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The scientific revolution of Thomas S. Kuhn and its contribution to the conflict resolution paradigm in Indonesia

Revolusi sains Thomas S. Kuhn dan kontribusinya pada paradigma resolusi konflik di Indonesia

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Abstract

The development of science which is reflected by the paradigm shift and the scientific revolution must be able to find new ideas more progressively. This study is motivated by the significance of a paradigm shift in the development of science through discoveries that are useful for the needs of human life. This study aims to explain Thomas Kuhn's epistemological views of the scientific revolutions which have become important issues in his thinking and their implications for society's perspective on conflict paradigms. This article uses a qualitative method to describe Thomas Kuhn's scientific revolution affects social change in society. This study is classified as library research with the individual life history approach. This article shows that Kuhn's thought has been implicated significantly in all scientific disciplines, including the conflict resolution paradigm. Kuhn's thoughts can change the community's perspective or paradigm of conflict resolution models from a security and law approach to local wisdom. In addition, Kuhn's thoughts have changed the meaning of peace, namely from negative peace to positive peace in people's lives. This study concluded that one of the important contributions of Kuhn's thinking of the paradigm shift and scientific revolution is the development of conflict resolution and religious peacebuilding in society.

Keywords: conflict resolution; paradigm; scientific revolution; Thomas S. Kuhn

Abstrak

Perkembangan ilmu pengetahuan yang dicerminkan oleh pergeseran paradigma dan revolusi ilmu pengetahuan harus mampu menemukan ide-ide baru secara lebih progresif. Kajian ini dilatarbelakangi oleh pentingnya perubahan paradigma dalam perkembangan ilmu pengetahuan melalui penemuan-penemuan yang bermanfaat bagi kebutuhan hidup manusia. Penelitian ini bertujuan untuk menjelaskan pandangan epistemologis Thomas Kuhn tentang revolusi ilmiah yang menjadi isu penting dalam pemikirannya dan implikasinya bagi perspektif masyarakat tentang paradigma konflik. Artikel ini menggunakan metode kualitatif untuk menggambarkan revolusi ilmiah Thomas Kuhn memengaruhi perubahan sosial di masyarakat. Penelitian ini tergolong penelitian kepustakaan dengan pendekatan riwayat hidup individu. Artikel ini menunjukkan bahwa pemikiran Kuhn telah berimplikasi secara signifikan dalam semua disiplin ilmu, termasuk paradigma resolusi konflik. Pemikiran Kuhn dapat mengubah cara pandang atau paradigma masyarakat terhadap model resolusi konflik dari pendekatan keamanan dan hukum menjadi kearifan lokal. Selain itu, pemikiran Kuhn telah mengubah makna perdamaian, yaitu dari perdamaian negatif menjadi perdamaian positif dalam kehidupan masyarakat. Studi ini menyimpulkan bahwa salah satu kontribusi penting pemikiran Kuhn tentang pergeseran paradigma dan revolusi ilmiah adalah pengembangan resolusi konflik dan pembangunan perdamaian agama di masyarakat.

***Kata kunci**: resolusi konflik; paradigma; revolusi sains; Thomas S. Kuhn*

Introduction

Science and technology in the modern era must be recognized to be growing very rapidly along with a variety of scientific discoveries that are very amazing. In the 21st century, it is the culmination of the development of science and technology that gave birth to many breakthroughs and innovations as a mirror of the perfection of modern man in utilizing his extraordinary potential. The culmination of this development of science and technology allows everyone in different parts of the world to communicate

precisely without the boundaries and bulkheads that stand in their way. Various discoveries in science and technology continue to emerge along with innovations made (Politi 2018). In the field of information technology, modern humans have succeeded in creating highly sophisticated and amazing communication tools with the invention of mobile phones not only in the form of audio-visuals but also through video calls or teleconferences directly and face to face without distance. There is no territorial boundary that separates people in different parts of the continent because all almost humans enjoy the sophistication of this modern technology.

The industrial revolution 5.0 at this time, increasingly makes people live in their comfort zones because any activity can be done online and based on digital technology. Any information in different parts of the world can be easily accessed in a very short time and everyone can enjoy the sophistication of technology with pride. Modern science and technology have made human life easier and more practical so that what is done no longer depends on humans in full, but uses tools or instruments to accelerate human work. In the development of modern science and technology, further research is needed to obtain discoveries that are more progressive and beneficial to the needs of human life in the world. At the same time, it is also important to question the benefits of modern scientific advancement, the limits of scientific progress, and the direction of scientific development for the needs of human life in the world (Sabila 2019).

In the context of scientific progress, the flow of positivism is so highly praised because it provides major changes in the dynamics of human development (Suriasumantri 2010). However, the progress of the philosophy of knowledge has indirectly influenced the way of thinking of humans not only concerned with its progress but also related to its usefulness for human life. The emergence of a new paradigm of science is a reflection that humans have begun to recognize the urgency of placing science as part of God's gifts which must be developed according to their respective portions and needs. Humans slowly focus on the spiritual aspect that seems to have disappeared in the dynamics of the struggle for modernity. At that time, views emerged that attempted to challenge the positivism paradigm which tended to place materialistic and mechanistic roots as its main foundation (Zubair 2002).

Modern science must indeed be recognized as being based on the flow of positivism and pragmatism which influence the methodology of human thinking in producing new findings. Rationalistic thinking in turn can negate the flow of thoughts that are contemplative in addressing every beauty of God's creation. Such thoughts can become a barrier for humans to being closer to God and tend to ignore relationships with God and the universe. If the relationship between God and the universe is broken, then humans will lose their identity as religious beings who have an inner bond with God and the universe as an important element in the survival of human life. The progress of science and technology is indeed projected to free humans from all forms of ignorance and backwardness and become an instrument to make it easier for humans to face all the difficulties of life in the modern era. However, if the progress of science is not properly controlled, it can cause disastrous results for the safety of mankind itself.

The presence of Thomas Kuhn's work is a new leap for the progress of science as a whole. For him, science must always be studied and developed more progressively to be able to present new values for the benefit of human life. The knowledge that was born and developed in the past does not have to be lamented but must be constantly studied with new, more enlightening thoughts. So, it is necessary to deconstruct the development of knowledge that is positivistic and mechanistic. On this basis, Kuhn made a sharp critique of the previously developed philosophical thought, such as Baconian philosophy, falsification philosophy, and probabilism. The emergence of a new philosophy in the scientific tradition is a reflection of the birth of Thomas Kuhn's very famous work, *The Structure of Scientific Revolutions*. The presence of this work is a hot topic of conversation among scientists who are interested in the development of the philosophy of science, especially for scientists who are always thinking innovatively to produce discoveries. This work not only opens new horizons in the development of science but also breaks down old paradigms that are not relevant to the development of more progressive modern technology.

The emergence of a revolution in the field of industry and modern technology in recent years has changed the way people perceive and behave in understanding science. Humans began to carry out a major revolution in the development of increasingly rapid technology along with the awareness to break down positivistic thinking that shackles modern humans in reconstructing science with a different approach from before (Politi 2018). One of the figures considered to have played an important role in carrying out the scientific revolution and changing the perspective or paradigm of science was Thomas S. Kuhn. He is a scientist who gives a new perspective to scientific thinking with a new, more progressive approach. He is considered a figure capable of breaking old thoughts into new thoughts or new paradigms (the new paradigm) as part of a scientific breakthrough or revolution (Putri & Iskandar 2020).

The paradigm in Kuhn's thinking is a new theory in the development of science. For Kuhn, science is not stagnant, but it continues to develop dynamically and adapt to technological advances (Bornmann & Marx 2014). Thomas Kuhn is not just a major contribution to the history and philosophy of science, but more than that, he has initiated the theories that have broad implications in the social sciences, arts, politics, education, and even religious sciences (Kamal 2016). In Kuhn's view, the existence of the history of the philosophy of science is not only an instrument to identify epistemological problems in the area of science, but also plays a role in supporting the development of science so as not to be trapped by positivistic, materialistic and mechanistic views. Kuhn sees scientific objectivity in the development of knowledge as something that cannot be single (cumulative) (Digarizki & Anang 2020).

This study refers to a significant paradigm shift in the increasingly rapid development of science. The development of science which is motivated by a paradigm shift and scientific revolution, demands a revolutionary change from the paradigm of society in understanding the development of modern science and technology. So, Kuhn emphasized that science which is reflected by a paradigm shift and scientific revolution must be able to break through rigid thinking in the development of science. Thus, this article seeks to explain Thomas Kuhn's contribution of scientific paradigms and revolutions in the development of a conflict resolution and peacebuilding paradigm in Indonesia.

Research Method

This research used the qualitative method to elaborate on Thomas Kuhn's epistemological views on scientific revolutions which have become important issues in the life of society. This study is classified as library research because this research focuses on Thomas Kuhn's thoughts about paradigm and scientific revolution as an important part of the development of science. This study uses the individual life history approach as the manner to explore the history of life background, education, the journey of intellectual, structure of thought, and stages of the scientific revolution in Thomas Kuhn's perspective. The focus of this research also explains the contribution of Kuhn's thoughts to the development of a conflict resolution and peacebuilding paradigm for social harmony in society.

In collecting data based on literature reviews, researchers use documentation data based on literature reviews from several books, journals, and research reports. To investigate the originality and genuine of Thomas Kuhn's thought, researchers try to elaborate on some monumental works wash published, namely The Structure of Scientific Revolutions. Kuhn's other works are entitled *The Essential Tension: Selected Studies in Scientific Tradition and Change, and The Road Since Structure* which was published in 2000 by the University of Chicago Press. Based on Kuhn's monumental works, this research explains the contribution of Kuhn's thoughts to the development of conflict resolution and religious peacebuilding in Indonesia.

To check the validity of the documentation data, the researchers used triangulated data to support research data and books related to Thomas Kuhn's thoughts on the importance of paradigm shifts and the scientific revolution. Documentation data for this research was collected from various academic literacy sources, books, journals, and research reports, which specifically discuss the contribution of Thomas

Kuhn's thoughts on the scientific revolution to the development of the paradigm of conflict resolution and religious peace in Indonesia. The data analysis used to explore Thomas Kuhn's thoughts on the scientific revolution is descriptive, namely data analysis that seeks to describe and interpret a theory, scientific point of view, ongoing processes, or trends that develop in the dynamics of society.

Results and Discussion

Intellectual biography of Thomas Kuhn

Knowledge of character biographies is not only important for knowing the background of life, education, and the influence of their thoughts, but also for determining the world view in examining all the contributions of their thoughts in transforming an old paradigm into a new one that is more enlightening for the progress of human civilization. Likewise, when we try to explore the intellectual biography of Thomas S. Kuhn (1922-1996) who is an important figure in the field of physics and the history of the development of science. Thomas Kuhn was born in a town in Ohio, to be precise on July 18, 1922. He was born to an industrial engineer named Samuel L. Kuhn and Stroock Kuhn. His tertiary education was completed at Harvard University in physics in around 1943 and obtained a master's degree in 1946. His academic degree made him known as a physicist and as a teaching force after earning his Ph.D. from the Harvard campus in 1949.

In living his academic life at the Harvard campus, Kuhn's attention to his scientific field has shifted, from physics to the history of philosophy of science. The change in concentration in the scientific field does not necessarily leave his study interest in physics, but he has a new view to deepen the history of the philosophy of science so as not to appear static in carrying out scientific development. His adventures as Harvard Junior Fellow for approximately three years earned him acceptance as an assistant professor at Harvard in the field of the history of science.

After serving himself at Harvard, Thomas Kuhn then taught at the University of California in the philosophy of history in 1961 (Bird 2000). On this campus, he succeeded in publishing his most influential work to date, namely The Structure of Scientific Revolutions, which he wrote in 1962. A qualified scientist, Thomas Kuhn has a quite brilliant career because his work has succeeded in becoming a very phenomenal work and has influenced the way of thinking of scientists or scientists in placing knowledge dynamically and progressively. Kuhn studied physics at Harvard University, then continued his postgraduate studies, and decided to move to the field of the history of science.

Every new paradigm emerges in the dynamics of scientific development it cannot be separated from a spontaneous response to previous thoughts which are considered contradictory and requires verification as a form of countermeasures to find scientific truth. Likewise, with the background of Thomas S. Kuhn's thought, who had the spirit to break the old order which was considered less contribute to the advancement of science. This background is what inspires scientists not to be trapped by old paradigms that are no longer relevant to the times. The emergence of Thomas Kuhn's thoughts about the scientific revolution is a response and criticism of the positivism paradigm and philosophy of science from Popper's perspective. In the view of Thomas Kuhn, Popper's philosophy has changed the facts about the emergence of empirical scholarship with a hypothetical method that is proven by falsification (Zubaidi 2007).

At the same time, Kuhn also criticized the positivism view that judged objective and empirical science to be the correct view. Positivism admirers claim that the various forms of the clutter of idealists with the metaphysical approach used in examining facts in the field lie in meaningless arguments. They also have the view that the source of knowledge comes from the results of experiences, confirmation, and verification which are experimental by using a scientific approach as evidence of scientific development. So, Popper is of the view that all forms of scientific development have the possibility of error through stages known as falsification (the experimental stage to show that science can contain error) and refutation (a form of theory denial) (Muslih 2004).

As a scientist, Thomas Kuhn's thoughts were certainly influenced by previous thinkers who had produced various theories and concepts about science. In analyzing the background of Kuhn's thought, it is very important to map his frame of mind as the main basis for compiling a theory that can be accepted by many groups from various scientific disciplines. Thomas Kuhn is one of the important figures who have brilliant thinking and a way of thinking that can break the scientific paradigm, surely it cannot be separated from the influence of the thoughts of previous figures who are considered to have contributed scientifically to scientific progress. One important aspect of Kuhn's philosophy involves the idea that "the decision to reject one paradigm is always simultaneously the decision to accept another" (Kalman 2016).

The glorious thought of Kuhn originated from his love of studying Aristotelian philosophy which he considered influenced the way of thinking about science. Initially, he read Aristotle's scientific works as formative experiences, which he judged to be highly relevant to future knowledge. Because of this, Kuhn was very intense in studying the field of the history of science by participating as an educator. On that occasion, he gave birth to a book entitled The Copernican Revolution as the first manuscript that laid the foundations of his thinking in the field of science (Kuhn 1957). From this first book, Kuhn began to be influenced by the thoughts of Nicholas Copernicus (1473-1543), who had succeeded and made a new surprise in changing the paradigm of human thought into a more amazing direction.

Copernican thought is considered by Kuhn to be very bold in rejecting the assumption that the earth is the center of all the movements of the stars and planets. His thinking is based on the results of his empirical studies on the inability of the earth to be the center of all the planets and stars. During its development, his thought became a diametral form (antithesis) of the early philosophers and ecclesiastical doctrines that considered the opposite, where the earth was the center of the movement of the stars (Tara & Sutrisno 2003). In Copernicus' view, the sun is the epicenter of the rotation or movement of the various planets and stars. He gave an example that a person who performs a movement at high speed is often not aware that he is moving.

In the end, Copernicus formulated a theory that Mercury was the planet closest to the sun. The other planets that are close to the sun in the sequence are Venus, Mars, Jupiter, and Saturn. Apart from the orbits of the most distant planets, it turns out that many stars are close to the sun. In Copernicus' view, the realm of this world is edged or has an end, where the sun has inhabited the epicenter, and the stars are the edges. When viewed from a more holistic aspect, the Copernican view indirectly provides objective observations relating to the existence of the universe. This fact shows that although Copernicus gives the impression of negating the role of man in the world as part of the center of pride, he also emphasizes that human existence has a strategic position in caring for and protecting the universe. In the terms of Thomas S. Kuhn, Copernican thought has been able to uproot the domain and interference of religion in the development of science which is considered very dangerous for human thought. Copernicus' revolutionary view became a turning point for the advancement of intellectualism in Western society which had major implications for shifting thoughts about religion and philosophy (Kuhn 1970).

This revolutionary thought prompted Kuhn to continue a point of view that was considered capable of silencing the old order towards a new, more progressive order as was done by Copernicus. As a scientist, Thomas Kuhn produced many important intellectual works and had a significant influence on the progress of human civilization. In Kuhn's view, there are at least three perspectives on how the Copernican revolution worked scientifically. The first is an astronomical perspective. He saw a change in the astronomical conception that was previously very dogmatic to more scientifically rational astronomy. Second, is the scientist's perspective, which is a more comprehensive way of looking at the human conception of the universe. Copernicus' scientific findings allow for continuous study and research on various scientific phenomena. Copernicus' findings eventually reached their peak in the era of Isaac Newton. Third, is the philosophical perspective, namely the transition of understanding among European societies about the values and morals. The change was impressed from its mystical nature to empirical rational philosophy (Kuhn 1970).

Thomas Kuhn's thought structure

In its development, a structure of thought can be used as a model or way of looking at something that is deemed necessary for scientific affirmation and practice. The structure of Kuhn's thought in question is a paradigm as a concept or scientific framework that encourages mankind to be more advanced in describing a theory of knowledge-as will be explained in detail below. Epistemology is a branch of philosophy that is a dilemma for many philosophers and scholars. Determining the scope or scope of epistemology alone has drawn a long debate, not even final for its scope (Anang 2019)

One of the important thoughts of Thomas Kuhn is related to the paradigm. According to the English-Indonesian Dictionary, the word paradigm means model, pattern, and example (Shadily & Echols 1975). Paradigm can also be understood as a way of looking at things, patterns, theories, and models in examining a particular discipline of knowledge. By referring to the paradigm, everything can be explained scientifically based on a concept or theory. The paradigm is very decisive in defining a concept that is scientific and becomes a general view that is empirical. In the end, the paradigm becomes the basis for identifying scientific problems and for solving research problems in the field (Bagus 2000).

The paradigm can be illustrated as a mapping in digesting and understanding something. The mapping does not only cover one field of science but can cover all disciplines depending on the expertise and capacity of a scientist. From there, paradigms can be interpreted as a part of a model, pattern, or theory used to explain something relevant to scientific activities (Covey 1993). There are two views of Kuhn regarding the paradigm that has become the prima donna of scientists. First, the paradigm is interpreted as the result of thoughts, ideas, values, and methods used by the scientific community. Second, the paradigm shows various constellations of thought and scientific findings that have not been resolved in modern human life. In the academic world, the paradigm becomes an instrument to facilitate the perspective of something about what must be understood, problems that must be solved, and rules that must be actualized in the form of action to answer mysterious problems.

Kuhn described the scientific paradigm as a basic concept in solving problems about certain disciplines or contemporary issues regarding the development of science and technology. Kuhn emphasized that the progressiveness of science must refer to what is known as the scientific paradigm. In Kuhn's view, what is called a scientific paradigm is related to the framework of thought and point of view practiced by the scientific community. From a scientific perspective, paradigms play a role in telescoping and observing the development of science in their respective fields. In other words, that paradigm is a scientific discourse that is debated by the scientific community and academics to find common ground about the objectivity of science (Muhadjir 2006).

In its development, the paradigm has characteristics that are quite distinctive to show a perspective on something that requires constant reasoning until it reaches the point of perfection. Paradigm always requires humans to push forward and develop sustainably. One of the earliest forms of change that emerged in the history of human life was the transition from myth to logos. Of course, this change would not have been possible without a revolution being carried out to create something different from before. In other words, there must be a factor behind why this change occurred. The background can be intrinsic, it can also be extrinsic, and there may be some inherent characteristics in the change itself. Therefore, historian Kuntowijoyo formulated a historical methodology, which takes the form of generalizations as to the nature of science. Something that cannot be generalized, is not included in the area of science (Kuntowijoyo 1991). Due to the generalizability of science, scientists can make predictions about what might happen in the future (Kuntowijoyo 2004).

The change from myth to logos was seen by Kuhn as part of a paradigm shift in the development of science. The change from myth to logos became the starting point for the birth of the history of world civilization. In Kuhn's view, a paradigm shift is a turning point from the emergence of a new paradigm

as a basis for building scientific principles that are more enlightening. This kind of paradigm shift does cause victims because it can negate the old, established paradigm. So, the old paradigm which is considered invalid must be replaced with a new one that is more promising to produce a large-scale revolution in scientific discoveries in the modern era. In the end, the effect of a paradigm term, as a central concept in Kuhn's thought has been very wide and strengthened the anti-positivistic philosophy tradition it belongs (Orman 2016).

Stages of the scientific revolution in Thomas Kuhn's perspective

Science in Kuhn's perspective does not develop by individual discoveries. Many scientists are directly involved in making experiments on a new science so that it can then be used for the needs of human life. Scientists or scientists carry out a scientific revolution based on important stages that characterize the development of human thought. From one generation to the next, scientists carry out further research to add, cancel, and classify knowledge from various theories and previous discoveries. According to Kuhn, there is always a reconstruction of theory and evolution against previous facts. There has never been a single problem in science that has been revolutionarily carried out suddenly and individually without any prior basis (Kuhn 1970).

In facing the development of science and technology, Kuhn has the awareness to make changes philosophically related to the development of science itself. If they keep up with the times, scientists must revolutionize significantly the way they view science and technology, which is heavily influenced by the positivistic paradigm. Thomas Kuhn disagreed with the positivist's view that the development of science cumulative and evolutionary means (Marcum 2005). Kuhn described the revolutionary stages that led to the advancement of human civilization through paradigm changes. The scientific revolution in Kuhn's view is a paradigm shift from the old to the new with a new perspective and orientation. Kuhn describes the development of science in The Structure of Scientific Revolution, which can be made into Kuhn's scientific development schemes, namely Pre-paradigm and Pre-Science, Paradigm and Normal Science, Anomaly, Revolutionary Crisis, New Paradigm, and Revolution. The revolutionary stages in the development of science will be described in detail as follows:

First, pre-paradigm and prescience stages. Before Thomas Kuhn sparked the idea of a scientific revolution, scientists were still confused about interpreting paradigms and theories as a way of looking at things. Kuhn was of the view that at that time scientists were still working independently so he seemed unable to find a more progressive paradigm for the benefit of science. Scientists are more selfish and act individually when finding new theories that are relevant to the development of science. They are also not free from the shadow of previous scientists who seemed to be closed to debating new theories that have emerged. With the emergence of Kuhn's paradigm, it is hoped that there will be an agreement between experts to use the same discourses so that the existing findings can be compared and progress can be observed (Muhadjir 2006).

Second, paradigm and normal science stage. At this stage of development, resistance among scientists was not very sharp. This is because there is a single paradigm that is accepted as a foundation in the development of science. This single paradigm that has been agreed upon, then strengthened, is protected from various negative responses and also from attacks by philosophical falsification. This condition shows the difference between normal science and prescience which are contradictory because they go through different stages. So, these stages of development are referred to as the stages of paradigm and normal science. Normal science is research based on one or more theories results that have been achieved previously (scientific achievements) and are considered the foundation for further research development (Kuhn 1970). It can be said that science has entered the normal phase of science if at that time there has been a theory that is considered established and generally accepted by scientists and is considered the basis for further scientific development. There are at least three concerns in research on the development of science, namely identifying relevant events, adapting facts to emerging theories, and elaborating theories to solve problems that occur in the field.

Third, stages of anomaly and discovery of new paradigm. At this stage of development, research in the normal phase of science which refers to the scientific paradigm is part of the experimental stage to test new theories that require a very long time and thought from scientists. The research carried out is not only aimed at completing what is its target, but also related to the rule of law, the validity of the theory, choice of language, and hypothesis which are important parts of the success of a study. Research conducted to uncover new findings may bring up events and facts that were not previously predicted, or even in the form of abnormalities, which are often called anomalies. Often anomalies are not noticed and are considered unimportant and are considered part of a scientist's mistakes in using research instruments.

Fourth, revolutionary crisis. At this stage of development, the old paradigm began to be shaken by the existence of a new paradigm so that it experienced a revolutionary crisis in the field of science. At the normal stage of science, the goal to be achieved is to uncover mysteries or puzzles related to the development of science, not focus on finding new concepts or paradigms. If there are discoveries that cannot be explained scientifically, there is a contradiction between theory and fact, then in turn it will affect the belief in paradigms from a scientific perspective, and then there will be a revolutionary crisis. The occurrence of a crisis in the development of science is not something negative. This is because a crisis can trigger the birth of a new theory that stimulates the enthusiasm of scientists to carry out further research. At this stage, scientists will argue vigorously, both from a philosophical and metaphysical point of view. Each will defend his new theory based on philosophical thinking in viewing paradigms. In such conditions, they may lose confidence because they insist on defending their theory too much. They do not necessarily negate the paradigm that leads to the crisis, so they have to wait for a new paradigm to be accepted as a perspective in producing science that is more advanced than before (Berten 2001).

Fifth is extraordinary science. This stage was an era of extraordinary scientific development in influencing the emergence of new theories. In this new paradigm, the phase of extraordinary science is practiced by the entire scientific community which fully supports the development of science itself. This phase is also an opportunity to provide confidence to supporters of the classical paradigm regarding the existence of a new paradigm that is more promising and closer to the truth. This new paradigm is considered superior and is expected to be able to sustain the advancement of science for the needs of human life. In Thomas Kuhn's view, no paradigm is correct and perfect in its application. No theory is free from deviations or abnormalities (anomalies), because the development of science must be relevant and able to adapt to the emergence of new paradigms, which are called scientific or scientific revolutions.

Sixth is the scientific revolution. This phase is a phase of transition from the old paradigm to the new one as the impact of anomalies and crises cannot be resolved only by relying on the old paradigm. This transitional phase is called to Thomas Kuhn a scientific revolution that breaks the old order into a new order that brings enlightenment and massive changes to the development of science. This scientific revolution will in turn change the way scientists view science as an effort to make an important contribution to the needs of human life. The scientific revolution in Kuhn's view is a turning point from the occurrence of a scientific crisis that encourages a paradigm shift (shifting paradigm). This shift from the old paradigm to the new one is called by Kuhn a scientific revolution. The scientific revolution is a mirror of scientific progress which is based on changing the way scientists perceive everything that happens in the universe (Bornmann & Marx 2014). For Kuhn, scientific progress can only be realized through a paradigm shift by leaving the old paradigm that is no longer relevant and unable to answer current problems. This paradigm shift is not only related to changes in thinking, understanding, and perspective but is also closely related to values changes in human life (Keraf 2014).

The occurrence of a paradigm shift in the development of science, allows scientists to make major changes to advance science with a more revolutionary approach. At present, we are indeed entering the initial period of fundamental change in science, as a paradigm shift like the very radical Copernican revolution (Capra 1996). The emergence of a new paradigm in the development of science shows the courage of scientists to negate the old and outdated paradigm. If the new paradigm is approved and

agreed upon by the scientific community, then the phase of the scientific revolution will be achieved as expected. In this phase of the revolution, scientists are faced with new challenges to use methods that are relevant to the development of science. One of the challenges in the phase of the scientific revolution is to continue to develop new theories that can generate advances in science itself. Thomas Kuhn argues that science can develop through the way of the scientific revolution, while the scientific changes occurred through a paradigm change (Ulya & Abid & 2015).

Contribution of the Thomas Kuhn scientific paradigm and revolution for the development of con

flict resolution in Indonesia

The results of Thomas Kuhn's thoughts on the scientific revolution are considered by scientists as a big leap in developing a more progressive and dynamic paradigm of knowledge. The birth of Kuhn's thoughts about the scientific revolution enabled scientists to develop their research results and discoveries in concrete forms. From the results of these research and findings, it is hoped that they can make an important contribution to the progress of science and the needs of people's lives. The scientific paradigm that was initiated by Kuhn is the result of brilliant thinking to revolutionize the image and reputation of absolute knowledge. Kuhn has the view that science will develop in a revolutionary manner according to human intelligence in exploring the abundant knowledge in this world. The new paradigm that was initiated by Kuhn is considered a big leap in the development of science, because of its very flexible and dynamic nature. Besides, Kuhn's scientific revolution has implicated humanization and social change (Kamal 2016).

Kuhn's paradigm has generated scientific traditions that seem stagnant in conducting research and discovering new theories. For Kuhn, there is no perfect and absolute paradigm, because human thinking continues to develop and innovate according to the times. From this crisis, anomaly, and paradigm shift, a scientific revolution will be encouraged to achieve very significant progress. In its development, a science will experience normal science, and slowly a crisis occurs, triggering the birth of a new, more revolutionary paradigm. A scientific revolution occurs when the pre-existing paradigm is overthrown by a new paradigm, which is capable of solving the old anomalies and lays the foundations for a new period of normal science (Politi 2018).

Kuhn's thoughts in *The Structure Scientific of Revolution* can change people's perspective or paradigm regarding conflict which always reflects tensions and disputes between people. This thinking can encourage a paradigm shift (shifting paradigm) from conflict to a peaceful life to achieve an orderly life in the world (Piiparinen 2015). This conflict paradigm is an alternative for social scientists and policyholders to negative thoughts that are no longer relevant to the development of science, especially how to respond to and view conflicts with different points of view according to the context and background of conflicts that occur in various regions. This is because every community wants a change of perspective in dealing with conflicts by their respective paradigms agreed upon in each region. Moreover, people's lives have undergone very revolutionary changes, especially when they face various life challenges that lead to conflicts, both individually and in groups.

From Kuhn's thoughts on a paradigm shift, this concept can be put into practice and transformed to build a paradigm of conflict resolution and peacebuilding that is by the traditions, character, and noble values of the Indonesian nation in various regions. Studies and practices of conflict resolution and peacebuilding applied in Indonesia have so far not touched on the problem and directly involved indigenous peoples in overcoming ethnic-based social and religious conflicts. Every time a conflict occurs, there must be one party who gets discriminatory treatment and is marginalized in the social life of the community. In fact, in some areas that are prone to conflict, the right resolution has not been found to resolve protracted conflicts. In social life, conflict is always placed as the cause of disharmony between peoples, resulting in tensions, hostilities, and unlined strife. The paradigm of conflict in social life is always stuck with regulations or rules that are very rigid in solving every problem that occurs in society. On a social level,

conflict should not be avoided to relieve tensions, but rather must be faced with wisdom. This is because conflict is always present in every individual and group so it must have a new paradigm for achieving a better life.

Conflict becomes an instrument of change to lead a more established life and continues to process to promote peace in people's lives. Conflict can serve as a social coherence between communities to bring about better changes to strengthen relations between conflicting individuals (Coser 1956). In other words, conflict can create boundaries between two groups by strengthening separate relationships to create an awareness of identity that brings goodness and benefit to society. By using a new paradigm in resolving conflicts, efforts to reduce tensions and disputes between conflicting groups can become a reality, because everyone has wisdom in addressing and managing conflicts. So far, the government has not been able to fully address the conflicts that occur in the community, both religious, social, ethnic, and political conflicts. Thus, old ways are still maintained to deal with conflicts in various regions without using cultural approaches and local wisdom that become the local wisdom of the community. Similarly, religious leaders still argue about religious doctrine without prioritizing humanitarian issues as a basic principle in caring for brotherhood among fellow nation's children.

In the context of people's lives, religious and social conflicts in Indonesia are still common. In the handling of conflict, a new paradigm is very important to be practiced so that there are no anomalies or irregularities in creating a peaceful and harmonious society. Therefore, a new paradigm is needed that can change the way people view conflict, which does not have to be addressed by violent means, but with the path of peace as a positive paradigm in suppressing various conflicts that occur in people's lives. This paradigm of conflict can be applied by the way people view it in reducing the dynamics of conflict that develops. In social life, conflict resolution is very important to strive for because it relates to harmony and peace between communities.

Conflict resolution can be interpreted as an effort to resolve a problem that occurs, either through mediation, negotiation, or arbitration. In other words, the paradigm of conflict resolution is understood as a way of view in implementing agreements to resolve conflicts that occur between the two sides to stop all forms of strife and violence between each other (Wallensteen & Sollenberg 1998). Before offering a conflict resolution paradigm, there is an important step that must be emphasized, namely the conflict prevention approach. There are three approaches in efforts to prevent conflict in people's lives, namely conflict prevention to preserve the peaceful atmosphere, encourage conflict transformation by seeking peace, and reconciliation efforts in a sustainable manner (Ramsbotham et al. 2011). Conflict prevention aims to avoid collective violence and further violence that has the potential to worsen relations or relationships. Therefore, conflict prevention is an important approach that can influence the achievement of peaceful life.

In the dynamics of conflict, prevention is an important aspect that can defuse conflict or resolve the conflict by eliminating the causes behind it. Therefore, the handling of conflict can be done in several stages, namely, conflict suppression, conflict avoidance, conflict containment, the institutionalization of conflict management events, conflict regulation, and conflict ending, which consists of conflict settlement, resolution, and conflict transformation (Sandole 2007). By using the perspective of a paradigm change from Kuhn, all forms of conflict that occur in Indonesia, do not have to use security operations by involving the security forces and the military in preventing conflict, but rather there must be efforts to negotiate culturally between conflicting groups. Besides, there needs to be a change of perspective in resolving conflicts, namely by revolutionizing structures that are considered unfair, empowering oppressed groups, and giving attention to the parties involved in the conflict. In other words, the paradigm of conflict resolution is not only focused on peacekeeping and peace-making strategies but also must prioritize peacebuilding as a strategy in restoring destructive conditions caused by violence and conflicts that occur, by building a culture of communication between conflicting parties.

By using this paradigm of conflict resolution, the peace that becomes a common goal can be achieved. However, peace is not just an idea, but it should be practiced in daily life. This is following the view of Johan Galtung, who divided peace into two, namely negative peace and positive peace (Galtung 1969). Negative peace can be understood as a condition of no violent conflict or war in people's lives. Meanwhile, positive peace is the creation of justice and prosperity in people's lives, as well as the loss of violence structurally and culturally, which gives birth to a sense of justice and harmony in the structure of people's lives (Shields 2017). One of the implementations of positive peace is reconciliation and integration into social harmony (Taufik 2020). The creation of a sense of justice and harmony in people's lives shows a paradigm change from negative peace to a positive peace which is the essence of true peace.

Conclusion

Science according to Kuhn has undergone very significant development to the results of human thought. The development of science for Kuhn did not proceed evocatively or accumulatively but was revolutionary. Thus, the development of science is strongly related to the paradigm shift in interpreting a theory that arises. The birth of the paradigm initiated by Kuhn shows the efforts of scientists to break the old paradigm towards a new paradigm that is more relevant and follows the development of the times. In other words, the Kuhn paradigm is considered to contribute greatly to the development of new science and civilization that is more enlightening.

Kuhn's thoughts on paradigm shifts in the scientific revolution have influenced almost all aspects of human knowledge that continue to evolve rapidly as variants of perspectives are built. In the realm of peaceful life development, Kuhn's thinking was able to revolutionize the negative view of the conflict that befell the lives of mankind. Restorative efforts to turn the disharmony of life into harmony into one of the great revolutions in the dynamics of human life are always haunted by various conflicts, whether individual, group, or social conflicts amid society.

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