Research Methodology –
Contemporary Practices
Research Methodology –
Contemporary Practices:
Guidelines for Academic Researchers

By

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and Hafsa Maryam

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To my beloved father who lies at Jannatul Baqi, Late Alhaj Md. Habibur Rahman, for his kind efforts, dedication, tremendous support and all-time aspiration.
—Md. Mamun Habib
Universiti Utara Malaysia (UUM), Malaysia

To my late grandmother, Mrs. Provable Banik, for her enormous inspiration to achieve excellence.
—Bishwajit Banik Pathik
American International University, Bangladesh (AIUB)

To my late parents, Dr. Muhammad Habibullah and Mrs. Sajeda Khatun, for their love and support.
—Hafsa Maryam
American International University, Bangladesh (AIUB)
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Research is one of the fundamental pillars in academia, as well as in modern business organizations. Therefore, the question arises as to how does one conduct research, i.e., what should be the methodology of a piece of research? This query creates an opportunity for us, the authors, to publish a book on the modern procedures of research for both academics and practitioners.

New researchers, whether on the academic or corporate level, confront challenges when pursuing any kind of research project due to a lack of proper knowledge in the field of research methodology. In general, the challenges evolve from starting a research project, choosing a niche topic, selecting appropriate tools and techniques, organizing paper publications, and presenting the findings. In view of such difficulties, the authors have written this book in order to help new scholars gain command of the contemporary practices for conducting research.

Chronologically, the book defines the various types of research including classifications, describes the five simple steps for carrying out research along with explanations, and discusses the tools and techniques used to carry out a research project in a systematic manner. Consequently, it distinguishes between different publications (conference or journal paper, book chapter, and book). In addition, it sheds light on writing practices and presents valuable tips for researchers, new to the field, to avoid common mistakes.

This manuscript brings clarity with comprehensive insight to the phenomenon of research methodology based on contemporary approaches. For academic scholars, this book finds solutions for many unsolved issues which may arise while carrying out research. It also presents additional insights into the nuances of research methods on a professional level for practitioners. Furthermore, for students, this book aids in understanding the direction to follow in the exploration of research design.
ACKNOWLEDGMENTS

The idea of this book originated during Dr. Habib’s Research Methodology lectures at postgraduate level. Subsequently, he shared his initial thoughts with his colleagues Mr. Pathik and Ms. Maryam. Eventually, the combined efforts of these three authors have resulted in this book. Although it has taken a long time to produce this manuscript, the book signifies a milestone for academic researchers, PhD scholars, as well as new faculty members, in the production of quality research works.

On the eve of this publication, Dr. Habib wishes to acknowledge and thank his beloved mother, Alhaja Shirin Habib, his understanding and supportive wife, Dr. Farzana Afzal, his son, Rafiul Habib, and other family members for their tireless inspiration in helping him to complete this book. Mr. Pathik would like to thank his parents, Mr. Shankar Proshad Banik and Dr. Bhagya Rani Banik, as well as his younger sister, Ms. Pratiti Banik Tuli, for their never-ending encouragement and support. Ms. Maryam acknowledges a great debt to her parents, Dr. Muhammad Habibullah and Mrs. Sajeda Khatun, for teaching her to be the person she is today.

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Md. Mamun Habib
Bishwajit Banik Pathik
Hafsa Maryam
PART 1:

AN INTRODUCTION TO RESEARCH

This introduction illustrates the fundamental concepts of research, particularly in the areas of data, information, research findings, the different types of research, the classification of research papers, their significance, and scientific methods of research. In the section on types of research, basic and applied research, evaluation and performance-monitoring research, exploratory, descriptive and causal research, qualitative and quantitative research, and funded and academic research have been defined. The next section encompasses the categorization of research papers, including conference papers, journal papers, editorial books, and books. Finally, the different stages of scientific research methods are illustrated in the last section.
AN INTRODUCTION TO RESEARCH

1.1 What is research?

Research is a scholarly, scientific, and systematic investigation to establish facts or principles, or to collect information on a subject to be presented in a detailed and accurate manner. Research is driven by a question or problem that guides the process for seeking information with a clear goal in mind. It works best when done step-by-step. The steps may need to be repeated, as the process is reiterative. In other words, research is the collection and interpretation of data in an attempt to resolve a problem at hand or to answer a question. It goes beyond facts and out-of-date ideas by taking a new look at the information and making a fresh stand.

However, research is not just the gathering of information or rearrangement of facts. For instance, it is neither a collection of paragraphs from e-sites, which is known as plagiarism, nor is it the rewording of phrases and citing someone else’s name on them.

Research involves the most detailed and thorough study of a problem with a view to gain information to reach its solution. Internet search engines, i.e., Google, Yahoo, Hotbot, Bing, Dogpile, etc., digital libraries, traditional and open access publishers, or any other source of vetted information can be used as an aid to research.

1.2 Data, information and research findings

Data are the raw facts that record measures of certain phenomena which are necessary to constitute a research work, whereas information is the presentation of facts in a suitable form for researchers to make decisions. Research findings are the outcome of the research described through effective information. Findings are obtained through a rigorous process by using primary data, secondary data, statistical analysis, and so on.
Primary data is the type of data which is sourced directly from the respondents/target users. It is also called raw data and can be in the form of numbers, figures, ranks, weights, and other similar response forms. The researcher needs to analyze this information in order to uncover the findings. Primary data is obtained through the researcher’s involvement in the process, either through direct surveys and/or field work. Secondary data is the type of information which is already in an organized form. The data has had prior work performed on it and it can be further used for other purposes. Commonly, secondary data sources include websites, published journals, conference papers, books, research reports, etc.

In order to construct research findings one has to utilize information in terms of data. Information should be relevant, i.e., information should be aligned with the core subject matter and not be on the periphery. The quality of information depends on the degree of data processing that has been verified and is authentic. Characteristics of valuable information are as follows:

(a) Relevance: One of the characteristics of useful information is that it should be relevant to the problem. Relevance entails an actual relationship with the problem. The facts of the data should connect to the situation and they should have a direct relationship. If the facts change, then the situation changes as well. For example, if consumers prefer to use compact cars in a crowded city, this factor would influence the sale of big vehicles.

(b) Quality: The quality of data is measured by its accuracy. It should represent real scenarios and should be reliable. Quality is a very important parameter in data collection and any compromise in it can lead to results which will not be valid. In order to ensure uncompromised, high-quality standards researchers sometimes tend to collect data from multiple sources.

(c) Timeliness: Business research is time oriented. By timeliness, the researcher should ensure that the data collected and analyzed is done so at a speed whereby it is still relevant and accurate to make decisions upon.
Lack of timeliness can lead to poor decision making for businesses. Thus, data should be provided immediately after an event occurs.

**(d) Completeness:** To carry out valid research, it is important that all relevant information is available. Completeness refers to the relevant amount of information about all aspects of a given situation or problem.

Additionally, it is important to be mindful of possible ethical issues. Conducting research requires the researcher to use honest methods in gathering data, and not become involved in unethical approaches which may be morally threatening. For example, in the case of primary data, the respondents should be genuine, not fake. A very common malpractice involves the researcher filling out the questionnaires, or one respondent filling out more than one questionnaire, to increase the total number of completed questionnaires. Another malpractice which should be avoided, especially in the case of secondary research, is directly copying from previously published research works; this is plagiarism. Instead, restructuring, paraphrasing, and rewriting of sentences should be carried out in order to make them fit coherently within the research, as well as to keep its integrity.

### 1.3 Types of research

This section outlines various types of research in current use, namely, basic and applied research, evaluation and performance-monitoring research, exploratory, descriptive, and causal research, qualitative and quantitative research, and funded and academic research.

#### 1.3.1 Basic and applied research

**Basic research** focuses on the fundamental principles and testing of hypotheses for the development of new and/or revised theories and repositioned theories. In fact, basic research is recognized as pure research. Basic research may focus on problem solving, but the problem is likely to be theoretical rather than practical [10]. The emphasis is on academic rigor and the strength of the research design. The output of basic or pure research is, thus, likely to be an academic paper, and articles published in academic journals for conferences.

The main objective of this kind of research is to expand knowledge, not simply to create or invent something. There is no obvious commercial value to the discoveries that result from basic research. In spite of the fact
that there may be no obvious value when the experiments are performed, this new knowledge often leads to breakthrough methods and treatments years or decades later.

Basic research is conducted without any specific decisions in mind. Usually it does not address the needs of any particular organization and is not directly involved in the solution to a practical problem. Much research carried out at doctoral degree level is denoted as basic research. Other examples are as follows:

- Discovery of x-rays which led to the study of bone fractures.
- Psychological studies of decision making that led to important findings in the fields of education, medicine, and economics.
- Chemists developed a tool called a nuclear magnetic resonance (NMR) machine to determine the structure of chemicals. When it was developed, it had no obvious applications in medicine; however, scientists eventually realized that the NMR machine could be hooked up to a computer to make a magnetic resonance imagery (MRI) machine. The MRI machine takes pictures of the bone and internal tissues of the body without the use of radioactivity [4].

**Applied research** is a study that is designed to apply its findings to solve an existing problem with the application of existing knowledge towards a specific organization. Applied research examines a specific set of circumstances, and its ultimate goal is relating those results to a particular situation. This research uses data directly for real world application [1]. An example would be research carried out on the impact of the addition of a new ingredient onto the menu of a KFC restaurant. More examples are given below:

- Treat or cure a specific disease.
- The improvement of safety in the workplace in a specific organization.
- The reduction of wastage of raw materials or energy in a factory process.

**1.3.2 Evaluation and performance-monitoring research**

**Evaluation research** is the formal, objective measurement and appraisal of the extent to which a given activity, project, or program has achieved its objectives.
Performance-monitoring research is a specific type of evaluation research that regularly provides feedback for evaluation and control. It also indicates whether things are or are not going as planned. Performance-monitoring research may be required to explain why something "went wrong."

For example, consider a five-year project. At the end of each year evaluations of the project in terms of quality, time, completeness, etc. need to be carried out. The research conducted every year would be the performance-monitoring research, whereas the research undertaken after completion of the whole project will be the evaluation research.

1.3.3 Exploratory, descriptive, and causal research

Exploratory or empirical research is undertaken to explore new ideas and concepts according to the conceptual models, hypothesis, and empirical evidence. The primary point of exploratory research is to give researchers pertinent information and help them to form initial hypotheses about the subject. This is transformed into a research problem or issue when there are very few or no earlier studies to which reference for information about the issue or problem can be made [10]. Empirical evidence is data based on observation or experience, and data are known facts or things used as a basis for inference or reckoning. Typical techniques used in exploratory research include case studies, observation, and historical analysis, which can provide both quantitative and qualitative data.

Exploratory research is the initial research conducted to clarify and define the nature of a problem. It does not provide conclusive evidence. As the problem is unknown, subsequent research is expected. Doctoral
level researches are usually based on model, hypothesis, survey, statistical analysis, and the like, all of which constitute exploratory research.

**Descriptive research** can be used to describe a unit of analysis, e.g., a case study of a particular organization, or to describe a research method. Descriptive research would be an application of the exploratory research based on the organization phenomena or event. It is used to identify and obtain information on the characteristics of a particular problem or issue.

Descriptive research goes further in examining a problem than exploratory research, as it is undertaken to ascertain and describe the characteristics of the pertinent issues. Some understanding of the nature of the problem is available in descriptive research in terms of detailed descriptions of the specific situation(s) using interviews, observations, and document reviews.

The ITESCM (Integrated Tertiary Educational Supply Chain Management) model was developed in 2009 by Dr. Habib as a result of his doctoral dissertation findings; this is an example of exploratory research. Consequently, the application of the ITESCM model upon many universities around the world represents descriptive research [11].

**Causal research** explores the effect of one variable on another. It represents the comparative study which is used to measure the impact of a specific change upon an existing system.

For example, a university has the intention to establish a new department, either the Engineering Management or the Operations Management. Conducting a survey among the prospective students for their preferences would be a causal research. Being surveyed on whether most of the students would prefer the Engineering Management, or whether the Operations Management would be liked by only a few students, indicates the cause and effect relationship of the causal research.

### 1.3.4 Qualitative and quantitative research

**Quantitative research** usually involves collecting and converting data into numerical form so that statistical calculations can be made to draw conclusions. Quantitative research is an inquiry into an identified problem, based on testing a theory, measured with numbers, and analyzed using statistical techniques. The goal of quantitative methods is to determine whether the predictive generalizations of a theory hold true [12].

Quantitative research options have been predetermined and a large number of respondents are involved. By definition, measurement must be objective, quantitative, and statistically valid. The sample size for a survey is calculated by statisticians using formulae to determine how large a
sample size will be needed from a given population in order to achieve findings with an acceptable degree of accuracy [13].

Table 1.1 Overview of qualitative and quantitative research

<table>
<thead>
<tr>
<th></th>
<th>Qualitative Research</th>
<th>Quantitative Research</th>
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<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Descriptive and conclusive</td>
<td>Exploratory and no conclusive evidence</td>
</tr>
<tr>
<td><strong>Sample Size</strong></td>
<td>Small samples</td>
<td>Large samples</td>
</tr>
<tr>
<td><strong>Question Type</strong></td>
<td>Broad range of questioning</td>
<td>Structured questions</td>
</tr>
<tr>
<td><strong>Interpretation</strong></td>
<td>Subjective interpretation</td>
<td>Statistical analysis</td>
</tr>
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</table>

Qualitative research may be more concerned with the individual’s personal experiences of the problem under study. It is the collection, analysis, and interpretation of data by observing what people do and say. It refers to the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things. Contrarily, quantitative research refers to counts and measures of things.

Research on philosophy, psychology, anthropology, and sociology represents qualitative research, whereas research in business administration and engineering is represented by quantitative research.

1.3.5 Funded and academic research

Research funded by different organizations in their prescribed format are categorized as funded research. Funds are provided to enhance the research contribution to society. Different government organizations, such as the National Science Foundation, and the Agency for Healthcare Research and Quality, and external funding organizations like the EU, the World Bank, the Foundation for Child Development and Young Scholars Program, and the Organization for Autism Research, often extend their funds to individual researchers directly or through universities.

Academic research is comprised of projects, theses, dissertations, or academic research publications such as conference papers, journal papers, book chapters, or books. The findings of academic research are further used as reference material for the academic level by prospective students as well as teachers. Usually, these researches are conducted by self-funding.
1.4 Categorization of research papers

Research papers are submitted for publishing in conferences, journals, book chapters, and books. Therefore, research papers could be categorized as a conference paper, journal paper, editorial book/book chapter and book.

(i) Conference paper
A research paper presented at an international conference, and published in the conference proceedings, is known as a conference paper. Acceptance of the paper is subject to many factors which are components of a continuous process: from abstract/initial paper submission, editing of the paper according to the reviewers’ comments, and then the final manuscript submission (camera-ready paper). Detailed information about conference papers is provided in Part 4.

(ii) Journal paper
If a comprehensive research paper is prepared and published in a reputable journal, which has periodical issues published by an international publisher, it is called a journal paper. Journals offer more flexibility than conference papers in terms of words and/or page limit leading to the publication of more elaborate research work. More information regarding journal papers can be found in Part 4 of this book.

(iii) Editorial book
An editorial book consists of several chapters which are contributed by different authors who have some expertise in the same area. This kind of book is reviewed by the editor, nominated by the book publisher, who is highly experienced in the subject of the book. Publisher or editor selects the contributing authors to submit manuscripts for the book chapters.

(iv) Book
A book can be formulated by a sole author or joint authors, who are highly knowledgeable in their respective fields of study. This is the most prestigious form of publication. Authors receive direct invitations from international publishers. If an individual has one editorial book, then he/she would be nominated as a sole author.
1.5 Significance of research

Research is undertaken to generate new ideas, revise existing theories, for concept testing, or for repositioning theories. The purpose of research is to expand knowledge, and for that the findings of the research have to be reported cohesively and in a pertinent manner befitting the particular research problem. Research has an impact on both the academic and practical levels. Usually, research is accomplished through different mediums, particularly projects, theses, or dissertations as part of academic graduation. Existing theories or new ideas would be practically implemented for the benefit of organizations and industries, thus helping to develop society. The rising trend in cross-cultural research work has the potential for further collaboration with different countries, as well as creating new dimensions for prospective researchers.

1.6 Scientific method of research

The scientific method is the analysis and interpretation of empirical evidence (facts from observation or experimentation) to confirm or disprove prior conceptions. It has five stages:

Stage 1: Problem defining
This refers to defining the research question(s) in order to narrow down a research topic. The researchers focus on a particular research problem or issue in order to produce a better outcome. The classic way to identify a research problem is to consider the literature and identify any gaps, as these indicate original areas for research. Issues arising from other academic articles, particularly suggestions for further research, can be explored.

Stage 2: Hypothesis setting
Researchers set a hypothesis, either null or alternate, based on research questions which are related to the problem that was defined in stage 1. Consequently, further stages, particularly those of collecting data, data analysis, etc. are furnished according to the proposed hypothesis.

Stage 3: Collecting data
There are a variety of ways in which one can collect research data. Because of the many differences between quantitative and qualitative methods, these are explained in separate chapters. For a quantitative methodology, researchers attempt to measure variables or count
occurrences of a phenomenon. On the other hand, in the case of a qualitative methodology, researchers emphasize the themes and patterns of meanings and experiences related to the phenomena [10].

**Stage 4: Hypothesis testing**
During this stage, researchers analyze the data that has been acquired by the survey. It includes primary data collected through various statistical tools such as EXCEL, SPSS, AMOS, LISREL, etc. In this stage, the hypothesis is tested based on data gathered through survey.

**Stage 5: Conclusion**
The resultant findings of the research become apparent after following the four stages mentioned above. The contribution of the study, application guidelines, recommendations, and further study are highlighted so that prospective researchers and practitioners can use them.

### 1.6.1 Two levels of scientific research

Scientific research is expressed in the following two levels in exploratory research:

- **a) Abstract level**
The abstract level presents the level of knowledge expressing a concept that exists only as an idea or a quality, separate from an object. At a glance, the abstract level consists of the type of study, the methodology used, the method of survey and statistical analysis, and the proposition (proposal), i.e. the contribution of the paper.

- **b) Empirical level**
The empirical level represents the level of knowledge which is verifiable by experience or observation. It encompasses the conceptual model, variables of the model, hypothesis setting, and respondents in the survey. It verifies hypotheses through statistical tools and presents the findings of the paper.
PART 2:

RESEARCH STEPS

It is of the utmost importance for the researcher to understand the basics of the research issue, in order to come up with a research publication free from problems and confusion. This section discusses the progression or methodical steps involved in carrying out a research paper. These steps can help to formulate a frame for the whole research activity and allow organization of the content into cohesive patterns. Hence, in-depth explanations, as well as defining each step, have been covered extensively.

Research publications are mostly dependent on the research instrument. A good research instrument has the potential to enhance the quality of the publication. Keeping this in mind, the different types of questionnaires used have been added to this section of the book. The various subjects within each step are discussed succinctly for a better understanding of the complete research process. Examples and illustrations are added to the chapter to aid effective understanding.