International Journal of Noesantara Islamic Studies, 1(1) - February 2024 51-62

Journal of Noesantara Islamic Studies

E - ISSN 3048-2658 | P - ISSN 3048-1147

Concepts and Development of Islamic Science in the History of Science

Arditya Prayogi [1], Riki Nasrullah [2]
[1] *Universitas Islam Negeri KH Abdurrahman Wahid Pekalongan, Indonesia*
[2] *Universitas Negeri Surabaya, Indonesia*

Corresponding Author: Arditya Prayogi, E-mail; aditya.prayogi@uingusdur.ac.id

Received: March 19, 2023	Revised: March 22, 2023	Accepted: March 25, 2023	Online: March 27, 2023

ABSTRACT
Islam is not only understood as a religion. He can also be understood as forming human civilization by developing a scientific tradition based on divine guidance. This article aims to provide an overview of how the conception of Islamic science is seen from the historical development of science itself. This article was written using a qualitative approach using the form of library research. From the results of the study, it is clear that in Islam, the tradition of developing knowledge is not something foreign. Islam makes reason, as well as revelation, a way to gain knowledge. Furthermore, scientific discourse from the time of the Prophet to the Umayyad dynasty continued to develop in various phases and could be said to peak during the Abbasid period and increasingly offered various new discourse dynamics.

Keywords: *Islamic scholarship, Science, Islamic Development*

Journal Homepage https://journal.ypidathu.or.id/index.php/ijnis

How to cite: Prayogi, A & Nasrullah, R. (2024). Concepts and Development of Islamic Science in the History of Science. *International Journal of Noesantara Islamic Studies*, 1(1), 51-62. https://doi.org/10.70177/ijnis.v1i1.803
Published by: Yayasan Pedidikan Islam Daarut Thufulah

INTRODUCTION

Science in the Islamic world began when the Prophet was sent to convey the message and teachings of Islam to mankind. Now we also know that Islamic knowledge is divided into several parts, so it seems as if we will only be able to understand Islam as a whole when we master all these scientific disciplines well (Cesar Da Silva dkk., 2021). If we look back (Ascarya dkk., 2022), Islam is actually a very simple/easy teaching and can be understood and implemented by all levels of society, both educated and uneducated as long as there is no reason to reject it, for example like crazy or idiot (Milwright, 2023). People can see this during the time of the Prophet Muhammad saw, where his followers ranged from nobles to slaves (Iqbal dkk., 2024), from city people to people in the interior. And at that time, there was no division of knowledge in studying Islam (Shengyao dkk., 2024). Muslims already understand that Islamic teachings originate from Allah's revelation which was revealed/conveyed to the Prophet Muhammad which was then

disseminated by Muhammad to all mankind along with an explanation of its implementation.

Muslims who live with the Prophet (muslimat al-risalah) do not experience many problems in their scientific discourse (knowledge development) because apart from there being no cultural acculturation, there is also a Prophet in their midst who is always the main reference in resolving various problems (rasulullah centrism) (Mukhtar & Todd, 2023). The discourse of knowledge during the time of the Prophet was that at that time the Prophet carried out ijtihad on laws which were decisions regarding problems faced by the Prophet or were a fatwa or answer to a question (Siminoff dkk., 2024). The khittah or path that the prophet followed in establishing the law was to wait for revelation (Ganzar dkk., 2024). If the revelation did not come, the prophet was of the opinion that Allah handed over tasyri' in the problems he faced to the prophet himself, so the prophet made "ijtihad" guided by the ruhusy syar'i for the benefit and deliberation.

During the Companion era, Islam had spread widely to various countries, for example to Persia, Iraq, Syria and Egypt. These countries already have a high culture, have certain customs, regulations and their own scientific discourse. The meeting of Islam with cultures outside the Arabian Peninsula encouraged the growth of various scientific (Islamic) discourses in subsequent periods. It even encourages the ijtihad of friends. For example (De Diego-Cordero dkk., 2024), the Usyuur case (customs duties on imported goods), the case of converts to Islam and others during the time of Umar bin Khatab. The way to make ijtihad among the shahabat is to first look for the text in the Al-Qur'an, if it is not there, look for it in the Hadith, if not found then make ijtihad by deliberation among the shahabat (Marcos-Vílchez dkk., 2024). This is a form of Ijtihad Jama'i. If they agree, there is a consensus between shahabat. The decision of this deliberation then formally becomes the guideline for the entire congregation (C. Wang dkk., 2024). Caliph Umar bin Khatab, for example, had two methods of deliberation, namely special deliberation and general deliberation (Ajgaonkar dkk., 2024). The special deliberation consists of friends of the Muhajirin and Anshor, who are tasked with deliberating on issues related to government policy (C. Wang dkk., 2024). The general deliberation was attended by the entire population of Medina gathered in the mosque, that is, if there was a very important problem. The characteristics of scientific discourse during the time of Rasul and Khulafaur Rasyidin emphasized one scientific entity, without presenting a dichotomy between world science and religion within certain boundaries.

During the Umayyad period, developing scientific discourse was divided into its own systematics which led to a dichotomy between religious knowledge and non-religious (world) knowledge (Ajgaonkar dkk., 2024). In general, the development of knowledge/knowledge at this time is classified on the basis of the curriculum content taught in various educational institutions which has been structured more systematically and complexly (Kırca dkk., 2024). In this case, the curriculum includes religious knowledge and general knowledge. On this basis, Islamic educational institutions at this time scientific educational institutions are also divided into two forms, namely formal and

non-formal educational institutions, where the first teaches religious knowledge and the second teaches general knowledge.

As time went by, shahabat and tabi'in began to appear and became known to the wider community because of their knowledge (Miquel dkk., 2024). Moreover, when the emergence of the Umayyad and (mainly) Abbasid dynasties, science developed so rapidly at that time, that many scientific disciplines and Muslim figures produced brilliant thought products (Li dkk., 2024). This paper will describe the development of scientific discourse in the Islamic world which began since the sending of the Prophet as the transmitter of the message, to the Abbasid dynasty which has produced so many Muslim thinkers and scientists.

RESEARCH METHODOLOGY

This article was written using qualitative research methods and supported by literature review methods by dissecting various things related to the concept and development of Islamic science in the flow of scientific history (Engelina Siregar, 2024). The analysis in this article is based on extracting library data/literature studies from several (written) literature sources (Al-Sharmani, 2023). The writing was carried out through the process of extracting data from various reference sources which discussed various matters related to the concepts and development of Islamic science in the flow of scientific history, which were published in public media. After that, descriptive-analytic analysis was carried out to find new meanings (Faizi dkk., 2024). This research chose the content analysis method to obtain accurate textual results considering that content analysis is a test involving efforts to record and systematically study media content that has been communicated, especially in the form of documents (Martins dkk., 2024). The researcher did not make direct observations, but the validity of the data obtained can be guaranteed based on scientific research theory, because the reference sources obtained, based on the method used, are sources whose existence can be guaranteed (King dkk., 2024). These sources can be accessed through various places (libraries) and open internet media. This article can be an extract from various related articles and writings (Kerkez & Şanli, 2024). Thus, this article is more of a synthesis of previous writings, to be seen in relation to what can be done in the current context.

RESULT AND DISCUSSION

DYNAMICS OF ISLAMIC SCIENCE IN THE FLOW OF SCIENTIFIC HISTORY

At the time of the Prophet, science was not as developed as it is today. At that time, muslims were still focused on spreading Islam. The Koran and Hadith of the prophet became the life guidelines for Muslims at that time (Abdul Shukor & Kattiyapornpong, 2024). Knowledge comes directly from the prophet through revelation from the Angel Gabriel (Abdul Shukor & Kattiyapornpong, 2024). The Prophet Muhammad received the first revelation from Surah Al-A'laq 1-5. The command to read from the angel Gabriel marked that the prophet Muhammad was ordered to seek knowledge (Kerkez & Şanli, 2024). This condition was continued by the prophet when he invited his friends to study

the Koran at Arqam's house. It's just that the knowledge taught by the prophet was limited to an invitation to unite Allah (Tauhid) (King dkk., 2024). After that, the companions always memorized the verses they had heard from the Messenger of Allah. With knowledge (Ashraf, 2023), a person will become noble, honorable, and able to face all the problems that occur in life.

Science has developed more in the field of basic knowledge about religion (ushuluddin) and the science of morals (akhlak). However, other sciences continue to develop, although not as fast as the science of religion and morals. At that time, a more systematic process of studying science began to take place, including the basics of the science of interpretation developed by the companions of the prophet. If studied in the period before Islam was revealed, the Arabs were known as the jahiliyah. This is because Arabs know very little about other sciences and intelligence (Vera Cruz dkk., 2024). Their only specialty is their height in the field of ignorant poetry which is spread by rote. With this reality, the prophet Muhammad was sent with the aim of improving morals, both morals in relating to God and fellow humans (M. Wang dkk., 2024). Likewise, in matters of science, the Apostle's attention was very great. The Prophet gave a revolutionary example of how science should be developed. Among the movements carried out by the prophet was to intensify the culture of reading, which was the promotion and eradication of illiteracy, an initial action that freed humans from ignorance (Guo dkk., 2024). Reading is the door to the development of knowledge. The prophet also ordered his friends to memorize the verses of the Koran. In this way, it can maintain purity and also be a medium for understanding the verses of the Koran. Apart from memorizing, it also creates a tradition of writing/recording revelations on skin, bones, date palm fronds and so on (Sunanto, 2004: 14-16).

The formation of Aqidah, Sharia and Morals was presented by Rasulullah as the great teacher of education gradually at the same time as the Koran was gradually revealed to him (Olivas Castellanos & De Gunther Delgado, 2024). This education was given in two periods, namely the period before the Hijrah which was centered in Mecca. And the period after the Hijrah was centered in Medina (Imran & Mardhiah, 2023). Then before he carried out education openly to the wider community after receiving the revelation, he formed a group in the form of a "recitation model". At first this was done in a place on a hill outside the city of Makkah but then it moved to the house of a young man named Al-Arqam bin Abu Arqam where it lasted for approximately four years. There were 40 people attending the recitation, most of whom were young people (Abdurahman, 2008:25-30).

The most famous educational institution during the time of the Prophet was the mosque (Cullinan dkk., 2024). It was the tradition of the Prophet that he sat in the Nabawi mosque in Medina to teach his friends lessons regarding religious and worldly matters. When the prophet Muhammad was in Medina, there began to be signs of progress (Cullinan dkk., 2024). He invited his ummah to deepen their faith, improve the ummah's economy, and deal with social, political and constitutional problems (Panah dkk., 2024). All knowledge used by the prophet comes from the revelation of the Koran and Al-Hadith.

After the death of the Prophet Muhammad, Islam was continued by the Khulafaur Rasyidin. Khulafaur Rasyidin has the meaning of people who were chosen and given instructions to become the successors of the prophet Muhammad. There are 4 people who are called Khulafaur rasyidin, namely (Ascarya & Tanjung, 2021): Abu Bakar As-Shidiq, Umar Bin Khattab, Utsman Bin Affan and Ali Bin Abi Talib. This period is often called the early classical period (650 – 690 AD). In this early classical period, the foundations of Islamic civilization were laid which lasted for 40 years. As has been explained, one of the advances achieved in the field of knowledge and science during this period was focused on efforts to understand the Koran and the Hadith of the prophet, to deepen the teaching of faith, morals, worship, mu'amalah and sirah also story in the Koran. However, it should be noted that during this period a culture of writing and reading was instilled (Prayogi, 2016).

During the time of Abu Bakar As-Sidiq, Islamic science did not progress, because it was busy with problems such as eradicating false prophets, the movement of apostates, the movement of hypocrites, and fighting those who were reluctant to give zakat. However, much progress has been achieved during this period, namely; improving socio-economics, collecting verses from the Koran and expanding Islamic territory to Iraq, Persia and Syria. During the time of Umar bin Khattab, the development of Islam was also limited to the expansion of Islamic power and constitutional (political) issues, however, during this period progress was also achieved such as; dividing the areas under Islamic control, establishing the Baitul Mal and the military council, determining the Hijriyah year, and building mosques such as the Grand Mosque, the Nabawi Mosque, the Al-Aqsa Mosque, and the Amr Ibn 'Ash Mosque.

During the time of Caliph Uthman bin Affan, the development of Islamic science had progressed as evidenced by the results achieved by Caliph Uthman, namely; renovating the Nabawi mosque, efforts to collect and write the Koran, the formation of a navy, and the expansion of Islamic territory to Khurosan, Armenia, Tunisia and Azerbeijan (Prakash dkk., 2024). During the time of Caliph Ali bin Abi Talib, the development of Islam was colored by political intrigues, especially from the Muawiyah group and the Khawarij group. However, Caliph Ali succeeded in maintaining Islamic territory with peace even though war was still going on. At least two wars occurred during this time, namely the Jamal war, against the troops of Tholhah, Zubair, and Aisyah) and the Shifin war (war against Muawiyah) (Abdurahman, 2008: 30-35).

During the Umayyad era, there were many efforts to develop science, especially in the fields of art and culture. Apart from that, the science of Qiraat is also growing, which is the study of reading the Koran. In the Islamic world there are seven types of Koran reading known as "Qira’atu Sab'ah" among the pioneers were Abdullah bin Katsir, Ashim bin Abi Nujud, etc (Haustein, 2023). During this period, the science of Tafsir also developed, but its development was only limited from oral to oral until finally written. The first Tafsir expert was Ibn Abbas, one of the famous companions of the prophet, he died in 68 AH. The development of Hadith science occurred after the discovery of many irregularities and misuses in narrating a Hadith, or after it was discovered that there were

many fake Hadiths created by certain groups for political purposes. Among the Hadith experts at that time was Abu Bakar Muhammad bin Syihab Az-Zuhri, who died in 123 H. Hadith bookkeeping occurred during this period when it was led by Caliph Umar bin Abdul Aziz (99-101 H / 717-720 AD).

At this time also, the Mu'tazilah ideology emerged which was inspired by the previous Qadariyah ideology, which did not recognize the Ma'ani nature of God and with its concept "manzilah baina manzilatain" there is a place between heaven and hell for believers who sin greatly. This ideology existed from (80 AH to 324 AH), by cultivating "Kalam Science" as a scientific discipline, since Wasil bin Atha' (died 131 AH) and his friend, Umar bin Ubaid (died 145 AH), separated themselves from their teacher. Hasan Basri (died 110 AH), Therefore, it is estimated that this Mu'tazilah movement was coordinated starting in 120 AH, after Hasan Basri died, by these two figures. So, the "Science of Tauhid" at this time, was transformed into the form of "Kalam Science", which discussed Islamic beliefs through logic, mantiq and philosophy in detail and depth in addition to the naqli postulates that they accepted. Meanwhile, philosophical science deals with matters of a speculative contemplation about life and its scope as wide as possible. The philosophy as a whole became known to Arab Muslims after they conquered and then associated with nations with a background in Greek civilization and the world of Greek thought (Hellenism). Almost all areas targeted for liberation by Muslims had previously experienced Hellenization (in addition to Christianization). These areas were Syria, Iraq, Egypt and Anatolia, with active centers of Hellenism such as Damascus, Atiocia, Harran and Alexandria. Even though Persia (Iran) did not experience Christianization (still being a Magian or Zoroastrian religion), it also experienced more or less Hellenization, with Jundisapur being the center of Persian Hellenism. The science of Sufism at this time also began to develop, which refers to the asceticism of the time of the Prophet. Marked by works of Sufism include Hasan al-Bashri (26 AH – 110 AH), he wrote a book entitled "Ri'ayat Huquq Alah" (Guarding the Rights of Allah) (Hitti, 2005: 235-348).

At this time the government's attention to the development of science was very great. The preparation of knowledge is more systematic and the field of knowledge is carried out, including science in the field of religion, namely, all knowledge that comes from the Al-Qur'an and Hadith. Knowledge in the field of history is all knowledge that discusses life's journey, stories and history. Knowledge in the field of language, namely, all knowledge that studies language, nahwu, sharaf and others. Knowledge in the field of philosophy, namely, all knowledge which generally comes from foreign nations, such as mantiq science, medicine, chemistry, astronomy, arithmetic and other sciences related to that science (Sunanto, 2004: 42).

The classification of sciences is intended to classify sciences according to their characteristics, all of which work together with each other, because one science cannot stand alone. So that science has become a skill, entering the field of understanding and thinking that requires systematics and organization. However, the group that is familiar with this skill is the non-Arab group called Mawali. Meanwhile, the Arabs were busy

leading the government. So we can know the figures of Nahwu science such as Sibawaihi, Al-Farisy and Al-Zujaj, all of whom were mawali. Likewise, Hadith figures, such as Al-Zuhry, AbuZubair Muhammad bin Muslim bin Idris, Bukhary and Muslim. It can be said that Islamic civilization at that time was already international in nature. The population includes dozens of nationalities, adheres to various religions, all of which are united by the Arabic language. The development of scientific traditions during the time of Khulafaur Rashidin was referred to as a period of scientific growth, during the Umayyad period as a period of scientific development, and during the Abbasid period as a period of scientific progress in Islam (Arditya, 2023).

CONCEPTION OF SCIENCE IN ISLAM

Science in the view of the Koran does not completely reject western science. There are certain aspects that are a point of similarity and difference. These points of similarity show that its existence is universally accepted. For example, the senses are recognized by the Koran as a medium for obtaining knowledge. In this case, all knowledge is actually attempted, while the basis of the effort is through sensing. And also through thought processes that exist in reason which are based on symbols that can be sensed. Even though human potential, namely in collecting facts, is very limited, because the five senses have weaknesses, namely they can make mistakes in making observations, scientific truth can always be wrong or erroneous. Therefore, facts or data do not always appear as captured by the senses. Likewise the ability of human reason. The Koran recognizes that human reason is a source or means of gaining knowledge. But like the senses, reason also has weaknesses, so it needs help. So the senses and reason in the Koran do not deny that they are sources or means of obtaining knowledge. However, both cannot be called absolute sources of knowledge. Both have weaknesses in solving all the problems faced by humans. Due to the limited conditions of both, ultimately Islamic epistemology was designed and built, in addition to referring to these two sources, it was also based on spiritual power originating from Allah, namely through the help of revelation (Kartanegara, 2003: 21).

Knowledge in Islam is acquired more predominantly through the help of spiritual power, so both the methods and objects of scientific thought in Islam are broader and more varied than those experienced by modern western science. Science in Islam, in addition to continuing to use methods commonly used by western science, although not entirely, also has its own methods that western science does not have. Likewise the object of thought, apart from problems that can be reached by the human mind, there are also problems that cannot be reached. In this last object, spiritual power plays a role very large, because human reason is only able to accept existing provisions. Islamic science always strives to apply different methods according to the nature of the subject being studied and ways of understanding that subject. Muslim scientists in developing various branches of knowledge have used every avenue of knowledge open to humans, from rationalization and interpretation of holy books to observation and experimentation. The use of these diverse methods is a logical consequence of the reality embraced by Islamic science. In

contrast to modern science which only limits its scope to objects of a sensory nature (observable facts), Islamic science works in areas that are thoughtable (conceivable areas) and areas that are not thought about (unconceivable areas). In this unthinkable area, science and knowledge in Islam is obtained through spiritual methods that have never been used by modern science. The spiritual method consists of intuition, inspiration and dreams. The fact that inspiration and dreams are sources of knowledge is clear from the Koran, as contained in Surah Al-Qasas 281: 7 and Yusuf: 121: 4.12 So the methods of intuition, inspiration and dreams are examples of spiritual methods, while history, observation, experiment, reasoning and inference include scientific (non-spiritual) methods (Prayogi, et al, 2023).

One of the main characteristics of Islamic science, according to the Koran, is that it is based on revelation which is placed above reason. In the Islamic view, science is not only based on something rational and empirical. Islam provides itself through revelation, the Koran and al-Sunnah, to be used as a reference in seeking, maintaining and developing knowledge. Revelation obtains the highest position. In an effort to develop Islamic science, what will be done is to make Divine revelation the source of absolute truth. A truth that is solid and cannot be tempted or refuted in the slightest by other truths. God's revelation provides the final solution after reason is no longer able to solve a problem. But, revelation also sometimes provides initial instructions for a search for knowledge, so that scientists carry out excavations and scientific experiments. In short, revelation is a place of guidance and consultation or support for knowledge in Islam, so that revelation has the most honorable position among existing sources of knowledge. The placement of revelation in this special position is in addition, because it is God's teachings as a guide to human life, and as an implication, revelation contains the highest weight of truth compared to the weight of truth achieved either through reason (ratio) or the senses (empiricism). Because revelation includes information that is not accessible to the senses and reason, while the senses' activities are limited to what can be seen, heard, touched, smelled and tasted. Beyond that everything is no longer accessible to the senses. Likewise, reason works on things that can be reasoned and thought about. Beyond that reason also has no ability. Even though there are many truths contained in things that are beyond the reach of the senses or reason. This truth can only be obtained through revelation. Thus, it is clear that revelation has the highest position as a source of knowledge compared to other sources of knowledge (IF, Prayogi, & Pujiono, 2024).

Another character of science in Islam is that it is based on a harmonious relationship between revelation and reason. The two are not contradictory, because there is common ground. Therefore, knowledge in Islam is not only formulated and built through reason alone, but also through revelation. Reason tries to work optimally to discover and develop knowledge, while revelation comes to provide guidance and instructions that reason must follow. So science in Islam has complete sources, especially when compared with western science. The existence of a concept that describes the correlation between revelation and reason, or between religion and philosophy (science) depicts a significant meaning, especially to emphasize that science in Islam has transcendental values, namely a value of

the highest degree. The scientific tradition in Islam ultimately gave rise to the characteristic that science in the Islamic view has two main characteristics, namely having a theocentric orientation and always being bound by values. (Nasrullah, et, al, 2024).

CONCLUSION

From this article there are several conclusions that can be drawn. Firstly, in Islam, the tradition of developing knowledge is not something foreign. Islam makes reason, as well as revelation, a way to gain knowledge. Second, in its development, it was agreed that the religious discourse in Islam was not value-free and would still be tied to the theocentric consciousness of a Muslim. Third, scientific discourse from the time of the prophet to the Umayyad dynasty continued to develop in various phases and could be said to peak during the Abbasid era. The comparison between scientific traditions and emerging intellectuals revolves around the presence of scientific figures themselves. Apart from that, the dichotomy discourse also began to emerge when the influence of Islam began to expand and increasingly offered various new discourse dynamics. Fourth, another character of science in Islam is based on a harmonious relationship between revelation and reason. The two are not contradictory, because there is common ground. Therefore, knowledge in Islam is not only formulated and built through reason alone, but also through revelation. The existence of a concept that describes the correlation between revelation and reason, or between religion and philosophy (science) depicts a significant meaning, especially to emphasize that knowledge in Islam has the highest level of value.

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