

## Thomas Kuhn's Science Paradigm

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### Abstract

Thomas Kuhn's thinking in this case is used as an analytical knife to see the revolution in science and education in general. For Thomas Kuhn, the history of science is a starting point in studying fundamental issues in scientific epistemology because science is basically always marked by a strong scientific paradigm and revolution afterward. The purpose of this study is to find out the philosophical foundations of Thomas S. Kuhn's scientific paradigm. The method used is a qualitative approach by applying a descriptive-analytical method. The results of this study show that, according to Kuhn, a paradigm is a set of beliefs, values, methods, and practices that are widely accepted by the scientific community.

*Keywords: Paradigm; Science; Thomas Kuhn.*

### Introduction

Historically, in the development of epistemological science, the positivist epistemological paradigm has dominated the field of philosophy for decades. However, in the last two or three decades, developments have been seen that are actually efforts to break through the positivist philosophy of science pioneered by figures such as Thomas Kuhn, Paul Feyerabend, N.R. Hanson, Robert Palter, Stephen Toulmin, and Imre Lakatos (Ilyasin, 2016). Kuhn argued that the development of science does not proceed continuously and linearly but rather through paradigm changes, which he called "scientific revolutions." A scientific revolution occurs when the dominant paradigm is no longer able to explain phenomena well or when there is a discrepancy between the paradigm's predictions and actual observation results (Afandi & Sajidan, 2017).

During the normal period of science, scientists work within the framework of an established paradigm and seek to expand knowledge within it through research, experimentation, and confirmation of the paradigm's predictions. However, when significant discrepancies occur,

such as anomalies or large differences between paradigm predictions and observed results, dissatisfaction arises, which causes a crisis. In this period of crisis, alternative paradigms or new theories have emerged that propose a different way of looking at this phenomenon. This process is called a paradigm shift. A paradigm shift occurs when a new paradigm is gradually accepted by the scientific community, replacing an old paradigm that can no longer explain phenomena well (Afandi & Sajidan, 2017).

Kuhn emphasised that paradigm shifts are not based solely on the empirical or logical qualities of the new paradigm but involve social, psychological, and historical factors (Kesuma & Hidayat, 2020) When a new paradigm is accepted, fundamental changes occur in the way scientists understand the world and conduct research. Although Kuhn's theory has been criticised by some scientists and philosophers of science, the concept of scientific paradigms that he introduced remains an important contribution to the understanding of the development of science and how paradigms influence the way we see and understand the world.

A number of previous studies have conducted various studies related to Thomas Kuhn's paradigm. Fia Alifah Putri and Wahyu Iskandar, in the *Nizhamiyah Journal* with the title "Thomas Kuhn's Paradigm: The Scientific and Educational Revolution", said that the paradigm was placed by Kuhn as a perspective, basic principles, methods, and values in solving a problem that is firmly held by a certain scientific community (Putri & Iskandar, 2020). Another study in the *Tadzkirah Journal: Journal of Basic Education* by Robiah Al Adawiyati and Yunita Budiarti with the title "Paradigm and Scientific Revolution (Thomas S. Kuhn)". The results of his research show that a paradigm has an important role in the scientific revolution; even the paradigm itself is capable of being a tester of scientific consistency.

In the *Scidac Plus* study, Shelly Alvareza Zazkia's work is entitled "Methods, Scientific Approaches, Thought Models, and Paradigm Revolution Theory of Thomas Samuel Kuhn". The results of his research show that the dynamics of educational science are able to contextualise Thomas S. Kuhn's thoughts about the process of the birth of science to be able to attain and acquire knowledge through a combination of problem-solving activities by an educator who has a big influence in helping students achieve their hopes (Zaskia, 2021). The current research and the results of previous research have something in common, namely discussing Thomas Kuhn's paradigm. However, there are differences between previous research and current research. Previous research discussed Thomas Kuhn's paradigm revolution. Meanwhile, current research focuses on discussing Thomas Kuhn's scientific paradigm (Wulandari, 2023).

The problem formulation of this research is: what is the scientific paradigm created by Thomas Kuhn? So the aim is to find out the scientific paradigm created by Thomas Kuhn. It is hoped that this research will have

theoretical benefits as a reference and additional library literacy in developing the treasures of knowledge. And has practical benefits in implementing science according to Thomas Kuhn's paradigm.

### **Research Methods**

This research uses a qualitative approach by applying descriptive-analytical methods (Qodim et al., 2018). This type of research data is library data that is not a number. Data sources for this research include primary and secondary sources. The primary data source is scientific paradigm literature. Meanwhile, secondary data sources are literature related to this research topic, which comes from journal articles, books, etc. It is hoped that this research will have theoretical benefits as a reference and additional library literacy in developing the treasures of knowledge. And has practical benefits in implementing knowledge in everyday life.

### **Results and Discussion**

#### **1. Biography of Thomas Kuhn**

Thomas Samuel Kuhn was born in Cincinnati, Ohio, United States, on July 18, 1922. He died at the age of 74 on June 17, 1996, in Cambridge, Massachusetts, United States. He was born to Samuel L. Kuhn and his wife, Minette Stroock Kuhn. His father was an industrial engineer (Sabila, 2019). Thomas Kuhn was an American philosopher, physicist, and historian of the 20th century. After obtaining a Ph.D., Thomas Kuhn completed his doctoral studies at Harvard in 1949. Later, at the proposal of the president of James Conant University, he was admitted to Harvard as an assistant professor in general teaching and science history. After leaving Harvard, he studied at the University of California at Berkeley and became a professor of science and history in 1961 (Putri & Iskandar, 2020).

Kuhn started his career as a physicist. It was only in later developments that he studied history, then history of science, and then philosophy of science (Sabila, 2019). At the beginning of his academic career, Kuhn was still in the era of positivism, which was pretty dominant at the time. Kuhn disagrees with the claims of positivism, especially the concept of the unity of science. For Kuhn, science is not one but plural. For Kuhn, a paradigm is a conceptual framework that results in observations becoming non-neutral (Putri & Iskandar, 2020). Kuhn's theory of paradigms is called Kuhn's greatest contribution to the philosophy of science. Exactly as an alternative theory to characterise the history and practice of science.

#### **2. Rejection of Positivism**

Thomas Kuhn is known to have a different view of positivism in the understanding of scientific progress. Kuhn rejects the view of logical positivism that sees science as an accumulation of objective knowledge that

continues to evolve linearly. Some of the arguments or rejections that Kuhn may have put forward against positivism. According to him, positivism tends to see the progress of science as a gradual addition to existing knowledge (Sabila, 2019). However, Kuhn emphasized a paradigm shift and a scientific revolution that changed the way we perceive phenomena.

Positivism tends to see scientific methods as the only reliable way to acquire valid knowledge. However, Kuhn argues that the scientific method is not entirely objective and is influenced by the theoretical framework that preceded it. Positivism tends to view science as a neutral entity and independent of its social context. Kuhn argues that the development of science is also influenced by social factors, such as political importance, dominant paradigms, and institutional power (Wulandari, 2023). It shows that science is not only about objective discoveries but also about social processes involving humans with all their interests, preferences, and conflicts.

In his rejection of positivism, Kuhn proposes a view of science that emphasizes the role of paradigm and scientific revolution in the development of science. This view provides a more complex and contextual perspective on how scientific knowledge evolves over time.

### **3. Phase of Science by Thomas Kuhn**

In general, science is divided into three different stages. The three-stage concept proposed by the philosopher of science, Thomas Kuhn, describes scientific development from a historical and social perspective. Here's an explanation of each stage.

#### ***a) Pre-Scientific***

A lack of a dominant paradigm characterizes the first stage, which is pre-science (Putri & Iskandar, 2020). The pre-scientific stage is an early stage in the development of science. At this stage, there are many ideas and speculations that have not been systematically tested using scientific methods. Researchers usually try to gather data and observe phenomena with the aim of finding patterns or principles underlying them. At this stage, there is no consensus or established scientific paradigm.

#### ***b) Normal Science***

Normal science is research that is firmly based on one or more scientific achievements in the past; the scientific accomplishments themselves will at some point be declared as the basis for future practice. The normal stage of science is the stage at which a well-established scientific paradigm has been formed (Sabila, 2019). This paradigm provides the theoretical and methodological framework used by scientists to explain phenomena and conduct research. At this stage, scientists work within the limits of existing paradigms, conducting focused research to test and

develop a deeper understanding of such paradigms. Scientists seek to expand knowledge within paradigm boundaries and solve puzzles that may arise (Putri & Iskandar, 2020).

*c) The Scientific Revolution*

When an established paradigm encounters significant obstacles and anomalies that are impossible to explain by an existing paradigm, the scientific revolution stage begins. At this stage, old paradigms are no longer considered adequate, and new paradigms emerge that are more inclusive and capable of explaining such anomalies. The scientific revolution brought about a major change in the way scientists understood and explained phenomena and led to a fundamental paradigm shift in a discipline (Sabila, 2019).

**4. The Paradigm Concept and the Science Revolution Thomas Kuhn**

Paradigma comes from the Greeks Para and Decyani. Para means side or side, and Dekyani means model or example (al-Adawiyati & Budiarti, 2020). According to the CBI, a paradigm is a model in the theory of science or is often referred to as a framework of thought. According to Zubaedi, Kuhn made the paradigm a central concept. Thomas Kuhn's thinking is shattered by his own history, which is the key or foundation for formulating his paradigm ideas. History has helped him discover constellations of facts, theories, and methods. With that process, Kuhn discovered a process of theoretical development called the process of revolutionary paradigm development. Kuhn tried to re-formulate the philosophy of science with his paradigm revolution, written in one of his works, *The Structure of Scientific Revolution* (al-Hadi & Abdillah, 2018).

According to Kuhn, the paradigm of science is a theoretical framework, or a way of seeing and understanding nature, that has been used by a group of scientists as their worldview. (Budiarti, 2022). Based on the statements above, Kuhn explains that the paradigm, as some examples of actual scientific practice, is accepted jointly. Includes the realms of law, theory, applications, and instruments that are commonly accepted models to be the source of tradition (al-Adawiyati & Budiarti, 2020).

Thomas Kuhn argues that the objectivity of science is not always dogmatic to a truth (Wulandari, 2023). This is what constitutes the basis of epistemology, or a paradigm angle that denies the (critical) belief of mankind in the title of the truth of science as a real appreciation of a phenomenon. Naturally, science has authority in obtaining the scientific truth of new science. The truth of the old paradigm is not true according to the new paradigm due to the existence of relativism. So from that, right or wrong values are not always bound by paradigms. But it can also be guided by something good or the best for the further development of science. The

final results obtained from the research the experts did should not be monotonous just to get the truth but can also give the meaning of axiology, both values that benefit human life (Zaskia, 2021).

In short, a revolution is the replacement of an old order with something new. Thomas Kuhn has the concept of a scientific revolution that can be interpreted as a drastic change in the stages of development or advancement of science. According to Thomas Kuhn, scientific advances are revolutionary in nature—rapid and drastic, not cumulative. Thus, Thomas Kuhn's paradigm of the scientific revolution is a fundamental change that is an episode of non-cumulative evolution in which the old paradigm is partially or entirely replaced by a new paradigm that is in conflict because of the existence of scientific facts that do not correspond to reality (Putri & Iskandar, 2020).

### Conclusion

According to Kuhn, a paradigm is a set of beliefs, values, methods, and practices widely accepted by the scientific community. A paradigm provides a framework for understanding natural phenomena and determining the kinds of questions to be asked and the methods used to answer them. A scientific revolution occurs when the dominant paradigm is no longer able to explain phenomena properly or when there is an inconsistency between paradigm predictions and actual observations.

### Reference

- Afandi, A., & Sajidan, S. (2017). Reinterpretasi Filsafat Sains Menurut Pandangan Karl Popper, Thomas Kunt Dan Imre Lakato. *Prosiding SNPS (Seminar Nasional Pendidikan Sains)*, 65–73.
- Al-Adawiyati, R., & Budiarti, Y. (2020). Paradigma dan Revolusi Ilmu Pengetahuan (Thomas Kuhn). *Jurnal Tadzkirah*, 107–113.
- Al-Hadi, & Abdillah, R. (2018). Ilmu Komunikasi dalam Paradigma Revolusi Sains Thomas Kuhn. *Journal of Islamic Communication*, 76–86.
- Ilyasin, M. (2016). Epistemologi Pendidikan Islam Monokotomik: Menakar Manajemen pendidikan Paripurna Berbasis Rasionalistik Wahyuistik. *At-Turas*, 71–87.
- Kesuma, U., & Hidayat, A. W. (2020). Pemikiran Thomas S. Kuhn Teori Revolusi Paradigma. *Islamadina: Jurnal Pemikiran Islam*, 166–187.
- Putri, F. A., & Iskandar, W. (2020). Paradigma Thomas Kuhn: Revolusi Ilmu Pengetahuan dan Pendidikan. *Jurnal Nizhamiyah*.
- Qodim, H. MA., Halim, I. A. MA., & Busro, M. A. (2018). *Pedoman Penulisan Skripsi Fakultas Ushuluddin*.
- Sabila, N. A. (2019). Paradigma dan Revolusi Ilmiah Thomas S. Kuhn (Aspek Sosiologis, Antropologis, dan Historis dari Ilmu Pengetahuan). *Zawiyah: Jurnal Pemikiran Islam*, 5(1), 80–97.

- Wulandari, R. I. (2023). Epistemologi Thomas Kuhn (Paradigma & Revolusi Ilmu Pengetahuan) dan Penerapan Metodologinya dalam Pendidikan Islam. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, 9(2), 2911–2936.
- Zaskia, S. A. (2021). Metode, Pendekatan Ilmiah, Model Pemikiran Dan Teori Revolusi Paradigma Thomas Samuel Kuhn. *Scidac Plus*.