

SCIENTIFIC METHOD IN RESEARCH: ESSENTIAL TECHNIQUES AND METHODS

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Annotation. This article provides a comprehensive analysis of the stages and levels of the scientific research process based on modern scientific and methodological approaches. Particular attention is paid to identifying research problems, formulating scientific hypotheses, selecting appropriate research methods, collecting and processing empirical data, systematically analyzing the obtained results, and implementing the findings in practice. In addition, the theoretical foundations of fundamental, applied, and innovative research levels are examined, and their scientific and practical significance is substantiated.

Keywords: scientific research, research stages, levels of research, methodology, hypothesis, innovation.

Introduction

Scientific research is one of the key driving forces behind the development of modern science and technology. It is a complex, multi-stage, and systematic process aimed at enriching existing knowledge, formulating new scientific concepts, and developing evidence-based solutions to practical problems. Any scientific study is organized based on clear methodological principles and logical consistency, and the careful planning of this

process, along with the sequential implementation of its stages, ensures the reliability, accuracy, and practical relevance of the obtained scientific results.

In the current context of globalization and digitalization, the significance of scientific research has increased even further. Today, research goes beyond merely deepening theoretical knowledge and has become a crucial strategic tool for addressing social development, economic stability, technological innovations, and environmental challenges. From this perspective, a thorough understanding of the stages and levels of scientific research, along with a correct interpretation of their essence and effective application in practice, is an essential responsibility for every researcher.

Stages of Scientific Research

The scientific research process is carried out in a systematic and logical sequence, where each stage ensures the reliability, validity, and scientific significance of the results. The main stages of scientific research are as follows:

Problem Identification Stage

This stage serves as the starting point of any scientific investigation. The researcher's primary task is to identify the scientific problem and substantiate its relevance. Existing literature is thoroughly reviewed, the object and subject of the research are defined, and the primary goals and objectives are established. This stage sets the strategic direction for the entire research process.

Hypothesis and Methodology Stage

In this stage, the research hypothesis is carefully formulated, representing the scientific assumptions that will be empirically tested throughout the study. The hypothesis serves as a foundational premise guiding the entire research process. To ensure rigorous validation, appropriate scientific methods are selected, which may include:

- Theoretical analysis
- Comparison
- Observation
- Experimentation

- Statistical analysis

Furthermore, a comprehensive research plan is developed, outlining the step-by-step schedule of activities, resource allocation, and methodological procedures. This structured approach provides a robust framework, ensuring the reliability, reproducibility, and scientific validity of the study.

Empirical Research Stage

During this stage, practical research activities are conducted, and empirical data are collected. Key activities include:

- Conducting experiments
- Performing observations
- Designing surveys and interviews
- Collecting and processing empirical data

The empirical stage allows for practical testing of the research hypothesis and forms the foundation for reliable scientific results.

Analysis and Generalization Stage

Collected data are analyzed and visually represented using tables, charts, and graphs. Statistical and logical analysis is performed to draw scientific conclusions and determine whether the hypothesis is confirmed or refuted. At this stage, the results are systematized, and their scientific and practical significance is established.

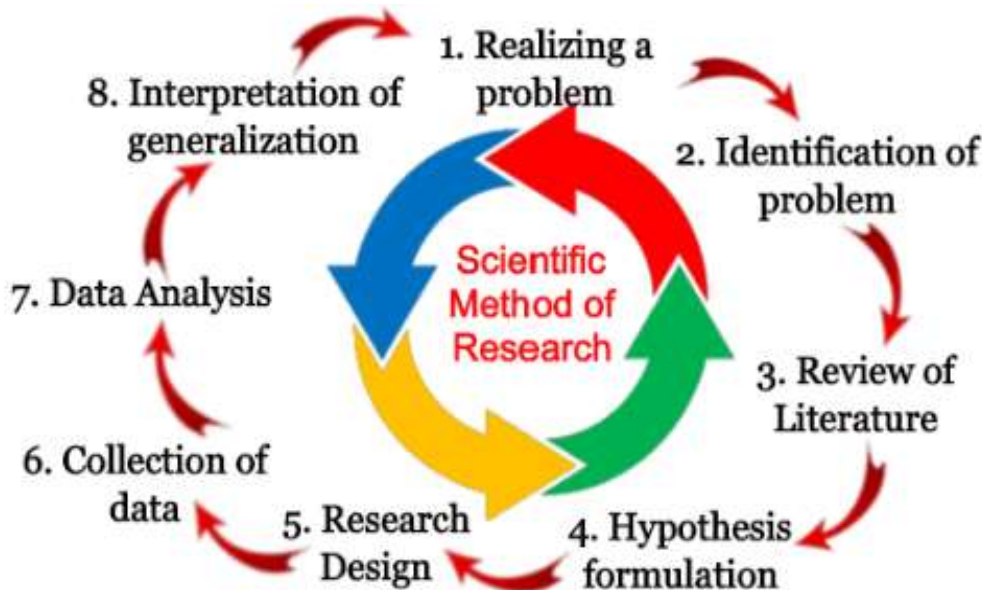
Results Documentation Stage

At this concluding stage, the research findings are meticulously documented and formally disseminated to the scientific community, ensuring clarity, transparency, and accessibility of the results. The outcomes may be presented in various academic formats, reflecting the study's scope and significance.

- Scientific articles
- Theses
- Monographs

-Dissertations

In addition to formal documentation, the practical implications and applications of the research results are highlighted, demonstrating their significance for advancing knowledge in the relevant field and contributing to societal development. This stage ensures that the study’s outcomes are accessible, interpretable, and usable by both scholars and practitioners.



Levels of Scientific Research

Scientific research can be categorized into three primary levels based on its content and objectives:

Fundamental Research

Fundamental research is directed toward the in depth exploration of the laws and principles governing nature and society. Its main purpose is to generate new theoretical knowledge, expand scientific understanding, and contribute to the development of science without immediate practical application.

Applied Research

Applied research focuses on the practical implementation of the results obtained from fundamental studies. It aims to develop methods, strategies, and solutions that can be

effectively applied in real-world contexts to solve specific problems or enhance existing processes.

Innovative Research

Innovative research is aimed at creating new technologies, products, methods, or systems based on existing scientific knowledge. This level of research emphasizes originality, practical application, and the advancement of technology, thereby contributing to societal and industrial progress.

Conclusion

The stages and levels of scientific research are interrelated, and conducting them systematically and coherently significantly enhances the effectiveness of the investigation. Each stage identifying the problem, analyzing the literature, defining the research methodology, collecting and analyzing data, and documenting results plays a crucial role as an integral part of the scientific process. Properly organized stages ensure the reliability and accuracy of scientific findings and serve as an effective means for generating new knowledge and applying it in practice. Moreover, the results of scientific research contribute not only to the advancement of science but also to the intellectual and technological development of society.

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