Quantitative Research Philosophy in Research Methodology

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Abstract
The research carried out aims to find out uncertain truths based on findings from the core of the problem. A complete explanation of research philosophy can be explained with the possibility of several paradigms and from a physiological perspective. The purpose of this paper is to explain the philosophy of quantitative research, explain the development of quantitative research philosophy and the characteristics of quantitative research. The method used in the research is a library research method. In this research, a critical study was also carried out of the thoughts of figures sourced from book literature and journals related to the material presented in the form of philosophy from quantitative research. Quantitative research is defined as research that is based on the philosophy of positivism, generally used to research certain populations or samples, sampling techniques are generally carried out randomly, data collection uses research instruments, data analysis is quantitative/statistical with the aim of testing predetermined hypotheses. The philosophy of positivism holds that reliable knowledge is factual knowledge obtained through observation and measurement.

Keywords: Philosophy, Quantitative Research, Positivism

INTRODUCTION

Humans as rational creatures are equipped with the desire to know. This human curiosity can be seen since a person was a child and will continue to develop dynamically following the phases of that person's psychological development. Humans' desire to know will be satisfied if they have gained knowledge about what is being asked. But it is human nature that after gaining knowledge about a problem, there will be a tendency to want to know more.

Basically, science arises or originates from humans' admiration for what they encounter, both the microcosm (small nature) and the macrocosm (big nature). Science is a collection of experiences and knowledge from a number of people combined harmoniously in an orderly structure. Science is a basic human foundation for thinking in carrying out research. Therefore, science is closely related to research activities.

According to David H. Penny, research is systematic thinking about various types of problems whose solutions require the collection and interpretation of facts. Another term for research is a form of work in understanding a particular science. Research is an important thing to develop certain knowledge and education. Research is also considered an important part in the development and progress of human civilization. Without research, science will never develop (Priyono, 2016)

One fundamental thing to understand regarding research activities is the research philosophy. In general, research philosophy is related to the meaning of research, starting from what is meant by research, why research is carried out, and how to do it. The scope of the research philosophy description becomes the basis for a researcher to appropriately plan and carry out research.

So far, research in this field has been carried out mainly with a positivist approach using mathematical models and statistical analysis. However, many people do not realize that research is actually not only about the tools used, but also depends on the philosophical foundation underlying the research. From the perspective of the philosophy of science, the validity of knowledge obtained from research is highly dependent on the consistency between the ontology, epistemology and methodology used by the researcher. A good researcher is one who has a good understanding of the philosophical foundations used in the research process.

RESEARCH METHOD

Creswell (2014) states that "research methods involve the form of data collection,

analysis, and interpretation that research proposes for the studies". Research methods are process activities in the form of data collection, analysis and providing interpretations related to research objectives. In this article the researcher uses the library research method used in this research. Focus on critically examining the thoughts of characters and texts in books, journals, magazines and other materials related to the material presented. Mirzaqon T and Purwoko stated that library research is research used to collect information and data using various materials in libraries such as articles, books, magazines, history, etc. (Aris Dwi Cahyono, 2021).

Literature study is also defined as studying various reference books and research results based on similar previous research to obtain a theoretical basis related to the problem to be researched. There are several definitions of library research. According to Mirzaqon, T, and Purwoko (2017) put forward several definitions of library research from several experts, namely:

1. Library research is a study used to collect information and data with the help of various kinds of materials in libraries such as documents, books, magazines, historical stories, etc. (Mardalis: 1999).
2. Library research is a study that studies various reference books and the results of similar previous research which is useful for obtaining a theoretical basis regarding the problem to be researched (Sarwono: 2006).
3. Library research is a data collection technique by reviewing books, literature, notes and various reports related to the problem you want to solve (Nazir: 1988).
4. Literature research is a theoretical study, references and other scientific literature related to culture, values and norms that develop in the social situation being studied (Sugiyono: 2012).

The data collection techniques in this research involve the use of secondary data such as literature, books and journals that are relevant to the research topic. Data is collected indirectly through these sources. Next, the data was analyzed through literature study using descriptive analysis methods. So, library research is a research activity that involves collecting information and data using materials from the library, including reference books, results of previous research, articles, notes and journals that are relevant to the problem you want to solve.

RESULTS AND DISCUSSION

A. Definition of Quantitative Research Philosophy

Philosophy in Greek, *philosophy*, which consists of two words: *philos* (love) or *addiction* (friendship) and *shopia* (wisdom, wisdom, knowledge, skills, practical experience, intelligence). Etymologically, philosophy means love of wisdom or truth. Philosophy is understood simply, as a view of life of a person or group of people which is a basic concept about life to achieve what one dreams of.

Aristotle described philosophy as a science consisting of the truth contained in it, namely the sciences of metaphysics, logic, rhetoric, ethics, economics, politics and aesthetics. Plato said that philosophy is knowledge that is intended to achieve real truth. Immanuel Kant stated that philosophy is science, which is the principal and basis of all knowledge, covering 4 issues: Can we know? What should we do? Where is our hope? What is called a human? Apart from that, Cicero also argued that philosophy is the noblest science and the desire to obtain it. Descartes stated that philosophy is a collection of all knowledge in which God, nature and humans are the subject of investigation

Based on the opinions of these experts, it shows that everything that exists on this earth must be able to be explained, and to achieve the real truth requires various scientific tools that are accepted in human life, a scientific basis and the ability to produce it systematically, in depth and comprehensively.

Research philosophy directs researchers in selecting the most

appropriate approaches and techniques in research (Ates, 2008). A research philosophy is a set of shared beliefs and agreements among scientists about understanding and solving problems (Kuhn and Hawkins 1963). According to Guba (1990), research philosophy can be grouped into several assumptions, namely ontological assumptions, epistemological assumptions, and axiological assumptions. It is stated that there are three important components in understanding what philosophy is as a whole, namely ontological, epistemological and axiological. First, **Ontological** which answers what objects are studied by a science. What is the essential form of the object of knowledge? And what is the relationship between the object and human perception (thinking, feeling and sensing) which connects knowledge. Second, **Epistemological**, comes from Greek, namely *episcmc* which means *knowledge*, knowledge and logos which means theory. Epistemology answers the nature of the knowledge process in the nature of science. This is how it works. What methods do we need to know in order to get the right knowledge? What is the truth and what are its criteria? Epistemology answers what methods/techniques/tools help humans gain knowledge in the nature of science. Third, **Axiological**, answering what benefits can be gained through knowledge in the form of knowledge for life. How do these benefits relate to applicable moral rules, and so on. The conclusions from this definition, namely ontological, epistemological and axiological, answer what, how and the benefits of everything, namely science in human life. (Jujun S. Suriasumantri 2005).

Quantitative research is a type of research that produces new findings that can be obtained using statistical procedures or other means of quantification (measurement). Research using a quantitative approach focuses research more on several symptoms that have certain characteristics, namely variables. In quantitative research, the nature of the relationship between variables is then analyzed using statistical testing tools and using objective theory (Jaya, I Made Laut Mertha, 2020). Quantitative research is a form of scientific research that examines one problem of a phenomenon, and looks at possible links or relationships between variables in the problem being determined. Quantitative research consists of numbers analyzed using statistics. (Siyoto & Sodik, 2015). Quantitative research is systematic scientific research on parts and phenomena and there are relationships or connections (Sunarsi & Priadana, 2021:41). Quantitative research in looking at the relationship of variables to the object under study is more cause and effect (causal), so that the research has independent and dependent variables. A causal relationship is a relationship between variables in which a change in one variable causes a change in another variable without the possibility of the opposite effect. Functional relationships are defined by two or more variables because the nature of their function causes changes in one variable and other variables experience changes (Indrawan & Yaniawati, 2017: 49).

B. Quantitative Research Philosophy

Quantitative research is called traditional methods, because this method has been used for a long time so that it has become a tradition as a method for research. This method is called a positivistic method because it is based on the philosophy of positivism. This method is a scientific/scientific method because it meets scientific principles, namely concrete/empirical, objective, measurable, rational and systematic. This method is also called the discovery method, because with this method various new science and technology can be discovered and developed. This method is called a quantitative method because the research data is in the form of numbers and analysis

uses statistics. Quantitative research can be interpreted as a research method based on the philosophy of positivism, used to research certain populations or samples, data collection used as research instruments, data analysis is quantitative/statistical, with the aim of testing predetermined hypotheses.

Quantitative research uses consistent assumptions based on the positivist paradigm, the behavior of the research object and the analysis is carried out, of course there are procedures that are similar to those of physical scientists in carrying out observations of certain phenomena. According to Leavy (2017), quantitative research is based on positivist philosophy (positivism), explaining that the independent reality of the research process can be objectively measured using scientific methods. According to Creswell (2018) quantitative research is a method used to test hypotheses used in research based on certain theories in examining the relationship between variables, each variable used is measured with a research instrument based on the research results obtained in the form of numbers, then the results are analyzed based on established statistical procedures.

According to Sugiyono (2013), positivism philosophy views the reality/symptoms of phenomena as being classifiable, relatively fixed, concrete, observable, measurable, and the relationship between symptoms is causal. This research is generally carried out on certain representative populations or samples. The research process is deductive, aimed at answering the problem formulation using concepts or theories so that hypotheses can be formulated. This hypothesis was then tested through field data collection. To collect data, research instruments were used. The data that has been collected is then analyzed quantitatively using descriptive or inferential statistics so that it can be concluded that the hypothesis formulated is proven or not. Quantitative research is generally carried out on samples taken randomly, so that the conclusions of the research results can be generalized to the population and the sample taken.

The Positivism philosophy believes that reliable knowledge is factual knowledge obtained through observation and measurement. The philosophy of positivism believes that knowledge is obtained through human experience. According to the positivist view, humans will behave according to certain laws that can be generalized through observation, measurement and testing (Bruce et al., 2008). The philosophy of positivism believes that the world consists of visible elements and unrelated events. These elements interact in observable, determinable, and orderly ways. In Positivism research, the researcher's role includes collecting and interpreting data with an objective approach. Research findings can be observed and quantified. The Positivism philosophy states that real events can be observed empirically and explained by logical analysis. The criteria for assessing the validity of a scientific theory is its ability to make predictions based on the theory and consistency with data that can be observed through the human senses.

The positivism paradigm in research follows quantitative methods that emphasize measuring variables and testing hypotheses, which are based on a realist or objective ontology and empirical epistemology. The hypothesis intended here is tested through collecting field data in the form of numbers that can be analyzed quantitatively. Quantitative data analysis usually involves the use of descriptive and inferential statistics to support hypotheses. The data collection process in quantitative research involves taking sample data randomly to allow generalization of research results according to the population.

Therefore, quantitative research is called a research method that is based on

positivist thinking, and is used to investigate relationships between variables based on certain population data or samples in the form of numbers, used to test hypotheses according to their interpretation of certain theories, and analyzed using statistical methods.

C. Development of the Philosophy of Positivism

Positivism is one of the schools of modern philosophy. The historical roots of positivism can be returned to the times of Hume (1711-1776) and Kant (1724-1804). Hume argued that scientific problems must be tested through experiments (empiricism). Meanwhile, Kant was the person who implemented Hume's opinion by compiling the Critique of Pure Reason (criticism of pure thought/the school of Criticism). Apart from that, Kant also created boundaries for the area of human knowledge and rules to punish this knowledge by making experience the axis (Handoyo, Eko and Ekaningsih Lailasari, 2019)

Positivism emerged in the 19th century, driven by a sociologist named Auguste Comte who argued that science must be real and useful and directed at achieving progress with existing results and how reality works (Nugroho, 2016). Positivism as a philosophy was first introduced by Auguste Comte from France who lived in 1798-1857 through his book entitled the Course of Positive Philosophy (in French it is Cours de Philosophie Positive).

In subsequent developments, positivism dominated scientific discourse from the beginning of the 20th century until now, by establishing criteria that must be met by sciences about humans and nature to be called true science, based on explanatory and predictive criteria. (Riono, et al, 2020). To fulfill these criteria, all sciences must have a positivistic view as follows:

1. Objective, meaning value-free theories.
2. Phenomenalism, meaning that science only talks about the observable universe. The presupposed metaphysics that exists behind visible symptoms are ruled out.
3. Reductionism, the universe is reduced to observable facts.
4. Naturalism, meaning that the universe moves mechanically like the workings of a clock.

Positivism from Comte's perspective shifted from metaphysical and religious beliefs to observation and reasoning as a means of understanding behavior and using empirical evidence for scientific descriptions. Oldroyd (1986) said that Comte created a new science about society with social phenomena that must also be investigated empirically like physical phenomena. Comte argued that all genuine knowledge is based on sense experience and can only be developed through observation and experimentation.

Through his writings and thoughts, Comte intended to warn scientists about the important developments that occurred in the course of science when human thought moved from the theological phase, to the metaphysical phase, and finally to the positive phase. In the theological phase (religious and divine stages) it is believed that there is supernatural power that regulates all movements and functions that regulate this natural world. This era is divided into three periods: animism, polytheism and monotheism. At this stage, to explain the phenomena that occur, only adhere to God's will.

Furthermore, in the metaphysical era (stage of philosophy), supernatural powers were replaced by abstract concepts, such as 'nature' and ‘cause'. In this phase, humans explain phenomena with metaphysical understandings such as causality, substance and accident, essence and existence.

Finally, in the positive period (positivism stage) humans have limited themselves to the facts presented and determined the relationships between these facts on the basis of observation and

the ability to reason. At this stage, humans interpret all forms of religious interpretation and philosophical review and only prioritize empirical methods in uncovering existing phenomena (Ahmad, 2009).

The criteria for evaluating the validity of scientific theories in positivism are knowledge based on theoretical predictions and consistent with information from the senses. Positive research methodology emphasizes micro-level experiments on the environment by using laboratories to tease out the complexities of the external world such as social, psychological, and economic relationships. The policies used in research are based on conclusions obtained through scientific methods.

Positivism uses available theories to form hypotheses. This hypothesis will be tested, confirmed, or refuted in whole or in part. The hypotheses used lead to further theoretical development which can be tested through further research. Positivism is a research philosophy based on the ontological principle that truth and reality are independent and do not depend on the researcher. Positivism can be interpreted as independent, independent and objective truth. The philosophy of positivism has a significant influence on the study of science. Therefore, the positivism approach is widely used in basic research, including research in the field of education.

The Basic Principles of Positivism are as follows:

1. There are no logical differences in investigations across sciences.
2. Research aims to explain and predict.
3. Research can be seen empirically through the human senses. Deductive reasoning is used to develop hypotheses that will be tested during the research process.
4. Science is not the same as common sense. Common sense alone cannot be used in research findings but must be accompanied by empirical facts.
5. Science is free from values and is judged only by logic.

D. Characteristics of the Philosophy of Positivism

The characteristics of positivism are as follows:

1. Objective/Value Free. The strict dichotomy between facts and values requires research subjects to distance themselves from reality by being value-free. Only through observed and measurable facts can our knowledge be structured and become a mirror of reality (correspondence).
2. Phenomenalism, which explains that reality consists of impressions. Science only talks about reality in the form of these impressions. The metaphysical substance that is assumed to be behind the phenomena of appearance is rejected (anti metaphysics).
3. Nominalism, that for positivism only concepts that represent particular realities are real.
4. Reductionism, that reality is reduced to observable facts.
5. Naturalism, that the regularity of events in the universe eliminates supernatural explanations. The universe has its own structure and originates its own structure.
6. Mechanism, that all phenomena can be explained by principles that can be used to explain machines (mechanical systems).

E. Advantages of the Positivism Philosophy

There are advantages to the philosophy of positivism, namely as follows:

1. Theories can be generalized at higher levels. Data for the same issue with different social contexts can be collected and the results can be generalized. Research findings can be generalized when they have been replicated across multiple populations and subpopulations differently (Johnson et al. 2007).

2. A quantitative approach is used in positivist research so that future predictions can be made (Johnson et al. 2007).
3. Parsimony helps positivist research to be useful for studying large amounts of data, as it can save time (Cohen et al. 2013).
4. Quantitative data provides opportunities for further scientific research. Quantitative data provides objective information that researchers can use to make scientific assumptions and it is easy to compare data (Johnson et al. 2007).
5. Reliability maintains consistency, dependability and replicability. Reliability is a measure of consistency over time and between similar samples. A reliable instrument for a study will produce similar data from the same respondents over time (Cohen et al. 2013). Researchers have a greater opportunity to maintain control over the research process.
6. The validity of quantitative data can be increased through careful sampling, selecting appropriate instruments and using statistics appropriate to the data (Cohen et al. 2013).

F. Weaknesses of the Positivism Philosophy

Positivism research has several advantages as follows.

1. Positivism research relies on experience as a valid source of knowledge. Many basic and important concepts such as cause, time and space are not based on experience.
2. Positivism research assumes that all types of processes can be considered as certain variations of individual actions or relationships between individuals.
3. The adoption of Positivism research in business studies and other studies can be criticized for relying on the status quo. Positivism research findings are descriptive, so they don't know the problem in depth.
4. Although Positivism research continued to influence research development for a long time, there were still criticisms of this research. Criticism was aimed primarily at a lack of attention to the subjective individual. Human behavior is considered passive, controlled and determined by the external environment. Often do not find the meaning attached to social phenomena. According to this criticism, objectivity should be replaced by subjectivity in the process of scientific inquiry. This gave rise to anti-Positivism or naturalistic philosophy.

G. The Importance of Quantitative Research

The reasons why it is important to conduct quantitative research include the following:

1. Researchers can develop and use mathematical models, theories or hypotheses related to natural phenomena. The measurement process is a central part of quantitative research because it provides a fundamental link between empirical observations and the mathematical expression of quantitative relationships.
2. Researchers in answering research questions can use careful measurements of research variables by determining the relationship between variables in a population. There are two types of quantitative research designs, namely descriptive and experimental. Descriptive quantitative studies take measurements only once. This means that the relationship between the variables being investigated only occurs once. Meanwhile, experimental studies carry out measurements between variables before and after to see the cause-

and-effect relationship of the phenomenon being studied.
3. Researchers want to generalize the research results to a wider area.

CONCLUSION

Philosophy in Greek, *philosophy*, which consists of two words: *philos* (love) or *addiction* (friendship, attracted to) and *shopia* (wisdom, wisdom, knowledge, skills, practical experience, intelligence). Etymologically, philosophy means love of wisdom or truth. Philosophy is understood simply, as a view of life of a person or group of people which is a basic concept about life to achieve what one dreams of.

Quantitative research is a type of research that produces new findings that can be obtained using statistical procedures or other means of quantification (measurement). Research using a quantitative approach focuses research more on several symptoms that have certain characteristics, namely variables. Quantitative research is called a research method that is based on positivist thinking, and is used to investigate relationships between variables based on certain population data or samples in the form of numbers, used to test hypotheses according to their interpretation of certain theories, and analyzed using statistical methods.

The philosophy of positivism emphasizes the importance of understanding order, balance and stability and the methods used to maintain them in society and organizations. Science is used as the basis for positivism research. To develop hypotheses that will be tested during the positivism research process, existing theories are used. Science is the foundation in the research philosophy of positivism. Positivism depends on the aspects of science being deterministic, science being mechanistic, science using methods, and science being empirical.

SUGGESTION

The research method used is library study so that researchers search more from various sources related to the availability of literature such as books, articles, journals and other literature to explore theories in library study. There is a need to continue library studies with more sources or literature and even from the results of research that is not only national, but needs to be developed on an international scale so that this research is even better.

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