



Disruption and Incommensurability Among Thomas S. Kuhn's Paradigms

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Abstract : *This paper specifically looks at the implications of Thomas S. Kuhn's ideas regarding the distinction between context of justification and context of discovery in the emergence of science. Kuhn's thesis is that science is not only formed from the context of justification, but the context of discovery (history) must also be considered. The method of research is an in-depth interpretation towards the relevance text to the research and then the author applies analytical method to examine certain terms objectively. The author also applies historical method to see the historical aspects of a thought and finally applies the heuristic method to obtain the novelty of a work. The results of the study indicate that by considering the context of invention of science, Kuhn is in fact trapped in an epistemological relativism. Kuhn's main weakness is the absolute and extreme discontinuity among competing paradigms due to his main idea of the incommensurability paradigm, that is, it is impossible to compare one paradigm to another. In this short article the author mutually analyses Kuhn's ideas with critical method. Finally, the author notes that special nature of such paradigms socially and culturally does not create a relative gap necessarily. However, it should be a capital of conversation and dialogue across cultures and civilizations.*

Keywords : *Incommensurability, Relativistic, Paradigm, Thomas S. Khun*

Abstrak : *Paper ini secara spesifik melihat implikasi gagasan Thomas S. Kuhn mengenai perbedaan antara context of justification dengan context of discovery dalam kemunculan sains. Tesis Kuhn adalah bahwa sains tidak*

hanya terbentuk dari konteks pembenaran, tetapi konteks penemuan (sejarah) juga harus diperhatikan. Metode yang digunakan dalam paper ini adalah interpretasi mendalam atas teks yang telah diseleksi untuk relevansi tulisan ini, setelah itu penulis melakukan metode analisis untuk menelaah istilah-istilah tertentu secara objektif, serta digunakan metode historis guna melihat aspek kesejarahan dalam sebuah pemikiran. Metode terakhir dari tulisan ini adalah metode heuristika, atau kebaruan dalam suatu karya. Hasil penelitian ini menunjukkan bahwa dengan alasan mempertimbangkan konteks penemuan pada sains inilah, Kuhn pada kenyataannya terjebak pada relativis epistemologis. Kelemahan utama Kuhn adalah diskontinuitas mutlak dan ekstrim antara paradigma-paradigma yang bersaing akibat gagasan utamanya tentang incommensurability paradigma, yakni adalah hal yang tidak mungkin membandingkan antara satu paradigma dengan paradigma lain. Dalam tulisan singkat ini penulis berupaya mendialogkan secara timbal-balik gagasan-gagasan Kuhn dengan telaah kritis yang penulis lakukan. Sebagai catatan akhir, bahwa kekhasan setiap paradigma yang secara sosial dan budaya semestinya tidak serta merta membuat jurang yang jatuh ke arah relatif. Namun, justru dan kekhasan paradigma menjadi modal percakapan, dialog lintas budaya dan peradaban.

Kata Kunci : *Ketidakterbandingan, Relativistik, Paradigma, Thomas S. Kuhn*

A. Introduction

The science philosophers agree that positivism should be attenuated and be even cut off by criticizing immanent on the science. Immanent term actually emerges from a problem on the relationship between God, nature and humans. The idea that God creates and dominates the world through the 'presence' of God in the world and in history of the world and human is called as immanency. However, for this study the author follows Mc. Charthy who uses the immanent term in the meaning of a historical and empirical criticism of science, not a transcendental and metaphysical criticism.

Empirical criticism is done by dismantling the veil of science objectivity and scientific rationality which has long been inherent in the nature of science. Unlike the previous science philosophers, Kuhn's criticism is more directed at the process of forming (*tadwin*) science, which is based on history and sociology. Naturally, the *stand point* of Kuhn's epistemological building is based on the history of science.

There are several former works that specially discussed implication of Thomas Kuhn's paradigm, such as its implication toward education, law, and religious thoughts. However, the author limits the study only on Kuhn's thought about paradigm and scientific revolution. Of them are first Nurkholis's work entitled *Konstruksi Teori Paradigma Thomas S. Kuhn* (Construction of *Thomas S. Kuhn's* Paradigm Theory) (2012)¹. This work discusses the paradigm as a set of general theoretical assumption, laws, and application technique embraced by member of scientific community. It is possible to occur sift of paradigm. Therefore, scientists who work within objective deals have to realise paradigm incommensurability that they follow it all the time.

The second one is Ulfa Kesuma and Ahmad Wahyudi Hidayat works entitled *Pemikiran Thomas S. Kuhn Teori Revolusi Paradigma* (*Thomas S. Kuhn* Thought on Paradigm Revolution Theory) (2020)². This paper explains the paradigm as a perspective, principle, method, and value in solving the problems strongly embraced by a scientific community. The paradigm supervises a scientific activity in period of normal sciences when scientists have occasion to develop it in detail and depth. They also do not criticise the paradigm supervising their activities. It goes until anomaly phase when they see several phenomena that are unexplainable on their theories, so a knowledge crisis occurs. This work also tries to actualise Kuhn's thought in Islamic knowledge, particularly in opening Muslim scientist mindset that essentially there is no absolute truth in sciences. However, it always opens a possibility to emerge new knowledge with new scientific epistemology that people sometimes hold it stronger.

The third work is Sonjoruri B. Trisakti's entitled *Thomas S. Kuhn dan Tradisi-Inovasi dalam Langkah Metodologi Riset Ilmiah* (*Thomas S. Kuhn* and Innovation Tradition in Step of Scientific Research Methodology) (2008)³. This work is sufficiently in depth to review Kuhn's thoughts from the aspects of the methodological steps of scientific research in the period of normal science and in the scientific revolutions period. The methodological steps of scientific research in the normal period of science

¹ Nurkholis, "Konstruksi Teori Paradigma Thomas S. Kuhn," *Islam Future* XI, no. 2 (2012).

² Ulfa Kesuma, "Pemikiran Thomas S. Kuhn Teori Revolusi Paradigma," *Islamadina* 21, no. 2 (2020).

³ Sonjoruri B. Trisakti, "Thomas S. Kuhn Dan Tradisi-Inovasi Dalam Langkah Metodologi Riset Ilmiah," *Jurnal Filsafat*, 2008.

aim at strengthening and developing a single applicable paradigm so that the resulted theoretical development is cumulative with a stronger attachment to tradition than the power of produced innovation. Meanwhile, the methodological steps of research in the scientific revolutions period aim at solving crises which the old paradigm cannot solve by solving it through the new paradigm, so that the resulting theoretical development is non-cumulative with the power of innovation that is more prominent than the attachment to tradition. In the normal science period, knowledge is developed in a strict paradigm box, so that observations and experiments carried out in creating new theories are limited by existing paradigms and the resulted theory is obtained on the basis of pre-existing theories. It makes theory develops cumulatively. In the scientific revolutions, knowledge is developed through experimental ideas that are outside the paradigm held by the majority of scientists. Observations and experiments aim at testing any new ideas that attempt to solve the old paradigm crises. This makes the power of innovation very important and makes the attachment to tradition very weak.

Based on several former works, there are fundamental differences with this paper. The works of Nurkholis, Ulfa Kesuma and Ahmad Wahyudi Hidayat discuss more about the meaning of paradigms and scientific revolutions, especially in Ulfa Kesuma work there is additional implications of Kuhn's paradigm for Islamic scholarship. In contrast to the two (2) works mentioned above, Sonjoruri's work focuses more on innovation-traditions in the normal science period and the scientific revolutions period. Meanwhile, in this paper the author points out basic weaknesses of Kuhn's paradigms. *First*, the arguments for the history of science are always limited by space and time. Kuhn's idea is shifted to relativity, such as the idea of a standard or criterion for judging a paradigm. *Second*, another fundamental weakness of Kuhn's paradigms is related to an incommensurability of the inter-paradigm dialogue. Thus, the scientific world is patterned and structured in polarization among paradigms without any mediation among them.

The research is a library research, therefore the first step the researcher takes is collecting data on object of the research in particular. Data are collected by coding each subsystem of research data. The research is designed qualitatively in which while collecting the data, the researcher at once is analysing the data to understand the meaning

and capture the essence of collected data category⁴. The data are step by step collected by: 1) recording data in quotation, namely recording data from the data source directly and accurately; recording the data on the data card in *paraphrase*, 2) recording and capturing the whole essence of the data then recording it on the data card, using sentences compiled by the researcher 3) recording data synoptically, namely recording data from data sources by making a summary⁵.

The used library sources are Kuhn's works entitled: *The Structure of Scientific Revolution*, Chicago: The University of Chicago Press, 1970⁶; "The Relationship between History and History of Science" in *Interpretative Social Science A Reader*, Paul Rabinow and William M. Sullivan (ed.). London: University of California Press, 1979⁷; Struan Jacobs and Brian Mooney, Sociology as a Source of Anomaly in Thomas Kuhn's System Science, *Philosophy of the Social Sciences*, Vol. 27 No. 4, December 1997⁸.

The collected data are analysed by using the following methods: 1) Interpretation method in which the first step is carried out by describing and revealing the essential meaning contained in the research object. Verbal data are analysed by revealing semantic meaning, then revealing the meaning of depth, essential or *deep structure*⁹ The essential meaning in logical criticism is, of course, not only at the empirical level, but also understanding the context behind the emergence of ideas, motives and even ideologies that are promoted in these ideas. 2) Analysis method which is used to objectively and critically analyse the concepts of revolution, incommensurability and others based on the meaning of the word¹⁰. The analysis is only and purely

⁴ Kaelan, *Metode Penelitian Kualitatif Bidang Filsafat* (Yogyakarta: Paradigma, 2005), 159.

⁵ Kaelan, *Metode Penelitian Kualitatif Bidang Filsafat* (Yogyakarta: Paradigma, 2005), 160-161.

⁶ Thomas S. Kuhn, *The Structure of Scientific Revolutions, The Structure of Scientific Revolutions*, 2013, <https://doi.org/10.7208/chicago/9780226458106.001.0001>.

⁷ Thomas S Kuhn, "The Relation Between History and History of Science," in *Interpretatif Social Science A Reader*, ed. William Rabinow, Paul, M. Sullivan (London: University of California Press, 1979).

⁸ Struan Jacobs and Brian Mooney, "Sociology as a Source of Anomaly in Thomas Kuhn's System of Science," *Philosophy of the Social Sciences* 27, no. 4 (1997): 466-85.

⁹ Poespoprodjo, *Interpretasi* (Bandung: Remaja Karya, 1987), 1.

¹⁰ J Sudarminta, "Diktat Epistemologi, Pengantar Ke Beberapa Masalah Pokok Filsafat Pengetahuan" (Jakarta, 2000, 103).

based on reasoning. Analytical truth is considered, created, and sustained by *abriter* human decisions by using a concept that is merely implication of linguistic conventions. 3) Historical method that strives to link a thought with cultural, ideological, political and social historicity. The method also attempts to determine the historical periodization¹¹. The method is used to see the historicity of Kuhn's thought, especially in relation to the historical context in science. 4) Heuristic method i.e. the theory of finding a way to overcome a problem scientifically. Heuristics always precedes science. The science has to describe, explain, prove the path towards science (heuristics) although it does not include explicitly. Hence, heuristics is usually considered as a field that cannot be sharply matched. The field includes a large number of non-scientific factors, however it is important for the emergence of knowledge or science¹². Factors that have been considered as non-scientific are metaphysical assumptions, context of discovery, prejudice, and others. The author hopes that the discovery or novelty of the research will produce new offerings, especially in the fields of epistemology and methodology.

In general, methodical steps are first directed at interpreting the selected data according to the title of the paper. The first methodical step is expected to be able to deeply understand the ideas of the scientific revolution, as well as the theoretical basis or formal object used as a framework for analysis. The next step, the author uses is analysis method as a pre-condition in applying the historical method (historical thought).

B. Theoretical Framework

The theoretical framework in this research uses Jurgen Habermas's communication theory. According to Habermas, the concept of communicative rationality contains three dimensions¹³; namely: first, the relation between subject of knowledge and events and facts in the world; second, the relation between the subject and social actions in the world; the subject practically interacts with others; and finally the relation between

¹¹ Charris Bakker, Anton, Zubair, *Metodologi Penelitian Filsafat* (Yogyakarta: Kanisius, 1990), 47.

¹² Van Peursen, *Fakta, Nilai, Peristiwa: Tentang Hubungan Ilmu Dan Etika*, ed. A. Sonny Keraf, Terjemahan (Jakarta: Gramedia, 1990), 97.

¹³ Rick Roderick, *Jurgen Habermas and Foundations of Critical Theory* (New York: St Martin's Press, 1986), 113.

subject's sufferings and desires (in Feurbach's terms) and its internal nature, its subjectivity and other subjectivities.

Formally, the concept of communicative rationality is explained in different ways, namely through the suitability of arguments. It is useful for evaluating established validity claims relating to the three dimensions of communicative action: external, community, and the internal realm.¹⁴

In the directed communication at external realm (cognitive-instrumental realm), rationality contains expressions that underlie correct views and actions as well as an ability to learn from mistakes.¹⁵ The right argumentation pattern in this dimension is a theoretical discourse in which truth claims; the efficiency of teleological action is the subject of discussion. Meanwhile, in communication that leads to society (practical-moral area), rationality contains justification for actions that refer to established norms, carefully, especially in conflict situations, as well as in assessing debates from a 'moral view' oriented towards consensus.¹⁶ The appropriate pattern of argumentation for this dimension is practical discourse, claims of normative accuracy being a topic of discussion.¹⁷

In the directed communication at the internal realm (the area of judgment and statement), rationality contains the desired and needed nature interpretation (like any other). It is the standard stipulated culturally, and even more, in adopting a reflective attitude towards their value standards.¹⁸ Here a universal agreement cannot be expected, so the type of argumentation is not with discourse but with aesthetic criticism. The adequacy of value standard is a topic of conversation in this context.¹⁹ To Habermas, the arguments reproduced in the psychoanalytic dialogue also reside in this dimension (the internal realm). In this context, rationality contains the willingness and ability to free itself from illusions (not a false fact), which comes from self-deception.²⁰ This type of argument through

¹⁴ *Ibid*, 114.

¹⁵ *Ibid*, 114.

¹⁶ Jürgen Habermas, *Theory of Communication Action (1): Reason and the Rationalization of Society* (Boston: Beacon Press, 1984), 19.

¹⁷ *Ibid*, 19.

¹⁸ Roderick, *Jürgen Habermas and Foundations of Critical Theory*, 114-115.

¹⁹ Habermas, *Theory of Communication Action (1): Reason and the Rationalization of Society*, 20.

²⁰ Roderick, *Jürgen Habermas and Foundations of Critical Theory*, 114-115.

therapeutic critique helps clarify systematic self-deception.²¹ Finally, in the communication directed at the language itself, rationality here seeks to overcome communication disorders through reading in order to bring understanding and reflect linguistic rules. Both, the comprehensiveness of symbolic expressions and the meaning of these expressions can be tested reflectively.²² The right type of argumentation in this dimension is to explain clearly (explicative discourse), where it can be understood and formed from symbolic expressions that are no longer considered naive, but are clearly the subject of discussion.²³

Apart from Habermas's communication theory, another used theory is the legitimacy of Lyotard's scientific knowledge. In analysing the legitimacy of science in post-industrial society, Lyotard uses a language game 'borrowed from' Wittgenstein. According to Lyotard's interpretation toward Wittgenstein's language game concept, language is not a single phenomenon, homology, i.e. totalizing the system in a single language, but a historical phenomenon which has locally and specifically basic character. We cannot judge one language game by measuring another language game.²⁴ Lyotard emphasizes the importance of rhetorical and competitive aspects in every language game. The interaction among language games is marked by a tendency to conquer one another. Each resulted language expressions can be seen as a kind of "political act" to dominate other language acts. In the language system, the marker presupposes verbal speech, namely speaking. Talking means "fighting" or "struggling" in a language game traffic struggle. Therefore, something considered to be radically democratic is a strategy of activating *paralogy*, namely the recognition of various languages. The main point is that a movement is needed to undermine the established and dominant language game by activating differences, as well as making continuous innovation and experimentation.²⁵

²¹ Habermas, *Theory of Communication Action (1): Reason and the Rationalization of Society*, 21.

²² Roderick, *Jürgen Habermas and Foundations of Critical Theory*, 115.

²³ Habermas, *Theory of Communication Action (1): Reason and the Rationalization of Society*, 22.

²⁴ Rizal Mustansir, *Filsafat Analitik, Sejarah Perkembangan Dan Peranan Para Tokohnya* (Yogyakarta: Pustaka Pelajar, 2001), 112.

²⁵ I Sugiharto, *Postmodernisme, Tantangan Bagi Filsafat* (Yogyakarta: Kanisius, 1996), 58.

There are three characteristics for every language game. First, each rule in the game does not get legitimacy from itself but it is the result of a contract among the players (explicitly or not). Second, if there is no rule, there is no game; a small modification of a rule will change the game. Third, each statement must be considered as a "move" in the game. The third characteristic is used by Lyotard as the first principle that underlies the whole method: issuing a statement (move) is fighting - in the context of a game - and the act of issuing such a statement is in the domain of "general agonistics" (a fight statement / argumentation). The principle of "statement struggle" leads Lyotard to the second principle, namely that social ties in society consist of "move-move" of language.²⁶

C. Criticism on the Incommensurability and Incommensurability of Paradigms

According to Kuhn, change and development of science are not based on empirical proving to know that a theory is wrong. However, the development of science occurs precisely through the scientific revolution and based on the history of science. Kuhn considers that the progress nature of science in revolutionary period is non-cumulative, while in normal science period, the science is evolutionary or cumulative. However, Kuhn emphasizes more on which the nature of science is revolutionary and accumulative.

Essentially, Kuhn opposes the thesis of science unity that has been adopted by positivism and been leaved by Popper. According to him, science is not one but plural; scientists actually work under one paradigm which contains ontological and methodological assumptions, and value structure. So, what is a paradigm? The special term, Thomas S. Kuhn uses has so many meanings. There are at least 22 definitions. However, the definition of a paradigm can be summarized into three meanings: *first*, the conceptual framework for classifying and explaining physical objects of universe. *Second*, it is a benchmark for specifying the appropriate methods,

²⁶ H. Dwi Kristanto, "Ketidakpercayaan Terhadap Metanarasi Kondisi Postmodern," *Driyarkara* XXV, no. 3 (2002), 8.

techniques and instruments used in researching the relevant object. *Third*, it is an agreement about legitimate cognitive goals²⁷

One simple example to illustrate the definition is that positivism is a paradigm. Positivism embraces the ontological assumption of a Newtonian mechanical universe; methodological assumptions of distance observation; and the value structure of glorifying objectivism. Positivism paradigm does not derive its legitimacy inter-subjectively but objectively. Positivism is valid because there is an academic community that upholds it and continues to reproduce it. Paradigm becomes a conceptual framework in perceiving the universe. It means that there are no neutral observations. All perceptual experiences of individuals has always been shaped by the used conceptual framework. For example, Aristotle saw the motion of a falling object as a straight line, while Newton perceived it as a pendulum motion. According to Kuhn, it was due to the different paradigms the both adopted. Aristotle and Newton adopted different ontological assumptions about the universe.

In Popper period, the debate in the science philosophy discourse is on the science progress. Popper believes that science moves in an evolutionary direction toward the truth. Popper believes that there is a cognitive accumulation that allows for rational comparisons between one theory and another. It means that there is a continuity between one theory and another. Kuhn rejects Popper's ideas and proposes the principle of incommensurability. The principle also opposes the continuity among theories. It is impossible, because they work under their respective paradigms. The scientists are guided by their paradigm in formulating the problem, research patterns, and so on.

In order to understand well concepts of discontinuity and incommensurability, it is necessary to firstly understand Kuhn's thought about the progress of science. To Kuhn, the progress of science begins from competitive struggle for the theory to gain inter-subjective legitimacy of the science community. The theory that gains social legitimacy will emerge as a paradigm. This is the normal science period where there are only justifications according to the paradigm assumptions adopted by the community. So, how can pluralism of reasoning and conceptual framework

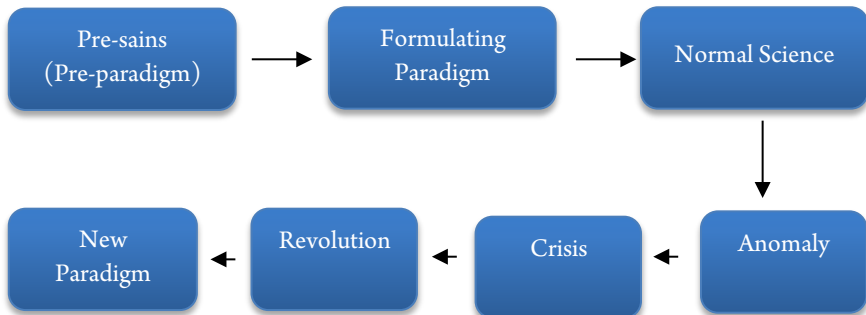
²⁷ John Tresch, "On Going Native: Thomas Kuhn and Anthropological Method," *Philosophy of the Social Sciences*, 2001, <https://doi.org/10.1177/004839310103100302>, 303-305. See also D G Adian, *Menyoal Objektivisme Ilmu Pengetahuan: Dari David Hume Sampai Thomas Kuhn* (Penerbit Teraju, 2002), 86.

reach consensus in a scientific community? Kuhn says that it occurs due to family likeness, a concept Wittgenstein puts forward to explain his thought in the language philosophy. Each member of the family is not one hundred percent similar to each other, although there are similarities that make them can be called as one family.

Kuhn states in his book entitled *The Structure of Scientific Revolution* that the seeds of science first appear as individual activities and then they proceed to normal science. However, anomalies which indirectly destroy normal science then appear. Such anomalies cause a crisis which then forces the scientists to radically question ontological and methodological basics, and used values. In the end, this critical reflection produces a new paradigm in order to overcome the anomaly where the new paradigm emerges is completely different from the old one. These methodical steps of Kuhn's thought are known as the scientific Revolution²⁸.

Schematically, Kuhn's scientific revolution can be described as follows:

Figure 1



The steps of Kuhn's science revolution can be explained as follows: a wide variety fragmented and disorganized activities that initiate forming the science is eventually structured and directed up to one time when single paradigm is embraced by the science community²⁹. At the first stage, the collected facts are not complete, therefore the explanation has to be taken from the outside, metaphysics, other sciences or from personal and historical events. It is not surprising that at the early development of any

²⁸ Kuhn, *Struct. Sci. Revolutions*, 141-154.

²⁹ A F Chalmers, *Apa Itu Yang Dinamakan Ilmu?: Suatu Penilaian Tentang Watak Dan Status Ilmu Serta Metodenya* (Hasta Mitra, 1983), 94.

sciences, different people can explain or interpret any same symptoms in a different way. In the end, these differences slowly compete and disappear in long period and then it occurs as a paradigm³⁰. A single paradigm emerges as an authoritative reference in every step of the scientific practitioners. The survive groups that do not adapt will gradually be evicted and thrown off the circle of paradigm.

If the paradigm has already gained a legitimacy from the scientific community, all scientific activities such as research will be around the paradigm. Scientific activities in this period referred to as the normal science. According to Kuhn, research in the normal science era is aimed at articulating the symptoms and theories, the paradigm has presented³¹. Normal science can be stated as a *puzzle solving* and everything is directed by paradigm³².

Normal science is a research that is firmly based on one or more past scientific achievements. Scientific achievements that certain scientific societies at one time can be claimed as providing the foundation for further practice. Today the achievements are recounted, although it is difficult to find them originally in elementary and advanced science textbooks. The textbooks describe in detail the accepted theory; they explain many or all the successful applications; and they compare those applications with experiments and observations.³³

Furthermore, if a scientist accepts a particular paradigm, his research will be aimed at answering problems arising from the paradigm. At one time, the paradigm stops proposing questions; many oddities or many phenomena, the theory cannot explain, appear. Thus, it is called as anomaly³⁴. If the anomalies accumulate and reach the higher quality, a crisis will emerge.

In times of crisis, the paradigm is paralyzed and unable to answer problems completely. In such conditions the paradigm is revisited, and in turn a new paradigm will emerge. If new paradigms emerge, it will produce

³⁰ Ferry Susanto, "Thomas S. Kuhn: Relativis Epistemologis?," XXV (Jakarta, n.d.), 41.

³¹ Kuhn, *Struct. Sci. Revolutions*, 23.

³² Kuhn, "The Relation Between History and History of Science., 472"

³³ Zainal Abidin Bagir, "Hand out Kuliah Filsafat Kealaman," 2008.

³⁴ R Verhaak, C., Haryono Imam, *Filsafat Ilmu Pengetahuan* (Jakarta: Gramedia Pustaka, 1989), 165.

theories that were never thought before. The shift between the old paradigm and the new one is called by Thomas S. Kuhn a "scientific revolution". The crisis arises when normal science undergoes anomalies. It means that the single paradigm that has been glorified so far is unable to solve the arising problems. Scientists question the ontological, epistemological and axiological basics of the paradigm.

A new paradigm is born when science is in crisis. The crisis, to Kuhn, is a necessary and important precondition for the emergence of new theories. All crises in science end in one of three ways: (1) that normal science is sometimes able to deal with problems that generate crises even though the paradigm has ended. (2) On other occasions, problems will survive without solution, even using radically new approaches. Up to that point, scientists hide away the problem for future generations who were more sophisticated. (3) A crisis then ends when a new paradigm candidate and a struggle in which new paradigm can be accepted by the scientific community appear³⁵.

The author in this context states that there are at least two main critics: namely regarding Kuhn's main idea of incommensurability among competing scientific concepts or languages; then Kuhn's idea of absolute and extreme discontinuity among competing paradigms. Kuhn's conceptual relativism lies in the keyword that every scientific paradigm is incommensurable.³⁶ Thus, Kuhn has to suppose that the entire language of observation applied by a paradigm characterizes the data carefully and does not allow the meaning of the paradigms to be separated. Competing paradigms are shackled by language and its own observations. Everything the paradigm does requires specific and untranslatable theoretical concepts. As a result, competing paradigms cannot explain the same observational data or answer the same questions about them, because there is no common language between the two competing paradigms and there is no communication between the two paradigms. At this level, Kuhn fails because assuming transition or leaping a belief from one paradigm to a new one is regarded as a more plausible. The authors precisely consider it as something non-scientific or irrational. Another thorny problem facing Kuhn is whether the new paradigm that is emerging provides a better explanation?

³⁵ Susanto, "Thomas S. Kuhn: Relativis Epistemologis?", 43

³⁶ Sudarminta, "Diktat Epistemologi, Pengantar Ke Beberapa Masalah Pokok Filsafat Pengetahuan", 25.

According to Kuhn, competing incommensurable paradigms are caused by the fact that they do not speak in the same language, but they only have the same study material so that they can still be meaningfully compared. At this point, Kuhn mentions a number of criteria that can be used to judge whether a theory is better than its competitors. These criteria include: "accuracy of forecasts, especially quantitative forecasts; a balance between the core of daily problems and the problem of expertise, as well as the number of problems that have been solved"³⁷. Such criteria create the values in the scientific community. So, the methods used by the values "must at the end of the analysis be psychological and sociological"³⁸.

Kuhn states that the most valid and high standard is the agreement of the scientific community³⁹. It means that whether a theory is better than another, must be judged relatively according to the standards accepted by the local community. In author's opinion, these standards are typically different according to the cultural and historical conditions of each society. Kuhn's relativism appears in his *Postscript in The Structure of Scientific Revolution*. According to him, "Scientific knowledge, like language, is intrinsically the common property of a community, otherwise it means nothing. To understand it, we need to recognize the specific characteristics of the community that created and used it."⁴⁰ Thus, Kuhn is actually a value relativist. However, the accusation as a relativist is totally rejected by Kuhn himself. He argues that: 'the letter scientific theory is better than the previous theory at solving problems that exist in different environments in which they were applied. According to him, this is not a relativist position, it shows his belief in scientific progress⁴¹. Based on the statement, it seems that Kuhn wants to specify a universal criterion for judging the usefulness of a theory, namely the ability to solve problems.

The author considers that the position is very difficultly maintained, because Kuhn asserts that judgment based on problem-solving abilities "does not compel individually or collectively" as far as related to the relative utility of competing paradigms. Isn't Kuhn led on a relative position

³⁷ Kuhn, *Struct. Sci. Revolutions*, 154.

³⁸ T. A. A. Broadbent, I. Lakatos, and A. Musgrave, "Criticism and the Growth of Knowledge," *The Mathematical Gazette*, 1972, <https://doi.org/10.2307/3613721>, 21.

³⁹ Kuhn, *Struct. Sci. Revolutions*, 97.

⁴⁰ Kuhn, 210.

⁴¹ Kuhn, 206.

again? According to Kuhn, aesthetic considerations (which assumes that the new theory is 'neater', 'more suitable', and 'more simple' than the old one) can sometimes be prescriptive⁴²

Kuhn still refuses a claim that he is a relativist who was anti-scientific advancement. According to him, if succession of the paradigm is not understood as a progress, differentiation of the pre-paradigm and the paradigm loses its significance. The movement from fierce competition which contains hundreds of reasoning and conceptual frameworks creates a paradigm which is legally accepted and becomes pervasive by showing the progress of science.

There are value sanctions in a scientific community to guide the choices made by individual scientists, including accuracy, scope, utility and so on. The scientists who hold on the values that can make different choices in the same concrete situation, because scientists in the same situation may differ in assigning different weights to values, and may apply the same criteria differently in the same context. Kuhn states: "It is difficult to find any other criterion that so clearly defines a field as science"⁴³

It is impossible to compare one paradigm with another in related to the problem of paradigm incommensurability. Paradigm is an artificial universe; hence it's useless to compare the two paradigms, because we are talking about two different universes. Therefore, there is Kuhn's relativistic dictum to know: "the two scientists who work on two different paradigms are in two different worlds". Kuhn celebrates paradigmatic pluralism. Kuhn's incommensurability concept that scientists are imprisoned in a prison they create. The Kuhn's concept constitutes a concept of theoretical truth which has no relevance in the practise field because of the absence of dialogue among paradigms. In author's opinion, the competing paradigms are absolutely and extremely discontinuous due to discuss overall the same study topics and both offer contradictory answers logically. However, Kuhn presumes that the discontinuity of the competing paradigm is far from radical, because it discusses some of the same study topics and can offer mutually disagreeing answers.

Kuhn states: "Science is a social product and a product of the scientific community".⁴⁴ According to the author, the universe is not merely

⁴² Kuhn, 206.

⁴³ Kuhn, 206.

⁴⁴ Kuhn, "The Relation Between History and History of Science", 229.

a social construction as Kuhn believed. The universe has two domains; the *first* is a transitive domain, the domain in which social processes affect the universe, and no object can be separated from the representations we use (theory, method, language and so on); the *second* is an intransitive domain, the domain of natural objects independent of human construction. The distinction is supposed to be a basis that not all science is awakened from a social product.

D. Conclusion

As a result, Kuhn's great project on the revolution of science actually works on three levels of meanings. First, it is unique that the revolution of science is the field of science on changes in the scientific concepts. Second, it works on a wider scientific element, because it brings changes in understanding universe. Third, it is philosophical, namely as part of a shift of Western society's understanding the values. Meanwhile, incommensurability among paradigms or competing paradigms does not always occur, because the two paradigms may in fact operate within their respective frameworks. Presumably, it is eligible to understand the concept of Lyotard's *paralogy* that each paradigm has its logic 'games' which should not be mutually negated because of the only an aim at legitimizing science. []

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