates and assumptions. The consensus of all experts on demand forecasts constitutes the final demand forecast.

5. Focus Groups: Focus groups are one example of qualitative data in education. In a focus group, a small group of people, around 8-10 members, discuss the common areas of the research problem. Each individual provides his or her insights on the issue concerned. A moderator regulates the discussion among the group members. At the end of the discussion, the group reaches a consensus.

6. Questionnaire: A questionnaire is a printed set of open-ended or closed-ended questions that respondents must answer based on their knowledge and experience with the issue. The questionnaire is part of the survey, whereas the questionnaire's end goal may or may not be a survey.

Merits of Primary Data Collection Methods

1. Its authenticity, specific existence, and up-to-date data are some common benefits of primary data, whereas secondary data is very cheap and not time-consuming.
2. Primary data is very accurate since it is essentially objective and explicitly obtained from the original source. Compared to secondary data, it also provides up-to-date data about just a research topic.
3. Whereas, secondary day is not costly, making it convenient for individuals to perform secondary study. It doesn't take too much time and it is easy to reach almost all of the secondary data sources for free.

Demerit of Primary Data Collection Methods

The limitation to primary data is the expense and time is spent on gathering data, whereas secondary information may be inaccurate or irrelevant. Due to the obvious procedures associated with carrying out primary research, primary data involve many costs and requires time.

2. Secondary Data Collection Methods

Secondary data is data that has been used in the past. The researcher can obtain data from the data sources, both internal and external, to the organizational data.

Internal sources of secondary data

- Organization's health and safety records
- Mission and vision statements
- Financial Statements
- Magazines
- Sales Report
- CRM Software
- Executive summaries

External sources of secondary data

- Government reports
- Press releases
- Business journals
- Libraries
- Internet

Merits of Secondary Data Collection Methods

Cost-effective: Secondary data is often readily available and can be accessed at a lower cost compared to collecting primary data through surveys or experiments.

Timesaving: Researchers can save time by using existing secondary data instead of spending time and resources on collecting new data.

Large sample size: Secondary data sources often provide access to large and diverse datasets, allowing for more comprehensive analyses and generalizable findings.

Longitudinal studies: Secondary data can enable researchers to conduct longitudinal studies by analyzing data collected over an extended period of time.

Multiple perspectives: Secondary data can offer multiple perspectives and insights from different sources, which can enrich the research process.

Demerits of Secondary Data Collection Methods

Lack of control: Researchers have limited control over the quality and scope of the secondary data, as it was collected for purposes other than the specific research at hand.

Data limitations: Secondary data may not include all the variables or measures needed for a particular research question, leading to potential gaps in the analysis.

Data quality issues: There may be concerns about the accuracy, reliability, and completeness of the secondary data, as it was collected by others for different purposes.

Outdated information: Secondary data may become outdated, especially in rapidly changing fields, which can impact the relevance of the research findings.

Bias and validity: The potential for bias in the original data collection process can affect the validity of using secondary data for research purposes.

Regardless of the data collection method of your choice, there must be direct communication with decision-makers so that they understand and commit to acting according to the results.

Steps in the Data Collection Process

The process of data collection is fundamental to any research initiative, serving as the backbone for accurate analysis and meaningful insights. A systematic and well-structured approach ensures that the data gathered is both reliable and relevant. This essay explores the sequential steps involved in the data collection process, highlighting their importance in achieving credible research outcomes.

The first step in the data collection process is to define the research objectives. This involves identifying the purpose of the study, the specific questions it aims to address, and any hypotheses that need testing. Clear objectives provide the foundation for the research, ensuring that the focus remains consistent throughout the study. Without a well-defined purpose, the data collection process risks becoming unfocused and inefficient (Creswell, 2014).

After defining the objectives, the next step is identifying the target population. This refers to the group or entities from which data will be gathered. Depending on the scope of the research, the population could include individuals, organizations, or phenomena. Researchers must also decide whether to collect data from the entire population (census) or a representative subset (sample). A carefully defined population ensures that the findings are relevant and applicable to the study's goals (Babbie, 2020).

The third step is selecting the most appropriate data collection method. This choice depends largely on the nature of the data required, which may be quantitative, qualitative, or a combination of both. Common methods include surveys, interviews, focus groups, experiments, and observations. Practical considerations such as time constraints, budget, and accessibility also influence this decision. For example, online surveys are well-suited for reaching large, dispersed populations, whereas interviews are ideal for gaining in-depth insights (Johnson & Christensen, 2017).

Once the method is chosen, researchers develop data collection tools tailored to their needs. These tools may include questionnaires, interview guides, observation checklists, or specialized equipment like sensors. The design of these tools must align with the research objectives and be easy for participants to understand and use. Piloting the tools on a small sample before full-scale deployment helps identify and address potential issues, ensuring the tools' reliability and validity (Fowler, 2013).

Ethical considerations are integral to the data collection process and must be addressed at every stage. Researchers are obligated to obtain informed consent from participants, explaining the purpose of the study and their rights. Participant privacy and data confidentiality must be safeguarded, and researchers should adhere to ethical guidelines established by institutions or professional organizations. Ethical practices foster trust and ensure compliance with legal and moral standards (Israel & Hay, 2006).

The next step involves the actual collection of data. This requires the implementation of the chosen methods and tools to gather the necessary information. During this phase, researchers must ensure consistency, minimize biases, and maintain thorough documentation. Proper planning and adherence to protocols are essential to avoid errors that could compromise the quality of the data (Patton, 2015).

After the data has been collected, it is crucial to review and validate it for accuracy and completeness. This step helps identify any gaps, inconsistencies, or errors in the data, allowing researchers to address these issues promptly. For example, researchers may follow up on missing survey responses or clarify ambiguous observations. Ensuring data quality at this stage is vital for reliable analysis and interpretation (Miles et al., 2014).

Organizing and securely storing the collected data is another critical step. Researchers must categorize and format the data systematically to facilitate analysis. Proper storage protects the data from loss, unauthorized access, or corruption. Digital data is typically stored in encrypted databases, while physical records should be kept in secure locations (Bryman, 2016).

Although data analysis is technically a separate phase, it is closely tied to the data collection process. The organized data is subjected to analysis to derive meaningful insights and answer the research questions. Quantitative data is often analyzed using statistical tools, while qualitative data is interpreted through thematic or content analysis. The insights gained from this analysis ultimately validate the efficacy of the data collection process (Creswell & Poth, 2018).

In conclusion, the data collection process is a structured and methodical series of steps that ensure the reliability and relevance of information gathered for research purposes. From defining objectives to organizing and storing data, each step contributes to the accuracy and credibility of the findings. By adhering to these steps and addressing potential challenges, researchers can achieve high-quality results that support informed decision-making and advance knowledge in their field.

DATA COLLECTION TOOLS

In the field of research and analysis, data collection is a fundamental process that serves as the foundation for deriving meaningful insights. Regardless of the domain—whether in academia, business, healthcare, or technology—the tools used to collect data significantly influence the quality, accuracy, and relevance of the outcomes. Data collection tools refer to the instruments or methods utilized to gather information from various sources, enabling researchers to analyze, interpret, and make well-informed conclusions (Smith, 2018).

Data collection tools are generally categorized based on the type of data they collect—quantitative or qualitative. Quantitative tools are primarily designed to capture numerical data, which is often used in statistical analysis. Common examples of such tools include surveys and questionnaires, which are highly efficient for collecting data from large populations. These tools typically consist of closed-ended questions, making them quick to administer and easy to analyze. Experiments, another quantitative method, are conducted in controlled environments, allowing researchers to manipulate variables and observe the effects. Observation checklists and sensor-based tools, which measure physical parameters like temperature or motion, also fall within this category, particularly in fields such as engineering and natural sciences (Brown etal., 2019).

In contrast, qualitative tools focus on collecting descriptive, non-numerical data that provide a deeper understanding of human behavior, opinions, and experiences. Interviews are one of the most effective qualitative tools, allowing researchers to explore participants' perspectives in depth. Focus groups, which involve moderated discussions among a small group of people, provide diverse insights and foster interactive dialogue. Similarly, unstructured or semi-structured observation allows researchers to record real-time behaviors and interactions in their natural settings. Document analysis is another valuable method, offering insights through the study of existing records, reports, or historical documents (Kumar,2020).

Technological advancements have significantly transformed the data collection landscape. Digital tools such as online survey platforms like Google Forms and Survey Monkey have streamlined the process, enabling researchers to collect data efficiently and at scale. Social media analytics and mobile applications further expand the scope of data gathering by tapping into real-time interactions and behaviors. Additionally, big data tools, cloud-based platforms, and artificial intelligence (AI) systems allow for the collection and analysis of vast and complex datasets, opening new frontiers for research and innovation (Bell & Bryman, 2015).

Choosing the right data collection tool is critical to the success of any research project. Several factors must be considered to ensure the tool's appropriateness and effectiveness. Research objectives should guide the selection process, ensuring that the chosen tool aligns with the study's goals. The target audience, including their demographics, technological literacy, and accessibility, also plays a pivotal role. Researchers must consider whether the study requires quantitative or qualitative data and evaluate the available resources, such as time, budget, and technical expertise. Moreover, ethical considerations, including participant privacy and informed consent, are paramount in the selection and use of data collection tools (Bell & Bryman, 2015).

Despite the availability of advanced tools, challenges in data collection persist. Biases in sampling or responses can distort results, while poorly designed tools may lead to incomplete or inaccurate data. Accessibility issues, particularly when working with remote or marginalized populations, can hinder data collection efforts. Furthermore, technological tools are not immune to limitations such as connectivity issues or user errors, which can compromise the quality of the data gathered.

In conclusion, data collection tools are indispensable for researchers seeking to address complex questions and generate actionable insights. The careful selection and application of these tools, coupled with an awareness of potential challenges, ensure that data is both reliable and meaningful. As technology continues to evolve, data collection methods will become more efficient and sophisticated, enabling researchers to uncover deeper truths and make more informed decisions.

PILOT STUDY

A pilot study is a research study conducted before the intended study. Pilot studies are usually executed as planned for the intended study, but on a smaller scale. Pilot testing is important for testing reliability, validity and viability of research instruments and the study. Data collection instruments as well as research design correctness and suitability are achieved through a pilot test (Saunders et al., 2019). Pilot testing is important because it help to detect weaknesses in research and instruments for data collection (Fraser ET AL.,2018). Mugenda and Mugenda (2012) pointed out that the sample size to be utilized for testing is governed by cost, time plus efficiency; however, 5-10% of the main sample is accepted.

VALIDITY TESTING

Validity is the extent where an instrument exactly measures its objective accurately as intended. Validity is the degree where methods of data collection precisely measure as planned as well as correctness of research findings (Gani ET AL., 2020). Trustworthiness, dependability and utility is a pointer to validity (Zohrabi, 2013). This means that the findings of the research can be replicated by usage of similar instruments and procedure. The researcher ensured that instrument validity was achieved through the research questions that were adapted to the study purposes. Construct validity was realized through making sure that the association concerning the operationalized variables agreed with the embodied theoretical concepts as picked up in the literature examination. The study also intended to depend on instruments advanced in similar studies and theories produced from suitable literature (Mohajan, 2017). The researcher sought the assistance of the experts in research to help improve content and construct validity of an instrument, their comments were assimilated in the study (Taherdoost, 2016).

RELIABILITY TESTING

Reliability is a measure in which a research instrument produces trustworthy and consistency results after repetitive trials. Reliability deals in a study precision, consistency, credibility and repeatability (Chakrabartty, 2013). Instruments error, observer mistake or respondent inaccuracy can be a problem to reliability. Reliability of instruments was guaranteed through undertaking a pilot study so that similar respondents' answer questions in consistent manner. Trained research assistants were utilized to reduce errors and condition for data collection was standardized. Coefficient of internal consistency Cronbach's alpha was used to measure reliability because it offers a unique quantitative estimation of internal consistency of the scale (Quinlan et al., 2019). Using the Cronbach alpha coefficient with a range of 1to 0, high values show better reliability. An alpha value of more than 0.70 designates robust internal consistency of the research instrument (Taber, 2017).

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

Introduction

Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. Zikmund et al. (2013) define data analysis as the application of reasoning to understand the data that has been gathered with the aim of determining consistent patterns and summarizing the relevant details revealed in the investigation. Sekaran (2006) suggests a four-step approach in data analysis namely, get the data ready for analysis (editing for accuracy, consistency and completeness); get a feel of the data (descriptive statistics); test the goodness of fit (diagnostic tests) and finally hypothesis testing.

Model Specification Test

Specification is the process of choosing an ideal form of analysis (Hausman, 1978).There are two common assumptions made concerning individual specific effects,namely random effect and fixed effects.

Random Effect Model

A random effects model is a way of analyzing data that considers the fact that some factors affecting the outcome may vary randomly across individuals or groups. For example, let's say we're interested in understanding how much a person's height affects their weight. We have data on 100 people, and we want to see how much their height affects their weight. If we use a random effects model, we will assume that there are some factors that affect weight that vary randomly across individuals. For example, some people may have a higher metabolism or be more active, which would affect their weight differently than someone with a lower metabolism or who is less active. We can account for these random factors by including a random effect in our model. This allows us to better estimate the effect of height on weight by taking into account the random variation across individuals. The word "random" refers to the fact that some of the factors that affect the outcome vary randomly across individuals or groups. By including a random effect in our model, we can better estimate the effect of the factor we're interested in by accounting for the random variation across individuals.

Fixed Effect Model

Fixed effect models assume that the explanatory variable has a fixed or constant relationship with the response variable across all observations. Let's understand it with a simple example. Let's say we want to study how exercise affects a person's weight. We have a group of 10 people, and we measure their weight before and after they start an exercise program. If we use a fixed effect model, we will assume that each person's weight is always affected the same way by exercise. So, if one person lost 5 pounds after the exercise program, we would assume that they would always lose 5 pounds if they did the program again in the future. This can be a helpful way to analyze data because it allows us to compare the effects of different factors on the outcome. For example, we could compare the weight loss of people who did the exercise program to people who didn't and see if there was a difference (Borenstein ET AL.,2010).

Mixed Effect Model

A mixed effects model is a type of regression model that combines both fixed and random effects. Mixed effects models are useful when there is variation in the effect of a factor across groups or individuals, but some of the variation is systematic (i.e., can be explained by specific variables) and some is random (i.e., cannot be explained by specific variables).

In a mixed effects model, the fixed effects are used to capture the systematic variation, while the random effects are used to capture the random variation. The fixed effects represent the effects of variables that are assumed to have a constant effect on the outcome variable, while the random effects represent the effects of variables that have a varying effect on the outcome variable across groups or individuals. For example, you could be studying the effect of taking an online course on academic performance in college students where there is a fixed difference between males and females but within each group (males or females) they share similar relationships with outcomes like grades.

Fixed Effect Model vs Random Effect Model

A fixed effects model is a type of statistical model that is used to estimate the effect of one or more categorical variables on a continuous outcome variable, while controlling for other variables. In a fixed effects model, the categorical variables are assumed to be fixed and not a random sample

from a larger population. Therefore, the model can estimate the effect of these variables on the outcome variable, while controlling for any other variables that may be influencing the outcome.
On the other hand, a random effects model is a type of statistical model that is used to estimate the effect of one or more categorical variables on a continuous outcome variable, while also accounting for the fact that the categorical variables are a random sample from a larger population. In a random effects model, the effect of the categorical variables is allowed to vary across the levels of the variable.
The main difference between a fixed effects and a random effects model is that a fixed effects model assumes that the categorical variables are fixed, while a random effects model allows for the effect of the categorical variables to vary across the levels of the variable. This means that a random effects model allows for the possibility that the effect of a variable may be different in different groups or levels of the variable.
In general, fixed effects models are appropriate when the goal is to estimate the average effect of a variable within a group, while random effects models are more appropriate when the goal is to estimate the overall effect of a variable across multiple groups.

Measure of Association

Association is a statistical relationship between two variables. This relationship tells you nothing but the value on one variable when you are known of the value of the other. These variables or measured quantities are dependent. Association is like correlation due to their intent of determining the patterns of variance in two or more terms. But correlation works ahead by using correlation coefficient which is used to measure the degree to which the association of the variables depends on some patterns. Correlation tends to define either linear or non-linear associations between the vehicles. The linear association is nothing but a simple linear relationship between the variables. There are various measures of association that infer the presence or absence of association in each dataset.

Causation is defined as the relationship between two variables where one variable affects another. Causation is detected when there is an increase or decrease in the value of one variable as a result of the value of another present variable.

Example: if you work for extra hours a day, your income is likely to increase. This means, one event (extra hours) is causing an effect on another event (income). This is a causal or cause-effect relationship.

A measure of association may be determined by any of several different analyses, including correlation analysis and regression analysis. (Although the terms correlation and association are often used interchangeably, correlation in a stricter sense refers to linear correlation, and association refers to any relationship between variables.) The method used to determine the strength of an association depends on the characteristics of the data for each variable. Data may be measured on an interval/ratio scale, an ordinal/rank scale, or a nominal/categorical scale.

Methods of analysis

There are three main methods of association analysis as discussed below

Pearson's correlation coefficient

A typical example for quantifying the association between two variables measured on an interval/ratio scale is the analysis of relationship between a person's height and weight. Each of these two characteristic variables is measured on a continuous scale. The appropriate measure of association for this situation is Pearson's correlation coefficient, *r* (rho), which measures the strength of the linear relationship between two variables on a continuous scale. The coefficient *r* takes on the values of −1 through +1. Values of −1 or +1 indicate a perfect linear relationship between the two variables, whereas a value of 0 indicates no linear relationship. (Negative values simply indicate the direction of the association, whereby as one variable increases, the other decreases.) Correlation coefficients that differ from 0 but are not −1 or +1 indicate a linear relationship, although not a perfect linear relationship. In practice, ρ (the population correlation coefficient) is estimated by *r*, which is the correlation coefficient derived from sample data.

Although Pearson's correlation coefficient is a measure of the strength of an association (specifically the linear relationship), it is not a measure of the significance of the association. The significance of an association is a separate analysis of the sample correlation coefficient, *r*, using

a *t*-test to measure the difference between the observed *r* and the expected *r* under the null hypothesis.

Spearman rank-order correlation coefficient

The Spearman rank-order correlation coefficient (Spearman rho) is designed to measure the strength of a monotonic (in a constant direction) association between two variables measured on an ordinal or ranked scale. Data that result from ranking and data collected on a scale that is not truly interval in nature (e.g., data obtained from Likert-scale administration) are subject to Spearman correlation analysis. In addition, any interval data may be transformed to ranks and analyzed with the Spearman rho, although this results in a loss of information. Nonetheless, this approach may be used, for example, if one variable of interest is measured on an interval scale and the other is measured on an ordinal scale. Similar to Pearson's correlation coefficient, Spearman rho may be tested for its significance. A similar measure of strength of association is the Kendall tau, which also may be applied to measure the strength of a monotonic association between two variables measured on an ordinal or rank scale.

As an example of when Spearman rho would be appropriate, consider the case where there are seven substantial health threats to a community. Health officials wish to determine a hierarchy of threats in order to most efficiently deploy their resources. They ask two credible epidemiologists to rank the seven threats from 1 to 7, where 1 is the most significant threat. The Spearman rho or Kendall tau may be calculated to measure the degree of association between the epidemiologists' rankings, thereby indicating the collective strength of a potential action plan. If there is a significant association between the two sets of ranks, health officials may feel more confident in their strategy than if a significant association is not evident.

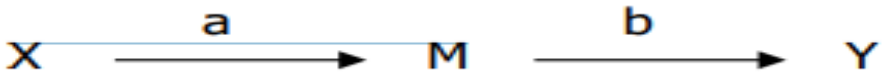
Chi-square test

The chi-square test for association (contingency) is a standard measure for association between two categorical variables. The chi-square test, unlike Pearson's correlation coefficient or Spearman rho, is a measure of the significance of the association rather than a measure of the strength of the association.

A simple and generic example follows. If scientists were studying the relationship between gender and political party, then they could count people from a random sample belonging to the various combinations: female-Democrat, female-Republican, male-Democrat, and male-Republican. The scientists could then perform a chi-square test to determine whether there was a significant disproportionate membership among those groups, indicating an association between gender and political party.

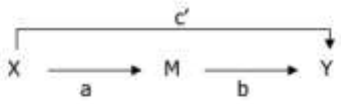
Test for Mediation/Intervening Effect

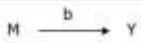
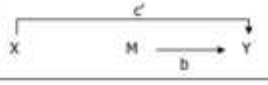
Mediation is a hypothesized causal chain in which one variable affects a second variable that, in turn, affects a third variable. The intervening variable, M, is the mediator. It "mediates" the relationship between a predictor, X, and an outcome. Graphically, mediation can be depicted in the following way:



Paths a and b are called direct effects. The mediational effect, in which X leads to Y through M, is called the indirect effect. The indirect effect represents the portion of the relationship between X and Y that is mediated by M.

Baron and Kenny (1986) proposed a four-step approach in which several regression analyses are conducted, and significance of the coefficients is examined at each step. Look at the diagram below to follow the description (note that c' could also be called a direct effect).



	Analysis	*Visual Depiction*
Step 1	Conduct a simple regression analysis with X predicting Y to test for path *c* alone, $Y = B_0 + B_1X + e$	
Step 2	Conduct a simple regression analysis with X predicting M to test for path *a*, $M = B_0 + B_1X + e$.	
Step 3	Conduct a simple regression analysis with M predicting Y to test the significance of path *b* alone, $Y = B_0 + B_1M + e$.	
Step 4	Conduct a multiple regression analysis with X and M predicting Y, $Y = B_0 + B_1X + B_2M + e$	

The purpose of Steps 1-3 is to establish that zero-order relationships among the variables exist. If one or more of these relationships are nonsignificant, researchers usually conclude that mediation is not possible or likely (although this is not always true; see MacKinnon, Fairchild, & Fritz, 2007). Assuming there are significant relationships from Steps 1 through 3, one proceeds to Step 4. In the Step 4 model, some form of mediation is supported if the effect of M (path b) remains significant after controlling for X. If X is no longer significant when M is controlled, the finding supports full mediation. If X is still significant (i.e., both X and M both significantly predict Y), the finding supports partial mediation (Baron and Kenny, 1986).

Test for Moderation Effect

A moderator was defined in Hayes (2017), "The effect of X on some variable Y is moderated by W if its size, sign, or strength depends on or can be predicted by W. In that case, W is said to be a moderator of X's effect on Y, or that W and X interact in their influence on Y. Whisman and Mc Clleland (2005) suggest a two-step procedure to test for moderation. Step 1 entailed assessing the direct association between the dependent and independent variables. Step 2 involves introducing a product of moderating variable and independent variable and regressing against the dependent variable. The moderation effect is said to be present when the coefficient of the interaction terms is statistically significant.

Diagnostic Tests

Diagnostic tests are conducted before data analysis to confirm if the assumptions of the model are met to obtain reasonable results (Saunders et al., 2011).

Linearity Test

The assumption of linearity posits a direct, straight-line relationship between predictor and outcome variables. If the residuals are normally distributed and exhibit homoscedasticity, linearity typically holds, simplifying the analysis process. ANOVA can be used to test a linear correlation between both the independent and dependent variables .To make the relationship between the independent and dependent variables linear, the transformation method could be used.

Multivariate Normality Test

The linear regression analysis requires all variables to be multivariate normal. This assumption can be assessed by examining histograms or Q-Q plots of the residuals, or through statistical tests such as the Kolmogorov-Smirnov test. In addition the Shapiro–Wilk (1965) test, which is a more robust test of normality, was also adopted. Data that is not normally distributed is adjusted for using a non-linear transformation, log-transformation.

Heteroscedasticity Test

The classical linear regression model assumes that the data is homoscedastic (literally, same variance). Homoscedasticity describes a situation in which the error term (that is, the "noise" or 59 random disturbances in the relationship between the independent variables and the dependent variable) is the same across all values of the independent variables that is that is the variance of the errors is constant and is known. Histograms, scatterplots, normal P-P plots are used to test for heteroscedasticity by splitting the data in high and low value to assess whether the samples were significantly different. In addition, the Levene‟s test can also be used to assess the assumption that variances of the populations from which different samples drawn were equal. The Levene‟s statistic tested the null hypothesis that the population variances are equal (called homogeneity of variance or homoscedasticity). Independent variables need to be added where the assumptions were violated. Breusch-Pagan to test can also be used to test for heteroscedasticity where if $P<0.05$ infers the presence of heteroscedasticity.

Multicollinearity Test

Multicollinearity occurs when the independent variables are not independent from each other meaning one independent variable can be linearly predicted from the others with some reasonable degree of accuracy (Woolridge, 2002). A second important independence assumption is that the error of the mean must be independent from the independent variables. When the independent variables are highly correlated the resultant regression model run will have high standard errors of the individual coefficients making the regression model very sensitive to small changes in the specifications (Brook. 2008). The presence of multicollinearity can be assessed using the VIF (Tolerance) test. VIF greater than 5 suggests the possibility of multi-collinearity, whilst a VIF

greater than 10 shows the certainty of multi-collinearity. Variables with multicollinearity issues need to be removed or substituted.

Autocorrelation Test

Autocorrelation refers to the degree of correlation between the values of the same variables across different observations in the data. The concept of autocorrelation is most often discussed in the context of time series data in which observations occur at different points in time (e.g., air temperature measured on different days of the month). For example, one might expect the air temperature on the 1st day of the month to be more like the temperature on the 2nd day compared to the 31st day. If the temperature values that occurred closer together in time are, in fact, more similar than the temperature values that occurred farther apart in time, the data would be autocorrelated. However, autocorrelation can also occur in cross-sectional data when the observations are related in some other way. In a survey, for instance, one might expect people from nearby geographic locations to provide more similar answers to each other than people who are more geographically distant. Similarly, students from the same class might perform more similarly to each other than students from different classes. Thus, autocorrelation can occur if observations are dependent in aspects other than time. Autocorrelation can cause problems in conventional analyses (such as ordinary least squares regression) that assume independence of observations. In a regression analysis, autocorrelation of the regression residuals can also occur if the model is incorrectly specified. For example, if you are attempting to model a simple linear relationship but the observed relationship is non-linear (i.e., it follows a curved or U-shaped function), then the residuals will be autocorrelated. If this assumption is not satisfied, the variables are converted from absolute to relative.

A common method of testing for autocorrelation is the Durbin-Watson test. Statistical software such as SPSS may include the option of running the Durbin-Watson test when conducting a regression analysis. The Durbin-Watson tests produce a test statistic that ranges from 0 to 4. Values close to 2 (the middle of the range) suggest less autocorrelation, and values closer to 0 or 4 indicate greater positive or negative autocorrelation respectively.

Stationary Test

It is important to test for stationary testing because there is a cross-section and time-series component for panel data. Gujarati (2003) suggested use of Augmented Dicky-Fuller test for stationarity. According to Fadhili et al. (2011), the mean and variance across time are the statistical features of time series. The series is classified as a stationary process if both are constant in time, and neither is random or has a unit root. If neither is random, the series is defined as a nonstationary process. If a sequence is stationary and has no deviations, it is referred to as I(0), or integrated 0.

The null hypothesis for this test states that there is a primary component for all data, while the alternative hypothesis suggests that not all data has a singular root. If one of the variables is found to have a unitary root, the study isolates that variable and performs the equations with the remaining variables.

Correlation Analysis

Correlation is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship. In terms of the strength of relationship, the value of the correlation coefficient varies between +1 and -1. A value of ± 1 indicates a perfect degree of association between the two variables. As the correlation coefficient value goes towards 0, the relationship between the two variables will be weaker. The direction of the relationship is indicated by the sign of the coefficient; a + sign indicates a positive relationship and a – sign indicates a negative relationship. Usually, in statistics, we measure four types of correlations: Pearson correlation, Kendall rank correlation, Spearman correlation, and the Point-Biserial correlation. A value of zero indicates no association exists between the two variables. Any value of r greater than 0 indicates a positive association between the variables implying that as the value of one variable increases, the value of the other variable equally increases. A value of the correlation coefficient of 1 designates perfect positive correlation which implies that an increase/decrease one variable is followed by a proportionate increase/decrease in the other variable (Cooper & Schindler, 2003).

Hypothesis Testing

Hypothesis testing was introduced by Ronald Fisher, Jerzy Neyman, Karl Pearson and Pearson's son, Egon Pearson. Hypothesis testing is a statistical method that is used in making statistical

decisions using experimental data. Hypothesis Testing is basically an assumption that we make about the population parameter Hypothesis Testing is a type of statistical analysis in which you put your assumptions about a population parameter to the test. It is used to estimate the relationship between 2 statistical variables. There are two types of hypotheses i.e. null hypothesis and alternative hypothesis. The null hypothesis is generally denoted as H0. It states the exact opposite of what an investigator or an experimenter predicts or expects. It basically defines the statement which states that there is no exact or actual relationship between the variables. The alternative hypothesis is generally denoted as H1. It makes a statement that suggests or advises a potential result or an outcome that an investigator or the researcher may expect.

Steps of Hypothesis Testing

Choose a statistical test based on the type of data and the hypothesis. Common tests include t-tests, chi-square tests, ANOVA, and regression analysis. The selection depends on data type, distribution, sample size, and whether the hypothesis is one-tailed or two-tailed.

Collect Data

Gather the data that will be analyzed in the test. This data should be representative of the population to infer conclusions accurately.

Calculate the Test Statistic

Based on the collected data and the chosen test, calculate a test statistic that reflects how much the observed data deviates from the null hypothesis.

Determine the p-value

The p-value is the probability of observing test results at least as extreme as the results observed, assuming the null hypothesis is correct. It helps determine the strength of the evidence against the null hypothesis.

Make a Decision

Compare the p-value to the chosen significance level:

- If the p-value $\leq \alpha$: Reject the null hypothesis, suggesting sufficient evidence in the data supports the alternative hypothesis.

- If the p-value > α: Do not reject the null hypothesis, suggesting insufficient evidence to support the alternative hypothesis.

Report the Results

Present the findings from the hypothesis test, including the test statistic, p-value, and the conclusion about the hypotheses.

Perform Post-hoc Analysis (if necessary)

Depending on the results and the study design, further analysis may be needed to explore the data more deeply or to address multiple comparisons if several hypotheses were tested simultaneously

Types of Hypothesis Testing

Z Test

To determine whether a discovery or relationship is statistically significant, hypothesis testing uses a z-test. It usually checks to see if two means are the same (the null hypothesis). Only when the population standard deviation is known and the sample size is 30 data points or more, can a z-test be applied.

T Test

A statistical test called a t-test is employed to compare the means of two groups. To determine whether two groups differ or if a procedure or treatment affects the population of interest, it is frequently used in hypothesis testing.

Chi-Square

You utilize a Chi-square test for hypothesis testing concerning whether your data is as predicted. To determine if the expected and observed results are well-fitted, the Chi-square test analyzes the differences between categorical variables from a random sample. The test's fundamental premise is that the observed values in your data should be compared to the predicted values that would be present if the null hypothesis were true.

Hypothesis Testing and Confidence Intervals

Both confidence intervals and hypothesis tests are inferential techniques that depend on approximating the sample distribution. Data from a sample is used to estimate a population parameter using confidence intervals. Data from a sample is used in hypothesis testing to examine a given hypothesis. We must have a postulated parameter to conduct hypothesis testing.

Bootstrap distributions and randomization distributions are created using comparable simulation techniques. The observed sample statistic is the focal point of a bootstrap distribution, whereas the null hypothesis value is the focal point of a randomization distribution.

A variety of feasible population parameter estimates are included in confidence ranges. In this lesson, we created just two-tailed confidence intervals. There is a direct connection between these two-tail confidence intervals and these two-tail hypothesis tests. The results of a two-tailed hypothesis test and two-tailed confidence intervals typically provide the same results. In other words, a hypothesis test at the 0.05 level will virtually always fail to reject the null hypothesis if the 95% confidence interval contains the predicted value. A hypothesis test at the 0.05 level will nearly certainly reject the null hypothesis if the 95% confidence interval does not include the hypothesized parameter.

One-Tailed and Two-Tailed Hypothesis Testing

The One-Tailed test, also called a directional test, considers a critical region of data that would result in the null hypothesis being rejected if the test sample falls into it, inevitably meaning the acceptance of the alternate hypothesis.

In a one-tailed test, the critical distribution area is one-sided, meaning the test sample is either greater or lesser than a specific value.

In two tails, the test sample is checked to be greater or less than a range of values in a Two-Tailed test, implying that the critical distribution area is two-sided.

If the sample falls within this range, the alternate hypothesis will be accepted, and the null hypothesis will be rejected.

Right Tailed Hypothesis Testing

If the larger than (>) sign appears in your hypothesis statement, you are using a right-tailed test, also known as an upper test. Or, to put it another way, the disparity is to the right. For instance, you can contrast the battery life before and after a change in production. Your hypothesis statements can be the following if you want to know if the battery life is longer than the original (let's say 90 hours):

- The null hypothesis is (H0 <= 90) or less change.
- A possibility is that battery life has risen (H1) > 90.

The crucial point in this situation is that the alternate hypothesis (H1), not the null hypothesis, decides whether you get a right-tailed test.

Left Tailed Hypothesis Testing

Alternative hypotheses that assert the true value of a parameter is lower than the null hypothesis are tested with a left-tailed test; they are indicated by the asterisk "<".

Type 1 and Type 2 Error

A hypothesis test can result in two types of errors.

Type 1 Error: A Type-I error occurs when sample results reject the null hypothesis despite being true.

Type 2 Error: A Type-II error occurs when the null hypothesis is not rejected when it is false, unlike a Type-I error.

Example:

Suppose a teacher evaluates the examination paper to decide whether a student passes or fails.

H0: Student has passed

H1: Student has failed

Type I error will be the teacher failing the student [rejects H0] although the student scored the passing marks [H0 was true].

Type II error will be the case where the teacher passes the student [do not reject H0] although the student did not score the passing marks [H1 is true].

P-Value

A p-value is a metric that expresses the likelihood that an observed difference could have occurred by chance. As the p-value decreases the statistical significance of the observed difference increases. If the p-value is too low, you reject the null hypothesis.

Here you have taken an example in which you are trying to test whether the new advertising campaign has increased the product's sales. The p-value is the likelihood that the null hypothesis, which states that there is no change in the sales due to the new advertising campaign, is true. If the p-value is .30, then there is a 30% chance that there is no increase or decrease in the product's sales. If the p-value is 0.03, then there is a 3% probability that there is no increase or decrease in the sales value due to the new advertising campaign. As you can see, the lower the p-value, the chances of the alternate hypothesis being true increases, which means that the new advertising campaign causes an increase or decrease in sales.

Significance of hypothesis Testing

Hypothesis testing is crucial in research methodology for several reasons:

1. Provides evidence-based conclusions: It allows researchers to make objective conclusions based on empirical data, providing evidence to support or refute their research hypotheses.
2. Supports decision-making: It helps make informed decisions, such as accepting or rejecting a new treatment, implementing policy changes, or adopting new practices.
3. Adds rigor and validity: It adds scientific rigor to research using statistical methods to analyze data, ensuring that conclusions are based on sound statistical evidence.
4. Contributes to the advancement of knowledge: By testing hypotheses, researchers contribute to the growth of knowledge in their respective fields by confirming existing theories or discovering new patterns and relationships.

Limitations of Hypothesis Testing

Hypothesis testing has some limitations that researchers should be aware of:

1. It cannot prove or establish the truth: Hypothesis testing provides evidence to support or reject a hypothesis, but it cannot confirm the absolute truth of the research question.
2. Results are sample-specific: Hypothesis testing is based on analyzing a sample from a population, and the conclusions drawn are specific to that particular sample.
3. Possible errors: During hypothesis testing, there is a chance of committing type I error (rejecting a true null hypothesis) or type II error (failing to reject a false null hypothesis).
4. Assumptions and requirements: Different tests have specific assumptions and requirements that must be met to accurately interpret results.

Linear Assumptions

Multiple linear regression analysis is predicated on several fundamental assumptions that ensure the validity and reliability of its results. Understanding and verifying these assumptions is crucial for accurate model interpretation and prediction. This is normally done by subjecting the data to some diagnostic test as described below.

CHAPTER FIVE: RESEARCH ETHICS

Introduction

Research ethics involves the application of fundamental ethical principles to research activities which include the design and implementation of research, respect towards society and others, the use of resources and research outputs, scientific misconduct and the regulation of research.

Principles of Ethics in Research

The following is a general summary of some ethical principles

Honesty: Honestly report data, results, methods and procedures, and publication status. Do not fabricate, falsify, or misrepresent data.

Objectivity: Strive to avoid bias in experimental design, data analysis, data interpretation, peer review, personnel decisions, grant writing, expert testimony, and other aspects of research.

Integrity: Keep your promises and agreements; act with sincerity; strive for consistency of thought and action.

Carefulness: Avoid careless errors and negligence; carefully and critically examine your own work and the work of your peers. Keep good records of research activities.

Openness: Share data, results, ideas, tools, resources. Be open to criticism and new ideas.

Respect for Intellectual Property: Honor patents, copyrights, and other forms of intellectual property. Do not use unpublished data, methods, or results without permission. Give credit where credit is due. Never plagiarize.

Confidentiality: Protect confidential communications, such as papers or grants submitted for publication, personnel records, trade or military secrets, and patient records.

Responsible Publication: Publish in order to advance research and scholarship, not to advance just your own career. Avoid wasteful and duplicative publication.

Responsible Mentoring: Help to educate, mentor, and advise students. Promote their welfare and allow them to make their own decisions.

Respect for Colleagues: Respect your colleagues and treat them fairly.

Social Responsibility: Strive to promote social good and prevent or mitigate social harms through research, public education, and advocacy.

Non-Discrimination: Avoid discrimination against colleagues or students on the basis of sex, race, ethnicity, or other factors that are not related to their scientific competence and integrity.

Competence: Maintain and improve your own professional competence and expertise through lifelong education and learning; take steps to promote competence in science as a whole.

Legality: Know and obey relevant laws and institutional and governmental policies.

Animal Care: Show proper respect and care for animals when using them in research. Do not conduct unnecessary or poorly designed animal experiments.

Human Subjects Protection: When conducting research on human subjects, minimize harms and risks and maximize benefits; respect human dignity, privacy, and autonomy.

Independent review: To minimize potential conflicts of interest and make sure a study is ethically acceptable before it starts, an independent review panel should review the proposal and ask important questions, including: Are those conducting the trial sufficiently free of bias? Is the study doing all it can to protect research participants? Has the trial been ethically designed and is the risk–benefit ratio favorable? The panel also monitors a study while it is ongoing.

Informed consent: Potential participants should make their own decision about whether they want to participate or continue participating in research. This is done through a process of informed consent in which individuals (1) are accurately informed of the purpose, methods, risks, benefits, and alternatives to the research, (2) understand this information and how it relates to their own clinical situation or interests, and (3) make a voluntary decision about whether to participate.

Respect for potential and enrolled participants

Individuals should be treated with respect from the time they are approached for possible participation — even if they refuse enrollment in a study — throughout their participation and after their participation ends. This includes:

- respecting their privacy and keeping their private information confidential
- respecting their right to change their mind, to decide that the research does not match their interests, and to withdraw without a penalty
- informing them of new information that might emerge in the course of research, which might change their assessment of the risks and benefits of participating
- monitoring their welfare and, if they experience adverse reactions, unexpected effects, or changes in clinical status, ensuring appropriate treatment and, when necessary, removal from the study
- informing them about what was learned from the research

Research Misconduct

(a) **Fabrication** - making up data or results and recording or reporting them.

(b) **Falsification** - manipulating research materials or changing or omitting data or results such that the research is not accurately represented in the research record.

(c) **Plagiarism** - the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

Plagiarism

Plagiarism means using someone else's work without giving them proper credit. In academic writing, plagiarizing involves using words, ideas, or information from a source without citing it correctly.

Examples of plagiarism	Why is it wrong?
Copying parts of a text word for word, without quotation marks	It makes it seem like these are your own words.
Paraphrasing a text by changing a few words or altering the sentence structure, without citing the source	It makes it seem like you came up with the idea, when in fact you just rephrased someone else's idea.
Giving incorrect information about a source	If readers can't find the cited source, they can't check the information themselves.
Quoting so much from a source that it makes up most of your text	Even with proper citations, you're not making an original contribution if you rely so much on someone else's words.
Reusing work you've submitted for a previous assignment, without citing yourself	Even though it's your own work, the reader should be informed that it's not completely new but comes from previous research.
Submitting a text written entirely by someone else (e.g., a paper you bought from a ghostwriter)	Not doing the work yourself is academically dishonest, undermines your learning, and is unfair to other students.

Types of Plagiarism

Plagiarism comes in many forms, some more severe than others—from rephrasing someone's ideas without acknowledgement to stealing a whole essay. These are the five most common types of plagiarism:

- **Global plagiarism** means passing off an entire text by someone else as your own work.
- **Verbatim plagiarism** means directly copying someone else's words.
- **Paraphrasing plagiarism** means rephrasing someone else's ideas to present them as your own.

- **Patchwork plagiarism** means stitching together parts of different sources to create your text.
- **Self-plagiarism** means recycling your own past work.

Avoiding Plagiarism

You can avoid plagiarism by:

1. Keeping track of the sources you consult in your research
2. Paraphrasing or quoting from your sources (by using a paraphrasing tool and adding your own ideas)
3. Crediting the original author in an in-text citation and in your reference list
4. Using a plagiarism checker before you submit
5. Use generative AI tools responsibly (outputs may be detected by an AI detector)

Consequences of Plagiarism

Consequences of plagiarism include:

Destroyed Student Reputation

Plagiarism allegations can cause a student to be suspended or expelled. Their academic record can reflect the ethics offense, possibly causing the student to be barred from entering college from high school or another college. Schools, colleges, and universities take plagiarism very seriously. Most educational institutions have academic integrity committees who police students. Many schools suspend students for their first violation. Students are usually expelled for further offences.

Destroyed Professional Reputation

A professional businessperson, politician, or public figure may find that the damage from plagiarism follows them for their entire career. Not only will they likely be fired or asked to step down from their present position, but they will surely find it difficult to obtain another respectable job. Depending on the offense and the plagiarist's public stature, his or her name may become ruined, making any kind of meaningful career impossible.

Destroyed Academic Reputation

The consequences of plagiarism have been widely reported in the world of academia. Once scarred with plagiarism allegations, an academic's career can be ruined. Publishing is an integral part of a prestigious academic career. To lose the ability to publish most likely means the end of an academic position and a destroyed reputation.

Legal Repercussions

The legal repercussions of plagiarism can be quite serious. Copyright laws are absolute. One cannot use another person's material without citation and reference. An author has the right to sue a plagiarist. Some plagiarism may also be deemed a criminal offense, possibly leading to a prison sentence. Those who write for a living, such as journalists or authors, are particularly susceptible to plagiarism issues. Those who write frequently must be ever-vigilant not to err. Writers are well-aware of copyright laws and ways to avoid plagiarism. As a professional writer, to plagiarize is a serious ethical and perhaps legal issue.

Monetary Repercussions

Many recent news reports and articles have exposed plagiarism by journalists, authors, public figures, and researchers. In the case where an author sues a plagiarist, the author may be granted monetary restitution. In the case where a journalist works for a magazine, newspaper or other publisher, or even if a student is found plagiarizing in school, the offending plagiarist could have to pay monetary penalties.

Plagiarized Research

Plagiarized research is an especially egregious form of plagiarism. If the research is medical in nature, the consequences of plagiarism could mean the loss of peoples' lives. This kind of plagiarism is particularly heinous.

Tools to detect Plagiarism

Quetext, Dupli Checker (DupliChecker.com), Copyleaks, Plagiarism Detector (plagiarismdetector.net), Copyscape, PlagScan, from Ouriginal, Noplag, Unicheck, Turnitin Originality and Turnitin iThenticate. The list is not exhaustive.

Citations

Citations are a way of giving credit when certain material in your work came from another source. It also gives your readers the information necessary to find that source again-- it provides an important roadmap to your research process. Whenever you use sources such as books, journals or websites in your research, you must give credit to the original author by citing the source.

Importance of citation

scholars use citations not only to give credit to original creators and thinkers, but also to add strength and authority to their own work. By citing their sources, scholars are placing their work in a specific context to show where they "fit" within the larger conversation. Citations are also a great way to leave a trail intended to help others who may want to explore the conversation or use the sources in their own work.

In short, citations

(1) give credit

(2) add strength and authority to your work

(3) place your work in a specific context

(4) leave a trail for other scholars

Citation Styles

A citation style is a set of guidelines on how to cite sources in your academic writing. You always need a citation whenever you quote, paraphrase, or summarize a source to avoid plagiarism. The citation style sometimes depends on the academic discipline involved. For example: APA (American Psychological Association) Style is the most popular citation style, widely used in the social and behavioral sciences. MLA (Modern Language Association) style is the second most popular, used mainly in the humanities. Chicago notes and bibliography style is also popular in the humanities, especially history. Chicago author-date style tends to be used in the sciences. We will only discuss APA style as it is the most commonly used in social science research.

American Psychological Association (APA)

APA referencing style is an author-date referencing system published by the American Psychological Association. APA Style is defined by the 7th edition of the Publication Manual of the American Psychological Association. It was designed for use in psychology, but today it's widely used across various disciplines, especially in the social sciences.

There are two components in the APA referencing style: in-text citations and their corresponding reference list entries.

When using APA format, follow the author-date method of in-text citation. This means that the author's last name and the year of publication for the source should appear in the text, like, for example, (Jones, 1998). One complete reference for each source should appear in the reference list at the end of the paper .Below are examples of in text citation

As Ahmed (2016) mentions... used at the beginning of the sentence.

(Ahmed, 2016)…….used at the end of the sentence.

When two authors are involved, name both authors in the signal phrase or in parentheses each time you cite the work. Use the word "and" between the authors' names within the text and use the ampersand in parentheses.

Research by Wegener and Petty (1994) supports... used at the beginning of the sentence.

(Wegener & Petty, 1994)… used at the end of the sentence.

When citing three or more authors, list only the first author's name followed by "et al." in every citation, even the first, unless doing so would create ambiguity between different sources.

Kernis et al. (1993) suggests... used at the beginning of the sentence.

(Kernis et al., 1993)..... used at the end of the sentence.

In *et al.*, *et* should not be followed by a period. Only "al" should be followed by a period.

If you're citing multiple works with similar groups of authors, and the shortened "et al" citation form of each source would be the same, you'll need to avoid ambiguity by writing out more names. If you cited works with these authors:

Jones, Smith, Liu, Huang, and Kim (2020)

Jones, Smith, Ruiz, Wang, and Stanton (2020)

They would be cited in-text as follows to avoid ambiguity:

(Jones, Smith, Liu, et al., 2020)

(Jones, Smith, Ruiz, et al., 2020)

Since et al. is plural, it should always be a substitute for more than one name. In the case that et al. would stand in for just one author, write the author's name instead.

If the work does not have an author, cite the source by its title in the signal phrase or use the first word or two in the parentheses. Titles of books and reports are italicized; titles of articles, chapters, and web pages are in quotation marks. APA style calls for capitalizing important words in titles when they are written in the text (but not when they are written in reference lists).

A similar study was done of students learning to format research papers ("Using Citations," 2001).

In the rare case that "Anonymous" is used for the author, treat it as the author's name (Anonymous, 2001). In the reference list, use the name Anonymous as the author.

If the author is an organization or a government agency, mention the organization in the signal phrase or in the parenthetical citation the first time you cite the source, just as you would an individual person.

According to the American Psychological Association (2000),...

If the organization has a well-known abbreviation, you may include the abbreviation in brackets the first time the source is cited and then use only the abbreviation in later citations. However, if you cite work from multiple organizations whose abbreviations are the same, do not use abbreviations (to avoid ambiguity).

First citation: (Mothers Against Drunk Driving [MADD], 2000)

Second citation: (MADD, 2000)

When your parenthetical citation includes two or more works, order them the same way they appear in the reference list (viz., alphabetically), separated by a semi-colon.

(Berndt, 2002; Harlow, 1983)

If you cite multiple works by the same author in the same parenthetical citation, give the author's name only once and follow with dates. No date citations go first, then years, then in-press citations.

(Smith, n.d., 1995, 2002, in press)

When using authors with the same last name; to prevent confusion, use first initials with the last names.

(E. Johnson, 2001; L. Johnson, 1998)

If you have two sources by the same author in the same year, use lower-case letters (a, b, c) with the year to order the entries in the reference list. Use the lower-case letters with the year in the in-text citation.

Research by Berndt (1981a) revealed strong correlations. However, a parallel study (Berndt, 1981b) resulted in inconclusive findings.

When citing an Introduction, Preface, Foreword, or Afterword in-text, cite the appropriate author and year as usual.

(Funk & Kolln, 1992)

For interviews, letters, e-mails, and other person-to-person communication, cite the communicator's name, the fact that it was personal communication, and the date of the communication. Do not include personal communication in the reference list.

(E. Robbins, personal communication, January 4, 2001).

If using a footnote to reference personal communication, handle citations the same way.

1. P. Smith also claimed that many of her students had difficulties with APA style (personal communication, November 3, 2002).

When citing information, you learned from a conversation with an Indigenous person who was not your research participant, use a variation of the personal communication citation above. Include the person's full name, nation or Indigenous group, location, and any other relevant details before the "personal communication, date" part of the citation.

(Caroline Jennings, Cherokee Nation, lives in Tulsa, Oklahoma, personal communication, October 2019)

Generally, writers should endeavor to read primary sources (original sources) and cite those rather than secondary sources (works that report on original sources). Sometimes, however, this is impossible. If you use a source that was cited in another source, name the original source in your signal phrase. List the secondary source in your reference list and include the secondary source in the parentheses. If you know the year of the original source, include it in the citation.

Johnson argued that... (as cited in Smith, 2003, p. 102).

(Johnson, 1985, as cited in Smith, 2003, p. 102).

If possible, cite an electronic document the same as any other document by using the author-date style.

Kenneth (2000) explained...

If no author or date is given, use the title in your signal phrase or the first word or two of the title in the parentheses and use the abbreviation "n.d." (for "no date").

Another study of students and research decisions discovered that students succeeded with tutoring ("Tutoring and APA," n.d.).

When an electronic source lacks page numbers, you should try to include information that will help readers find the passage being cited. Use the heading or section name, an abbreviated heading or section name, a paragraph number (para. 1), or a combination of these.

According to Smith (1997), ... (Mind Over Matter section, para. 6).

Note: Never use the page numbers of webpages you print out; different computers print webpages with different pagination. Do not use Kindle location numbers; instead, use the page number (available in many Kindle books) or the method above.

Example paragraph with in-text citation

A few researchers in the linguistics field have developed training programs designed to improve native speakers' ability to understand accented speech (Derwing, Rossiter, & Munro, 2002; Krech Thomas, 2004). Their training techniques are based on the research described above indicating that comprehension improves with exposure to non-native speech. Derwing et al. (2002) conducted their training with students preparing to be social workers but note that other professionals who work with non-native speakers could benefit from a similar program.

References

Derwing, T. M., Rossiter, M. J., & Munro, M. J. (2002). Teaching native speakers to listen to foreign-accented speech. *Journal of Multilingual and Multicultural Development,* 23(4), 245-259.

Krech Thomas, H. (2004). *Training strategies for improving listeners' comprehension of foreign-accented speech* (Doctoral dissertation). University of Colorado, Boulder.

CHAPTER SIX: RESEARCH WRITING AND ARTIFICIAL INTELLIGENCE

Academic research writing is a foundational element of scholarly communication, allowing researchers to present their findings, engage in critical discourse, and contribute to the advancement of knowledge in their respective fields. The process of writing in academia requires a high level of precision, logical organization, and adherence to established standards of evidence. However, it also presents several challenges, including the need to synthesize large amounts of information, maintain clarity, and ensure accuracy. With the rapid rise of artificial intelligence (AI), academic research writing has entered a new era, where AI tools are increasingly being integrated into various stages of research, from idea generation to manuscript preparation, data analysis, and even publication. The application of AI is revolutionizing how academic work is conducted, making the writing process more efficient, precise, and accessible while also raising ethical considerations that require careful attention.

The Role of Academic Research Writing

Academic research writing serves as the primary medium through which scholars communicate their findings, engage with existing literature, and contribute to the collective body of knowledge. It requires a balance between creativity, critical thinking, and technical proficiency. Researchers must clearly define their research questions, present their methodologies, analyze data, and interpret findings in a way that is comprehensible to a broader academic audience. Moreover, the integrity of the work must be upheld, with proper citations and ethical considerations taken into account.

Writing in academia is often a time-consuming and arduous task, especially when considering the complex nature of research topics, the depth of literature reviews required, and the analysis of data. Maintaining consistency and clarity while adhering to specific academic formatting guidelines (such as APA, MLA, or Chicago styles) can be challenging. Furthermore, the iterative nature of writing—where drafts are revised, feedback is incorporated, and final versions are prepared—requires significant effort. This is where AI can provide crucial assistance, facilitating various stages of the writing process and enhancing overall productivity.

The Role of Artificial Intelligence in Academic Writing

AI has introduced a wide range of tools and technologies that are transforming academic research writing. From the initial stages of literature review and idea generation to the final manuscript submission, AI applications are making research writing faster, more efficient, and more accurate. These AI-powered tools utilize machine learning algorithms, natural language processing (NLP), and data analytics to provide valuable support at every step of the writing process.

1. Idea Generation and Literature Review

One of the most time-consuming aspects of academic research is conducting a comprehensive literature review. Researchers must review vast amounts of published work to understand the existing state of knowledge in their field. AI-powered tools, such as semantic search engines and citation management systems, can significantly streamline this process. These tools use AI algorithms to analyze and summarize vast amounts of research, identifying relevant studies and helping researchers spot trends and gaps in the existing literature. Platforms like Zotero, EndNote, and Mendeley have revolutionized reference management, allowing researchers to automatically organize citations and generate bibliographies in various citation styles.

AI-powered systems like Scholarcy can generate concise summaries of long academic articles, enabling researchers to quickly grasp the key points without having to read the entire document. This can be especially helpful when reviewing large volumes of literature or identifying critical research questions.

2. Drafting and Editing

Once researchers have gathered their materials, drafting and editing the manuscript can be one of the most challenging aspects of academic writing. AI-driven tools such as Grammarly, ProWritingAid, and even sophisticated writing assistants like ChatGPT can significantly improve the quality of writing. These tools offer real-time grammar and spelling checks, suggest sentence restructuring, and enhance overall readability.

AI systems can also help refine academic writing by ensuring clarity, consistency, and coherence. For instance, AI can highlight overly complex sentences or jargon-heavy passages, offering simpler alternatives that are more accessible to readers. Furthermore, AI tools can aid in adjusting writing style to match academic norms, ensuring that tone, structure, and language are aligned with disciplinary expectations.

Additionally, AI can help detect inconsistencies in writing, such as missing citations, repetitive phrases, or unclear arguments. This type of automated editing ensures that the manuscript meets high standards of academic rigor and professionalism.

3. Data Analysis and Visualization

In research, data analysis is often a central component of the study, and AI tools play a vital role in this process. AI-powered platforms like SPSS, Python libraries (e.g., Pandas, NumPy), and specialized tools like Tableau are designed to handle large datasets, analyze patterns, and generate insightful visualizations. These platforms can process vast amounts of quantitative or qualitative data, uncover hidden trends, and perform complex statistical analyses at a fraction of the time it would take using traditional methods.

AI technologies can also create visualizations that help researchers present their findings in an easily digestible format. Data visualization tools allow complex data to be transformed into graphs, charts, and tables that communicate research results clearly and effectively. This visual representation of data is invaluable when it comes to sharing results with a wider academic audience or presenting them in journals or conferences.

4. Plagiarism Detection and Citation Accuracy

Maintaining academic integrity is a critical aspect of academic writing, and AI has a significant role to play in ensuring that research remains original and ethically sound. AI-powered plagiarism detection tools like Turnitin and iThenticate are commonly used to identify instances of potential plagiarism in academic manuscripts. These tools compare the content of a paper against vast databases of academic journals, articles, and other published work to ensure that all sources are properly attributed.

AI can also assist in ensuring the accuracy and consistency of citations. Reference management tools that incorporate AI can automatically format citations and cross-check them for errors, helping authors adhere to specific citation styles such as APA, MLA, or Chicago.

5. Accessibility and Translation

AI has opened up new possibilities for making academic writing more accessible to a global audience. Machine translation tools, such as Google Translate and DeepL, are continuously improving and enabling researchers to translate their papers into multiple languages, facilitating wider dissemination of their work. Moreover, AI-driven speech-to-text and text-to-speech technologies are improving access for individuals with disabilities, such as those with visual impairments or learning disabilities, by converting written content into audio format or transcribing spoken content into text.

Challenges and Ethical Considerations

Despite the significant advantages of AI in academic writing, there are important challenges and ethical considerations that must be addressed. One concern is the potential over-reliance on AI tools, which may undermine the critical thinking and creative processes essential to research. AI should be viewed as a tool to enhance, not replace, the intellectual labor of researchers. Furthermore, the use of AI in content generation could lead to concerns regarding academic integrity, especially if researchers present AI-generated work as entirely their own. Transparency in acknowledging the use of AI tools is essential to maintaining trust in the academic community.

Moreover, AI algorithms can introduce biases, particularly if the underlying data is incomplete or unrepresentative. This can be particularly problematic in areas such as data analysis and literature review, where biased algorithms could skew results or reinforce existing inequalities. Researchers must be cautious about relying on AI without critically evaluating its outputs and ensuring that these outputs align with ethical standards and the goals of their research.

Future Implications

As AI continues to evolve, its impact on academic research writing is expected to grow. Advances in natural language processing (NLP) and machine learning will allow AI tools to become more sophisticated, enabling tasks such as hypothesis generation, proposal writing, and even the identification of research funding opportunities. AI may also help researchers automate the peer review process or predict the likelihood of a manuscript being accepted for publication based on historical data.

In the future, AI could democratize access to academic resources, leveling the playing field for researchers in developing countries or those with limited resources. By providing accessible tools for writing, data analysis, and publishing, AI has the potential to increase collaboration, accelerate the pace of research, and enhance global knowledge sharing.

Conclusion

Artificial intelligence is transforming the landscape of academic research writing, offering researchers a suite of tools that enhance efficiency, accuracy, and accessibility. From assisting with literature reviews and data analysis to improving writing quality and ensuring academic integrity, AI is reshaping how research is conducted and communicated. However, as AI continues to evolve, researchers must be mindful of the ethical considerations and potential challenges that come with its use. By embracing AI responsibly, researchers can harness its power to produce high-quality, impactful work while maintaining the integrity and originality that are central to academic scholarship.

CHAPTER SEVEN: PROPOSAL AND THESIS DEVELOPMENT

Introduction

A research proposal is a comprehensive plan for a research project. It is a written description of a research plan that must be undertaken. It determines the specific areas of research, states the purpose, scope, methodology, overall organization and limitations of the study. It also estimates its requirements for equipment (if necessary), finance and possible personnel. Simply put, it is your plan for the research you intend to conduct. All research proposals are designed to persuade someone about how and why your intended project is worthwhile. Different universities around the world adopt variant format for proposal. Here in discussed is a general format of a proposal and the possible questions during oral presentations.

Cover page

The cover comprises of the Topic/Title of the proposal, full name of the student, registration number(optional), the award in which the proposal is submitted for ,the school and the University and ends with the date of the submission. This page should not be numbered, and words should be single spaced. Example.

MERGERS AND ACQUISITIONS, RISK MANAGEMENT, INSTITUTIONALCHARACTERISTICS AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

JUSTIN IRUNGU GACHIGO

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN BUSINESS ADMINISTRATION, FACULTY OF BUSINESS AND MANAGEMENT SCIENCES, UNIVERSITY OF NAIROBI

NOVEMBER 2023

Topic

A “research topic” is the area of study that you are researching. A research topic can comprise of, dependent variables, intervening variables, moderating variable and independent variables. The complexity and the number of variables required in a topic is dependent on the level of study ;for example, for an undergraduate you may only require two variables i.e. dependent and independent variables, master’s you many require three variables while for Doctoral studies you may require using the four variables.

Examples: Mergers and Acquisitions, Risk Management, Institutional Characteristics and Financial Performance of Commercial banks in Kenya

The general guideline in choosing a research topic are as follows;

- **Choose a topic that's appropriate to the length of your paper**. Students often pick topics that are too broad to be adequately covered. Narrow topics lead to close observation, while broad topics lead to overgeneralization. If you're writing a five-page paper, don't write on the history of women's rights; instead, write about one incident in the history of women's rights. Even a personal or descriptive essay will be better if you choose a narrow topic—your childhood in a small town, for example, rather than your childhood, or your uncle's barn rather than the Midwest.

    1. **Avoid a topic that will tempt you to summarize rather than to discuss or analyze.** Don't choose the plot of Macbeth but how the final scene of Macbeth illustrates the play's theme. The second topic is narrower and less likely to lead to summary. When considering a topic, ask yourself if it can lead to a reasonable thesis.
    2. **Choose a topic that interests you.** If you don't care about limiting cigarette advertising, don't select it as a topic for a persuasive essay. You'll have more to say, and you'll write better, on something you care about. Generally, if you choose a topic that is interesting to you, then your reader will find it interesting too.
    3. **If your assignment requires research, choose a topic on which you can find material.** Even when you aren't writing a research paper, make sure you select a subject that you can develop with sufficient details.

4. **After you've picked a topic, don't be afraid to change it if it isn't working out.** Instructors would rather you write a good essay than that you grind out pages on something that was a poor choice.
5. Think of the who, what, when where and why questions:

    i. **WHY** did you choose the topic? What interests you about it? Do you have an opinion about the issues involved?
    ii. **WHO** are the information providers on this topic? Who might publish information about it? Who is affected by the topic? Do you know of organizations or institutions affiliated with the topic?
    iii. **WHAT** are the major questions for this topic? Is there a debate about the topic? Are there a range of issues and viewpoints to consider?
    iv. **WHERE** is your topic important: at the local, national or international level? Are there specific places affected by the topic?
    v. **WHEN** is/was your topic important? Is it a current event or an historical issue? Do you want to compare your topic by time periods?

Declaration

The primary purpose of the declaration page is twofold: to affirm the originality of the research and to acknowledge the contributions of individuals or sources that have assisted in the thesis's completion. The declaration page is numbered in roman and bears (ii).The declaration to read as follows:

This thesis is my original work, and it has never been submitted to any other university for a degree award, in completely or in part.

Signature……Date……....

JUSTIN IRUNGU GACHIGO

D80/54006/2019

As University Supervisors, we have given our approval to this research thesis for study:

Signature…*……Date……...***

DR. XYZ

Senior Lecturer, Department of Finance and Accounting

Faculty of Business and Management Science

University of Kenya

Abbreviations and Acronyms

An abbreviation is a shortened form of a word used in place of the full word (e.g., Inc.). An acronym is a word formed from the first letters of each of the words in a phrase or name (e.g., NREL or DOE). They are employed to improve readability and conciseness. Examples:

CBK : Central Bank of Kenya

CMA : Capital Market Authority

I&M : Investments and Mortgages

KCB : Kenya Commercial Bank

Definition of Operational Terms

Operational definitions are essential for conducting meaningful research as they provide clarity and consistency in how variables are defined and measured. Various terminologies used in the proposal or thesis are defined here. The words should be single spaced and definition should bear the citation. Examples:

Consumption tax*- This entails all those taxes levied on the extraction, production delivery, sale, lease, transfer and service provision or even on the permission to use goods, on the use of goods or in the performance of various activities (OECD, 2023). In this study, it incuded excise duty, import duty and value added tax.*

Excise duty- *refers to a type of tax charged on* goods that a country produces *(Katz & Jung, 2023). In this study, it was operationalized as the total excise tax collected by the government from the telecommunication companies over the study period (2017-2022).*

Abstract

The abstract allows readers to quickly determine if a paper is relevant to their needs, saving them time and effort. The abstract should introduce the reader to the context of the study, concept of the study, motivation and the problem statement of the study, research objectives, theoretical anchorage and research methodology. It should not be more than one page and should be single spaced. It is normally in the present tense. The difference between abstract in the proposal and the projector thesis is that, in the thesis ,it is written in past tense and includes study finding's ,Study's recommendation, Study's conclusion, limitations of the study and suggestions for future studies. See example below of an abstract for thesis.

Commercial banks operate in a volatile operational and legal environment that is fraught with competition. Commercial bank regulators have established stringent requirements to protect depositors in the event of a bank failure. Commercial banks are looking for ways to ensure compliance while improving overall performance considering the demanding and competitive operating and legal environments. The research examined the connection among mergers and acquisitions, risk management, institutional characteristics, and financial performance of commercial banks in Kenya. The emphasis was narrowed to the effect of mergers and acquisitions, the determination of moderating role of institutional characteristics on the relationship among mergers and acquisitions and commercial bank financial performance, and the determination of the mediating role of risk management on the interaction among mergers and acquisitions and commercial bank financial performance. Synergies theory, resource-based view theory, agency theory, and concentration theory were used to achieve the study's objectives. A correlational descriptive research design with cross-sectional data analysis and positivism paradigm was used

to accomplish the project's goals. The thirty Kenyan commercial banks that had undergone mergers and acquisitions by 2017 formed the population of the study. The data was gathered from publicly available financial statements, which were split into two; three years before and three years after mergers and acquisitions, with the transaction year been excluded. To determine the mathematical connection among the variables in the study, multiple regressions were used. The results of the study showed that mergers and acquisitions had a significant positive effect the on the financial performance of commercial banks in Kenya, resulting in the rejection of the first null hypothesis. The study also found that the connection between mergers and acquisitions and commercial bank financial performance is moderated by institutional characteristics, implying that the second null hypothesis is rejected. The study's findings also revealed that risk management failed to mediate the connection between mergers and acquisitions and commercial bank financial performance, thus failing to reject the third null hypothesis. Finally, the combined impact of mergers and acquisitions, risk management, and institutional characteristics on commercial bank financial performance was found to be significant, resulting in the rejection of the fourth null hypothesis. The findings of the research provide answers to the inconsistencies found in the prior reviewed studies by empirically testing the study variables thus contributing to knowledge by providing new insights based on the variables studied. The research findings contribute to the theory by revealing the relationship among the supporting theories. Synergies theory results to increased value of the firm, where agency theory highlights possible misuse of free cash flows and guides on solutions to avoid the agency problem, while resource-based view supports mergers and acquisitions as a means of mopping excess cash flow by combining homogenous resources for competitiveness. The research findings further contribute to the policy and practice in the sense that the insights will help decision-making processes geared toward targeted outcome. The study results are limited to elements of the study and hence a recommendation of similar study using other attributes in varied context and scope (Gachigo, 2023).

Chapter I – Introduction

Different university have different approach to this section. The section may have three or more sections depending on the University as described below:

Background of the study

Gives overview of the study focusing on the Title of the work to be done. It should contain minimum literature review. This section should be maximum one and half pages. It should give a global, regional and local overview, narrowing to the problem being studied.

The introduction in the background of the study need to introduce the reader to a discussion of the study's concept, explaining the current issues surrounding the concepts of the study and their significant. The conceptual discussion should also introduce the reader to the interaction among the study variables. It should also introduce the reader to a discussion of the theories that explains the relationship among the variables. The background of the study should also introduce the reader to the contextual argument where the researcher should bring forward the statistics concerning the context of the study and bring out the motivation toward the study of the context.

See example below an excerpt from a thesis:

The wave of mergers and acquisitions has become increasingly popular in recent years as businesses see them expand and improve their financial performance (Beverly et al., 2019). Mergers and acquisitions enable organizations to achieve economies of scale, tax planning, and acceleration; gain market power, access new technologies and new research and development, increase shareholder wealth, product diversification, and improve financial performance (Amedu, 2004; Gaughan, 1991; Leepsa&Mishra, 2016).Variables such as the firm size involved in the deal affect the success of mergers and acquisitions, though there has never been consensus on the ideal ratio (Ahuja & Katila, 2001; Cohen & Levinthal, 1990). Mergers and acquisitions can influence how a firm manages its risk management, which in turn can influence financial performance. Mergers and acquisitions can affect an organization's risk management, including credit and liquidity risk, and thus its financial performance. Non-performing loans are reduced with proper credit risk management, leading to greater financial performance. Proper liquidity risk management, on the other hand, lets the company pay its bills as they come due, so it does not lose

money because of penalties from third parties, get in trouble with regulators, or hurt its brand name (Chui, 2011; Harelimana, 2017).

The anchoring theory in the study was the synergy theory (Ansoff, 1968). The synergy theories explain that firm mergers and acquisitions are a strategy toward growth derived from various synergies such as financial, operating, and managerial efficiency. The idea also emphasizes that mergers and acquisitions generate value, since 2+2=5. The theory supports mergers and acquisitions, institutional characteristics, and financial performance because when organizations combine, they are theoretically expected to grow and improve their financial performance. The resource-based perspective supported mergers and acquisitions, institutional characteristics, and financial performance (Penrose, 1959). Mergers and acquisitions, risk management, and financial performance are all supported by concentration theories (Eckbo, 1985).

In Kenya, commercial bank mergers and acquisitions date back to 1989, when nine banks merged to form the Consolidated Bank of Kenya. By 2021, the banking sector will have seen 57 mergers and acquisitions. Commercial bank mergers and acquisitions are distinguished by their dynamic regulatory approach to evolving risk. Mergers and acquisitions became extremely popular following the 2008 financial crisis, which resulted in numerous bank failures. Locally, the Central Bank of Kenya issued prudential guidelines in 2013 that increased the requirements for capital adequacy and liquidity ratios. Commercial banks that were unable to comply with the new laws were compelled to pursue alternate methods, including mergers and acquisitions, to assist them comply with the regulator's declaration (CBK, 2020).

Problem statement

The problem should be identified as pertaining to the study area. It should answer the question of the problem being studied in the specific study location. The problem statement should have at least four paragraphs. Paragraph one should discuss the conceptual relationship among the variables and why they are important and any conceptual gap in a pyramid format i.e stating from global, regional and finally local. Paragraph two should discuss context of the study and the contextual gaps again in a pyramid format. Paragraph three should discuss studies on the topic plus

the gaps clearly stating the nature of the research gap in a pyramid format. Paragraph put a summary of the identified research gap and ends with a research question which captures the reason why the study is being carried out.

Research Gap

A research gap is, simply, a topic or area for which missing or insufficient information limits the ability to reach a conclusion for a question. It should not be confused with a research question, however. For example, if we ask the research question of what the healthiest diet for humans is, we will find many studies and possible answers to this question. On the other hand, if we were to ask the research question of what the effects of antidepressants on pregnant women are, we would not find much-existing data. This is a research gap. When we identify a research gap, we identify a direction for potentially new and exciting research.

Considering the volume of existing research, identifying research gaps can seem overwhelming or even impossible. I don't have time to read every paper published on public health. Similarly, you guys don't have time to read every paper. So how can you identify a research gap?

There are different techniques in various disciplines, but we can reduce most of them down to a few steps, which are:

- Identify your key motivating issue/question
- Identify key terms associated with this issue
- Review the literature, searching for these key terms and identifying relevant publications
- Review the literature cited by the key publications which you located in the above step
- Identify issues not addressed by the literature relating to your critical motivating issue

Types of Research Gap

Identifying research gaps is an essential step in conducting research, as it helps researchers to refine their research questions and to focus their research efforts on areas where there is a need for more knowledge or understanding.

1. Knowledge gaps

These are gaps in knowledge or understanding of a subject, where more research is needed to fill the gaps. For example, there may be a lack of understanding of the mechanisms behind a particular disease or how a specific technology works.

2. Conceptual gaps

These are gaps in the conceptual framework or theoretical understanding of a subject. For example, there may be a need for more research to understand the relationship between two concepts or to refine a theoretical framework.

3. Methodological gaps

These are gaps in the methods used to study a particular subject. For example, there may be a need for more research to develop new research methods or to refine existing methods to address specific research questions.

4. Data gaps

These are gaps in the data available on a particular subject. For example, there may be a need for more research to collect data on a specific population or to develop new measures to collect data on a particular construct.

5. Practical gaps

These are gaps in the application of research findings to practical situations. For example, there may be a need for more research to understand how to implement evidence-based practices in real-world settings or to identify barriers to implementing such practices.

Example of a problem statement with research gaps

"Commercial banks operate in an ever-evolving operating and legal environment. The risks facing commercial banks are becoming more sophisticated and complex daily with the emergency of technology and digital lending platforms accompanied by an increase in online fraudsters and hackers. There are increasing corporate governance issues, which are putting customer's deposits into risk. As such, the regulator has instituted a stringent operating and legal environment with which commercial banks are bound to comply. The financial crisis of 2008, when there was a mass of bank failures, opened the door for regulators to tighten the regulations to avoid such an occurrence. In Kenya, the Central Bank comes up with prudential guidelines, which all commercial banks are bound to comply. Commercial banks are further bound to follow Basel's committee guidelines as well as international accounting standards and more so (IFRS 9) in consideration of impairments of financial assets and liabilities.

The guidelines, pronouncements, and frameworks, which the banks are bound by makes some commercial bank unable to comply and therefore look for where mergers and acquisitions become the most solemn way to enhance compliance and competitiveness (CBK, 2020; Nguli&Kyule, 2020; Kumar& Bansal, 2008; Kathali, 2014). Mergers and acquisitions facilitate the creation of entities with a large capital base and a sufficient liquidity ratio. It also enables entities to find a soft landing for growth and diversification, tax savings, market power domination, and overall improved financial performance. The synergies brought about by mergers and acquisitions also facilitate proper risk management due to the combination of homogenous resources (Chui, 2011; Ciobanu et al., 2014; Filipovic, 2012; Heller, 2013).

Mergers and acquisitions can be traced back to 1989, when nine banks merged to form the Kenya Consolidated Bank. Since then, the trend has gained traction with 57 commercials considering mergers and acquisitions as of December 2021. The trend observed reveals that most of the entities acquired have been performing in a dismal manner while the entities that acquired them have been performing extremely well. In Kenya, recent mergers and acquisitions include the National Bank of Kenya and Kenya Commercial Bank of Kenya, the State Bank of Mauritius and the Chase Bank of Kenya, Equity bank and spire bank, and Access bank and Transnational bank. A performing bank and a non-performing bank are involved in the mergers and acquisitions. Other mergers,

such as that of NIC and CBA to form NCBA, involved two performing banks seeking synergies. Some commercial banks are under statutory management, which included Dubai Bank and Imperial Bank, due to non-compliance with the regulator's guidelines, which also pointed toward corporate governance problems (Asokoinsight, 2020; Catton, 2019).

The wave of bank mergers and acquisitions has attracted academicians and researchers to equal measures. The direct relationship has been widely studied on mergers, acquisitions, and financial performance as evidenced by the reviewed studies whose findings and conclusions are varied. The varied findings and conclusions could point towards varied methodologies, population characteristics, context of the study, and assumptions made. A study on the direct connection for both mergers and acquisitions that discovered and concluded that mergers and acquisitions resulted in improved financial performance is an example (Ibeji, 2015; Kathali, 2018; Korir, 2006; Ogada et al., 2016; Ombaka&Jargongo, 2018; Mwanza, 2016). Further reviewed studies on direct relationships whose findings and conclusions indicated that mergers and acquisitions do not have a direct impact on the financial performance of commercial banks included those of (Chesang, 2002; David, 2011; Ochieng, 2006; Marembo (2012), Muya, 2006; and Ndura, 2010). Harney (2011) did more research that was contradictory and found no link between M&A activity and how well commercial banks did financially.

Local studies have looked at the direct connection between mergers and acquisitions and financial performance. The investigations did not consider any factors that could strengthen or weaken the correlation between the predictor and outcome variables. The investigation also did not consider intervening variables. The highlighted studies reviewed in the local context included those of Juma et al., 2012; Kathali, 2018; Ombaka&Jagongo, 2018; and Wango'mbe, 2015). International studies reviewed, which also followed a direct relationship, included those of Asli et al., 2014; Nga &Kamolrat, 2007). Following the above shortcomings, these studies will be submitted to address the concept of moderating and intervening variables in the association among predictor and outcome variables in a local context.

The studies reviewed have also revealed varied methodological approaches and population characteristics. Some of the studies reviewed revealed that the researchers used small samples, which could result in an increase in margins of error and hence unreliable results

(Njeru&Gathuku, 2015; Kathali, 2014; Waqas, 2019). This study will endeavor to study the aggregate population for accurate and reliable results. Other studies reviewed have used a span of one year before and after mergers and acquisitions, which is a short period for the effect of the event to be felt (Putri V, 2010). This study will use an average of three years before and after mergers and acquisitions, with the deal year being excluded. Other studies reviewed have used primary qualitative data, which is expensive, time-consuming, and sometimes biased due to human emotion variations. This study will use secondary quantitative data, which is more reliable and is available to the public (Muriithi et al., 2016; Yimka et al., 2015; Muriithi & Waweru, 2017; Orangi et al., 2019).

The reviewed studies present three main research gaps. First is the conceptual gap, where the reviewed studies yielded different findings and conclusions, driving toward insufficient knowledge of the in the subject matter. Some studies revealed that mergers and acquisitions result in increased financial performance while others indicated that the relationship is mutually exclusive. Still others indicated that mergers and acquisitions have no impact on the financial performance of commercial banks. The second is the methodological gap, where the reviewed studies present variations in sample size, duration of data collection, and data collection techniques. The third is the contextual gap, which ties with the methodological gap, where the reviewed studies in developing and developed economies have focused on direct associations amongst the predictor and the outcome variables while ignoring the role of moderating and intervening variables. The study intended to fill the gaps identified and empirically test the relationship between mergers and acquisitions, risk management, institutional characteristics, and financial performance among commercial banks in Kenya."

Research Objectives

Research objectives are specific, measurable, and achievable goals that you aim to accomplish within a specified timeframe. They break down the research aims into smaller, more manageable components and provide a clear picture of what you want to achieve and how you plan to achieve it. Objectives can be general or specific. The general objective of your study states what you expect to achieve in general terms. Specific objectives break down the general objective into smaller, logically connected parts that systematically address the various aspects of the problem.

Example

Main Objective: The study endeavored to establish the relationships amongst mergers and acquisitions, risk management, and institutional characteristics on the financial performance among commercial banks in Kenya. The specific objectives of the study were-

i. *To establish the effect of mergers and acquisitions on financial performance among commercial banks in Kenya*

ii. *To determine the effect of institutional characteristics on the relationship between mergers and acquisitions and financial performance among commercial banks in Kenya*

iii. *To investigate the effect of risk management on the relationship between mergers and acquisitions and financial performance among commercial banks in Kenya*

iv. *To examine the joint effect of mergers and acquisitions, risk management and institutional characteristics on financial performance among commercial banks in Kenya*

Research Question or Hypothesis

Research questions and hypothesis are normally derived from the research objectives. It is not mandatory to have the questions or hypothesis stated in this section as it is repeated in section 2 of the project when describing the conceptual framework. Research questions are used in projects while hypothesis is used in thesis writing. The difference between a thesis and a research project that; thesis is generally larger in scope, has a more theoretical basis, and a deeper contribution to the field.

Example of research hypothesis

H_1: *There is no significant relationship between mergers and acquisitions and the financial performance among commercial banks in Kenya.*

H_2: *There is no significant moderating roles of institutional characteristics on the relationship between mergers and acquisitions and financial performance among commercial banks in Kenya.*

H_3: *There is no significant intervening role risk management on the relationship between mergers and acquisitions and financial performance among commercial banks in Kenya.*

H_4: *There is no significant joint relationship of mergers and acquisitions, risk management and institutional characteristics on financial performance among commercial banks in Kenya.*

Significant of the study

The significance of a study is its importance. It refers to the contribution(s) to and impact of the study on a research field. The significance also signals who benefits from the research findings and how. The significant of the study underpins the users of the research report, for examples academician, policy makers, regulators etc. An example from a thesis report excerpt below:

"The investigation results and conclusions have a significant impact on financial theories, particularly those that support or oppose mergers and acquisitions and financial performance requirements. The findings serve as a foundation for decision-making by connecting theories to practice. By empirically investigating the factors, the data feeds theories with competing opinions.

The study's findings contribute to policy-making practices, as they it informs the regulator in their design of policies, especially those touching on mergers and acquisitions. The regulator can either formulate policies that encourage mergers and acquisitions among commercial banks or discourage them, depending on the objectives. The findings also shed light on other elements that affect merger and acquisition financial performance, which may be of concern to regulators.

The study's findings advise decision-makers about whether mergers and acquisitions are beneficial to the firm's vision. The conclusions of the study would also advise decision-makers about other aspects to consider, which could either enhance or diminish the relationship between mergers and acquisitions and financial success, or even mediate it. The research assists academia by expanding current knowledge of mergers and acquisitions. The study's findings enable future academics to go further both within and outside of the context."

Limitation and Delimitation

Limitations reflect the shortcomings of your study, based on practical or theoretical constraints that you faced or anticipating facing i.e. lack of data, lack of literature on the topic etc. Contrasted to that, delimitations reflect the choices that you made in terms of the focus and scope of your research aims and research questions. DELIMITATIONS are what you decide upfront will be the boundaries, restrictions or fences of your research. For example, you may decide to restrict your population or sample, or to restrict the time of your study, its geographic location, the theories you're modelling, or some other boundary.

Chapter Two: Literature Review

A literature review discusses published information in a particular subject area, and sometimes information in a particular subject area within a certain period. A literature review can be just a simple summary of the sources, but it usually has an organizational pattern and combines both summary and synthesis. There are two types of literature review as discussed below:

Theoretical Literature Review

The theoretical literature review helps to establish what theories already exist, the relationships between them, to what degree the existing theories have been investigated, and to develop new hypotheses to be tested. Each theory should have at least three paragraph i.e Para1: the origin of the theory and how it works; Para2: a critique of the theory by other and the relevance of the theory to your study. There are two types of theories i.e. anchoring theory and supporting theories. Anchoring theory is the main theory and should at least support three or more variables while supporting theories should support at least two variables. Example from a thesis excerpt;

According to the theory of synergy, the combined effect of a group of things is greater than the su m of their individual parts.When two companies merge, synergies result in enhanced efficiency th at neither could have achieved individually (Gaughan, 2010;Sherman, 2010).When two business es work together, it's like getting a free bonus of value, because 2+2 always equals 5. When two c ompanies join forces through a merger or acquisition, the combined entity is expected to perform better than either one would individually. If we extrapolate this analogy, we find that the combin ed firm has a higher net present value (NPV) than the sum of its individual components (Hasen, 2015).

The concept of synergy holds that the aggregate is superior to segments. Synergies are the results of the merger of two firms in which the combined firms outperform the isolated firm (Gaughan, 2010; Sherman, 2010). When two businesses merge in such a way that 2+2=5, value addition occurs as a byproduct. When it comes to mergers and acquisitions, it shows that when two companies combine, their performance improves. This example implies that the combined firm earns more profit than an isolated firm, i.e., NPV firm XY>NPV X+NVP Y. (Hasen, 2015).

Ansoff (1968), who argued that synergies are a major component of an organization's product-market strategy, originally promoted the theory. Hiroyuki (1991), who argues that real synergy occurs when each entity utilizes its intangible assets efficiently, expounded the theory. Barney (1991) further developed the theory by incorporating tangible capital, human capital, and organizational capital, which can be used to cause synergistic effects through mergers and acquisitions, as the resources are unique and cannot be imitated. Weston (1998) added managerial synergies, operating synergies, financial synergies, and undervaluation effects to the theory to explain how the total value of a company goes up when it is taken over, restructured, or has better corporate governance.

This theory has been criticized on the basis that it is not possible to address the synergies that will be derived in the future during the due diligence stage if the intervening factors are not well managed post-consolidation (Rappaport, 1998). Damodaran (2005) argues that it is not possible to measure synergies due to the numerous assumptions made during the valuation stage. Consolidation pegged to the synergistic relationship requires a well thought out post-consolidation implementation as there is no redress for mergers and acquisitions and premiums are paid upfront (Campbell &Goold, 1998). McGee & Channon (2014) also analyzed the theory based on lack of strategic fit, especially if it involves an unrelated industry, i.e., some aspects like those that managerial synergies may not be realized due to different managerial expertise.

Financial, operational, and managerial synergy are the 3 types of synergy. When a company grows and risk diversifies, financial synergies emerge from lower capital expenses. Operational synergies improve the firm's operations by achieving economies of scale through the distribution of constant expenses and cost efficiencies because of the large size of transactions; economies of scope are achieved using shared resources; and market power is achieved through price leadership.

Managerial efficiencies are obtained through the addition of new talent by both firms' management (Hitchner, 2003). The synergy theory underpins this study, which supports the link between mergers and acquisitions and financial performance. According to the theory, mergers and acquisitions result in operational, managerial, and financial efficiencies".

Empirical Literature Review

An empirical literature review, also known as a systematic literature review, analyzes previous empirical studies to provide an answer to a specific research topic. Rather than drawing information from theories or beliefs, empirical research relies on observations and measurements to arrive at conclusions. The studies reviewed should take the pyramid pattern where global studies begins, followed by regional studies and finally local studies. The studies reviewed should be the most recent with recency defined as a period of 5 years and below .The studies should be reviewed in the manner of : Independent Variable versus Dependent Variable, Independent Variable versus Dependent Variable plus Intervening Variable, Independent Variable versus Dependent Variable plus Moderating Variable and Joint Effect of Independent Variable, Intervening Variable and Moderating Variable on Dependent Variable with each having at least four paragraph. The format of the review depends on the number of the variables in the study. All studies reviewed must be critiqued and that is what generates the research gaps. An example from a thesis excerpt:

"Mergers and Acquisitions and Financial Performance"

"Umoren and Olokoyo (2007) investigated the financial results of Nigerian commercial banks following major mergers and acquisitions. Thirteen bank mergers and acquisitions were studied, with financial performance measured using return on equity 2 years beforehand and 2 years afterwards merger and acquisition (ROE). The results of the study showed an incremental post-merger financial performance as determined by the change in ROE following mergers and acquisitions. The study was conducted in a different setting and with a smaller sample size. The research will be conducted in a more local setting with a larger sample size. ROA was used in the study to indicate earning potential.

Haruna et al. (2017) investigated the impact of mergers and acquisitions on firm financial results in Ghana. The combined bank produced better financial results, according to the study's findings. When compared to revenue and assets, NPM and ROCE increased slightly, which could be

attributed to consolidation-related expenses. Because no moderating or intervening variables were included in the study, the findings may not be generalizable. Furthermore, the study only used two banks, which may not be enough for regression analysis and representation. The goal of this study is to investigate how changing and intervening variables affect the relationship between consolidation and financial performance. Because the population was small, the census method was used rather than sampling.

Rashid and Naeem (2017) investigated the implications of business consolidation in Pakistan. The sample consisted of 25 mergers that occurred between 1995 and 2012. Profitability and liquidity ratios were computed. Consolidation has no significant impact on a firm's financial success, according to the study's findings. This contradicts the findings of Awdeh and EL-Moussaw (2011), who discovered that consolidation increases profitability slightly; Inoti et al. (2014), who discovered that consolidation has no effect on financial performance; and Kimotho (2018), who discovered that consolidation improves financial performance.

Fatima and Shehzad (2014) explored the impact of mergers and acquisitions on Pakistani banks' financial results. The study's sample was drawn from ten banks that merged between 2007 and 2010. They investigated the effects of mergers. The study lasted three years before the merger and three years afterward. The financial ratios used to assess financial success were return on assets, return on equity, debt to equity ratio, deposit to equity ratio, and earnings per share. The research discovered that, except for ROE, which had a non-normal distribution, all ratios had a normal distribution. Mergers, according to the study's findings, do not improve financial performance.

Muhammad, Waqas, and Migliori (2019) explored the impact of mergers and acquisitions on Pakistani banks' financial performance. Data for the investigation were gathered for the banks that combined between 2004 and 2015. From a population of 30 banks, 15 were chosen using a purposive sampling method. The impact of mergers and acquisitions on the bank's financial performance was empirically assessed using panel data. Financial performance metrics included the advance to deposit ratio, cash to asset ratio, current ratio, return on assets and return on equity, net profit margin, and gross profit margin. According to the investigation, the merger increased liquidity, investment, and profitability ratios while decreasing solvency, indicating a negative relationship".

Summary of Literature Review and Research Gaps

This is a table that captures the key research gaps identified and how they are expected to be filled in the current study. Example:

Table 6: Summary of Literature Review and Research Gaps

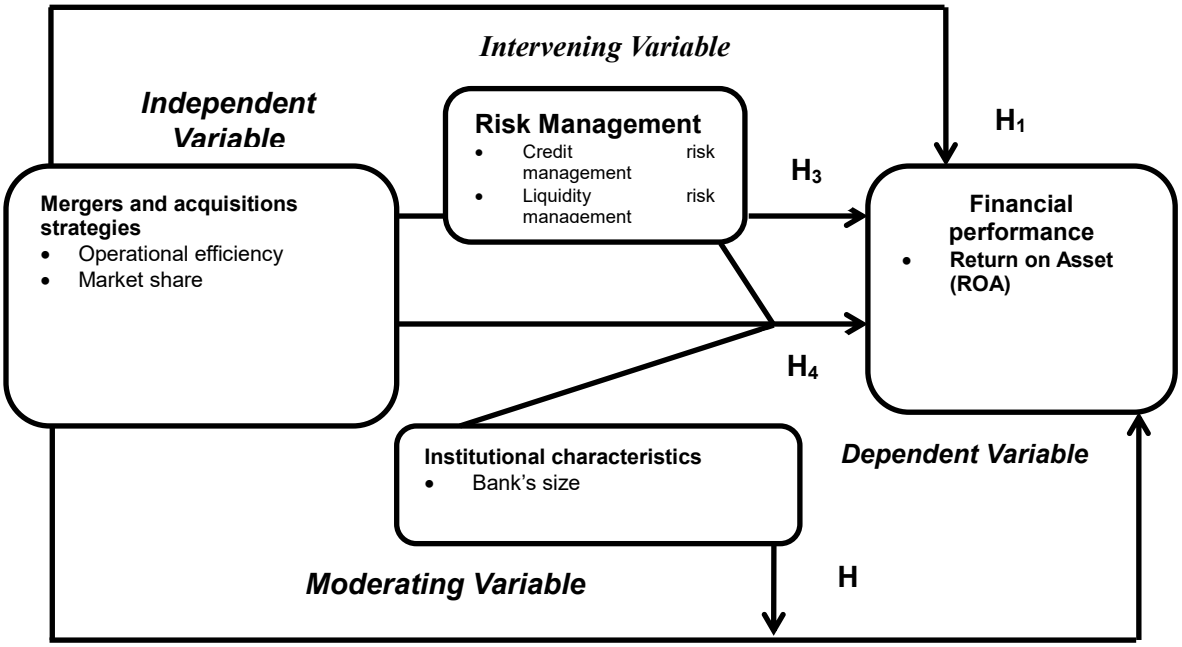
Author(s)	Country	Focus of the Study	Main Findings	Limitations (Research Gaps)	How Gaps were Addressed in the Current Study
Suehiro (2002)	Thailand	Bank's restructuring and risk management.	There was improvement in NPL after the bank's restructuring.	-Only one aspect of risk management was analyzed. -The moderating role of institutional characteristics was not considered.	-Three aspects of risk management were analyzed. -The moderating effect of institutional characteristics was being considered.
Worldbank (2003)	U.S.A	Bank Concentration and Financial performance	Acquisitions and mergers have a favorable impact on financial success.	-The study was conducted in a developed context. -Moderating and intervening variables were not tested.	-This study was done in a local developing context. -Moderating and intervening effect of institutional characteristics and risk management was being considered.

Source: Author

The Conceptual Framework

A conceptual framework is a representation of the relationship you expect to see between your variables, or the characteristics or properties that you want to study. Conceptual frameworks can be written or visual and are generally developed based on a literature review of existing studies about your topic. A conceptual framework should include the hypothesis. Visual conceptual framework is commonly used .Tough not included in the below model, a conceptual framework should include the measurements of variables. See example below:

Table 7: Conceptual Model



Source: Author

Research Hypothesis

The research hypothesis should be stated in null form;

Example

H_1: *There is no significant relationship between mergers and acquisitions and the financial performance among commercial banks in Kenya.*

H_2: *There is no significant moderating roles of institutional characteristics on the relationship between mergers and acquisitions and financial performance among commercial banks in Kenya.*

H_3: *There is no significant intervening role risk management on the relationship between mergers and acquisitions and financial performance among commercial banks in Kenya.*

H_4: *There is no significant joint relationship of mergers and acquisitions, risk management and institutional characteristics on financial performance among commercial banks in Kenya.*

Chapter Three: Research Methodology

This Chapter highlights methodological details appropriate to the study. Thus:

Research Philosophy

State and justify the chosen philosophy

Practical example

"The framework and assumptions that guide data collection, analysis, and utilization of a phenomenon are referred to as research philosophy. The research philosophy supports the research strategy and methods used in data analysis and interpretation (Saunders, Lewis, & Thornhill, 2007). Research philosophy also refers to the primary concepts that inform the researcher's decision on the research position to be adopted. (Carson, Gilmore, Perry, and Gronhaug, 2001): What, how, and why the research is done will depend on the research philosophy.

There are two major philosophies in business and management, which include phenomenology and positivism. The Phenomenological research paradigm supports qualitative research and concentrates on an individual's lived experience. The paradigm is skewed toward events as they occur, with no regard for theory, deduction, or assumptions. The paradigm stresses people's experience rather than an empirical or scientific approach. The synonyms for phenomenological paradigms are qualitative, subjectivist, humanistic, or translation paradigms, while those of positivistic paradigms are quantitative, objective, scientific, experimentalist, or paradigm of traditional research (Blumberg et al., 2005).

A phenomenological research paradigm or mindset is a perception of human conduct from the researcher's point of view. The act of investigating the truth within the realm of thought, therefore, seems to have an impact on what is real. According to Miller and Salkind (2002), a researcher who applies a phenomenological paradigm concentrates on the definitions people relate to the actual encounters pertaining to a situation or object instead of estimating it. This infers that this kind of researcher must individually interact with the object under study. By applying this kind of approach, specialist advisories are looked after instead of drawing samples from people (Collis & Hussey, 2003).

Positivists often assume that truth is given indefinitely and can be explained by measurable structures separate from the investigator and his or her instruments. According to reasoning by Orlikowski and Baroudi (1991), positivist research often tries to experiment with the theory to expand predictability of conditions. Orlikowski and Baroudi (1991) support the suggestion that positivism is effective where there is documentation of sanctioned proposals, measurable changes, hypothesis testing, and hypothetical illustration of the object from the representation of the population ascertained.

Positivism as a research philosophy guided this study. The paradigm shifts toward a quantitative method of phenomena analysis, causality research, and concept testing (Orlikowski &Baroudi, 1991; Saunders et al., .2007). The study adopted this paradigm as it involved the use of both theoretical and empirical literature, the development of a conceptual framework, hypothesis testing, and establishing the causal link among the study variables".

Research Design

State and justify the chosen design

Practical example:

"A research design is an overview, blueprint, or sketch for carrying out a study while controlling the variables that could affect the legitimacy of the findings (Burns & Grove, 2010). The adhesive or fixtures that carry elements of the study together are also known as the design (Trochim, 2005). Research blueprints are used to structure the study by demonstrating how the main components of

the research study relate to each other and endeavor to answer the research questions. Exploratory, descriptive, and explanatory research designs are the three main types of research designs (Bhattacherjee, 2012).

A correlational descriptive research design, which is relevant in this study, is the research design that facilitates a study analyzing correlations among study variables (Konthari& Garg, 2014). A correlational descriptive research design was used for the study, which included time series data. The design attempted to establish correlations between study variables as well as characterize the characteristics of phenomena (Konthari& Garg, 2014; Cooper& Schindler, 2008)".

Population

Describe the study population; describing specifically who will be part of the study. Keep in mind the UNIT of measurement.

Practical example:

" A population is the aggregate of all cases that conforms to some designated set of specifications (Nachmias and Nachmias, 1996). The target population of this study was top 100 mid-sized firm's survey in Kenya. It was carried out in Nairobi at the KPMG and Nation Media Group survey of Top 100 firms. Some of these firms have applied for listing in the Nairobi securities exchange but because of one or two reasons they have not been able to be listed. These firms were segmented into segments that is the agricultural; commercial and services; investment, banking and energy; manufacturing, construction and automobiles and telecommunication and technology market segments to find out the factors that affect access to the capital markets. The target population as per segment is presented in table 3.1. Refer to Appendix III and Appendix IV".

Table 3.1 Target population

	Market Segment	*Medium firms*	*Small firms*	*Total*
1	*Agricultural*	*1*	*2*	*3*
2	*Commercial and services*	*22*	*34*	*56*
3	*Investment, banking, and energy*	*3*	*2*	*5*
4	*Manufacturing, construction, automobiles*	*13*	*7*	*20*
5	*Telecommunication and Technology*	*7*	*9*	*16*
	TOTAL	***46***	***56***	***100***

Source: Author

Sampling Techniques

Explain clearly the methods that will be used to select the sample

Example.

"The study used stratified random sampling technique to select a sample size for Commercial and services Manufacturing, construction and Allied and Telecommunication and Technology enterprises firms. This is because the population has some distinct categories. According to Mugenda and Mugenda (2003 cited in Konthari, 2011) the goal of a stratified random sampling is to achieve desired representation from various sub-groups in the population. Census technique was used to select a sample size for Agricultural and Investment, Financing enterprise firms. This is because their target population was small. Therefore 96 SMEs owners were selected from the list of 100 SMEs which constituted the sample population for the study".

Table 8 Sample size

	Market Segment	Medium	Small	Total population	Medium firms	Small firms	Total Sample
1	Agricultural	1	2	3	1	2	3
2	Commercial and services	22	34	56	21	33	54
3	Investment, banking, and energy	2	3	5	2	3	5
4	Manufacturing, construction, automobiles	13	7	20	12	7	19
5	Telecommunication and Technology	7	9	16	7	8	15
	TOTAL	**45**	**55**	**100**	**43**	**53**	**96**

Source: Author

Sample Size Determination

Describe how the sample size will be computed invoking the formulae to be used.

"Kothari (2004) defines a sample as the selected respondent representing the population. The major criterion used when deciding on the sample size is the extent to which the sample size represents the population. The study used Fisher's formula to come up with a sample size. Based on the fisher formula below the minimum target sample for a large population are 96 cases. This formula ignores the large population when coming up with sample. Using this formula assures a representative sample. The Fisher (1983) formula given below:

$n=Z^2*p*(1-p)/d^2$

Where:

n = Sample size

Z = Normal distribution Z value score, (1.96)

p = Proportion of units in the sample size possessing the variables under study, where for this study it is set at 50% (0.5)

d = Precision level desired or the significance level which is 0.1 for the study

The substituted values in determining the sample size for a large population are as follows.

$$n = \frac{(1.96)^2(0.5)(0.5)}{(0.1)^2} = 96$$

The sample size for the study will hence be 96 respondents".

Data Collection instruments

Explain the instruments that will be used in the study and how they will be constructed

"The researcher used both the primary and secondary methods of data collection. Secondary data were obtained from reports, journals, publications and articles related to the research topic while primary data were collected through semi structured questionnaires which contained questions that are designed to collect data in accordance with the research objectives. The questionnaires were developed to contain both open and close ended questions. A questionnaire is a research instrument consisting of a set of questions (items) intended to capture responses from respondents in a standardized manner (Bhattacherjee, 2012). Questionnaires may be structures or unstructured and consists of a number of questions printed or typed in a definite order on a form or set of forms. According to researchers, questionnaires are preferred for primary data collection because they are less costly, especially when the population is large and widely spread geographically. They ensure anonymity, permit use of standardized questions and ensure uniform procedures. It also ensures that respondents who are not easily approachable are reached conveniently. Besides, questionnaires can provide time for respondents to think about responses and are easy to administer and score (Kothari, 2011)".

Pilot Study

Describe how piloting and pre-testing centers will be selected. [This will depend on the type of study.

"The researcher carried out a pilot test before the final and actual data collection process. Pilot studies are important in detecting ambiguity, evaluating the type of answers given to determine whether they help the researcher to achieve the laid down objectives (Robson, 2007). Mugenda & Mugenda (2003) reported that a pre-test sample should be between 1% and 10% depending on the sample size. The respondents who participated in the pilot study were excluded in the final study. The findings from the pilot study were used to refine the questionnaire for final administration".

Data Validity

Explain how the validity of the instruments will be established

"The research used criterion-related validity by establishing concurrent validity whereby these mid-sized firms were segmented into segments that is the agricultural; commercial and services; investment, banking and energy; manufacturing, construction and automobiles and telecommunication and technology market segments to find out the factors that affect access to the capital markets (Elstak, 2013). The study used stratified random sampling technique to achieve desired representation from various sub-groups in the population.

The Top 100 mid-sized firms were divided into stratum on the basis of market segment categories with a total of 96 companies out of which one hundred (100) sampled randomly for the study of which some have applied for listing in the Nairobi securities exchange. The researcher got respondents from each of the sampled categories within the strata to respond to the research questionnaire. The researcher used determines Cronbach's Alpha tointernal consistency reliability which will use (Cronbach, 1946, cited by Bhattacherjee (2012) and when the reliability analysis test is carried out and found to be greater than 0.70, it should indicate that it's a good scale to perform the analysis".

Data Reliability

Show and explain how the reliability of the instruments will be established N.B. IF using standardized test, quote test and existing validity and reliability levels.

"Reliability is the extent to which any measuring procedure yields the same results on repeated trials (Neuman, 2010). In many areas of research, the precise measurement of hypothesized processes or variables (theoretical constructs) poses a challenge by itself. In general, in all social

sciences, an unreliable measurement of people's beliefs or intentions obviously hampers efforts to predict their behaviour. Reliability and item analysis can be used to construct reliable measurement scales, to improve existing scales, and to evaluate the reliability of scales already in use. Specifically, Reliability and item analysis aided in the design and evaluation of sum scales, that is, scales that are made up of multiple individual measurements (different items, repeated measurements, different measurement devices, etc.) (Creswell, 2008). The program computed numerous statistics that allowed the user to build and evaluate scales following the so-called classical testing theory model. The assessment of scale reliability is based on the correlations between the individual items or measurements that make up the scale, relative to the variances of the items (Sekaran, 2006). In this context the definition of reliability is straightforward: a measurement is reliable if it reflects mostly true score, relative to the error".

Diagnostics Tests

To verify that the information was free from any bias caused by the linear regression model suppositions, a diagnostic test is normally performed. Examples of the tests include:

- Linear Relationship: The core premise of multiple linear regression is the existence of a linear relationship between the dependent (outcome) variable and the independent variables. This linearity can be visually inspected using scatterplots, which should reveal a straight-line relationship rather than a curvilinear one.
- Multivariate Normality: The analysis assumes that the residuals (the differences between observed and predicted values) are normally distributed. This assumption can be assessed by examining histograms or Q-Q plots of the residuals, or through statistical tests such as the Kolmogorov-Smirnov test.
- No Multicollinearity: It is essential that the independent variables are not too highly correlated with each other, a condition known as multicollinearity. This can be checked using:
- Correlation matrices, where correlation coefficients should ideally be below 0.80.

- Variance Inflation Factor (VIF), with VIF values above 10 indicating problematic multicollinearity. Solutions may include centering the data (subtracting the mean score from each observation) or removing the variables causing multicollinearity.
- Homoscedasticity: The variance of error terms (residuals) should be consistent across all levels of the independent variables. A scatterplot of residuals versus predicted values should not display any discernible pattern, such as a cone-shaped distribution, which would indicate heteroscedasticity. Addressing heteroscedasticity might involve data transformation or adding a quadratic term to the model.

Data Analysis and presentation

Explain the methods that will be applied in analyzing the data

"According to Mugenda and Mugenda (2005) data obtained from the field in raw form is difficult to interpret. The data was cleaned, coded, and key-punched into a Statistical Package for social Sciences (SPSS) for analysis so that the researcher was able to make sense out of the data. The researcher used descriptive statistics to summarize the data. The researcher used both open-ended and closed-ended questions. The open-ended questions were analyzed qualitatively based on their content as closed-ended questions were analyzed using measures of central tendencies, measures of dispersion, frequency tables, bar graphs, pie charts, and percentages. The researcher also used inferential statistics which entails correlation, ANOVA (Analysis of variance) and multiple regression analysis. The regression equation that was used is:

$[Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e]$, *where;*

Y- *Access to capital markets*

α – *Constant term*

β_1 - *Beta coefficient*

X_1 - *Capital contribution*

X_2 – *Information access*

X_3 - *Legal and regulatory requirement*

X_4 – *Cost of listing*

e *– Error term*

This is to determine whether there is a linear relationship between the variables. The researcher also used Spearman Rank correlation Coefficient whose purpose was to establish whether there is any form of association between two variables when the variables are arranged in a ranked form according to Lucey (2010)".

Ethical considerations

This section must be done in conformity with Ethical Review Committee recommendations. The proposal will be submitted to an Ethical Review Committee before approval for commencement of the study.

"In the carrying out this research all the information collected were held confidentially and all participants were informed about it. No respondent was subjected to any form of intimidation and all respondents remained anonymous throughout the study. All participants were required to give their informed consent prior to participating in the study. Those who did not wish to participate were excused from the study".

References

References should be single spaced and listed alphabetically in the reference list. Student should use citation style recommended by their universities, though APA is commonly used. Examples of APA citation style :

Aggarwal et al. (1998), *"Volatility in Emerging Stock Markets, Proceeding for the Conference: Alternative Structures for Securities Markets",* Capital Markets Research Center, Georgetown University, School of Business, Washington, D.C., September 10-11

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Appendices

Will include such items as work plan, budget, maps, questionnaires, etc. numbered sequentially.

Work plan

	April 2023	May 2023	June 2023	July 2023	August 2023	Sept 2023	Oct 2023	Nov 2023
Identification of topic								
Presentation of concept paper								
Development of proposal								
Literature review								
Proposal presentation								
Piloting of instruments								
Data collection								
Data processing and analysis								
Report writing								
Presentation of the final research report								

Budget

Item Description	Quantity Description	Quantity	Unit Price - Kshs	copies/number of items	Cost- Kshs
Stationery	Pieces	1	2,000	2	4,000
Photocopying	Pages	55 pages	3	10	1,650
Typing	Pages	55 pages	10	9	4,950
Spiral binding services	Pieces	20	100	-	2,000
Internet bundles	hours	90 days	50	-	4500
Book binding	Pieces	10	400	9	36,000
Data gathering costs	Person	2	10,000	-	20,000
Contingency 10%					7,310
Total					**80,410**

Secondary Data Collection Template

Year	Firm in KES	Excise Duty collected in KES	Import Duty collected in KES	Value Added Tax collected in KES	Net Income In KES	Total Assets in KES
2017						
2018						
2019						
2020						
2021						
2022						

Sample Questionnaires

This data collection tool is aimed at collecting information on "**SMALL AND MEDIUM SIZED ENTERPRISES AND ACCESS TO CAPITAL MARKET IN KENYA. A CASE OF TOP 100 MID-SIZED FIRMS".** Kindly answer the following questions as honestly and accurately as possible. The information given will be treated with a lot of confidentiality. Please do not write your name anywhere on this questionnaire. You are encouraged to give your honest opinion.

Part 1: Demographic Information

1. Gender of respondents

   a) Male [ ]
   b) Female [ ]

2. How old are you? (Years)

   a) Less than 28 years: [ ]
   b) 29-39 years: [ ]
   c) 40-50 years: [ ]
   d Over 50 Years:[ ]

3. What is your level of education?

   a) Less than High school[ ]
   b) College [ ]
   c) Undergraduate [ ]
   d) Post Graduate [ ]

4. How long have you worked in this firm?

   a) less than 5 year [ ]
   b) 6 to 10 years [ ]
   c) 11 to 15 years[ ]
   d) More than 16 years [ ]

5. In which market segment does your company lie?

a) Agricultural [ ]

b) Commercial and services [ ]

c) Investment, banking, or energy [ ]

d) Manufacturing, construction or automobiles[ ]

e) Telecommunication and Technology[ ]

6. Has your company ever applied for listing in the GEMS?

Yes [ ] No [ ]

7. How would you rate the performance of capital markets in Kenya?

a) Extremely dissatisfied [ ]

b) Dissatisfied [ ]

c) Neutral [ ]

d) Satisfied [ ]

e) Extremely satisfied [ ]

8. What do you think make companies that are able and eligible for listing not to be listed in the GEMS?

a) Strict legal and regulatory framework [ ]

b) Inadequate access of information on capital markets [ ]

c) Lack of confidence in the capital markets [ ]

d) Huge capital requirements [ ]

e) High transaction costs [ ]

f) Barriers to entry and exit [ ]

Part 2: Contribution of regulatory modularity on small medium sized enterprises' access to capital markets in Kenya

Section A: Contribution of capital

This section is concerned in investigating the contribution of capital on access to capital markets by small medium sized enterprises in Kenya. Please mark (x) in the box which best describes your agreement or disagreement on each of the following statements.

Statement	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
	1	**2**	**3**	**4**	**5**
Loans carrying low spreads, against current yields demanded by investors					
Increase in spreads charged on SME loans					
Under-developed investor base for SME market-based finance					
The lack of liquidity in secondary markets					
Issuance price, that is, the discount applied by the market over the stock's price would be not fair					

In your opinion, does contribution of capital influence access to capital markets by small medium sized enterprises in Kenya?

a) Yes [ ]
b) No [ ]

Section B: Information

This section is concerned with examining the influence of information on access to capital markets by small medium sized enterprises in Kenya.

Please mark (x) in the box which best describes your agreement or disagreement on each of the following statements.

Statement	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
	1	**2**	**3**	**4**	**5**
Insider trading					
Poor methods of disseminating of information					
Information asymmetry					
Unfair practices of capital markets					
poor information technological infrastructures					
Information-poor environment					

In your opinion, does information influence access to capital markets by small medium sized enterprises in Kenya?

a) Yes [ ]
b) No [ ]

Section C: Legal and regulatory requirement

This section is concerned with exploring the influence of legal and regulatory requirement on access to capital markets by small medium sized enterprises in Kenya.

Please mark (x) in the box which best describes your agreement or disagreement on each of the following statements.

Statement	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
	1	**2**	**3**	**4**	**5**
Minimum paid up capital,					
Minimum allocation to retail investors					
Minimum free float in percentage or in actual terms					
Minimum number of subscribers / shareholders required					
Amount of investment required by each investor					
Number of years of profitable operation					
Financial transaction taxes					

In your opinion, does legal and regulatory requirement influence access to capital markets by small medium sized enterprises in Kenya?

a) Yes [ ]
b) No [ ]

Section D: Cost of listing

This section is concerned with investigating the influence of cost of listing on access capital markets by small medium sized enterprises in Kenya.

Please mark (x) in the box which best describes your agreement or disagreement on each of the following statements.

Statement	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
	1	**2**	**3**	**4**	**5**
Audit and accounting fees					
Legal fees					
Underwriters' fees					
Associated regulatory fees					
Exchange listing fees					
Communication, marketing and investor relations fees					
Printing, public relation service fees					
Transfer agency fees					
Nominated advisor (nomad)					
Market maker fees					

In your opinion, does cost of listing influence access to capital markets by small medium sized enterprises in Kenya?

a) Yes
b) No

Section E: Access to capital markets by small medium sized enterprises in Kenya

This section is concerned with assessing the overall access capital markets by small medium sized enterprises in Kenya.

Statement	**Increased**	**Fairly increased**	**Can't say**	**Fairly decreased**	**Decreased**
	1	**2**	**3**	**4**	**5**
Number of Enterprises listed					
Expansion capital through issue of shares to investors					
Improved liquidity of the firm as the investors can buy and sell securities at will					
Improved corporate image					

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