Introduction to research: Mastering the basics

Mohammad Abu Sayed Toyon

Center of Management Research, Estonian Business School, Tallinn, Estonia

Article Info	ABSTRACT
	This paper provides an in-depth introduction to research methods and discusses numerous aspects related to the research process. It begins with an overview of research—what it is, why it is important, what forms it might take, and what its fundamental components are—before shifting its attention to the design of research and the benefits and drawbacks of various approaches. In addition, the article details the purpose of and procedures for a literature review. Data collection, its varieties, technique selection, validity, and reliability are then addressed. Ethics in research and guidelines for research are also discussed, along with the various types of data analysis, and how results should be obtained. In addition, the paper covers topics such as reference and citation management. This paper takes a narrative approach to summarising the scholarly resources useful for introductory-level coursework in research method. Both research and writing are never-ending processes, with endless opportunities for improvement. However, the compilation of essential academic resources might help university students, researchers and research method instructors.

Corresponding Author:
Mohammad Abu Sayed Toyon
Center of Management Research
Estonian Business School, Estonia
Email: mohammad.toyon@ebs.ee
ORCID: 0000-0002-3522-1861

1. INTRODUCTION

Research is the systematic process of gathering, analysing, and interpreting data to answer questions and solve problems. It is a fundamental component of academic and professional activity, enabling the expansion of society's knowledge and comprehension of the world around it. This section will provide an overview of research, including its definition, significance, fundamental components, research philosophies, and investigative strategies.

Research is an investigation into a topic, phenomena, or question of interest that is conducted using scientific methods (Gray, 2014; Saunders, Lewis, & Thornhill, 2007). It is a process that is methodical, objective, and comprises the gathering of information, the analysis of that information, and the drawing of conclusions. Research can be carried out in a wide number of disciplines, such as the natural sciences, the humanities, business, and the social sciences.

Research facilitates the development of new theories, the testing of current ones, and the exploration of the world's intricacies. It is vital to the advancement of knowledge and comprehension in numerous domains. In addition to providing evidence-based information that can inform decision-making in a variety of contexts, including legislation and business strategy, research also contributes to the advancement of science. In

business, research is undertaken in a range of fields, such as marketing, finance, human resources, and operations management, and business researchers are in high demand in these fields, working for private corporations, government agencies, or academic institutions. They may perform research to comprehend consumer behaviour, develop new products or services, review business strategy, or examine the influence of various rules or regulations on organisations. In the humanities, academics investigate areas such as literature, history, philosophy, and cultural studies. Researchers in the humanities may work at academic institutions, museums, libraries, or other cultural organisations, and they do research to better comprehend human culture, language, and history, or to assess the social and cultural repercussions of diverse events or phenomena.

Research typically entails generating research questions or hypotheses, planning studies, gathering and analysing data, evaluating outcomes, and communicating those conclusions in written, spoken, and visual forms (such as research papers, reports, and presentations). Therefore, effective research careers in any field demand strong analytic and critical thinking skills, as well as great communication and cooperation skills, in order to work with colleagues and stakeholders from a variety of disciplines. Research careers in these disciplines can be both hard and gratifying, as they offer the chance to contribute new knowledge and insights to help guide decisions and enhance the lives of individuals and society.
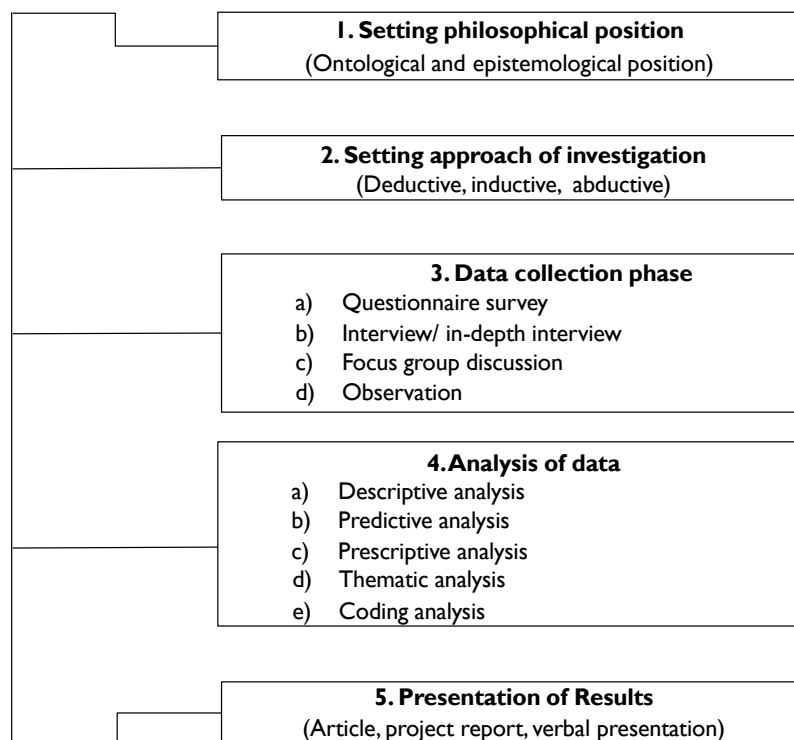
1. Setting philosophical position
(Ontological and epistemological position)

2. Setting approach of investigation
(Deductive, inductive, abductive)

3. Data collection phase
a)   Questionnaire survey
b)   Interview/ in-depth interview
c)   Focus group discussion
d)   Observation

4. Analysis of data
a)   Descriptive analysis
b)   Predictive analysis
c)   Prescriptive analysis
d)   Thematic analysis
e)   Coding analysis

5. Presentation of Results
(Article, project report, verbal presentation)

Figure 1: Research phase

1.1 Basic components of research

According to scholar (Creswell, 2012), research involves the following basic components.

1.1.1 Research question. Identifying the research question or problem that the researchers wish to investigate is the first step in every research project. It is the fundamental question that drives the research.

1.1.2 Literature review. It entails a thorough analysis of all relevant literature, articles, books, and research papers pertinent to the research question. This procedure assists researchers in identifying the gaps between existing knowledge and research on a particular topic.

1.1.3 Methodology. Researchers frequently refer to this as research design and the research process. In fact, it entails deciding on the kind of investigation that will be carried out and using that decision to guide the

research design that will be chosen. The research design is the blueprint for performing the investigation, and it specifies the methods, procedures, and techniques that will be utilised to gather and analyse the data.

1.1.4 Results and conclusion. The last component consists of presenting the outcomes of the investigation and generating conclusions based on the findings; it is the final step of the research and requires a clear and concise presentation of the findings in different forms (see Figure 1).

1.2 Ontological and epistemological positions of research

The ontological and epistemological positions of research pertain to the researcher's assumptions regarding the nature of reality (ontology) and knowledge (epistemology). These assumptions inform the choice of research design, methodology, and data analysis strategies (Gray, 2014; Saunders, Lewis, & Thornhill, 2007).

The researcher's assumptions regarding the character of reality are known as their "*ontology*". "*Objectivism*" and "*constructivism*" are the two primary schools of thought in ontological debate. Objectivism is the concept that reality exists independently of human perceptions and can be explored objectively. Objectivism can be defined as the belief that reality can be objectively investigated. The premise of objectivism is that there is one objective reality that can be perceived and measured by scientific means. They hold the belief that empirical inquiry can lead to the discovery of universal rules that regulate social phenomena and that these laws can be found to govern social phenomena. Constructivism is the idea that holds that individuals create their own realities and that these realities are formed by the perceptions, experiences, and interpretations of the individuals who create them. Constructivists start with the premise that there are numerous realities that are experienced by different people and that these realities can be investigated via the analysis of social phenomena. They hold the belief that social phenomena are reliant on the context in which they occur and that these phenomena can only be understood through the individual interpretations of those experiences.

The researcher's assumptions regarding the *character of knowledge* are referred to as their "*epistemology*". There are primarily two schools of thought when it comes to epistemology: "*positivism*" and "*interpretivism*". The concept that knowledge may be acquired by the objective observation and measurement of one's surroundings is referred to as positivism. People who subscribe to the positivist school of thought believe that there is one universal, objective truth that may be uncovered via scientific investigation. They hold the belief that knowledge expands over time and that it may be applied to the formulation of general laws that can both explain and anticipate occurrences in the natural world. Interpretivism is the notion that knowledge is built through the interpretation of social phenomena. Interpretivism is also known as "*social constructionism*". Interpretivists operate under the assumption that knowledge is personal and that it can only be comprehended in relation to the environment in which it was generated. They maintain that knowledge is dependent on one's particular circumstances and that it emerges as a result of the interaction of individuals with the social and cultural environment in which they find themselves.

1.3 Philosophy of research

The beliefs or assumptions that form the basis of research methodology are referred to as "research philosophy". These beliefs and assumptions can be about the nature of the world or how it can be explored. In general, positivism, interpretivism, and critical realism are regarded as the primary philosophies to research (Gray, 2014); nevertheless, additional contemporary philosophies are also listed here.

"*Positivism*" is a research philosophy that is based on the belief that the only reliable knowledge is scientific knowledge that can be obtained through objective observation and measurement. Researchers that adhere to the positivist school of thought put their theories to the quantitative test and work to build general rules that can be applied to explain and forecast a variety of facts. They have the perspective that the world is made up of factors that can be seen and measured, and they believe that research should be value-free, objective, and unbiased.

As a philosophical movement, "*post-positivism*" developed in reaction to positivism's shortcomings in the social sciences (Crotty, 1998). Research, according to post-positivists, is inherently subjective and influenced by the values, beliefs, and assumptions of the researcher, and hence knowledge cannot be totally objective and value-free. While post-positivists agree that scientific inquiry is necessary for knowledge creation, they stress the importance of researchers becoming more reflective and self-aware in their work. They do not deny theory's influence but stress the value of data and the need to compare theoretical predictions with observations.

"*Interpretivism*" is a research philosophy that is based on the belief that reality is subjective and that it can only be understood through the interpretation of social and cultural phenomena. The fundamental idea behind interpretivism is that reality can only be understood through the interpretation of social and cultural phenomena. Researchers who use an interpretivist approach rely on qualitative methodologies to achieve a

more in-depth understanding of the social environments in which social phenomena occur. They believe that research ought to be subjective, value-laden, and contextual because they see the world as being made up of a variety of different meanings that are each constructed by different people.

"*Social constructionism*" is a theoretical perspective that proposes that people and groups actively construct their own realities and meanings by interacting with their social and cultural surroundings. It emphasises the significance of language, culture, and social institutions in influencing the reality perceptions and ways of thinking of individuals. According to social constructionism, knowledge and understanding are socially and culturally created rather than objective and universal. This implies that reality is constructed through social interactions, language, and cultural practises and is not created or found. Social constructionism also highlights the significance of power relations and how they impact the perception of reality. Certain groups may have more power than others to construct and influence reality, resulting in the formation of dominant and subordinate perspectives. The terms "*social constructionism*" and "*social constructivism*" may appear to have similar meanings, but they are in fact distinct. While both social constructionism and social constructivism highlight the role of social processes and interactions in producing knowledge and reality, their respective applications are different. Social constructionism is a broader theoretical perspective that criticises objective reality and stresses the role of power relations, whereas social constructivism is a learning theory that focuses on how individuals construct their own knowledge via experiences and interactions.

"*Critical realism*" is a research philosophy that strives to comprehend the fundamental causal mechanisms that generate observable world phenomena. It recognises that there is a reality independent of human consciousness, but that this reality is not directly observable and can only be deduced from its effects or manifestations. Critical realism highlights the significance of context and acknowledges that social phenomena are shaped by their historical, cultural, and structural settings. It recognises the importance of power and ideology in forming social structures, as well as the ways in which social structures can constrain or empower human agency. In terms of research, critical realism often promotes a mixed-methods strategy that integrates quantitative and qualitative data to develop a more comprehensive knowledge of social processes. It also encourages researchers to critically evaluate the underlying assumptions and ideologies that underlie their research topics and processes.

"*Pragmatism*" is a school of thought in philosophy that places an emphasis on the real-world relevance of abstract concepts. Pragmatism is a research paradigm that values both objective and subjective information, and that aims to solve problems in the real world by focusing on applicable, realistic, and implementable solutions. Pragmatism in research stresses the relevance of context, experience, and interpretation in making sense of complicated phenomena, and it favours the use of mixed methods and interdisciplinary approaches to do so. Researchers that take a pragmatic approach employ a variety of research methods and techniques to find answers to research questions that are both theoretically sound and practically relevant.

Careful examination of the research questions, aims, and nature of the phenomenon being studied is required when deciding on the most appropriate research philosophy for a study. The following are some broad principles that might be used as a starting point when deciding on a research philosophy:

1.3.1 Identify the research problem and research question

When picking a research philosophy, a researcher must clearly define the research problem and questions they want to investigate. The research questions must be specific, measurable, and relevant to the research problem. The researcher must assess whether a positivist, interpretive, critical, or other scheme is required to solve the problem. For example, if the research question involves exploring the lived experiences of individuals, an interpretivism or social constructionism approach may be appropriate. On the other hand, if the research problem involves testing a hypothesis, a positivist approach may be more suitable.

1.3.2 Consider epistemological stance

Epistemology is the study of knowledge and how it is acquired. Researchers are required to consider their epistemological position or view of the world. These questions are helpful: Do you believe that there is a single objective reality that can be measured and quantified (positivism)? Or do you consider knowledge to be subjective and context-dependent (interpretivism)?

1.3.3 Consider ontological stance

Ontology is the study of what exists in the world. Researchers must consider their ontological position or their perspective on the nature of reality. These questions may prove useful: Do you believe that reality is

fixed and unchanging (objectivism)? Or do you believe that reality is dynamic and shaped by human interpretation (constructivism)?

1.3.4 Review the literature

Research philosophies that have been successfully employed in previous studies of a similar nature can provide insight into which one could be most appropriate for the current investigation.

1.3.5 Consult with expert or research team

Often, obtaining expert viewpoints and discussing the research topic, questions, and objectives with the principal investigator, supervisor, or research team can provide direction and assist researchers in determining the best appropriate research philosophy for their research.

2. RESEARCH DESIGNS

Research design is the blueprint or roadmap that leads the research process and defines the methods and procedures for collecting and analysing data to answer the research question. In this section, the definition and types of research designs, how to select a research design, and the advantages and disadvantages of different research designs have been discussed.

The research design is the plan or strategy that defines how the research will be conducted, including the methods and processes that will be utilised to gather and analyse data. This may also be referred to as the research plan or research strategy.

It requires making decisions regarding the sort of inquiry that will be carried out, the research topic, the sampling strategy, as well as the techniques of data collection and analysis.

In addition to this, it requires assessing the data in order to form conclusions and establish generalisations on the topic under inquiry. Also, it requires devising techniques for presenting the findings and spreading them to bigger audiences.

2.1 Types of research design

There are several types of research designs, and each type has its own strengths and weaknesses and is appropriate for different research questions and contexts. Researchers must carefully consider which type of research design is most appropriate for their specific research question and goals.

2.1.1 Descriptive research

Descriptive research aims to describe the characteristics or behaviours of a particular population or phenomenon (Nassaji, 2015). It involves collecting data using techniques such as surveys, observations, interviews, or any other technique, and analysing the data to identify patterns and trends. Descriptive research is typically used when the research question seeks to provide a detailed description of a specific experience or phenomenon and when the researcher seeks to describe the thoughts and feelings of participants in their own words. The ability to provide a clear description of the phenomenon being investigated, adaptability of the investigation technique, and the ability to record participants' opinions and experiences in their own words are all hallmarks of descriptive research.

2.1.2 Exploratory research

Exploratory research is a form of research design used to get a preliminary understanding of a research problem or topic through investigation. Typically, it is undertaken when a researcher wants to get a greater understanding of a phenomenon (Stebbins, 2001). That implies that when the researcher needs to come up with fresh ideas or concepts or is unsure of the factors to investigate, exploratory research comes in handy. It is useful when the researcher needs to learn more about the larger context of the research problem.

2.1.3 Experimental research

Experimental research involves manipulating one or more variables to observe the effects on an outcome. Such design seeks to establish a cause-and-effect relation between variables by controlling for other variables that may influence the outcome (Creswell, 2012). In the natural sciences, the social sciences, and psychology, experimental research is utilised extensively in order to put hypotheses and theories to the test, evaluate interventions, and provide input for decision-making. Nonetheless, there are some limitations that should be brought to the attention of researchers when doing experimental investigation. For instance, the manipulation of certain variables might be impossible due to ethical considerations or the impossibility of doing so in practise. Additionally, the findings of experimental research may not be generalised to real-world settings because the experimental setting may be different from the natural setting in which the phenomenon occurs.

2.1.4 Correlational research

Correlational research aims to identify the relationship between two or more variables. It involves quantifying the variables and determining the strength and direction of the relationship through statistical analysis (Creswell, 2012). Without manipulating the variables, correlational research investigates the relationship between two or more variables. It seeks to examine the degree to which two or more variables are associated and the nature of that relationship. Often, correlation coefficients, such as Pearson's correlation coefficient or Spearman's rho, are used to evaluate the strength and direction of the association between two variables. The correlation coefficient runs from -1 to +1, where -1 denotes a perfect negative correlation, 0 denotes no correlation, and +1 denotes a perfect positive correlation.

Correlational research is also utilised frequently in the social sciences, psychology, and business to investigate the correlations between variables, find potential predictors of behaviour or outcomes, and test hypotheses. Correlational research can be used to answer questions such as "Is there a significant association between exercise and mental health?" or "What is the relationship between employee engagement and job performance?" or "Is there a correlation between education level and income?" Correlational research's benefits include the ability to investigate associations between variables that cannot be manipulated for ethical or practical reasons, as well as the capacity to test complex theories involving several variables. But nevertheless, correlational research has drawbacks as well. It cannot establish cause-and-effect relationships among variables, nor can it account for extraneous variables that may influence the relationship between the variables of interest.

2.1.5 Case study research

Case study research involves in-depth analysis of a single case or a small number of cases. It aims to understand the complexities and nuances of a particular situation or phenomenon (Patton, 2014). Case study research is a research design that incorporates in-depth exploration and analysis of a specific case, which might be an individual, a group, an organisation, a country, a person, or a phenomena. Case studies entail collecting extensive data through a range of approaches, including interviews, observation, documents, and artefacts, and then evaluating the data to acquire insight into the topic under investigation. Case study research may be used to answer questions such as "What variables contributed to the success of a particular business?" or "How do teachers apply new curriculum in the classroom?" or "What is the experience of patients with a certain medical condition?"

One of the characteristics of case study research is its capacity to provide rich, thorough, and detailed information about a specific case, which can lead to profound insights and comprehension of complicated phenomena. Case studies can also be utilised to generate theories that can be evaluated using alternative analytical techniques. There are, however, limitations to case study research. Data collection and analysis can be time-consuming and resource-intensive, and the findings of a single case study may only be applicable to similar situations or contexts. In addition, case studies may be prone to researcher bias about specific cultural context and interpretation, which can affect universal validity and practicality.

2.1.6 Longitudinal research

Longitudinal research involves collecting data from the same group of participants over a period of time. It aims to observe changes or trends in behaviour, attitudes, or characteristics over time. Longitudinal study involves gathering data from the same set of individuals over a long period of time, generally months or years (Caruana, Roman, Hernández-Sánchez, & Solli, 2015). This design permits researchers to investigate changes in behaviour, attitudes, or other characteristics over time, as well as the causes that may have contributed to such changes. Examples of research questions that can be addressed by longitudinal research include: "How do personality traits change over the course of adulthood? ", "What are the long-term effects of early childhood interventions on academic achievement? ", and "How do health behaviours and outcomes change over time?"

One of the advantages of longitudinal study is that it allows researchers to observe changes in behaviour or other factors over time, which can lead to a greater understanding of how and why these changes occur. It is also valuable for investigating the long-term consequences of interventions or treatments, as well as the causal relationships among variables. There are, however, limitations to longitudinal research. Collecting and analysing data over a prolonged period of time can be time-consuming and resource-intensive. In addition, longitudinal research may be susceptible to attrition, whereby participants drop out of the experiment, which might result in biassed findings.

2.1.7 Cross-sectional research

Cross-sectional research involves collecting data from a sample of participants at a single point in time. It is often used to compare groups or populations at a specific point in time (Wang & Cheng, 2020). By "single point in time", it is meant that data is collected from all study participants at a single occurrence or time. In other words, the researcher just takes data from each subject once, as opposed to monitoring them over time and collecting data at several periods. In contrast, longitudinal research collects data from the same group of participants at various time points, enabling researchers to monitor changes in behaviour or opinions over time. Examples of research questions that may be addressed by cross-sectional research include: "What are the differences in health behaviours between different age groups? ", "How do different cultures view mental health? ", and "What are the differences in attitudes towards social issues among individuals with different levels of education?"

One of the benefits of cross-sectional research is that it enables researchers to examine differences between different groups of participants at a "single point in time", which can yield insights into cultural, social, or demographic factors that may be associated with particular behaviours or attitudes. There are, however, limits to cross-sectional studies. Due to the fact that data is collected at a "single moment in time", it is unable to study "changes" in behaviour or attitudes "across time". In addition, cross-sectional research is incapable of establishing causal relationships among variables.

2.1.8 Action research

Taking action is at the core of action research. Taking action within the context of action research refers to implementing interventions based on the insights and conclusions gained from the data collected and analysed during the research process. The essence of action research is the creation of practical solutions and the implementation of real-world improvements based on the results (Greenwood & Levin, 2006).

In addition to gathering information and analysing data, the purpose of action research is to "actively engage" in a cyclical process of problem-solving and improvement. This means that researchers and practitioners engage to identify an issue, collect data, analyse the data, develop and implement an action plan, and evaluate the intervention's effectiveness. This procedure is then "repeated" in an ongoing cycle of development. In this sense, "taking action" entails adopting changes based on the facts and insights gathered during the study process, and it may entail modifying a programme, procedure, or practise, or adopting new techniques to enhance results. In a certain context, the action conducted is designed to produce major and long-lasting change.

2.1.9 Ethnography

Ethnography involves observing and immersing oneself in the culture and behaviour of a particular group or community to understand their lived experiences and practices. The purpose of ethnography is to know the cultural and social behaviours of a group of people (Eriksson & Kovalainen, 2008). To achieve a comprehensive knowledge of a specific culture or social group (e.g., ethnic community, gang, company, etc.), investigators often spend extensive periods of time monitoring and interacting with group members. Such method permits researchers to gain an insider's understanding of the group's customs, beliefs, and ways of life.

Observation is one of the most important aspects of ethnography. This may involve attending social events, partaking in rituals, or simply spending time with group members in their natural environment. This type of active observation enables researchers to obtain a greater comprehension of the group's behaviour, interactions, and social dynamics. The utilisation of interviews is another key part of ethnography. Researchers may conduct formal or informal interviews with members of the group to elicit their thoughts on a variety of cultural or social group features. In addition to participant observation and interviews, ethnography involves relevant document analysis, which may involve studying written materials such as books, newspapers, and other published works pertaining to the group under study. Researchers may also examine organisational papers, such as memos, reports, and regulations, to acquire a deeper knowledge of the group's social context.

Sometimes, ethnographers use a mixed-methods strategy that combines qualitative and quantitative data collection and analysis to gain a deeper understanding of a culture or social group. An ethnographer conducting research on a community may use questionnaires or surveys to collect demographic information, such as age, gender, and socioeconomic position. Quantitative data can help objectively explain a culture or social group. While ethnography can include quantitative data collection techniques, its primary objective is to gain an insider's understanding of a culture or social group.

2.1.10 Phenomenology

The word "phenomenology" is derived from two Greek words: "phainomenon," which means "that which appears" or "that which is visible," and "logos," which means "study" or "knowledge." Put together, "phenomenology" refers to the study or knowledge of that which appears or is visible. Phenomenology aims to understand the essence or meaning of an experience or phenomenon as it is experienced by individuals (Eriksson & Kovalainen, 2008). Phenomenology derives from the philosophical tradition of phenomenology, which emphasises the significance of investigating the "subjective experiences" of individuals. The term "subjective experience" is used to describe the inner and biased reflections of an individual on their surroundings. It is something that happens within an individual, and it depends on the person and their characteristics, beliefs, and life experiences to form. In this sense, the purpose of phenomenology research is to get an in-depth understanding of how people perceive and make sense of their surroundings.

An important characteristic of phenomenology is its emphasis on bracketing, also known as epoche. In order to study a phenomenon with an open mind, bracketing requires leaving aside one's prior conceptions and assumptions about it. Doing so allows the researcher to concentrate on the subjective experiences of participants without being influenced by their own biases or presuppositions. Despite the fact that phenomenology focuses primarily on the subjective experiences of humans, it is feasible to include quantitative measurements in a phenomenological investigation. For instance, a phenomenological investigation might use a structured questionnaire to collect quantitative data on the age, gender, and occupation of participants. In addition, a quantitative measure may be used to determine the severity of the examined symptoms or experiences.

2.1.11 Grounded theory

The phrase "grounded theory" represents the process of the investigation plan, which emphasises the significance of empirical data-based theory creation (Eriksson & Kovalainen, 2008). The premise of grounded theory is that theory should arise from the evidence as opposed to being imposed from without. In other words, the theory is "based" on the research participants' collected data. Instead of depending on preconceived conceptions or theoretical frameworks, the grounded theory approach is committed to using empirical facts as the basis for theory creation. Such technique permits the development of ideas that are strongly based in the experiences and views of the individuals being investigated and have the potential to be highly relevant and useful in real-world settings.

There are differences between grounded theory and phenomenological research designs. Here is an illustration of some of these distinctions:

Assume a researcher wishes to investigate the experience of chronic pain patients. The researcher could investigate this topic using either grounded theory or phenomenology.

If the researcher chooses grounded theory, they may undertake a series of interviews with chronic pain patients as a starting point. They would then evaluate the data from these interviews to uncover themes and patterns, and utilise these themes to construct a theory that explains how these people endure chronic pain. For instance, they may propose that people with chronic pain face feelings of loneliness and frustration because their condition is grossly misunderstood.

On the other hand, if the researcher chooses phenomenology, they may conduct in-depth interviews with chronic pain sufferers in order to comprehend their subjective experience of pain. Without imposing preconceived beliefs or theories, they would attempt to identify the fundamental structures and ideas of the patients' experiences. For instance, they may discover that patients with chronic pain describe their condition as a continuous battle between their desire to engage in enjoyable activities and the limitations imposed by their discomfort.

This example illustrates how grounded theory and phenomenology take distinct approaches to data collection, analysis, and theory construction. Grounded theory aims to construct a theory that explains the examined experience, whereas phenomenology seeks to discover the context of the experience and the perception of the individuals involved.

2.2 How to choose a research design

Selecting a research design depends on several factors, including the research question, the availability of resources, the research setting, and the research approach. The research question should guide the selection of a research design. For instance, if the research question is about causality, then experimental or quasi-

experimental design may be appropriate. If the research question is about exploring a new phenomenon, then exploratory design may be appropriate.

The choice of a research design is determined by a number of criteria, such as the nature of the research topic, the resources that are available, the practicality of research techniques, and the theoretical and methodological viewpoints of the researcher.

Research designs are blueprints that outline how information will be gathered and analysed to provide an answer to a research question. There are a wide variety of research designs available, each with its own advantages and disadvantages and suited to specific sets of questions. Because research questions can be so intricate and multifaceted, it is not always easy to strictly adhere to a single research design in practise. For researchers to completely capture the complexity of their research question and accomplish their research objective, they may need to mix several research designs. To learn more about the evolution of a phenomenon over time, a researcher may combine two study designs: cross-sectional (data collection at a single point in time) and longitudinal (data collection over time). A more complete answer to the research question may be attained through the use of this mixed-methods strategy than could be achieved using either design alone. Combining the research design that emphasises the collection and analysis of numerical data with the research design that emphasises the collection and analysis of non-numerical data such as interviews, observations, and case studies is another example. Nonetheless, researchers are free to integrate various research schemes in order to answer their research question more thoroughly and efficiently.

2.3 Selection of an investigational strategy

In research, the approach of inquiry refers to the logical procedure used to create and test hypotheses and theories (Gray, 2014). There are three main approaches to inquiry: deductive, inductive, and abductive.

2.3.1 Deductive approach

The deductive approach is a top-down approach that starts with a theory or hypothesis and tests it through the collection and analysis of data. In this approach, the researcher develops a hypothesis or theory based on existing knowledge or previous research, and then collects data to test the hypothesis. The deductive approach is often used in quantitative research, where the aim is to test a theory or hypothesis using statistical analysis.

2.3.2 Inductive approach

The inductive approach is a bottom-up approach that starts with the collection and analysis of data, and then develops a theory or hypothesis based on the patterns and themes that emerge from the data. In this approach, the researcher begins with an observation or a question and collects data through observation, interviews, or surveys. The data is analysed to identify patterns and themes, and a theory or hypothesis is developed based on the emerging themes. The inductive approach is often used in those research, where the aim is to develop a theory or hypothesis based on an in-depth understanding of the data.

2.3.3 Abductive approach

The abductive approach is a middle ground between the deductive and inductive approaches. It involves the iterative process of developing a theory or hypothesis, testing it through data collection, and revising the theory or hypothesis based on the data. The abductive approach is often used in mixed methods research, where both quantitative and qualitative data are collected and analysed (Toyon, 2021).

3. LITERATURE REVIEW

A literature review is a critical analysis and evaluation of existing literature related to a specific research question or topic. It is an essential component of any research project, allowing researchers to build on existing knowledge and identify gaps in current understanding. A literature review is a comprehensive and systematic summary and analysis of existing research and literature related to a specific research question or topic (Creswell, 2012). In order to provide a critical revision of the present state of knowledge on the research question or issue, it entails identifying, assessing, and synthesising relevant literature.

A literature review is important for several reasons. It provides a comprehensive and systematic overview of existing knowledge on the research question, allowing researchers to identify gaps in current understanding and potential avenues for further research. A literature review also helps to establish the theoretical and conceptual framework for the research study and provides a context for the research findings. There are several steps involved in conducting a literature review. These include:

(i) Defining the research question or topic, and purpose of literature review

(ii) Identifying relevant literature through a systematic search of databases and other sources

(iii) Evaluating the quality and relevance of the identified literature

(iv) Synthesising and summarising the key findings and themes from the literature

(v) Identifying gaps in current knowledge and potential avenues for further research

3.1 Types of literature review

There are several types of literature reviews, each with its own focus and purpose. Here are some of the most common types of literature reviews.

3.1.1 Narrative literature review

Narrative review provides a summary of the literature on a particular topic, focusing on the key findings and themes that emerge from the studies (Ferrari, 2015). A narrative literature review is a thorough summary and synthesis of the existing literature on a particular topic or research question.

In contrast to systematic literature reviews, narrative literature reviews rely on a more flexible and subjective way to find, select, and assess relevant studies according to predetermined criteria. Typically, narrative reviews need a comprehensive search of academic databases and other sources to locate relevant papers, books, and other sources that provide insight into the topic or question at hand. The researcher then reviews and synthesises each source's information, recognising similar themes, patterns, and gaps in the literature. The resulting narrative often provides a descriptive and interpretive synthesis of the current literature on the issue along with the author's personal thoughts and viewpoints on the significance and consequences of the findings. In addition to highlighting areas where additional research is required, narrative evaluations may also make recommendations for future research.

Narrative literature reviews give a useful summary of existing knowledge on a topic, enabling readers to better comprehend the present state of research and highlight areas where additional study is required. However, because narrative reviews rely on subjective judgements, it is essential to analyse the quality and reliability of the sources utilised and the conclusions formed.

3.1.2 Systematic literature review

A systematic literature review is a comprehensive and rigorous process for summarising and analysing existing research on a particular topic or question (Gregory & Denniss, 2018). In contrast to narrative reviews, which rely on a more subjective and flexible approach, systematic reviews adhere to a predetermined methodological framework and criteria to ensure that the review is exhaustive, transparent, and reproducible. It typically involves a comprehensive search of multiple databases and the application of specific inclusion and exclusion criteria to identify relevant studies. The studies are then analysed and synthesised using a formal methodology. The typical steps taken when doing this type of review are outlined below.

(a) Using a comprehensive search strategy. A comprehensive search technique entails locating all relevant studies on the issue by searching several databases with a combination of keywords and by examining relevant studies' reference lists. To ensure that the search strategy is as exhaustive as feasible, it should be devised in cooperation with a librarian, information specialist, or any field-specific expert.

(b) Screening and selection criteria. To ensure that only relevant studies are included in the review, a variety of inclusion and exclusion criteria must be created and applied to all papers identified throughout the search.

(c) Quality assessment. To guarantee that the studies included in the review are of high quality and free of methodological flaws, it is important to conduct a quality assessment using a standardised protocol.

(d) Data extraction. Relevant data should be extracted from each included study using a standardised data extraction form. This ensures that data is collected consistently across all studies and reduces the risk of errors.

(d) Synthesis techniques. The results of the included studies should be synthesised using appropriate techniques, such as meta-analysis or narrative synthesis. The synthesis should be conducted in a transparent and reproducible manner.

(e) Reporting. The review should be reported in accordance with established reporting guidelines, such as the PRISMA statement, to ensure that the review is transparent and reproducible. PRISMA is an acronym that stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA, 2020). PRISMA is a well-recognised and acknowledged set of reporting requirements for systematic literature reviews and

meta-analyses. The PRISMA declaration is comprised of a lengthy checklist and a four-phase flowchart outlining the procedure for performing a systematic literature review or meta-analysis. The review checklist has components such as the title, abstract, introduction, methodology, results, and discussion.

3.1.3 Meta-Analysis

Meta-analysis involves the statistical analysis of the results of multiple studies on a particular topic, in order to provide a quantitative summary of the findings (Shelby & Vaske, 2008). It typically includes a systematic search of multiple databases, and the application of specific inclusion and exclusion criteria to identify relevant studies. The results of the studies are then combined using statistical methods to calculate a summary effect size. For example, a meta-analysis might examine the effect of mindfulness meditation on reducing symptoms of anxiety, using statistical methods to combine the results of multiple studies.

3.1.4 Scoping review

Scoping review provides a broad overview of the literature on a certain topic, without the depth of analysis of a systematic review or meta-analysis (Verdejo, Tapia-Benavente, Schuller, & Vergara-Merino, 2021). It typically involves a comprehensive search of multiple databases, and the inclusion of both empirical and non-empirical literature. The aim is to identify key concepts and themes in the literature, and to map the existing research in a particular area. For example, a scoping review might examine the literature on the use of social media in healthcare, providing an overview of the different types of studies and approaches to the topic.

3.1.5 Bibliometric review

Bibliometric review is a type of literature review that uses bibliometric methods to analyse and evaluate the characteristics and patterns of a specific body of literature. Bibliometric review often involves the quantitative analysis of publication and citation data to identify patterns and trends in a particular field of research (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

Bibliometric reviews can be useful in identifying key authors, institutions, and publications in a particular field, as well as trends in research topics, methods, and theoretical frameworks. They can also be used to evaluate the impact and influence of individual publications and researchers and to identify gaps and opportunities for future research. Examples of bibliometric reviews include:

(a) Citation analysis. It starts by analysing the citation patterns of a particular collection of publications, such as a journal, conference proceedings, or a specific author or research group. Citation analysis can highlight the most significant publications, authors, and research organisations in a certain topic, as well as suggest emerging trends and research areas.

(b) Co-citation analysis. It entails analysing the citation patterns of a collection of articles to determine the most frequently cited publications and their relationships. Co-citation analysis can be used to determine the most significant concepts and topics in a certain field, as well as the relationships between various academic institutions and groups.

(c) Bibliographic coupling. Specifically, bibliographic coupling requires examining the similarity between the reference lists of various publications in order to pinpoint the most relevant ones. The most influential research teams and partnerships in a subject can be uncovered, as well as new research trends and directions, with the use of bibliographic coupling.

(d) Authorship analysis. It aims at doing an analysis of the publication patterns of individual writers in order to determine the collaborations and research groups to which they most commonly contribute, as well as the themes on which they most frequently publish. Authorship analysis is an approach that may be utilised to determine not just the most prominent writers in a specific subject but also the ties that exist between various research groups and organisations.

4. DATA COLLECTION

Data collection is the process of gathering information and data through various methods and techniques in order to answer the research question. It involves the collection of both primary and secondary data (Gray, 2014; Creswell, 2012; Saunders, Lewis, & Thornhill, 2007).

Primary data is data that is collected directly from research participants through methods such as surveys, interviews, and observations.

Secondary data is data that has already been collected by others and is available in sources such as books, journals, archives, repositories, and databases.

4.1 Ways of data collection

There are several data collection techniques used in research. These techniques can be broadly categorised into two main types. primary data collection and secondary data collection.

4.1.1 Primary Data Collection Techniques

Primary data is data that is collected directly from the source, through methods such as surveys, interviews, focus groups, observations, and experiments. Some common techniques used for primary data collection are.

(a) Surveys. Survey is a common technique used to gather primary data. Surveys can be conducted through various means, such as online surveys, mail surveys, phone surveys, or in-person surveys. There are several types of survey techniques used in research, each with its own advantages and disadvantages. Here are some of the most common types of survey techniques:

(i) Mail surveys. The questionnaires for this type of survey are sent out to a representative sample of the population through mail. The fact that this method may reach a vast and diverse audience, as well as give respondents time to think about their responses, is the primary benefit of using it. On the other hand, response rates are often quite low, and the quality of the data may be jeopardised as a result of responses that are either insufficient or erroneous.

(ii) Telephone surveys. Surveys conducted via the phone means gathering responses to questionnaires through telephone, using either pre-programmed devices or the services of skilled interviewers. The ability to reach a large number of individuals in a short amount of time is the primary benefit of using this method. Another advantage is that the replies may be collected and analysed in real time. However, response rates may be lower than those seen in surveys conducted in-person, and there may be questions over the reliability and precision of the data collected.

(iii) Online surveys. The development of surveys and its administration through the use of online channels, such as email, social media, or websites (e.g., survey monkey, google form etc.) specifically dedicated to surveying, are both included in the technique for carrying out online surveys. The ability to reach a broad audience that is representative of a variety of demographics in a short amount of time and at a low cost is the primary benefit of this method. Answers can be gathered and analysed in real time, and there are a range of tools available to assist in ensuring the quality of the data obtained. Nonetheless, there may be questions regarding the representativeness of the sample, and respondents may have a greater propensity to submit responses that are either incomplete or erroneous.

(iv) In-person surveys. Conducting a survey in person, either through interviews or questionnaires that respondents fill out on their own, is what's meant by a "in-person survey". The capacity to deliver a high response rate and provide more in-depth responses, as well as the capability to clarify and probe responses, is the primary benefit of using this method. However, this approach can be time-consuming and costly, and there is always the possibility of "social desirability bias" or interviewer effects influencing the results.

(v) Mixed-mode surveys. This involves using a combination of survey techniques, such as online and in-person surveys, to reach a larger and more diverse population. The main advantage of this method is that it can help overcome the limitations of individual survey methods and provide a more comprehensive and representative sample. However, this method can be complex and expensive to implement, and there may be concerns about sample bias and data consistency across different survey modes.

(b) Interviews. Interviews involve a one-on-one conversation between the researcher and the respondent. Interviews can be conducted in person, over the phone, or through video conferencing. There are several types of interview methods, each with its own advantages and disadvantages:

(i) Structured interviews. Interviews that are structured involve the interviewer asking a series of questions that have been prepared in advance and following a predefined sequence. The main advantage of this method is that it allows for easy comparison of responses across participants and can be used to collect quantitative data. However, it may not allow for in-depth exploration of the participants' experiences or perspectives.

(ii) Semi-structured interviews. In semi-structured interviews, participants are asked a series of open-ended questions and given the opportunity to discuss other topics as they come up over the course of the interview. The main advantage of this method is that it allows for in-depth exploration of the participants' experiences and perspectives, while still maintaining some level of standardization. However, it can be time-consuming and requires skilled interviewers to manage the conversation effectively.

(iii) Unstructured interviews. In unstructured interviews, participants are questioned using open-ended questions rather than according to a predetermined format or structure. The main advantage of this method is that it allows for maximum flexibility and exploration of the participants' experiences and perspectives. However, it can be time-consuming and requires skilled interviewers to manage the conversation effectively, and may not allow for easy comparison of responses across participants.

(iv) Group interviews. Conducting interviews with a group of participants, either in person or online, is what is meant by the term "group interviews". The main advantage of this method is that it allows for interactions between participants and can generate rich and diverse data. However, it can be challenging to manage the conversation and ensure that all participants have an equal opportunity to express their views.

(c) Focus group discussion. A focus group involves a group of individuals discussing a specific topic under the guidance of a moderator (Morgan, 1997). Focus groups can be conducted in person or online. There are different types of focus group discussion methods:

(i) Traditional group discussion. This method involves bringing together a group of participants who share similar characteristics, such as age, gender, or occupation. A facilitator who asks open-ended questions to encourage participants to share their experiences and opinions leads the group.

(ii) Mini focus groups. This method involves conducting a shorter version of the traditional focus group discussion. The group size is typically smaller and may involve participants who share a specific characteristic such as their level of education or occupation.

(iii) Dual-moderated focus groups. This method involves having two facilitators who lead the group discussion. One facilitator asks questions, while the other observes and takes notes.

(iv) Online focus groups. This method involves conducting the discussion online, using a virtual platform. Participants can join the discussion from their own computer or mobile device, which can be more convenient for those who live far away or have mobility issues.

Focus group interviews can be useful for a number of reasons (Morgan, 1997). The use of focus groups is one method whereby participants can open up about their thoughts, feelings, and experiences in a public forum. This can give researchers a wealth of information from which to draw conclusions about intricate social phenomena. Discussion and debate in a focus group setting can lead to the development of fresh viewpoints and ideas. By bringing together people who share similar interests, backgrounds, and experiences, facilitators can foster an atmosphere where everyone feels comfortable speaking openly and honestly. Focus group discussion, however, has a few drawbacks. People in a group could be swayed by what they hear from others, which might result in "groupthink" and stifle individual thought. Findings from focus groups may not be extrapolable to the entire population due to the small sample size. An experienced facilitator will know how to keep the conversation moving forward and give everyone a chance to speak. Finding common ground while accommodating everyone's requirements in a group conversation can be difficult.

(d) Observations. Observations involve the researcher directly observing the behaviour of the participants (Ciesielska, Boström, & Öhlander, 2018). Observation can be done through structured or unstructured way. There are different types of observation methods:

(i) Participant observation. In participant observation, the researcher to take an active role in the group or environment that is being studied. That implies that the investigator might take on a position inside the group in order to acquire a more in-depth understanding of the social dynamics and interactions that are taking place.

(ii) Non-participant observation. The non-participant observation approach requires the researcher to observe from a distance, without taking part in the activity that is being observed, such as the group or the environment. Using this type of technique can be helpful for gathering data in an objective manner and avoiding bias.

(iii) Structured observation. In the structured observation approach, the researcher keeps track of the actions or events they see by utilising a checklist or rating scale that has been established in beforehand.

(iv) Unstructured observation. With the unstructured observation method, the researcher simply observes the events and behaviours being studied without using a checklist or rating scale in advance. Such approach has the potential to be beneficial for the collection of detailed and nuanced data, but it may be more challenging to analyse.

There are numerous benefits to the observation approach. Observation, for instance, enables researchers to collect firsthand information about the behaviour and interactions of people or events in their natural

environments. Observation can be used to investigate sensitive matters that are difficult to discuss using other research methods, such as surveys or interviews. Unlike self-report bias and social desirability bias, observation can provide objective facts on behaviours and interactions. But nonetheless, there are downsides to observation. Observation, for instance, can be a time-consuming method of data gathering, as researchers may be required to spend extensive time in the field. Observers may contribute their own biases and interpretations to the data they collect, thereby diminishing the data's quality. Observing subjects (e.g., individuals, animals etc.) without their knowledge or agreement could raise ethical considerations. When performing observations, researchers must ensure that they adhere to ethical standards.

4.1.2 Secondary data collection techniques

Secondary data is data that has already been collected and is available for use by other researchers. Some common techniques used for secondary data collection are.

(a) Literature gathering. Literature gathering involves collecting and analysing previously published research studies on a particular topic. Details have been discussed about the different types of literature review in the above sections.

(b) Government reports. Government agencies collect a large amount of data, which is available for public use. These reports can be used as a secondary data source.

(c) Online databases. There are many online databases that provide access to a wide range of data sources, including academic journals, government reports, and industry data.

(d) Social media and web analytics. Social media platforms and web analytics tools provide a wealth of information about online behaviour and can be used as a secondary data sources.

Each data collection technique has its own advantages and disadvantages. Researchers must carefully consider which technique will be most appropriate for their research question and data analysis goals.

4.2 Suggestions on data collection method and fieldwork

Selecting a data collection method depends on several factors, including the research question, the research design, the population being studied, the resources available, and ethical considerations. The data collection method should align with the research question and research design (Gray, 2014). For instance, if the research question is about exploring a new phenomenon, then qualitative methods such as interviews and observations may be appropriate. If the research question is about determining causality, then experimental methods may be appropriate.

4.2.1 General suggestions on data collection

Data collection is a critical stage of research, and it is important for researchers to carefully plan and execute their data collection methods to ensure that the data is reliable and valid. Here are some suggestions that a researcher should keep in mind while collecting data for research.

(a) Choose appropriate data collection methods. The choice of data collection method depends on the research question, the type of data needed, and the research context. Researchers should carefully choose the most appropriate methods for collecting data, such as surveys, interviews, observations, or experiments.

(b) Develop clear research instruments. Research instruments, such as questionnaires, interview guides, or observation protocols, should be carefully designed to ensure that they are clear, concise, and unbiased. Researchers should pilot test their instruments to identify and address any issues before using them for data collection.

(c) Train data collectors. If data collection involves a team of data collectors, they should be trained to ensure that they understand the research instruments and the procedures for data collection. This will help to ensure consistency in data collection across different collectors.

(d) Ensure informed consent. Researchers should obtain informed consent from participants before collecting any data. Participants should be informed about the purpose of the study, the procedures involved, and their rights as participants. They should also be assured of the confidentiality and anonymity of their data.

(e) Monitor data quality. Researchers should monitor the quality of the data collected to ensure that it is accurate and reliable. This can be done through methods such as double data entry, spot checks, or inter-rater reliability tests.

(e) Minimise bias. Researchers should take steps to minimise bias in the data collection process. This can be done through methods such as random sampling, blinding data collectors, or using standardised protocols.

(f) Maintain ethical standards. Researchers should adhere to ethical standards and guidelines for research, such as ensuring participant confidentiality, avoiding harm to participants, and protecting the rights of vulnerable populations.

By following these suggestions, researchers can ensure that their data collection methods are effective, reliable, and ethical, and that the data collected is of high quality and supports the research objectives.

4.2.2 Suggestions for fieldwork

Fieldwork is a critical stage of research, particularly for qualitative research, which involves direct observation and engagement with the research participants in their natural settings (Eriksson & Kovalainen, 2008). Here are some suggestions that a researcher should keep in mind while conducting fieldwork for research.

(a) Prepare thoroughly. Before starting fieldwork, researchers should prepare themselves by familiarising themselves with the research topic, the research question, and the research context. They should also develop a detailed plan for the fieldwork, including the methods to be used, the sites to be visited, and the participants to be engaged.

(b) Build rapport with participants. Researchers should build rapport with the research participants to gain their trust and cooperation. This can be done through methods such as introductions, establishing a comfortable setting, and actively listening to participants.

(c) Be adaptable. Researchers should be flexible and adaptable to changes in the fieldwork environment. This can include adjusting the research methods to suit the participants or adapting to unexpected changes in the research site.

(d) Be aware of cultural differences. If the research involves participants from a different culture, researchers should be aware of and sensitive to cultural differences. This can include learning about local customs and norms, and avoiding any actions that may be considered inappropriate or offensive.

(e) Take detailed notes. During fieldwork, researchers should take detailed notes of observations and interactions with participants. This can include recording non-verbal cues, the context of the interaction, and any other relevant details.

(f) Address ethical issues. Researchers should address ethical issues that may arise during fieldwork, such as obtaining informed consent from participants, maintaining participant confidentiality, and avoiding harm to participants.

(g) Take care of personal safety. Researchers should take steps to ensure their own personal safety during fieldwork, particularly if the research involves visiting unfamiliar or potentially dangerous locations. It can include taking necessary precautions, such as travelling with a colleague, informing local authorities, or carrying emergency communication devices.

4.3 Sampling

Sampling is the process of selecting a subset of individuals or cases from a larger population for the purpose of conducting research (Lind, Marchal, & Wathen, 2015). There are two main types of sampling techniques. probability sampling and non-probability sampling.

4.3.1 Probability sampling

Probability sampling involves selecting participants from a population at random, so that every member of the population has an equal chance of being selected. There are several types of probability sampling, including,

(a) Simple random sampling. In this method, individuals are chosen randomly from the population, without any bias or systematic selection process.

(b) Stratified random sampling. In this method, the population is divided into strata (subgroups) based on certain characteristics (e.g., age, gender), and individuals are randomly selected from each stratum in proportion to their representation in the population.

(c) Cluster sampling. In this method, the population is divided into clusters (e.g., geographic areas), and clusters are randomly selected. Then, individuals within each selected cluster are randomly selected for the study.

Many benefits are associated with probability sampling. It provides a representative sample of the population. It enables researchers to calculate sample errors and confidence intervals, which aid in determining the reliability of the data. It broadens the findings' applicability to a larger population, which boosts their Generalisation, and delivers a greater degree of precision and exactness. There are, however, a number of

drawbacks to probability sampling. It can be costly and time-consuming to conduct. It may not be possible to gather a complete list of the population, making it difficult to collect a sample based on probability. Small or specialised populations may not find it useful.

4.3.2 Non-Probability sampling

Non-probability sampling involves selecting participants in a non-random manner, often based on convenience or judgment. There are several types of non-probability sampling, including:

(a) Convenience sampling. In this method, participants are selected based on their convenience or accessibility, such as students in a class or patients in a clinic.

(b) Purposive sampling. In this method, participants are selected based on their specific characteristics or attributes relevant to the research question. For example, a researcher may select participants who have a particular medical condition.

(c) Snowball sampling. In this method, participants are initially recruited based on some predetermined criterion, and then asked to refer others who meet the same criteria. This method is often used in hard-to-reach populations. There are a number of benefits to non-probability sampling. It is frequently more practical and economical than probability sampling. When probability sampling is impractical or unethical, such as when investigating stigmatised populations, stratified sampling might be effective. It permits researchers to analyse specific groups or people. There are a number of drawbacks to non-probability sampling. It could inject bias into the sample, limiting the generalisation of the results. It may be challenging to assess sample errors and evaluate the reliability of the results. Some individuals or groups may be more likely to participate than others, making it challenging to acquire a representative sample.

4.4 Sample size

Calculating the appropriate sample size for quantitative and qualitative research involves different methods.

4.4.1 Sample size for quantitative analysis

For quantitative research, the sample size can be calculated using statistical formulas that take into account the desired level of precision, confidence level, population size, and variability of the data (Lind, Marchal, & Wathen, 2015). One common formula (based in precision rate) used for calculating the sample size is the following: $n = (Z^2 * p * q) / e^2$; where, n is the required sample size, Z is the Z-score corresponding to the desired level of confidence (e.g., for a 95% confidence level, Z=1.96), p is the estimated proportion of the population with the characteristic of interest, q is (1-p), and e is the desired margin of error.

4.4.2 Sample size for qualitative analysis

For qualitative research, the sample size is determined by the principle of saturation, which means that data collection continues until no new information is being obtained (Vasileiou, Barnett, Thorpe, & Young, 2018). The aim of qualitative research is not to generalise findings to a larger population, but to gain an in-depth understanding of the phenomenon under study. Therefore, the sample size in qualitative research is often smaller than in quantitative research (Sandelowski, 1995), and is determined by factors such as the research question, the scope of the study, and the resources available. In light of these considerations, the sample size of qualitative research can consist of merely one sample tailored to the specific research questions being investigated. However, it is important to note that sample size calculations provide an estimate of the required sample size, and that actual sample sizes may vary depending on the characteristics of the population, the research design, and the sampling method used.

4.5 Validity and reliability in research

Validity and reliability are important concepts in data collection (Drost, 2011). Validity refers to the extent to which the data collected accurately reflects the research question or topic. Reliability refers to the consistency and stability of the data collected. To ensure validity and reliability in data collection, researchers use appropriate data collection methods, establish clear and consistent procedures, and use standardised instruments and protocols. They should also ensure that the sample size is adequate and representative, and that the data collection process is well-documented and transparent. While validity and reliability are relevant to both quantitative and qualitative research, they may be interpreted differently in each approach.

4.5.1 Ensuring validity in quantitative and qualitative research

(a) Validity in quantitative research. Validity refers to the degree to which a measurement tool, such as a survey or test, accurately measures what it is supposed to measure. Validity refers to the precision and

soundness of a statistical result or inference based on the analysis's data and techniques. A study or experiment is considered valid if it measures what it is meant to measure and is free of biases and errors. In quantitative research, validity can be assessed using different types of validity, including content validity, construct validity, and criterion validity.

(i) Content validity refers to the degree to which a measurement tool covers all the relevant aspects of the concept being measured. Content validity is ensured in two ways: literature review and expert opinion.

(ii) Construct validity refers to the degree to which a measurement tool accurately measures the theoretical construct it is intended to measure. Convergent validity and divergent validity are two components of construct validity.

(iii) Criterion validity refers to the degree to which a measurement tool correlates with an external criterion, such as another measurement tool or an observed behaviour.

(b) Validity in qualitative research. In qualitative research, validity refers to the degree to which the research findings accurately represent the experiences and perspectives of the participants (Whittemore, Chase, & Mandle, 2001). Validity can be assessed using different strategies, including "triangulation", member checking, and peer debriefing. Triangulation involves the use of multiple data sources, methods, and researchers to confirm the accuracy of the findings (Olsen, 2004). Member checking involves the review of the research findings by the participants to confirm the accuracy of the interpretations. Peer debriefing involves the review of the research process and findings by other researchers to ensure the validity of the interpretations.

4.5.2 Ensuring reliability in quantitative and qualitative research

(a) Reliability in quantitative research. Reliability refers to the consistency and stability of a measurement tool over time and across different situations. In quantitative research, reliability can be assessed using different types of reliability, including test-retest reliability, inter-rater reliability, and internal consistency reliability.

(i) Test-retest reliability refers to the degree to which a measurement tool produces the same results when administered multiple times to the same group of participants.

(ii) Inter-rater reliability refers to the degree to which different raters or observers produce consistent results when using the same measurement tool.

(iii) Internal consistency reliability refers to the degree to which different items in a measurement tool are consistent with each other.

(b) Reliability in qualitative research. In qualitative research, reliability refers to the consistency and dependability of the research process and findings. Reliability can be assessed using different strategies, including dependability, confirmability, auditability, and trustworthiness.

(i) Dependability refers to the degree to which the research process and findings can be replicated or repeated by other researchers.

(ii) Confirmability refers to the degree to which the findings can be confirmed or verified by other researchers.

(iii) Auditability refers to the degree to which the research process and findings are transparent and well-documented.

(iv) Trustworthiness means the degree to which research findings are aligned with the evidence provided by the investigators.

4.6 Generalisation of research

Generalisation refers to the extent to which the findings of a research study can be applied to a larger population beyond the study sample. Generalisation is a key consideration in research because the goal of most research is to make inferences about a larger population based on the findings from a sample.

4.6.1 Generalisation in quantitative research

In quantitative research, generalisation is typically achieved through probability sampling, which allows researchers to draw a random sample from a population and generalise the findings to the larger population (Lind, Marchal, & Wathen, 2015). Probability sampling methods include simple random sampling, stratified sampling, and cluster sampling. In addition, statistical techniques such as hypothesis testing and confidence intervals can be used to assess the generalisability of the findings.

4.6.2 Generalisation in qualitative research

In qualitative research, Generalisation is achieved through the use of theoretical sampling, which involves selecting participants and cases based on their relevance to the research questions and the emerging theories. Generalisation in qualitative research is not based on statistical inference, but on theoretical saturation, which refers to the point at which new data no longer yield new insights or understanding. Qualitative researchers may also use transferability, which refers to the extent to which the findings of a study can be applied to similar contexts or populations (Toyon, 2021).

Generalisation is an important consideration in both quantitative and qualitative research, but it is achieved through different methods and techniques. In quantitative research, generalisation is achieved through probability sampling and statistical inference, while in qualitative research, generalisation is achieved through theoretical sampling and transferability. Both approaches aim to make inferences about a larger population based on the findings from a sample, but the degree of generalisability may differ depending on the research design and methodology.

5. DATA ANALYSIS

Data analysis is the process of examining and interpreting data collected through various methods and techniques to answer the research question (Creswell, 2012). Data analysis involves organising, cleaning, coding, and transforming data to derive meaningful insights and conclusions (Saunders, Lewis, & Thornhill, 2007). Data analysis can involve both quantitative and qualitative methods, depending on the nature of the research question and data collected.

5.1 Types of data analysis

There are several types of data analysis methods, including descriptive statistics, inferential statistics, code analysis, and thematic analysis. Descriptive statistics involve the analysis of numerical data to describe the characteristics of a population or sample. Inferential statistics involve the use of statistical tests to make inferences about a population based on data collected from a sample. Code analysis involves the analysis of textual or visual data to identify patterns and themes. Thematic analysis involves the identification of themes and patterns within data.

5.1.1 Quantitative data analysis techniques

Quantitative data analysis techniques are applied to numerical data, such as statistics, survey results, and experimental data. These analysis techniques, which can be either descriptive, predictive, or prescriptive, are frequently employed in the social sciences, natural sciences, and other disciplines where it is vital to have a clear understanding on objective measurements and statistical analysis.

(a) Descriptive analysis. This technique involves summarising and describing the characteristics of a set of data, such as the mean, median, and standard deviation (Lind, Marchal, & Wathen, 2015). Descriptive statistics can be used to provide a snapshot of the data and to identify any patterns or trends. Descriptive statistics are a set of techniques used to summarise and describe the main features of a dataset. They provide a simple and effective way to understand and interpret data by summarising it into key statistics and visualisations. The following are some examples of descriptive statistics.

(i) Measures of central tendency. These statistics are used to summarise the typical or central value of a dataset. The most commonly used measures of central tendency are the mean, median, and mode.

(ii) Measures of dispersion. These statistics are used to describe how spread out the values in a dataset are. The most commonly used measures of dispersion are the range, variance, and standard deviation.

(iii) Frequency distributions. These statistics are used to display the number or proportion of times that each value in a dataset occurs. They are often visualised as histograms or bar charts.

(iv) Percentiles. These statistics are used to describe the relative position of an individual value within a dataset. The most commonly used percentiles are the 25th, 50th (median), and 75th percentiles.

(v) Measure of association. Correlation coefficients statistics are used to describe the strength and direction of the relationship between two variables. The most commonly used correlation coefficients are Pearson's r and Spearman's rho. Table 1 provides a summary of some of the most often employed measures of association approaches for various types of variables. The chi-square test is the most popular measure of association for nominal variables. This test analyses whether two categorical variables are significantly associated. In addition, Lamda, Somer's D, and Cramer's V can be used to quantify the association's strength and the size of the effect, respectively. Phi is a measure of association for nominal variables that is comparable to Cramer's V, but is

used exclusively for 2x2 tables. Moreover, Tau and Phi can be utilised in specific circumstances. However, depending on the specific research question and the characteristics of the data, there are various more techniques that can be applied to analyse association.

The chi-square test of association is used to test whether two categorical variables are independent or not. It examines whether there is a significant association between two categorical variables, i.e., whether knowing the value of one variable helps predict the value of the other variable. In other words, it tests whether the distribution of one variable is independent of the distribution of the other variable. On the other hand, the chi-square test of association is used to examine the association between two categorical variables.

Table 1: Measure of association technique

Variable types	Nominal	Ordinal	Dichotomous
Nominal	Chi-square Lamda Cramer's V	Chi-square Lamda Cramer's V	Chi-square Phi
Ordinal	Chi-square Cramer's V Lamda	Chi-square Somer's D Tau	Chi-square Somer's D Tau Phi
Dichotomous	Chi-square Phi	Chi-square Somer's D	Chi-square Many techniques
Source: author-compiled based on existing literature			

(vi) Factor analysis. This technique involves identifying the underlying factors or dimensions that are associated with a set of variables (Field, 2009). Factor analysis can be used to simplify complex data and to identify the key factors that are driving a particular outcome. Factor analysis is a statistical technique used to uncover underlying factors that explain correlation patterns among a set of variables. Often, it is employed for exploratory data analysis or to create a more compact representation of a large set of variables. Inherently, factor analysis is neither predictive nor prescriptive. In contrast, it is largely a descriptive statistical method used to obtain insight into the relationships between a group of variables. By finding underlying factors, factor analysis can aid researchers and analysts in developing theories regarding the correlations between variables and data structure.

(vii) Analysis of variance (ANOVA). This statistic is used to test whether there is a significant difference between two or more groups based on a sample of data. For example, ANOVA can be used to test whether there is a significant difference in the mean income of different occupational groups.

(iix) Confidence intervals. These statistics are used to estimate the range of values within which a population parameter is likely to fall. For example, a confidence interval can be used to estimate the range of likely values for the average income of a population based on a sample of that population.

(ix) Hypothesis testing. These statistics are used to test whether an assumption about a population parameter is likely to be true based on a sample of data. For example, a hypothesis test can be used to test whether the average income of a population is significantly different from a certain value.

(b) Predictive analysis. Inferential statistics are a set of techniques used to make inferences about a population based on data obtained from a sample of that population. These statistics are used to test hypotheses, estimate population parameters, and make predictions about future events (Kumar & Garg, 2018). The following are some examples of inferential statistics.

(i) Regression analysis. This statistic is used to model the relationship between two or more variables and to make predictions about the values of the dependent variable based on the values of the independent variables. For example, regression analysis can be used to predict the sales of a product based on its price, advertising budget, and other factors.

(ii) Decision trees. A non-parametric method used for predictive modelling that recursively partitions the data into mutually exclusive subsets based on the value of the predictor variables. Several decision tree techniques exist, such as Classification and Regression Trees (CART), Chi-squared Automatic Interaction Detection (CHAID), random forest, etc.

(iii) Structural equation modeling. Structural equation modeling (SEM) is a statistical technique used to model complex relationships among observed and latent variables. SEM is a robust technique that allows researchers to test complex theoretical models and determine which factors are most crucial for explaining a certain phenomenon. It can also be used for predictive modelling, testing hypotheses, and assessing the effects of interventions or policy changes on a system or population. It is common practise to follow structural equation modelling with exploratory factor analysis and then confirmatory factor analysis.

(v) Time series analysis. A statistical technique used to analyse time-dependent data and make predictions about future values.

(b) Prescriptive analysis. Prescriptive analysis is a kind of analysis that identifies the optimal path of action to attain a particular objective or result. In contrast to descriptive and predictive analysis, which focus on evaluating historical data or projecting future events, prescriptive analytics goes a step further by providing precise recommendations or solutions for a given problem or circumstance.

To provide suggestions, prescriptive analysis often combines mathematical modelling, optimisation, and data-driven insights (Lepenioti, Bousdekis, Apostolou, & Mentzas, 2020). The procedure begins with the definition of the problem or decision to be made, the identification of the relevant variables, and the specification of the constraints and objectives. The algorithm then examines the potential solutions based on the provided criteria to identify the optimal course of action.

(i) Optimisation models. A mathematical modelling technique that identifies the optimal solution to a problem according to a set of constraints by maximising or reducing an objective function.

(ii) Simulation models. A strategy for describing complex systems and processes using computer models to simulate and analyse a variety of possible outcomes and situations.

5.1.2 Qualitative data analysis techniques

Qualitative data analysis techniques are used to analyse data that are non-numerical in nature, such as text, images, and audio recordings. These techniques are often used in social sciences, humanities, and other fields where subjective experiences and perceptions are important to understand. Some common qualitative data analysis techniques include:

(a) Thematic analysis. This technique encompasses the identification of data patterns or segments (Guest, MacQueen, & Namey, 2012). Researchers analyse the data by coding it, grouping similar codes together to form categories, and then identifying overarching themes that emerge from the categories. Below is an example of an interview answer that demonstrates a thematic analysis.

Interview Question: "*What factors do you believe contribute to stress in the workplace?*"

Interviewee Answer:

> "*In my experience, I think there are a few key factors that contribute to stress in the workplace. The first one is workload - when there's too much work to do in too little time, it can be really overwhelming. It feels like you're always behind and can't catch up. That's definitely something that's caused me stress in the past.*
>
> *Another factor is the organisational culture. If the management doesn't seem to care about our well-being and is always pushing us to do more with less, it can create a really negative work environment. Poor communication and a lack of support from management can also add to the stress levels. I've seen that happen in a few places where I've worked, and it's definitely not a good feeling.*
>
> *Lastly, coworker relationships can be a big factor. Having supportive coworkers can make all the difference in the world, but conflicts with coworkers can be really stressful. I've had both experiences - I've worked on teams where everyone was really supportive and it made the work so much easier, but I've also had to deal with coworkers who were difficult to work with, and it definitely added to my stress levels*".

Thematic Analysis: From the above-mentioned interview answer, it is possible to identify three key themes that contribute to stress in the workplace. For example, "*work demands*", "*organisational culture*", and "*coworker relationships*". Within these themes, it is possible to see several codes that relate to each theme. For example, the code "*too much work to do in too little time*" falls under the theme of work demands, while the code "*poor*

communication" falls under the theme of organisational culture. By identifying these themes and codes, it is also possible to gain a deeper understanding of the factors that contribute to stress in the workplace, which can help researchers to develop strategies for reducing stress and improving employee well-being.

(b) Coding analysis. Coding analysis in interview data is a technique used to identify patterns, themes, and categories within the data obtained from interviews. It involves systematically analysing the data by breaking it down into smaller segments, such as words, phrases, or sentences, and assigning descriptive labels or codes to those segments (Linneberg & Korsgaard, 2019). This process allows the researcher to identify and organise the key concepts and themes that emerge from the data. These codes can then be grouped together into larger categories or themes, which can provide insights into the participants' perspectives and experiences.

Coding analysis can be done manually or with the help of software programmes that aid in the organisation and management of the coded data. The analysis can be iterative, with the researcher going back and forth between the data and the codes to refine and clarify the emerging themes. The end result is a set of categories and themes that capture the main ideas and concepts that emerged from the interview data. Generally, these qualitative data analysis techniques provide researchers with tools to analyse complex and subjective data, and to develop a deep understanding of people's experiences and perspectives.

Here is an example of coding analysis for the above interview response:

Codes identified:

> *Workload, organisational culture, management support, communication, coworker relationships, supportive coworkers, conflicts with coworkers, stress caused by workload, negative work environment, lack of well-being care from management, difficulty in catching up with work, feeling overwhelmed by workload, difficulty in working with difficult coworkers.*

In this coding analysis, each code represents a theme or category that captures the key points made by the participant. For example, "*workload*" is a code that represents the theme of "*too much work in too little time causing stress*". "*Management support*" and "*communication*" are codes that represent themes related to the participant's "*negative experiences with management in the workplace*". "*Supportive coworkers*" and "*conflicts with coworkers*" are codes that capture the participant's "*experiences with coworkers and their impact on stress levels*".

5.2 Selection of data analysis method

Selecting a data analysis method depends on several factors, including the research question, the research design, the type of data collected, and the analytical tools and software available. The data analysis method should align with the research question and research design. For instance, if the research question is about exploring the experiences of participants, then qualitative methods such as content analysis or thematic analysis may be appropriate. If the research question is about determining the relationship between two or more variables, then inferential statistics may be appropriate.
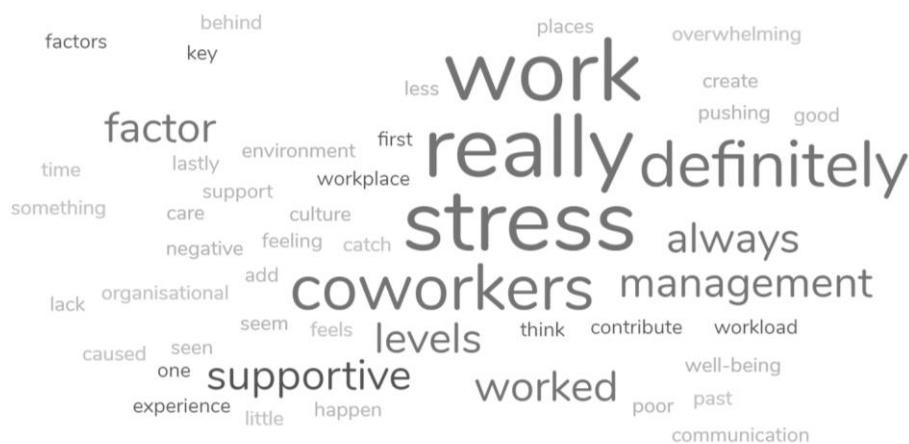

Figure 2: Codes generated from interview script

6. ETHICS IN RESEARCH

Ethics in research refers to the guiding concepts and standards of conduct for researchers (Gray, 2014). These principles include respect for study participants, protection of their privacy and confidentiality, informed consent, harm minimization, and transparency regarding research techniques (Saunders, Lewis, & Thornhill, 2007). Research ethics is essential because it guarantees that researchers do their job responsibly and accountably, and that the rights and welfare of research participants are maintained. There are several ethical considerations that researchers need to take into account when conducting research. These considerations include informed consent, confidentiality and privacy, minimising harm, ensuring that participants are not coerced into participating, and ensuring that participants are fully informed about the nature and purpose of the research. Other ethical considerations may include issues related to cultural sensitivity, gender, and vulnerable populations.

(a) Informed consent. Research often involves in-depth interviews, observations, or focus groups, and it is important to obtain informed consent from participants. Researchers should provide information about the study, explain the risks and benefits of participation, and obtain consent from participants. As with qualitative research, informed consent is important in quantitative research. Participants should be provided with information about the study, and their consent should be obtained before any data is collected.

(b) Confidentiality and anonymity. Research often involves sensitive or personal information, and it is important to protect the privacy of participants. Researchers should take steps to ensure that data is kept confidential and that participants are not identified in any reports or publications. Regarding the protection of human subjects, researchers should take steps to ensure that participants are not harmed by the research. This may involve providing support or counseling services to participants, or taking other steps to Minimise the risks associated with the study.

(c) Power differentials. In research, power differentials may exist between the researcher and the participant, and this can affect the dynamics of the research. Researchers should be aware of power dynamics and strive to create a comfortable and safe environment for participants.

(d) Debriefing. At the end of the study, it is important to debrief participants and provide them with an opportunity to ask questions or raise concerns.

(e) Ethical use of statistical techniques. Researchers should use statistical techniques appropriately and ethically, which means avoiding the manipulation of data or the use of statistical techniques to mislead or misrepresent findings.

In many universities and research institutions, an ethics committee is established to oversee the ethical conduct of research. The ethics committee plays an important role in ensuring that research is conducted in an ethical and responsible manner, and that the rights and welfare of participants are protected.

7. MANAGEMENT OF REFERENCES AND CITATIONS

References and citations are essential components of academic research that serve to give credit to the sources utilised and provide extra context and support for the arguments and results. Typically provided at the end of a research paper or document, references are a list of sources reviewed during the research process. Books, journal articles, papers, websites, and other sources of information may be included in the list of references. In general, references provide a means for readers to access and validate the material presented in the research.

Citations, on the other hand, are specific references to sources used throughout the body of the research manuscript. Citations can take numerous forms, including in-text citations, footnotes, and endnotes, based on the citation style followed. In general, citations enable readers to identify the precise sources utilised to support particular arguments, statements, or ideas in the research. Several citation styles, such as American Psychological Association (APA), Modern Language Association (MLA), Chicago, and Harvard, are used in academic research. The format of citations should be utilised "consistently" throughout the entire manuscript. Consistency in citation format is crucial for a number of reasons. Employing a consistent citation format throughout the manuscript makes it easier for readers to comprehend and follow the references and citations and ensures that they can identify and verify the supplied material. The consistent usage of citation style demonstrates that the author has taken care in their work and is dedicated to presenting their research in a professional manner; perhaps it contributes to the author's credibility and reputation in the area. Several academic journals and publishers require that authors adhere to a certain citation style, such as APA or

Harvard. By employing a consistent citation format, authors can ensure that their manuscript fits the requirements of the journal or publisher and has a greater chance of being published.

8. CONCLUSION

Carrying out research necessitates going through a number of stages that need to be meticulously prepared for and carried out if one is to obtain results that are reliable and legitimate. Researchers are required to establish a distinct philosophical perspective, select the most appropriate approach to investigation, utilise a variety of data collection methods, apply proper analysis techniques, and effectively convey their findings. Each stage of the research process is essential, and careful consideration must be made to guarantee that the investigation is carried out in an organised fashion at all times. This paper discussed several facets of research, such as the research design, the literature review, the data collecting, the data analysis, the ethics of research, and the management of references and citations. In addition to providing some instances, it emphasised how crucial it is to select suitable research approaches and to adhere to ethical principles when carrying out research. This work took a narrative approach to summing up academic resources useful for introductory-level research-methods instruction; such a compilation of relevant academic resources would be useful to researchers and educators alike.

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Notes

Disclosure of conflicts of interest

The author declares that no perceived, potential, or actual conflict of interest exists.

Funding/Sponsorship

The author confirms that no financial support was received and that the author is not affiliated or associated with any organisation or entity with a financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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