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Astronomy Development since Antiquity to Islamic Civilization from the Perspective of Islamic Historiography

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Abstract

Modern science historiography views astronomy development since antiquity solely on human interaction with nature. Such a secular evolutionary view is derived from the positivistic paradigm. In contrast, the Islamic science historiography perspective explains astronomy development since antiquity primarily based on revealed knowledge, while the scientific method is employed accordingly. Even so, there are differences among scholars in elucidating Islamic science historiography which is classified into two dimensions. The first dimension focuses on the philosophical aspects that underline the historical narrative and the second dimension prioritises scientific evidence. The question is how these differences could be reconciled so that the historical narrative of astronomy development that emerged from modern science historiography would be more coherent with Islamic science historiography. Therefore, this library study was conducted using data collection based on the documentation method and a content analysis method was employed for data analysis. As a result, the Priority Principle from *fiqh al-awlawiyyat* as a strategic locus to reconcile the differences in Islamic science historiography was identified. The principle prioritises the role of Allah, the prophets and the revelations according to Shariah and the scientific method is used suitably. It is also crucial to be emphasised in addressing the secular evolutionary view that underlie astronomy development. It is thus concluded that astronomy development from antiquity to Islamic civilization can be marked as starting from the time of Prophet Adam and will be over at the end of time.

Keywords: Astronomy Development, Astronomical Jurisprudence, Historiography of Science, Islamic Science, Islamic Science Historiography

Introduction

Astronomy is known to be the oldest natural science in human civilization.[1] In the historiography of science, information on its development is outlined through different historical narratives.[2] The modern science historiography based on the understanding of secular evolution describes astronomy development solely due to human interaction with nature. As for the formation of technology, it is seen due to the effect of various random factors such as natural, societal, humanitarian and coincidental reasons.[3] In a more general context, science itself is written in modern science historiography developing cumulatively from a primitive phase and changing gradually into advanced science and technology. Modern science historiography considers the empirical and scientific sources in studying the history of science, also referred to as a positivist approach.[4] In the positivist interpretation, various fields of knowledge are considered scientific only when using empirical and quantitative as their

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[1] Aizan Ali Mat Zin, Khadijah Ismail and Mohammaddin Abdul Niri (2015), "Sejarah Dan Faktor Perkembangan Astronomi Islam Di Malaysia: Satu Penelitian," *Journal of Al-Tamaddun*, Vol. 10, No. 1, pp. 1-18; Aizan Ali Mat Zin, Nur Nabilah Azimoha and Siti Hajar Aziz (2016), "Sejarah Jalinan Astronomi Islam Dalam Buku Teks Sekolah Menengah Kementerian Pelajaran Malaysia," *Journal of Al-Tamaddun*, Vol. 11, No. 2, pp. 45-56.
[2] Hairudin Harun (2004), *Daripada Sains Yunani Kepada Sains Islam: Peranan dan Proses Penyerapan Sains Asing Dalam Pembentukan Sains Islam Klasikal*, Kuala Lumpur: Penerbit Universiti Malaya, pp. 10-16.
[3] Sarma Nataraja (2000), "Diffusion of Astronomy in The Ancient World," *Endeavour*, Vol. 24, No. 4, pp. 157-164; Robert Wilson (2005), *Astronomy Through The Ages: The Story of The Human Attempt to Understand the Universe*, Taylor & Francis e-Library, p. 6.
[4] Seyyed Hossein Nasr and Muzaffar Iqbal (2007), *Islam, Science, Muslims and Technology*, Kuala Lumpur: Islamic Book Trust, pp. 80-85.

epistemological foundation. Any knowledge that does not base on scientific methodology is tend to be classified as pseudoscience.[5]

In contrast, Islamic science historiography classifies revealed knowledge as the primary source in writing the history of science. The position of Allah S.W.T, the prophets and the revelation have an essential role in the development of science, including astronomy. The worldview of Islamic science historiography firmly accepts that Prophet Adam was prepared with revealed knowledge before he was brought down to the Earth. The Islamic worldview also acknowledges the existence of The Arch Angel Gabriel and his role in conveying the revelation to the prophets starting from Prophet Adam until Prophet Muhammad S.A.W. Similarly, the development of technology was started gradually from the time of Prophet Adam can be accepted within the framework of Islamic science historiography.[6]

However, there were differences among scholars in outlining Islamic science historiography, particularly during the growth of scientific activities in the Islamic civilization, which were classified into two dimensions; the first dimension focuses on the philosophical aspects as discussed by Hairudin Harun (2004)[7] and Seyyed Hossein Nasr and Muzaffar Iqbal (2007)[8], and the second dimension concentrates on the scientific methodology as employed by George Saliba (2009)[9] and and Robert Morrison (2021)[10]. The question is how any difference in Islamic science historiography could be reconciled in order that the historical narrative of astronomy development derived from modern science historiography can be straightened out. As such, the study proposes the priority principle from *fiqh al-awlawiyyat* to be used in the bid to reconcile the differences.

Priority Principle

In Arabic, priority refers to *awlawiyyat* from the root word *awla* (أولى) that means more entitled (أحق) or closer (أقرب). This can be seen in the example of the sentence (فلان اولى بيسمان الامر من فلان), which means "this individual has more right to do this business than others". The verbal noun is *awlawiyyah*, while its plural is *awlawiyyat* (أولويات) which means more entitled (الأحقية).[11] In short, it means something more important than other things.[12] Therefore, the terminology is defined as putting something in its place based on considerations of the revelation and reasoning. Although this term was not discussed thoroughly by previous scholars, contemporary scholars have discussed the terminology. Shaykh Dr Yusuf al-Qaradawi was the first scholar to define *fiqh al-awlawiyyat*. In more detail, al-Qaradawi described *fiqh al-awlawiyyat* as "to put everything in its place, so do not delay things that should be advanced or advance what should be delayed, do not minimise large things or magnified small things."[13] In the Islamic discourse, Imam al-Ghazali was one of the earliest scholars who mentioned the Priority Principle. It is related to the priority of the revealed knowledge (*naqli*) over the acquired knowledge (*aqli*).[14] In current literature, Shaykh Dr Muhammad Abu Zahrah[15] applied the priority principle in theological discourse, and al-Qaradawi examined it further in the jurisprudence context.[16] It has also been employed in our previous study of cosmological texts.[17] It consists of (i) prioritising the fundamental aspect (*daruri*) over the theoretical aspect (*nazari*), (ii) prioritising the objective over the explicit form, (iii) prioritising the simplifying efforts rather than complicating, (iv) prioritising general interest over individuals and (v) prioritising quality over quantity.

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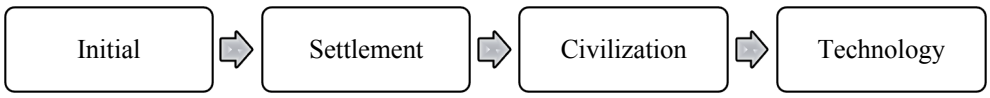
[5] Sherry A. Southerland, Barry Golden and Patrick Enderle (2012), "The Bounded Nature of Science: An Effective Tool in an Equitable Approach to the Teaching of Science," in Myint Swe Khine (ed.), *Advances in Nature of Science Research*, Dordrecht, Heidelberg, London & New York: Springer, pp. 75-96.
[6] Hairudin (2004), *Daripada Sains Yunani Kepada Sains Islam*, pp. 10-16.
[7] Hairudin (2004), *Daripada Sains Yunani Kepada Sains Islam*, pp. 10-16
[8] Seyyed and Muzaffar (2007), *Islam, Science, Muslims and Technology*, pp. 80-85.
[9] George Saliba (2009), *Islamic Science and the Making of the European Renaissance*, Reviewed by Michael H. Shank, Aestimatio: Sources and Studies in the History of Science, 6, pp. 63-72.
[10] Robert Morrison (2021), "Algebra, Alchemy, Astronomy," in Asef Bayat and Linda Herrera (eds.), *Global Middle East: Into the Twenty-First Century*, California: University of California Press, p. 35.
[11] Yusuf al-Qaradawi (1995), *Fi Fiqhi al-Aulawiyyat wa Dirasah Jadidah fi Daui' al-Qur'an wa al-Sunnah*, Cairo: Maktabah Wahbah, p. 9.
[12] Oxford Learner's Dictionary (n.d.), entry "priority," accessed 19 December 2022, https://www.oxfordlearnersdictionaries.com/definition/american_english/priority.
[13] Al-Qaradawi (1995), *Fi Fiqhi al-Aulawiyyat*, p. 9.
[14] Osman Bakar (1998), *Classification of Knowledge in Islam*, Cambridge: Islamic Texts Society, p. 203.
[15] Muhammad Abu Zahrah (n.d.), *al-'Aqidah al-Islamiyyah Kama Ja'a Biha al-Qur'an al-Karim*, Kaherah: Majmu' al-Islamiyyah, p. 29
[16] Al-Qaradawi (1995), *Fi Fiqhi al-Aulawiyyat*.
[17] Mohammaddin Abdul Niri, Che Zarrina Sa'ari and Sa'adan Man (2016), "Konsep Alam Menurut Daud Al-Fatani dalam Karyanya Manhal al-Safi: Analisis dari Perspektif Astronomi Islam," *Afkar: Jurnal Akidah & Pemikiran Islam*, Vol. 18, No. 2, pp. 1-42.

Hence, applying the Priority Principle in Islamic science historiography focuses on prioritising the revealed knowledge while accepting the scientific knowledge accordingly. It was described in the Qur'an,[18] including the priority of the right judgments and the priority of more important fundamentals when dealing with differences.[19] Likewise, in the Hadith of the Prophet Muhammad S.A.W,[20] for example, the virtue of a firm believer is more loved by Allah than a weak believer and the priority of efforts towards more beneficial things. Thus, the Priority Principle is applied in Islamic science historiography in reconciling the differences and as the basis for straightening the development of the astronomy narrative derived from modern science historiography.

The Perspective of Modern Science Historiography

The development of astronomy in human civilization based on modern science historiography can be examined through the study of Mayank N. Vahia (2011).[21] It is divided into four stages of development: Initial, Settlement, Civilization and Technology, as shown in Figure 1. Although Vahia's study was based on the Indian civilization context, the division into stages has become a reference to comprehend astronomy development from the macro perspective, as illustrated in the research of Sajid Iqbal (2016)[22] and Tracy Daugherty (2019).[23] While the study of modern science historiography and its differences from Islamic science historiography has been studied,[24] it did not delve into aspects of the Priority Principle that were being focused on in this study.

Figure 1: Modern science historiography perspective



Based on figure 1, in the Initial Stage, which referred to the development of human society, the Sun was recognised as an essential celestial object for its role in providing light and warmth for life. The acquired knowledge was then recorded on unstructured stones.[25] The stones then became archaeological material showing how astronomy was formed at its earliest stage. The study of astronomy development at an early age was recorded in archaeological materials and thus created a separate field of study, namely archaeoastronomy. Reference for archaeoastronomy can be made to Stephen C. McCluskey (2015),[26] David H. Kelley (2005)[27] and Michael E. Chauvin (2000).[28]

At the Settlement Stage,[29] certain areas had begun to be inhabited by humans permanently. Their survival no longer depended on hunting activities but was already carried out in the form of more routine and settled activities like agriculture. Celestial objects, especially the Moon and stars, began to be understood as time indicators. From a methodological point of view, simple counting methods were developed, and various celestial phenomena were associated with certain beliefs. These beliefs were recorded in written works and thus astrology, another discipline was formed. Religious and traditional leaders dominated astronomy during the Settlement Stage.[30]

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[18] Qur'an, chapter al-Isra' (17): 35.
[19] Qur'an, chapter al-Nisa' (4): 59 and chapter al-Ahzab (33): 6.
[20] Sahih Muslim, Hadith No. 2664, accessed 19 December 2022, https://sunnah.com/muslim:2664#:~:text=A%20strong%20believer%20is%20better,not%20done%20that%2C%20it%20would.
[21] Mayank N. Vahia and Nisha Yadav (2011), "The Origin and Growth of Astronomy as Viewed from an Indian Context," in Wayne Orchiston, Tsuko Nakamura and Richard Strom (eds.), *Highlighting the History of Astronomy in the Asia-Pacific Region*, Astrophysics and Space Science Proceedings, New York: Springer, pp. 61-84.
[22] Sajid Iqbal (2016), "Ancient Astronamy & Advance Science," *International Journal of Scientific Research*, Vol. 5, No. 2, p. 437-440.
[23] Tracy Daugherty (2019), *Dante and the Early Astronomer*, New Haven & London: Yale University Press.
[24] Mohammaddin Abdul Niri (2017), "Kaedah Pensejarahan," in Aizan Ali Mat Zin (ed.), *Sejarah Astronomi Islam Di Malaysia*, Kuala Lumpur: Universiti Malaya, pp. 7-16.
[25] Mayank and Nisha (2011), "The Origin and Growth of Astronomy as Viewed from an Indian Context," pp. 61-84.
[26] Stephen C. McCluskey (2015), "Disciplinary Perspectives on Archaeoastronomy," in Clive L. N. Ruggles (ed.), *Handbook of Archaeoastronomy and Ethnoastronomy,* Dordrecht, Heidelberg, London & New York: Springer, p. 227.
[27] David H. Kelley and Eugene F. Milone (2005), *Exploring Ancient Skies: An Encyclopedic Survey of Archaeoastronomy*, United States of America: Springer Science and Business Media, p. 1.
[28] Michael E. Chauvin (2000), "Useful and Conceptual Astronomy in Ancient Hawaii," in Helaine Selin and Xiaochun Sun (eds.), *Astronomy across Cultures*, *Science across Cultures: The History of Non-Western Science*, Netherlands: Springer, p. 117.
[29] Lawrence H. Robbins (2000), "Astronomy and Prehistory," in Helaine Selin and Xiaochun Sun (eds.), *Astronomy across Cultures*, *Science across Cultures: The History of Non-Western Science*, Netherlands: Springer, pp. 31-52.
[30] Mayank and Nisha (2011), "The Origin and Growth of Astronomy as Viewed from an Indian Context," pp. 61-84.

At the Civilization Stage, human society is more organised as a structured social system. By that time, the study of astronomy had grown extensively to include several inquiries like the measurement of time, developing calendar systems, understanding cosmology and cosmogony, and believing in astrology and mythology. From a methodological point of view, astronomy at this stage involved a better calculation method with more accurate and precise results than compared to the early stage, which only required a simple calculation method. Compared to the Settlement Stage, the calendar system was developed to be more systematic during this stage. At this stage, astronomy was no longer the exclusive property of religious leaders but had begun to be learnt inclusively by scholars and students.[31]

The human society was already in a more complex social system for the Technological Stage. The specialisation of expertise and the division of tasks had become a norm, and each member of society could learn only some aspects of the job. It was sufficient that only specific specialisations were mastered according to their respective abilities. Educational activities and the dissemination of knowledge in the community were developed rapidly in various forms and became more attractive for other study discipline. The activity was sponsored and patronised by the government, and it became an essential feature of this stage.[32] Although there was government patronage, the scientific inquiry at this stage was the primary catalyst for the growth of science, including astronomy. Scientific aspects were affected by technological advancement and the interconnection of various other branches of science.[33] In addition, the interaction with other intellectual cultures also played an essential role in encouraging astronomy development. Astronomical methods at this stage were getting better than at the previous stage. The existence of the sky phenomena and celestial objects can be explained with a scientific approach that involved the application of mathematics, physics and instrumentation. Verification methods became more systematic and continuously improved due to scientific inquiries and technological changes.[34]

As for the developmental factors, a study by Robert Wilson (2005)[35] explains that belief and application were important factors that fostered the astronomy development in the early stages of civilization. The calendar system is an example of an astronomical product that each civilization developed based on their needs and their respective beliefs and religions. The improvement of the calendar system was also affected by other applied factors, especially sailing and agricultural activities.[36]

In agricultural activities, for example, understanding changes in the seasons was rather crucial as the seeds had to be planted and harvested at the right time. In areas affected by changes of the four seasons, spring marks the beginning of planting time, and autumn indicates the time to harvest crops. These estimated times occur naturally. The calculation of a day referred to the phenomenon of sunrise and sunset. The measure of a month was based on the complete cycle of the Moon phases orbiting the Earth. One year was calculated based on the season changes, and the constellation changes were equivalent to 12 complete moon cycles around the Earth. Almost every ancient civilization had its own calendar system, whether based on the Sun (the Solar Calendar), the Sun-Moon (the Lunisolar Calendar) or the Moon (the Lunar calendar).[37] Apart from these factors, the clash of civilizations also contributed to astronomy development.[38]

Analysis from the Perspective of Islamic Science Historiography

The previous four stages of astronomy development were definitely arranged based on an understanding of a secular evolution. It put astronomy development solely since antiquity solely on humans interaction with nature.[39] It differed from the view of Islamic science historiography, which prioritised the revelation source as a guide to knowing the development of human knowledge in general and astronomy development in particular. Based on the Islamic worldview, astronomy development in human

[31] James Evans (1998), *The History and Practice of Ancient Astronomy*, Oxford: Oxford University Press, pp. 19-20.
[32] Mayank and Nisha (2011), "The Origin and Growth of Astronomy as Viewed from an Indian Context," pp. 61-84.
[33] Asger Aaboe (1974), "Scientific Astronomy in Antiquity," *Philosophical Transactions of the Royal Society of London. Series A, Mathematical and Physical Sciences*, Vol. 276, No. 1257, pp. 21-42.
[34] Mayank and Nisha (2011), "The Origin and Growth of Astronomy as Viewed from an Indian Context," pp. 61-84.
[35] Wilson (2005), *Astronomy through the Ages*, p. 6.
[36] Wilson (2005), *Astronomy through the Ages*, p. 18
[37] Helaine Selin and Xiaochun Sun (eds.) (2000), *Astronomy across Cultures: The History of Non-Western Astronomy*, Vol. 1, p. xx.
[38] Nataraja (2000), "Diffusion of Astronomy in the Ancient World," pp. 157-164.
[39] Wilson (2005), *Astronomy through the Ages*, p. 18.

civilization was given a different explanation.[40] The development could be referred to three main factors: the role of Allah, the prophets and the revelation. Studies by Abdul Rahman Abdullah (2010)[41] and Mat Rofa Ismail (2006)[42] thoroughly examined the three factors and provided an alternative paradigm in outlining Islamic science historiography.

The Role of Allah

Allah, The One and The All-Knowing, plays a significant role in in teaching human and honouring them with knowledge (*'ilm*).[43] Allah says in Chapter al-'Alaq, verses 3 to 5, "*Recite, and your Lord is the most Generous. Who taught by the pen. Taught man that which he knew not.*" Due to His Divine Mercy (*rahmah*), He allows human to make the effort to seek knowledge using their intellectual capacity accordingly. Still, Allah sent His prophets to guide them with the revelation, which has the absolute truth, so that they are guided to differentiate between right and wrong.[44]

The most important role of Allah to mankind and with His blessings is when He continuously sent the prophets to guide them. He granted human to choose their way of life but most of them rejected the prophets. Chapter al-Qamar, verses 9 to 43, records that most of the previous people who opposed the prophets were among the excelled races with outstanding achievements. However, they were finally destroyed by Allah due to their arrogance and superiority. What happened in the modern era deserves to be reflected upon when the scientific factors in secular values triggered by the West have resulted in making people to be more arrogant with scientific achievements and subtly encouraging people to forget the actual owner of infinite knowledge.[45]

The Prophets

In terms of the prophetic factor,[46] astronomy development, as well as the whole sciences, is placed starting at the time of Prophet Adam. Prophet Adam was the first prophet and human being sent by Allah to the Earth as explained in the Qur'an in Chapter al-Baqarah verses 30 to 33. It was narrated that Prophet Adam had passed his knowledge to his children. One of his children, Prophet Seth, was the teacher of Prophet Idris. Prophet Idris was born in Babylon and lived with Prophet Adam approximately for 308 years. Various sciences were developed in Babylon and Egypt, including astronomy. The legacy of his teachings was continued by Prophet Daniel, who also preached in Babylon. Likewise, all the other prophets preached and called to monotheism and taught their respective peoples. For instance, the development of the Indian and Chinese civilizations was related to the descendants of Prophet Noah. After the great flood, Sem, the son of Prophet Noah, brought his father's teachings to India and then expanded to China. However, after their deaths, distortions occurred against the monotheistic teachings they had conveyed.[47]

For example, as identified by Abdul Rahman Abdullah (2010)[48] and Mat Rofa Ismail (2006),[49] Prophet Idris had been associated with the God of Thoth in Egypt and Hermes in Greece. The ancient Greek civilization highly praised the Hermes tradition. Hermes was a Greek title for a person who has knowledge and wisdom. Prophet Idris was linked to one of the three great Hermes, *Hermes Trismegistus*, and was also known as *Ukhnukh*. The teachings of Hermes initially not only guided monotheism but also taught sciences, including astronomy. However, it could no longer be considered part of the original and authentic teachings of Prophet Idris. The recorded tradition of Hermes' knowledge had changed in the hands of many Greek scholars along with the transition of time. There is no guarantee that the tradition is being preserved in its authenticity and free from any form of distortion.

[40] Mohammaddin (2017), "Kaedah Pensejarahan," pp. 7-16.
[41] Abdul Rahman Abdullah (2010), *Wacana Falsafah Sains: Sejarah dan Pemikiran*, Pulau Pinang: Pusat Kajian Pengurusan Pembangunan Islam (ISDEV), Universiti Sains Malaysia, pp. 23-35.
[42] Mat Rofa Ismail (2006), *Falsafah Sains Pendekatan Kualitatif*, Kuala Lumpur: Dewan Bahasa dan Pustaka, pp. 87-89.
[43] Nuraan Davids and Yusef Waghid (2016), *Ethical Dimensions of Muslim Education*, Switzerland: Springer, pp. 49-63.
[44] Mat Rofa (2006), *Falsafah Sains Pendekatan Kualitatif*, pp. 87-89.
[45] Syed Muhammad Naquib al-Attas (2007), *Tinjauan Ringkas Peri Ilmu dan Pandangan Alam*, Pulau Pinang: Penerbit Universiti Sains Malaysia, pp. 38-43.
[46] Abdul Rahman (2010), *Wacana Falsafah Sains: Sejarah dan Pemikiran*, pp. 23-35.
[47] Abdul Rahman (2010), *Wacana Falsafah Sains: Sejarah dan Pemikiran*, pp. 23-35.
[48] Abdul Rahman (2010), *Wacana Falsafah Sains: Sejarah dan Pemikiran*, pp. 23-35.
[49] Mat Rofa (2006), *Falsafah Sains Pendekatan Kualitatif*, pp. 87-89.

The Revelation

In terms of the revelation factor itself, it contains the impetus to study and develop astronomy. As a revelation revealed to the Prophet Muhammad S.A.W., the Qur'an covers various explainations of the natural world primarily as a guide to carry out the worship of Allah. For example, the daily solar motion from sunrise to sunset guides prayer times. The appearance of the crescent moon is the basis for determining the beginning of the lunar month for fasting, Hajj and the arrangement of the calendar system. The geometric shape of the Earth's sphere and its direction system determines the Qibla direction.[50]

It is fundamentally clear that the Western secular paradigm and Islamic worldview occupied different positions on astronomy development since antiquity. The Western paradigm acknowledges its early age as a primitive human that evolved secularly from the *Homo erectus* into the *Homo sapiens*.[51] However, the Islamic worldview firmly believes that Prophet Adam was the first human created by Allah, sent to the Earth and founded the settlement which expanded later to become human civilization. He had been prepared by Allah with revealed knowledge and the intellectual capacity to be His Caliph and lived for a long period. The tradition of his knowledge was passed down from one generation to the next. The human race then developed from his descendants; among them were those who built advanced civilization but disobeyed the prophets.[52]

Figure 2: Islamic science historiography perspective

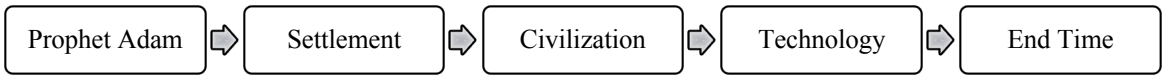

Figure 2 summarises the development stages of all knowledge including astronomy from antiquity to Islamic civilization. The prophetic message from Prophet Adam ended when Prophet Muhammad S.A.W was sent in the 7th century and brought Islam to replace the entire teachings of the previous prophets as well as a mercy towards all the worlds.[53] A century after the death of the Prophet Muhammad S.A.W, the traditional era receded and the Technology Stage of the modern era began in the 17th century, which continues to this day.[54] Nowadays, various fields of knowledge and astronomy are considered more scientific only when using empirical sources and quantitative methods as the primary epistemology. Such consideration is different from the Islamic tradition that prioritises the revealed knowledge, while the scientific approach is used accordingly.[55] Another significant weakness of modern science historiography is the lack of clear direction about the End Time (*akhir al-zaman*). In the Islamic worldview, the End Time is a crucial stage that is strongly believed to happen and has been indicated by the revelation. Therefore, all human advancements in science and technology, including astronomy, will definitely be over when the End Time arrives.[56]

Conclusion

The Priority Principle has a significant role in ensuring that Islamic science historiography prioritises the revelation in understanding the astronomy development in particular, and all knowledge and sciences itself in general. In this regard, the scientific approach within Islamic science historiography is conducted accordingly. Therefore, the reconciliation of internal differences in Islamic science historiography is addressed based on this principle. It prioritises the role of Allah, the prophets and the revelation according to Shariah and the scientific method is used suitably. The principle is also crucial to be emphasised in addressing the secular evolutionary view on the astronomy development. As a

[50] Mohd Zambri Zainuddin, Amran Mohamad and Mohammaddin Abdul Niri (2008), "Pentafsiran Ilmu Astronomi Dalam Sorotan Sains Moden dan Islam," *Jurnal Pengajian Sains & Teknologi Malaysia*, No. 6, pp. 35-46.
[51] Carl C. Swisher III et al. (1996), "Latest *Homo erectus* of Java: Potential Contemporaneity with *Homo sapiens* in Southeast Asia," *Science*, Vol. 274, No. 5294, pp. 1870-1874.
[52] Qur'an, chapter al-Qamar (54): 9-43.
[53] Thamaeem Ushama (2021), "Islam's Rahmah (Compassion) as Applied by Hadrat Muhammad Rasūlullah Khātam Un Nabiyyīn Sallallāhu 'Alaihi Wa 'Alā Ālihi Wa Ashābihi Wa Sallam," *Hamdard Islamicus*, Vol. 44, No. 2, pp. 9-35.
[54] Abdul Rahman (2010), *Wacana Falsafah Sains*, pp. 23-35; Haradhan Mohajan (2019). "The First Industrial Revolution: Creation of a New Global Human Era," *Journal of Social Sciences and Humanities*, Vol. 5, No. 4, pp. 377-387.
[55] Further discussions about the scientific approach based on Islamic science framework are presented in the article: Mohammaddin Abdul Niri et al. (2022), "Integrasi Model DIKW (Data-Information-Knowledge-Wisdom) dalam Ilmu Falak Berasaskan Kerangka Sains Islam," *Afkar: Jurnal Akidah & Pemikiran Islam*, Vol. 24, No. 2, pp. 99-142; Mohd Saiful Anwar Mohd Nawawi et al. (2012), "Application of Scientific approach to determine Lunar Crescent's visibility," *Middle-East Journal of Scientific Research*, Vol. 12, No. 1, pp. 96-100.
[56] Achmad Baiquni (2017), "The Understanding of Classical and Modern Scholars about Hadith Doomsday," International Conference on Qur'an and Hadith Studies (ICQHS 2017), Atlantis Press, pp. 359-364.

conclusion, the development of astronomy from antiquity to Islamic civilization can be marked as starting from the time of Prophet Adam and will be over at the end of time.

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