

A Study of Religious and Scientific Perspectives on Buddhist Cosmology

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Abstract

This research was qualitative, it was to investigate Buddhist cosmology as found in Buddhist scriptures and compare cosmological perspectives between 5 Buddhist scholars and 5 scientists. In Thai Buddhist cosmology, the principles of *Paṭiccasamuppāda* and *Tilakkhaṇa* share some similar ideas with the causality principle of science. Scientists regard them as a fundamental universal principle that underpins the laws of nature, which is unsurprising. Another similarity is *Samsāra*, the cycle of rebirth, which may be compared to the birth and extinction of stars but is not comparable to the physical Universe as a whole. Thai Buddhist scholars have accepted that Buddhist and scientific cosmologies are compatible. I argue that when it comes to the physical matter of the universe, its definition, evolution, shape, space, and time, the perspectives of Buddhist scholars and scientists are radically different and cannot be compared. Furthermore, Buddhist and scientific approaches to understanding natural laws are diametrically opposed; Buddhism concentrates on the mind, whilst science concentrates on the physical universe; thus, they cannot be naturally compared.

Keywords: Buddhist cosmology, cosmology, Buddhism and science, Buddhist, Modernism

1. Introduction

Comparisons between religious and scientific perspectives on what Buddhist and scientific cosmology have in common are *Paṭiccasamuppāda* and *Tilakkhaṇa* principles and the cause and effect or causality principle, which is a straightforward principle that underpins the laws of nature. As a result, it is unsurprising from a scientific perspective. Another similarity, while not the entire physical Universe, is *Samsāra*, the cycle of rebirth, which may be seen as identical to the emergence and extinction of stars. Thai Buddhist scholars have attempted to reconcile all facets of Buddhist cosmology with scientific cosmology and have previously concluded that they are compatible. I argue that the similarities between Buddhist and scientific cosmology are the principles of *Paṭiccasamuppāda* and *Tilakkhaṇa* in comparison to the causality principle, but they can be compared to only a small portion of the universe's physical scientific concepts and discoveries, and in many scenarios, they cannot be compared at all. Most significantly, when biological and physical sciences, as well as neurology, are examined in detail, they are proven to be completed so dissimilarly that they cannot be compared. Furthermore, the approaches to understanding the laws of nature taken by Buddhism and science are very different. Buddhism is concerned with the mind, while science seeks to understand the physical world (Reynolds & Reynolds, 1982; Zajonc, 2004; Schneider, 2006; Sritong-On, 2012; Yuktirat, 2016; Tan, 2020).

In Thai Buddhist cosmology, the most notable difference between religious and scientific perspectives is that Buddhist scholars strive to reconcile Buddhism with science, whereas scientists do not. The comparison of Buddhist and scientific cosmology serves as an example of the comparison of Buddhism and science, both of which have distinct magisterial called non-overlapping magisterial. Buddhism's magisterium is focused on human goals, meaning, and value, while science's magisterium is focused on the empirical world. In response to the question, are Buddhist and scientific cosmologies compatible? The rationale is that they are compatible; despite their numerous differences, each side carries out its obligations independently, which occasionally necessitates cooperation, and Buddhism, in particular, frequently seeks assistance from science rather than science seeking assistance from Buddhism. For two primary reasons, Buddhism seeks scientific cooperation: (1) to assist in clarifying the teachings of Buddhism and assist people in understanding them more readily and profoundly, and (2) to fulfill the virtues and morality of those who adhere to the materialism created by scientists. Neither side, however, would seek to destroy or defeat the other (Kittisak, 1986; Kloetzli, 1997; Sadakata, 1997;

McMahan, 2004; Sukhuprakarn, 2012; Bogle, 2016).

Many Buddhists are fascinated by the Buddhist Universe, *Cakkavāla*, and the Universe, particularly the beginning and end of the Universe, the origin of beings, the world system, the 31 Planes of Existence, space and time, the *Kappa*, the destruction of the *Kappa*, and so on. They also wonder if the study of Buddhism's Universe and the study of science's Universe are compatible. However, Buddhist scholars, scientists, and researchers have attempted to investigate the relationship between Buddhism and science. Many of them use material from the *Tipiṭaka* and various commentaries to write articles, books, and research studies. Based on the material that the writers have studied and quoted from other articles, books, and other materials, they frequently analyze the correctness of the written language or, at times, compare the information between Buddhism and science to determine if it is compatible or not. That is a fantastic effort, and I am quite impressed. However, since I got the opportunity to study the comparison between Buddhist and scientific cosmology for myself, my study would be more interesting, up-to-date, and theoretically correct than that of many specialists in the past. To put it another way, in addition to reading articles and papers on the Universe, I also interviewed actual experts who are knowledgeable about Buddhist cosmology and specialists in scientific cosmology to obtain genuinely correct information from those experts (Hardy, 1863; Payutto, 1979; Utta, 2014; Sritong-On, 2015; Chantanee, 2018).

I interviewed experts from both sides, Buddhism, and science, to see ideas and perspectives on Buddhist cosmology. I have chosen ten experts, five Buddhist scholars, and five scientists to be representatives of the population of interest. I used judgment sampling to select the experts based on their own existing knowledge and their professional judgment. Of the five Buddhist scholars, two were monks from one of the best religious universities in Thailand, two were lecturers from one of the best religious universities and universities in the fields of Buddhist philosophy in Thailand, as well as one Buddhist philosopher and writer from one of the best universities in Thailand. Three of the five scientists were from one of Thailand's best universities in the field of physics, and two were from Thailand's best astronomical research institutes. Many of them also published Buddhist and scientific articles and books. The five Buddhist scholars and the five scientists were as follows:

The five Buddhist scholars are:

- 1) Dr. Phramaha Hansa Dhammhaso, Director of International Buddhist Studies College (IBSC), Mahachulalongkornrajavidyalaya University
- 2) Dr. Phramaha Maghavin Purisuttamo, Department of Buddhism and Philosophy, Graduate School, Mahamakut Buddhist University
- 3) Dr. Watchara Ngamchit Charoen, Department of Philosophy and Religions, Faculty of Liberal Art, Thammasat University
- 4) Dr. Suvin Ruksat, Department of Religions and Philosophy, Mahamakut Buddhist University
- 5) Dr. Sorakarn Sri Tong-Orn, College of Industrial Technology, King Mongkut's University of Technology North Bangkok

The five scientists are:

- 6) Dr. Pornchai Patcharintanakul, a Special Professor at the Department of Science, Chulalongkorn University,
- 7) Dr. Sarun Posayajinda, the Director of the National Astronomical Research Institute of Thailand (Public Organization) (NARIT)
- 8) Dr. Wiphu Rujopakarn, Department of Physics, Chulalongkorn University
- 9) Dr. Maneenate Wechakama, Department of Physics, Faculty of Science, Kasetsart University
- 10) Dr. Utane Sawangwit, NARIT researcher, The National Astronomical Research Institute of Thailand (NARIT)

2. Contents of the Study

The dissertation was divided into six chapters:

Chapter I: Introduction – I started chapter I with an Introduction. In the introductory section, I showed my overall picture of the whole process of my dissertation. I included the statement of the problems, the aims of the study, the method I chose the experts for my interview, the research methodology I used in the study, the instruments used, the literature review, and the contents of the study.

Chapter II: The Definition of Buddhist Cosmology – In this chapter, I began by explaining the word Buddhist Universe, "*Cakkavāla*" and comparing it with the word "Solar System" in science. The following were the main

questions used in my interview: 1) What is the definition of Buddhist cosmology from your perspective? 2) What are the similarities and differences between the religious and scientific perspectives on the definition of Buddhist cosmology? and 3) Are the definitions of Buddhist and scientific cosmology comparable?

Chapter III: The Evolution of the Universe – What I want to know is, does the information from scientists support the evolution of the Universe in Buddhist cosmology? The main questions I used were as follows: 1) What is the evolution of the Universe in Buddhism? 2) What are the similarities and differences between the religious and scientific perspectives on the evolution of the Universe in Buddhist cosmology? and 3) Is the evolution of the Universe between Buddhist and scientific cosmology comparable?

Chapter IV: Shape of the Universe – There was a problem with how the Universe is defined or interpreted in terms of its shape. The interpretation was dependent on the scholars. Many of these were interpreted according to the requirements of the individual, which might appear to be in contradiction with the meanings provided by the internationally recognized English Pali dictionary. These were the questions used to investigate Buddhist scholars' and scientists' perspectives on how they defined or viewed the shape of the Universe: 1) What is the shape of the Buddhist Universe? 2) What are the similarities and differences between the religious and scientific perspectives on the shape of the Universe in Buddhist cosmology? and 3) Is the shape of the Universe between Buddhist and scientific cosmology comparable?

Chapter V: Space and Time – It was possible that everyone was interested in how the issues of space and time related to physical space and time as they were studied in science. The following questions were used to clarify such doubts: 1) What are space and time in Buddhist cosmology? 2) What are the similarities and differences between the religious and scientific perspectives on space and time in Buddhist cosmology? and 3) Is the concept of space and time comparable between Buddhist and scientific cosmology?

Chapter VI: The Holistic Picture of a Comparison between Buddhism and Science – If we looked at Buddhist cosmology from a broader perspective, could we say that Buddhist and scientific cosmology were similar and even somewhat compatible? Of course, this was the most explicit information we have read or studied from regular articles and books, which might or might not have come directly from cosmologists, astronomers, or scientists. These questions below were used: 1) Is there any other similarities or differences between Buddhism and science? and 2) Is Buddhism and science comparable and compatible when seen from a broader perspective?

Chapter VII: Conclusion – This research sheds light on a number of incompatible issues, but they were not so significant that we would forsake our belief in Buddhism as a result of it. We could find fulfillment in Buddhist cosmology in the Buddhist scriptures, which was consistent with our knowledge of Buddhist *Dhamma*. Additionally, *Traibhumikatha* was the most beautiful piece of literature with an overwhelming story about Buddhist cosmology that demonstrated the author's profundity of intellect and creativity, as well as his dedication to assisting people in understanding the physical universe according to Buddhist beliefs and the relationship between merit and sin that propelled them to hell and heaven. We couldn't dispute that there were some aspects of Buddhist cosmology that were comparable to those of the Universe as understood by scientific principles. It was only a waste of time; it was not true. However, we were unable to compare them directly due to the lack of physical evidence in Buddhist cosmology, as well as a large number of enigmatic and miraculous things that made it impossible to draw meaningful comparisons between them.

In each chapter, you would find in-depth explanations of Buddhist cosmology provided by Buddhist scholars and scientists in response to the questions I have posed so that everyone might understand their perspectives on Buddhist cosmology. I have attempted to elaborate and add proof on several issues in order to make the content clearer and simpler to comprehend, as well as to support and verify what those experts said so that everyone might have trust and greater confidence in the information, as well as to properly analyze and interpret the results in accordance with various hypotheses.

3. The Definition of Buddhist Cosmology

The comparison of Buddhist scholars' and scientists' perspectives on the definition of Buddhist cosmology revealed that there were both similarities and differences, as follows:

Table 1. Similarities between Religious and Scientific Perspectives on the Definition of Buddhist Cosmology

Similarities	
Buddhist Scholars' Perspective	Scientists' Perspective
1. Human origins are not from a Creator, God.	1. The physicists do not talk about God, however; rather, they refer to physical laws, the law of cause and effect, and causality.
2. <i>Cakkavāla</i> is compared to the Solar System.	2. <i>Cakkavāla</i> is compared to the Solar System based on the presence of the Sun and Moon.
3. <i>Cakkavāla</i> and <i>Lokadhātu</i> are the same things.	3. <i>Cakkavāla</i> and <i>Lokadhātu</i> may be the same thing based on the grouping <i>Lokadhātu</i> . The term <i>Lokadhātu</i> indicates a smaller unit, a Solar System, with a <i>Loka</i> which is the same definition of <i>Cakkavāla</i> .
4. <i>Cakkavāla</i> relies on the law of dependent origination, <i>Paṭiccasamuppāda</i> .	4. <i>Paṭiccasamuppāda</i> is the same as the concept of cause and effect as causality. However, this cause-and-effect theory is seen in all fields, not just religious ones.
5. Hinduism's world and Universe beliefs and doctrines existed before Buddhism.	5. Buddhist cosmology should not be ascribed to the Buddha; it is a Brahmanical view.
6. <i>Anattā</i> , "no-self" and <i>Suññata</i> , the emptiness	6. Emptiness, the notion that nothing has an inherent nature, and quantum physics, which recognizes that subatomic particles cannot be considered concrete entities with fixed qualities such as momentum and position.

The similarities between Buddhists and scientists are that Buddhists believe that human origins, everything in the Universe, and the Universe itself is not from a Creator, God, while scientists believe that human and Universe origins are due to physical laws, such as cause and effect and causality. Many Buddhist sources compare *Cakkavāla* to the Solar System, but it was Thai Buddhist scholars who compared it to the Galaxy. *Cakkavāla*, according to science, is compared to the Solar System, as many sources claim, because of the presence of the Sun and Moon. *Cakkavāla* and *Lokadhātu* are the same things in Buddhism. Since the term *Lokadhātu* is also used to refer to the Solar System, this viewpoint is similar to that of scientists. *Paṭiccasamuppāda* is the same as the scientific concept of cause and effect known as causality. There was a time before Buddhism when Hinduism had its own set of cosmological beliefs and doctrines. Quantum physics, which understands that subatomic particles cannot be viewed as actual solid things with set qualities, is likely to be a factor in the concept of emptiness.

Table 2. Differences between Religious and Scientific Perspectives on the Definition of Buddhist Cosmology

Differences	
Buddhist Scholars' Perspective	Scientists' Perspective
1. Buddhism is atheistic	1. Buddhism is not atheistic
2. All living beings have a beginning, including humans, but it is not from the Creator or God.	2. The majority of Asian Buddhists do believe in Gods, but not an omnipotent creator God, and do not meditate.
3. <i>Cakkavāla</i> is compared to the Solar System.	3. The position of the Sun and the Moon in <i>Cakkavāla</i> is not in the approximate position of the Sun and Moon in the Solar System.
4. <i>Cakkavāla</i> consists of one Moon and one Sun.	4. There are more than 200 Moons in our Solar System.
5. <i>Cakkavāla</i> is frequently compared to a Galaxy.	5. <i>Cakkavāla</i> is comparable to the Solar System.
6. <i>Cakkavāla</i> is within us and proven by minds.	6. Most scientists, and indeed the majority of people in general, struggle to comprehend this concept of levels of consciousness.
7. Many Buddhists believe in the existence of hell and heaven meritorious actions will benefit them in this lifetime and also their chances of being reborn in the higher heavenly realms of hell.	7. Heaven and hell are merely beliefs, as well as symbolic and psychological interpretations, which is a form of demythologization in which nothing exists in reality.

The differences between Buddhists and scientists are that Buddhism claims that Buddhism is atheism, while science claims that Buddhism is not. Even though Buddhism believes that all living things and the Universe have a beginning, it is not from the Creator or God, Buddhism does not explicitly rule out the existence of a God or Gods. *Brahma*, *Indra*, *Ganesha*, *Shiva*, and other Hindu deities are revered and worshipped by many Thai people (Suebsantiwongse, 2020). Although *Cakkavāla* is compared to the Solar System, the Sun and Moon in *Cakkavāla* are not in the same approximate position as the Sun and Moon in Solar System. Each *Cakkavāla* has one Moon and Sun, but scientific evidence shows that our Solar System has more than 200 Moons. *Cakkavāla* is frequently compared to a Galaxy by Thai Buddhist scholars, but scientists compare it to the Solar System because they consider it in terms of its constituent elements, the Moon and the Sun. *Cakkavāla* is said to be within us and proven by our minds in Buddhism. Most scientists, as well as the majority of people, find the concept of levels of

consciousness extremely difficult to accept. The majority of Buddhists believe in the existence of both hell and heaven and that doing good deeds in this life would increase one’s chances of rebirth in a higher heaven realm. Heaven and hell, on the other hand, are merely beliefs, symbolic and psychological interpretations, according to science, which is a type of demythologization in which nothing exists in reality.

4. The Evolution of the Universe

The comparison of Buddhist scholars’ and scientists’ perspectives on the evolution of the Universe revealed that there were both similarities and differences, as follows:

Table 3. The similarities between Religious and Scientific Perspectives on the Evolution of the Universe

Similarities	
Buddhist Scholars’ Perspective	Scientists’ Perspective
1. The Universe from a Buddhist perspective is based on <i>Tilakkhaṇa</i> .	1. Physical theory about the natural law of cause and effect
2. Seven Suns rising to destroy the Earth.	2. The Sun will expand to over two hundred times its current size and a few thousand times its current size when it will become the Red Giant and destroy the Earth.
3. <i>Samsāra</i> or the cycle of rebirth	3. A life cycle occurs on the scale of stars.
4. Law of <i>Kamma</i> and Natural law	4. The law of cause and effect, or causality principle, and natural law

The similarities between Buddhism and science in terms of the evolution of the Universe are *Tilakkhaṇa*, impermanence (*Anicca*), suffering (*Dukkha*), and not-self (*Anattā*), as well as physical theory regarding the natural law of cause and effect. The seven Suns rising to destroy the Earth is a scientific possibility because the Sun, even if it does not have the seven Suns stated in Buddhism, but just one Sun in the Solar System will grow huge enough to swallow the planets in its orbit, including Earth. *Samsāra*, or the cycle of rebirth, is similar to the life cycle of stars on a scale of stars. The law of *Kamma*, also known as natural law, is comparable to the law of cause and effect, the causality principle, and natural law. “Natural law” is a term that is used interchangeably by Buddhism and science.

Table 4. The differences between Religious and Scientific Perspectives on the Evolution of the Universe

Differences	
Buddhist Scholars’ Perspective	Scientists’ Perspective
1. Seven Suns rising to destroy the Universe.	1. The Sun is neither large nor massive enough to destroy the Solar System or even the Universe.
2. The Universe would be destroyed by fire, water, and wind.	2. The Universe will continue to expand indefinitely. However, if the Universe comes to an end with the Big Crunch, the Big Freeze, or the Big Rip. Big Crunch means the Universe will end in heat, Big Freeze means the Universe will end in cold, and Big Rip means the Universe will end in fragmentation.
3. The Cycle of Four Periods or the four phases of the evolution of the Universe: (1) Evolution (2) Evolution-Duration (3) Dissolution (4) Dissolution-Duration	3. No evidence supports the cyclic Universe. The evolution of the Universe can be divided into two distinct phases: (1) the origin phase and (2) the infinite evolution phase.
4. <i>Samsāra</i> or the cycle of rebirth	4. Life of a biological immortal jellyfish

The differences between Buddhism and science in the evolution of the Universe are that, according to Buddhism, seven Suns are rising to destroy the Universe, but science has determined that there is only one Sun. The Sun is neither large nor massive enough to destroy the Solar System, and thus can have any effect on the Universe as a whole. Although fire, water, and wind would destroy the Universe in Buddhism, science predicts that it will continue to expand indefinitely. This universe will come to an end in one of three ways: in the heat with the “Big Crunch,” in cold with the “Big Freeze,” or in fragmentation with a “Big Rip.” The Cycle of Four Periods or the four phases of the evolution of the Universe: (1) Evolution (2) Duration of evolution (3) Dissolution (4) Dissolution-Duration, on the other hand, there is no scientific evidence for a cyclic Universe. The evolution of the Universe can be classified into two distinct phases: the origin phase and the infinite evolution phase. The Life of a biological immortal jellyfish makes a compelling case for *Samsāra* or the Buddhist cycle of rebirth.

5. Shape of the Universe

The comparison of Buddhist scholars' and scientists' perspectives on the shape of the Universe revealed that there were both similarities and differences, as follows:

Table 5. The similarities between Religious and Scientific Perspectives on the Shape of the Universe

Similarities	
Buddhist Scholars' Perspective	Scientists' Perspective
1. <i>Lokadhātu</i> consists of three sizes: small, middle, and large.	1. Group of Galaxies: The Local Group, Virgo Cluster, Local Supercluster, and Virgo Supercluster
2. <i>Cakkavāla</i> is similar to the Solar System.	2. <i>Cakkavāla</i> should be compared to the Solar System based on dictionary definitions and the Sun and Moon appearing on Mount <i>Sineru</i> , both of which are Solar System elements.
3. A thousand <i>Cakkavāla</i> comprises 1,000 Moons and 1,000 Suns	3. <i>Cakkavāla</i> is comparable to the Solar System in terms of its constituent elements; thus, a thousand <i>Cakkavālas</i> contain a thousand Suns and a thousand Moons.
4. <i>Cakkavāla</i> has a disk shape	4. Certain Galaxies are shaped like disks.

From both sides' perspectives on the shape of the Universe, four aspects are relatively similar to Buddhist scholars and scientists. *Lokadhātu* consists of three sizes: small, middle, and large. *Cakkavāla* or *Lokadhātu* is classified into three sizes: small, medium, and large. This classification is comparable to the scientific classification of Galaxies in science, which divides the Galaxy group into the Local Group, the Virgo Cluster, the Local Supercluster, and the Virgo Supercluster. *Cakkavāla* is similar to the Solar System in terms of dictionary definitions and the Sun and Moon appearing on Mount *Sineru*, which are both Solar System elements. A thousand *Cakkavāla* composed of 1,000 Moons and 1,000 Suns is conceivable because, while our planetary system is the Solar System, there are over 3,200 other stars in our Galaxy with planets orbiting them. When compared to the shape of *Cakkavāla*, which is shaped like a disk, it may appear to be similar to the shape of the Galaxy, which is also shaped like a disk.

Table 6. The Differences between Religious and Scientific Perspectives on the Shape of the Universe

Differences	
Buddhist Scholars' Perspective	Scientists' Perspective
1. <i>Cakkavāla</i> is similar to a Solar System, Galaxy, or the whole Universe.	1. <i>Cakkavāla</i> should have resembled a Solar System, not a Galaxy or the entire Universe.
2. <i>Cakkavāla</i> has a disk shape.	2. <i>Cakkavāla</i> is more closely related to the Solar System, which lacks a disk shape but has an orbit that moves like a circle. There is only one Universe with three shapes: (1) Flat Universe (2) Closed Universe (3) Open Universe.

According to Buddhist scholars, the term *Cakkavāla* can be defined in a variety of ways; for example, some compare it to a Solar System, others to a Galaxy, and still others to the entire Universe. Based on the elements contained within it, *Cakkavāla* should have resembled a Solar System rather than a Galaxy or the entire Universe. *Cakkavāla* is disk-shaped. By examining its disk shape, we can see that the Galaxy should have been compared to a number of other Galaxies that also have a disk shape. However, according to information gathered from a variety of sources and scientists' observations, *Cakkavāla* is more closely related to the Solar System, which does not have a disk shape but does have an orbit that moves in a circular pattern.

6. Space and Time

The comparison of Buddhist scholars' and scientists' perspectives on space and time revealed that there were both similarities and differences, as follows:

Table 7. The Similarities between Religious and Scientific Perspectives on Space and Time in Buddhist Cosmology

Similarities	
Buddhist Scholars' Perspective	Scientists' Perspective
<p>The Matter of Space</p> <ol style="list-style-type: none"> 1. <i>Paricchinnāākāsa</i>, the space between <i>Rūpa</i>, figure, or the space in our bodies. 2. The Universe has other dimensions, 31 Planes of Existence <p>The Matter of Time</p> <ol style="list-style-type: none"> 3. Time runs differently in 31 Planes of Existence. 4. Time in hell and heaven 	<p>The Matter of Space</p> <ol style="list-style-type: none"> 1. Space is everything in the Universe beyond the Earth's atmosphere. 2. Multiverse <p>The Matter of Time</p> <ol style="list-style-type: none"> 3. Time runs differently at each point in the Universe. 4. Theory of relativity and time dilation

The similarities between Buddhism and science in space and time are *Paricchinnāākāsa* is defined as the space between *Rūpa*, figure, or the space within our bodies. In science, it is similar to the concept of space, which refers to everything outside the Earth's atmosphere in the Universe. The 31 Planes of Existence, hell, and heaven, or the world in another dimension are similar to the scientific theory of the multiverse. In the same way, that time runs differently in each of the 31 Planes of Existence, time runs differently at each point in the Universe according to scientific principles. The concept of time running differently in hell and heaven is similar to time dilation and Einstein's theory of relativity.

Table 8. The differences between Religious and Scientific Perspectives on Space and Time in Buddhist Cosmology

Differences	
Buddhist Scholars' Perspective	Scientists' Perspective
<p>The Matter of Space</p> <ol style="list-style-type: none"> 1. <i>Karina</i> is a term that refers to the space that exists in our minds when we are meditating. 2. The Universe has other dimensions, 31 Planes of Existence 3. The teaching of hell and heaven is a Buddhist psychological teaching intended to inspire ethical behavior. <p>The Matter of Time</p> <ol style="list-style-type: none"> 1. There is no equation that adequately explains how time moves through the 31 Planes of Existence. 2. Monks have the ability to recall previous lives. 3. Buddhism makes a psychological connection between the present moment and the way of life. 	<p>The Matter of Space</p> <ol style="list-style-type: none"> 1. Mental spaces are cognitive structures in physics. 2. The multiverse is a mathematical theory that has not been proven. 3. Cosmology is the study of the origin, evolution, and end of the Universe in terms of physical matter. <p>The Matter of Time</p> <ol style="list-style-type: none"> 1. Einstein's theory of relativity and time dilation can explain how time moves in the Universe. 2. Not only monks but also laypeople, can recall previous lives. 3. Science refers to the present moment in terms of physical time.

The differences between Buddhism and science in space and time are *Karina* is a term that refers to the space that exists in our minds when we are meditating, whereas, in science, the term refers to mental spaces, which are cognitive structures in physics, rather than the space that exists in our minds. Buddhists believe in the existence of 31 Planes of Existence, hell, and heaven, as well as the existence of the Universe in other dimensions; however, in science, the multiverse is a mathematical theory that has not been proven. The teachings of hell and heaven are Buddhist psychological teachings intended to inspire ethical behavior, whereas cosmology is the study of the origins, evolution, and end of the Universe in terms of physical matter. However, Einstein's theory of relativity and time dilation can explain how time moves throughout the Universe, whereas there is no equation that adequately explains how time moves through the 31 Planes of Existence. Previous lives can be remembered by monks, but in scientific experiments, not only monks but also laypeople have demonstrated the ability to recall previous lives. Buddhism establishes a psychological link between the present moment and one's way of life, whereas science defines the present moment in terms of the physical Universe's passage of time.

7. The Holistic Picture of a Comparison Between Buddhism and Science

The comparison of Buddhist scholars' and scientists' perspectives on the holistic picture of comparison between Buddhism and Science revealed that there were both similarities and differences, as follows:

Table 9. The similarities between Religious and Scientific Perspectives on the Holistic Picture of the Comparison between Buddhism and Science

Similarities	
Buddhist Scholars' Perspective	Scientists' Perspective
The Matter of Space	The Matter of Space
1. Except for the Universe, individuals can prove Buddhist <i>Dhamma</i> .	1. A very small amount of evidence exists to support the claim that Buddhist cosmology is a genuine physical phenomenon.
2. Cycle of rebirth	2. Life cycle of stars

The similarities between religious and scientific perspectives on the holistic picture of the comparison between Buddhist and scientific cosmology are that individuals, with the exception of the Universe, can prove Buddhist *Dhamma* (Nyanatiloka, 1988). Because Buddhism refuses to explain the nature of the Universe, there are very few facts about the physical Universe, which makes it similar to science's claim that there is a small amount of evidence to support the claim that Buddhist cosmology is a genuine physical phenomenon. From the perspective of the cycle of rebirth, it is similar to the life cycle of stars, which I explained in detail in the previous chapter before this chapter.

Table 10. The differences between Religious and Scientific Perspectives on the Holistic Picture of the Comparison between Buddhism and Science

Differences	
Buddhist Scholars' Perspective	Scientists' Perspective
The Matter of Space	The Matter of Space
1. Buddhism emphasizes ethical values.	1. Morality is not limited to religious believers; laypeople can be just as moral as they are.
2. Buddhism is concerned with the interior world.	2. Science is concerned with the exterior world.

The similarities between religious and scientific perspectives on the holistic picture of the comparison between Buddhist and scientific cosmology are that Buddhism emphasizes ethical values, which are similar to the expectations of the general public that they will be good people with morals. It is also important to note that morality is not restricted to religious believers; laypeople can be just as moral as they are. The interior world is the focus of Buddhism, while the exterior world is the focus of science. The terms "interior world" and "exterior world" have a very broad interpretation. Buddhism's interior world encompasses the meaning of life's purpose, ultimate origin, and destiny, as well as the experience of inner life, whereas science's exterior world encompasses the meaning of objective and repeatable data accompanied by quantitative predictions that can be confirmed by experimentation based on logically coherent theories.

8. Conclusion and Suggestion

8.1 Conclusion

I summarized the research findings in light of my thesis goals, having examined the specifics of the study on a Comparison of Religious and Scientific Perspectives on Thai Buddhist Cosmology:

- 1) To investigate Buddhist cosmology as found in Buddhist scriptures.
- 2) To compare cosmological perspectives between Buddhist scholars and scientists.

The first objective was to present Buddhist scriptures and other Buddhist cosmology-related sources. The second objective was to present a summary of Buddhist scholars' and scientists' cosmological perspectives. Each objective was listed in the order of the main chapters:

- The Definition of Buddhist Cosmology (Chapter II)
- The Evolution of the Universe (Chapter III)
- Shape of the Universe (Chapter IV)
- Space and Time (Chapter V)
- The Holistic Picture of a Comparison between Buddhism and Science (Chapter VI)

8.1.1 The Summary of Buddhist Cosmology Found in Buddhist Scriptures

Buddhism's ancient scriptures, such as the *Nikāyas* and *Āgamas* (4th–3rd century B.C.E.), do not expressly spell

out a whole system of cosmology, but they do encompass many of the concepts and elements of the evolving cosmology. The Vedic scriptures include cosmological conceptions that have been appropriated and adapted from an early Indian source of cosmological concepts (1500–500 B.C.E.). The *Abhidhamma*, which was written in the third or second century B.C.E., is a later work of systematic Buddhist philosophy that expands on the early concepts and details. It then comes together in hermeneutic *Abhidhamma* commentaries and textbooks from the early twentieth century C.E. *Theravāda*, the *Sarvāstivāda*, and the *Yogācāra* are the three primary *Abhidhamma* traditions that are well-known in modern Buddhism and academia. The *Theravāda* or Southern tradition of Buddhism has had a considerable effect on Sri Lankan and Southeast Asian Buddhist perspectives. The *Sarvāstivāda*, or Northern tradition, was passed on to the *Abhidhamma* system of the *Mahāyāna* school of thought, which is called “Yoga practice” (*Yogācāra*) or “ideas only” (*Vijñapti-Mātra*). They were also added to the belief systems of East Asian and Tibetan Buddhism. Each of these *Abhidhamma* systems provides a complex cosmology that is virtually identical, except for minor specifics. Despite changes in the religious landscape, this ancient cosmology still has a lot to do with how ordinary Buddhists see the world when they live in traditional Buddhist communities (Mon, 2002; Gombrich, 2006; Koggalage, 2018; Promta, 1988; Punnadhammo, 2018; Somaratena, 2011).

The *Nikāya* texts, like most of the particular material, postulate the following four essential principles of *Abhidhamma* Buddhist cosmology: (1) There is no specific creator of the universe; the Buddhist cycle of causal conditions known as *Paṭiccasamuppāda*, which is based on the concept of *Kamma*, provides an appropriate explanation for its existence. (2) In terms of both space and time, the Universe’s space and time are infinite. (3) The Universe is composed of numerous planes of existence that are organized in a hierarchical form. The only way out of this perpetual cycle of rebirth, referred to as *Samsāra*, is to acquire knowledge, which is what the attainment of *Nibbāna* necessitates. (4) All beings are perpetually reborn in conformity with their previous *Kamma* in the different realms.

To cover the entire material of Buddhist cosmology, I studied and gathered knowledge from the *Tipiṭaka*, *Aṭṭhakathā*, *Abhidharmakosa*, and *Traibhumikatha*. The *Aṭṭhakathā* I discovered is an explanation by Buddhaghosa, an Indian Theravādin Buddhist commentator and scholar who lived in Sri Lanka, based on the *Tipiṭaka*’s four *Nikāyas*, *Dīgha*, *Majjhima*, *Anguttara*, and *Saṃyutta* (Bodhi, 2012). In the Pali language, his name means “Voice of the Buddha.” He translated *Nikāyas* to Pali. The *Visuddhimagga*, or Path of Purification, is his most well-known book, a comprehensive summary, and analysis of *Theravāda* understanding of the Buddha’s path to liberation.

Analysis of the Theravādin understanding of the Buddha’s path to liberation. In *Visuddhimagga*, he also described meditation extending the cosmological narrative. Since at least the 12th century CE, Buddhaghosa’s interpretations have been widely accepted as the orthodox understanding of *Theravāda* scriptures. Finally, today, *Aṭṭhakathā* is considered orthodox scripture for *Theravāda*.

I also add a few materials from the *Abhidharmakosa*, a Sanskrit text written by Vasubandhu in the 4th century C.E. Vasubandhu discussed Buddhist cosmology in the *Abhidharmakosa*, which is more systematic than what is found in the *Theravāda*, so I incorporate it into my thesis to help everyone get a better understanding of Buddhist cosmology.

8.1.2 The Summary of the Comparison of Cosmological Perspectives Between Buddhist Scholars and Scientists

The similarities between Buddhists and scientists are that *Tilakkhaṇa* and *Paṭiccasamuppāda* are the same as cause and effect or causality principles in science. Buddhists believe human origins, everything in the Universe, and the Universe itself are due to *Paṭiccasamuppāda* which is the same as the principles of causality and biology, and also the theory of relativity in physics. Indeed, Thai Buddhist scholars sometimes compared *Cakkavāla* to the Solar System, which is consistent with how *Cakkavāla* is compared to the Solar System by science due to the presence of the Sun and Moon (Sirimangalajarn, 2005). Considering *Cakkavāla* and *Lokadhātu* are Buddhist terms, *Lokadhātu* also refers to the Solar System, rendering this a scientific perspective. Subatomic particles cannot be viewed as solid entities with fixed attributes in quantum physics, which may be related to *Suññata*, emptiness. Prior to Buddhism, Hinduism had its own cosmological beliefs and doctrines, which indicates that Buddhist cosmology was influenced by Hindu cosmology and therefore does not belong to Buddhism.

The differences between Buddhists and scientists are that atheism is claimed by Buddhists, but not by scientists. While Buddhism holds that all living things and the Universe have a beginning, it does not explicitly deny the existence of a God or Gods. Many Thais revere Hindu Gods like *Brahma*, *Indra*, *Ganesha*, and *Shiva*. In terms of physical cosmology, Thai Buddhist scholars frequently compare *Cakkavāla* to a Galaxy, but scientists compare it to the Solar System because they consider it in terms of the Moon and the Sun. Although *Cakkavāla* is compared to

the Solar System, the Sun and Moon are not in the same approximate position. Furthermore, each *Cakkavāla* has one Moon and one Sun, but our Solar System indeed contains over 200 Moons. Additionally, Buddhism asserts that *Cakkavāla* resides within us and is demonstrated by our minds, while the majority of scientists, and indeed the majority of people, struggle to accept the idea of levels of consciousness. Many Buddhists believe in hell and heaven, and that good deeds will benefit them in this life and future lives. However, according to science, heaven, and hell are merely beliefs, symbolic and psychological interpretations, a type of demythologization in which nothing exists in reality.

8.2 Confrontation Between Buddhism and Science

People in the Western world have been at odds with Buddhism and science ever since the 16th century when Western imperialism and colonialism were at their peak. The religion of Buddhism spread from India to the rest of Asia about 2,500 years ago. It has become important in a lot of countries in South, East, and South-East Asia. Although the West made early allusions to Buddhism, their presence was trivial. The confrontation between religion and science became more complicated after the 16th century. As Christian missionaries, they regarded Buddhism as idolatrous, superstitious, ritualistic, pessimistic, and nihilistic as they traveled the world.

With the rise of scientific investigation, empiricism, and rationalism became more important in aspects of learning. Using philology, Western orientalist began exploring Buddhist literature, particularly the Pali Canon. Buddhism, together with the dominant scientific forms of thinking, aversion to increased proselytizing, and tolerance for religious diversity, created the settings for the developing discourse of scientific Buddhism. Buddhism and science were compatible in the 1860s, prompting one thinker, Paul Carus, to describe the Buddha as “the first positivist, humanitarian, and prophet of the Religion of Science” in 1896. The late 19th and early 20th-century anti-imperialist movements and efforts to resurrect Buddhism stressed this compatibility.

Dogmatism, fundamentalism, clericalism, and devotion to supernatural spirits and deities are only some of Buddhism’s non-scientific worldviews. Modern Buddhists, however, argue that Buddhism is a rational and scientifically based religion. Some Buddhists believe that Buddhism might be considered a branch of mental science, or even an inner science. Those who argue that Buddhism and science are compatible make reference to significant similarities between the two. The 14th Dalai Lama noted in a presentation to the Society for Neuroscience that Buddhism and science share philosophical principles such as skepticism of absolutes, causality, and empiricism.

Aside from this, Buddhism refers to literature that encourages reasonable, empirical evaluation of the Buddha’s teaching before adopting them. Scientific and Buddhist explanations of nature have the same fundamental concept, impermanence, and emptiness. According to many studies, Buddhism is not particularly rational or science-friendly. As a consequence of the confrontation between Buddhism and western thought, Buddhist modernism emerged.

The history of Buddhist modernist discourse could well be traced back to the nineteenth-century modernist movement and on into the twenty-first century. Buddhism is also a scientific religion since it is compatible with science and reason. Others like Anagarika Dharmapala, Paul Carus, Henry Olcott, Migettuwatte Gunananda, D.T. Suzuki, Shaku Sōen, and Edwin Arnold endorsed this viewpoint as well (Carus, 1897; Olcott, 1889). The Buddhist notion of *Dhamma*, typically viewed as a natural law, is compatible with modern scientific discoveries like evolution. They considered Buddhism was a rationalist religion based on causation and empiricism, not faith in revelation, God, superstition, or religious ritual. In contrast to mythological and religious elements of Buddhism, Geoffrey Samuel and Martin J. Verhoeven believed Buddhism was a scientific philosophy.

8.3 What Should Thai Buddhists and Scientists Do in the Face of the Differences Between Buddhism and Science?

This research demonstrates that significant differences exist between Buddhist scholars’ and scientists’ perspectives. As can be seen, Buddhist scholars attempt to connect them, while scientists rely on empirical facts to make a reasonable argument. Although there are many incompatibilities in comparing Buddhist and scientific cosmology, especially in the physical aspect of the Universe, they cannot be compared at all; they can only be compared based on broad concepts, *Tilakkhaṇa* and *Paṭiccasamuppāda* with the general principle of causality in science. On the other hand, Buddhist cosmology remains to be fascinating and integral to Buddhist living.

I propose a directive to continue, maintain, and preserve the most essential Buddhist cosmology literature in history, including Buddhism, *Theravāda* Buddhism, Buddhism in Thailand, and Buddhism throughout the world. In order to discover new possibilities for the development of Buddhism, I propose that Buddhist cosmology be studied in more depth, whether it is the history of Buddhist cosmology or modern cosmology, and that comparison be drawn between them. It is not to undermine science, overcome science, or lower the level of the Buddhist

situation, but to be consistent with the Buddha's teaching, especially in the *Kālāma Sutta*, where the Buddha emphasizes the importance of proof before belief (Sugunasingh, 2013; Tan, 2010; Tan, 2014; Tan, 2018).

This study reveals a number of incompatible issues, but they are not so significant that we will lose faith in Buddhism. According to my study, Buddhist cosmology can be seen in Buddhist scriptures, which enables us to understand Buddhist *Dhamma*. At the same time, that science can and will help people, it cannot and will not give human life meaning. That's OK because finding meaning is entirely internal. In reality, science thrived after it ceased attempting to be all-knowing and all-encompassing. That emphasis on natural phenomena has made it highly effective at finding, measuring, characterizing, and acting on them. This endeavor yielded so much information that it has demolished the notion that science is not intended to address basic concerns about our existence. No, modern science has never failed to assist people in achieving happiness and inner peace.

We can also see the beauty of literature in *Traibhumikatha*, as well as the author's profound thought and creativity, and dedication (ASEAN Committee on Culture and Information, 1985). We cannot argue that there are certain aspects of Buddhist cosmology that are similar to scientific cosmology, such as the principle of causality, *Tilakkhaṇa*, and *Paṭiccasamuppāda*. As with science, Buddhist concepts, and hypotheses can be examined. They are concerned with the nature of the mind and its relationship to the external world. They explore the nature and causes of suffering, as well as what can be done to bring about people's liberation. These are all key aspects of Buddhism. Naturalism rather than transcendentalism in this sense. It is not correct that it is just a waste. Buddhism and science have irreconcilable disagreements since religious ideas are not beyond the realm of science. Since religions make claims about the nature of existence, they should be challenged by scientific investigation.

Owing to the limitations of Buddhist cosmology's physical evidence and certain mysterious scientific phenomena, we are unable to compare them face to face. However, I would like to propose the following recommendations for maintaining the valuable literature and Buddhist cosmology that exists among Thais, Buddhists, and Buddhists around the world: to introduce the concept of Buddhism cosmology, *Dhamma*, ethics, the inner world, and the outer world, the relationship between the mind and different realms in 31 Planes of Existence, and the path to *Nibbāna*. For Buddhism, understanding the mind and its relationship to the rest of the Universe is essential among all natural sciences.

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