

## TYPES OF EMPIRICAL DATA

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**Abstract:** This article covers the importance of empirical data in scientific research and their types. Empirical data is fact-based information obtained from experience, observation, and measurement. The article gives an overview of the main types of these data: quantitative and qualitative data, as well as the methods of their collection and analysis. It is emphasised that for the researcher, the correct selection and analysis of empirical data is an important factor in ensuring scientific reliability.

**Keywords:** empirical data, quantitative analysis, qualitative research, scientific method, observation, experiment, data collection, statistical analysis.

**Introduction.** Empirical data is a collection of real facts and numerical indicators collected through direct experience, observation, or experiments. They are an integral part of the scientific process of knowledge and serve as the main source for confirming or rejecting theories. This data allows scientists to understand real reality, identify relationships between phenomena, and make practical decisions.

In the process of modern scientific research, the reliability and accuracy of data are of great importance. Especially in the field of social sciences such as psychology, sociology, pedagogy, and economics, the use of empirical data becomes the foundation of research when studying real-life phenomena. Empirical data includes information obtained as a result of experience, observation, experimentation, or statistical analysis. They provide objectivity and allow theoretical hypotheses to be tested on a practical basis.

**Main part.** Empirical data is understood as factual information obtained from reality through direct or indirect observation. This type of data serves as the main material for scientific research. Through them, a scientist or researcher checks theoretical hypotheses, confirms or refutes them.

Observation - collecting information through direct or indirect observation of events. This method is widely used in psychological research.

Experiment - artificially creating and studying events under predetermined conditions.

Questionnaires and interviews - determining the opinions and attitudes of participants.

Tests and diagnostic tools - quantitative assessment of the state of an individual or group.

Empirical data plays a key role in research. It allows us to test theories, confirm hypotheses, and develop realistic approaches to problems. The correct collection and analysis of empirical data determines the reliability of research results.

Empirical data is factual information collected through experiments, observations, or experiments conducted by humans or natural systems. They are central to scientific research and methodologies because they provide evidence needed to confirm or refute theories. The main types of empirical data are quantitative and qualitative data, which are different from each

other. Quantitative data is based primarily on quantitative measurements and is analyzed using statistical analysis. Qualitative data is about people's thoughts, feelings, and experiences, which are expressed through words, conversations, and images. There are various methods for collecting empirical data. Among these, observation, surveys, interviews, experiments, and tests are the most commonly used methods. Each method has its own advantages and is used for different purposes in scientific research.

The main types of empirical data:

Qualitative (categorical) data

Qualitative data represent the descriptive characteristics of objects and are usually in the form of categories. For example: a person's gender (male/female), color (blue/red), profession, level of education, etc. This type of data is usually analyzed in the form of graphs or tables.

Quantitative (quantitative) data

Quantitative data are represented by numbers and mathematical and statistical operations can be performed on them. They are divided into the following subtypes:

Discrete data - data that can be counted, usually in the form of whole numbers (for example, the number of students, the number of car wheels).

Continuous data - data obtained as a result of measurements, covering any value (for example, a person's height, weight, air temperature).

Types of empirical data and their importance in scientific research

**Results and discussion.** One of the main tasks of science is to accurately study, explain, and predict phenomena in existence. One of the main sources of this is empirical data. Empirical data refers to facts and figures that reflect real life, obtained through experience, observation, or experimentation. They play an important role in testing theoretical ideas, creating new knowledge, and solving practical problems.

Empirical data play a key role in testing theoretical knowledge and connecting it to real life. Many great discoveries in the history of science are based on empirical observations. For example, the famous English physicist Isaac Newton relied on empirical observations to discover his law of gravity. There, analyzing the fall of a body and the movement of celestial bodies, he discovered a general law between these phenomena. Newton's work was confirmed not only theoretically, but also on the basis of accurate measurements and calculations, which clearly shows how important empirical data is for science.

In modern times, empirical data is widely used in many fields such as sociology, psychology, medicine, and economics. For example, during the pandemic, medical workers collected millions of empirical data on the spread, effects, and treatment methods of the COVID-19 virus, and vaccines were developed and quarantine policies were formed based on this data. Empirical data is factual information collected through direct observations or experiments. They are used as the main source in research and play an important role in drawing scientific conclusions. Empirical data is divided into the following types. Quantitative data - this type of data is based on numerical measurements. They are given in numerical expressions and analyzed using statistical methods. For example, measuring supply and demand, providing figures on product sales. Qualitative data - this type of data is qualitatively defined and expressed through text, images, or other symbols. Qualitative data is usually collected based on subjective opinions, experiences, or observations. Examples: interviews, focus groups, open-ended questions. Experimental data is a type of data obtained through



experiments. This type of research requires manipulation and control. The researcher changes some factors and measures the results. For example, data from a chemical reaction obtained in a laboratory.

Observational data - this data is collected directly in nature or through observations at the place where events occur. This data is often obtained by chance or in natural conditions. For example, observing the behavior of animals in nature. Archival data - data usually obtained from previously collected and stored documents, databases, or written materials. For example, archival documents used in historical research.

Empirical data is used in various fields such as social sciences, natural sciences, economics, and many other scientific fields. They are very important in drawing scientific conclusions based on research and experience.

Life satisfaction is a key component of subjective well-being and is influenced by a variety of factors, including personal accomplishments, relationships, and socioeconomic status (Yang et al., 2024). Being resilient means being able to overcome life's challenges, stresses, and difficulties and still do well. It means bouncing back from setbacks, keeping your mind steady, and continuing to work toward your goals even when things get tough. Resilience is not a single trait, but a dynamic process that can be developed and strengthened through experience and supportive relationships.

**Conclusion.** In conclusion, it can be said that empirical data play a key role in scientific research, as they provide a valid and reliable basis for testing theoretical ideas and hypotheses. They ensure the basic principles of scientific methodology - such aspects as objectivity, reliability and reproducibility. Distinguishing between quantitative and qualitative types of empirical data and choosing appropriate research methods for them allows the researcher to successfully solve the tasks facing him. The development of modern science shows that not a single method, but a combination of different approaches - mixed methodology - leads to effective results. Therefore, it is advisable for the researcher to use both theoretical and practical approaches in collecting empirical data. This increases the relevance and effectiveness of scientific research.

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