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Research Article

ISLAMIZATION OF KNOWLEDGE DURING THE CALIPHATE OF HARUN AL-RASHID: A HISTORICAL ANALYSIS

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Abstract

This study examines the process of the Islamization of knowledge during the reign of Caliph Harun al-Rashid as a significant phase in the development of Islamic civilization. During this period, the Islamic world absorbed foreign knowledge from Greek, Persian, Indian, and Roman traditions, which was subsequently translated, critically evaluated, and integrated into the Islamic epistemological framework. Employing a qualitative method with a literature-based approach, this research analyzes classical historical sources and contemporary scholarly journals using historical-descriptive analysis. The findings indicate that Bayt al-Hikmah functioned as a major center for translation and scientific development, fostering cross-cultural and interreligious scholarly collaboration and contributing to advances in mathematics, medicine, astronomy, and chemistry. The integration of external knowledge also influenced the development of logic, kalam, and usul al-fiqh, leading to a more rational intellectual tradition. Despite criticism from traditionalist groups, particularly concerning the influence of Greek philosophy, this process strengthened Islamic epistemological boundaries and ensured that scientific development remained aligned with the principle of tawhid.

Keywords: Abbasid Islamic Civilization, Harun al-Rashid, Islamization of Knowledge

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INTRODUCTION

The reign of Caliph Harun al-Rashid (786–809 AD) was one of the most important phases in the history of Islamic civilization because it marked the beginning of the formation of a mature and organized scientific tradition. During this period, the Abbasids were able to bring about political stability and significant economic growth (Mahyudi, 2019), enabling the development of transnational scientific institutions. Baghdad became a meeting place for various nations and cultures, making it an ideal environment for the Islamization of science (Al-Daghistani, 2022; Arroisi et al., 2023; Idrees & Ali, 2025; Mahyudi & Aziz, 2018; Razzaq & Nawaz, 2025; Zengin-Arslan, 2020). This shows that the epistemological foundation of the scientific movement during the time of Harun al-Rashid was built on solid sociopolitical conditions (Hasanah, 2022).

Caliph Harun al-Rashid was personally known as a ruler who loved science. Historical records show that he interacted extensively with scholars, philosophers, doctors, and linguists, both Muslim and non-Muslim. The caliph's palace became an intellectual space open to discussion, scientific presentations, and interdisciplinary dialogue. The caliph's patronage of translators, scientists, and scholars made knowledge one of the pillars of Abbasid legitimacy. Thus, Harun al-Rashid's leadership function was not only administrative but also encouraged the growth of an academic habitus among the people (Irfan, 2016).

One of the important dynamics during this period was the influx of foreign knowledge from Greece, Persia, India, and Rome through translation activities. This major project was not carried out sporadically, but through a planned state policy. Galen's medical manuscripts, Aristotle's philosophy, Indian mathematics, and Persian astronomy were systematically translated into Arabic. This translation was the first step in an epistemological transformation process that enabled Muslims to access the world's scientific treasures and then develop them further. Bayt al-Hikmah (House of Wisdom) became the main center for these scientific activities. This institution functioned as a large library, translation center, college, and scientific laboratory. According to Algeriani and Mohadi, Bayt al-Hikmah had a reading room, translation office, copying room, and an astronomical observatory that was one of the most advanced of its time. This center of learning brought together Muslim, Persian, and Nestorian Christian scientists in a collaborative space, demonstrating that the Islamization of science was not exclusive, but accommodated a diversity of knowledge sources (Algeriani, Adel Abdul-Aziz, 2017).

The Islamization of science during the Abbasid period encompassed three main stages: translation, critical evaluation, and integration. In the translation stage, scholars sought to preserve the meaning while adapting foreign terms to the structure of the Arabic language (Bunza, 2020; Khosravi Nik & Zia, 2014; Yildiz, 2017). The second stage was critical evaluation, in which foreign concepts were filtered based on Islamic principles (Ahmed, 2014; Akbar et al., 2024; Anwer, 2019; Mabrouk, 2025; Mohd Radzol & Hamzah, 2023; Rahmat et al., 2016), particularly tawhid. Muslim scientists such as Al-Kindi did not accept Greek philosophy wholesale, but criticized certain metaphysical aspects such as the idea of the eternity of nature. This demonstrates the existence of an epistemological filter that ensured knowledge remained within the framework of Islamic teachings (Irfan, 2016). The integration stage is the creative dimension of the Islamization of science (Irham, 2025; Mabrouk, 2025; Paya, 2025; Widiyanto, 2017). After going through a screening process, Muslim scientists developed new theories, methods, and disciplines that were more in line with the Islamic worldview (Arroisi et al., 2023; Bunt, 2012; Hidayatullah & Arif, 2022; Mabrouk, 2025; Zacky & Moniruzzaman, 2024). Al-Khawarizmi, for example, developed Indian and Persian mathematics to produce the discipline of al-jabr, while Jabir ibn Hayyan integrated Greek chemistry and experimental techniques to lay the foundations of modern chemistry. This integration made the Islamic world not only the heir to ancient science, but also the producer of original scientific theories (Hasanah, 2022).

The development of science during the reign of Harun al-Rashid also influenced Islamic sciences. Interaction with Aristotelian logic led to the birth of a more rational and systematic tradition of kalam and usul al-fiqh methodology. The role of logic in formulating theological and legal arguments strengthened the internal scientific tradition of Muslims. This shows that the integration of foreign knowledge not only had an impact on natural sciences, but also enriched the intellectual framework of Islam itself (Irfan, 2016). However, this process was not without criticism. Some traditional scholars were concerned about the influx of Greek philosophy, which was considered potentially destructive to religious beliefs. However, the debate between rationalists and traditionalists actually shows a healthy epistemological dynamic in Islamic civilization. This discourse became an arena for testing the validity of new concepts, so that the knowledge that was accepted had truly undergone a process of intellectual validation. Thus, internal criticism was part of the mechanism of Islamization itself (Hamka, Muhammad, Agusman, 2024).

The impact of the Islamization of science during the reign of Harun al-Rashid was monumental. Baghdad emerged as a global scientific center, home to the world's largest library, and the birthplace of great figures such as Al-Kindi, Hunayn ibn Ishaq, Al-Khawarizmi, Ar-Razi, and many others. The knowledge produced during this period was then transmitted to Europe via Andalusia and Sicily, and became the foundation for the birth of the Renaissance. In other words, the Abbasid science project contributed directly to the development of world science (Hasanah, 2022). Ultimately, the Islamization of science during the reign of Harun al-Rashid shows that Islamic intellectual progress was built through openness, critical adaptation, and creative integration of knowledge from various civilizations. This historical experience is important as a foundation for modern Islamic civilization in facing the challenges of secular scientific globalization. In line with the calls of contemporary scholars, the revival of Islamic civilization will depend on the ability to integrate modern science and technology with transcendent Islamic values. Therefore, studies on the period of Harun al-Rashid remain relevant as a reference in designing today's Islamic education and research systems.

Despite the abundance of historical studies on Abbasid scientific achievements, existing scholarship often emphasizes descriptive narratives of translation activities or biographical accounts of prominent scholars without sufficiently analyzing the epistemological mechanisms underlying the Islamization process (Gutas, 1998; Idrees & Ali, 2025; Saliba, 2007). In particular, limited attention has been given to how translation, critical evaluation, and integration functioned as interconnected stages within a coherent knowledge framework rooted in tawhid (Irfan, 2016; Nasr, 2007). Furthermore, many contemporary discussions on Islamization of knowledge focus primarily on modern thinkers, while underexploring classical historical precedents that could inform present educational discourse (Al-Attas, 1993; Hamka, Muhammad, Agusman, 2024; Kamali, 2011). This gap suggests the need for a historically grounded analysis that examines the reign of Harun al-Rashid as an early and successful model of epistemological integration. Therefore, this study seeks to answer the following questions: how was the Islamization of knowledge systematically implemented during the reign of Harun al-Rashid, and what socio-intellectual structures enabled its success? The main objective of this research is to critically analyze the stages of Islamization of knowledge and to reassess the role of Bayt al-Hikmah as an epistemic institution rather than merely a translation center (Al-Attas, 1993; Algeriani, Adel Abdul-Aziz, 2017; Hamka, Muhammad, Agusman, 2024; Hasanah, 2022; Kamali, 2011).

RESEARCH METHOD

Research Design

This research uses a qualitative approach with library research as the main technique for data collection and analysis. This approach was chosen because the study of the Islamization of science during the reign of Harun al-Rashid is historical-philosophical in nature.

Research Procedure

All data were analyzed using a historical-analytical approach (Razzaq & Nawaz, 2025), which is a method of reading historical data by systematically connecting the socio-political background, institutional structure, and scientific thought development of that period.

Instruments, and Data Collection Techniques

Requires an in-depth search of relevant primary and secondary sources. Primary sources include manuscripts (Handoko et al., 2024; Putra et al., 2025) and classical historical records, such as the works of al-Tabari, al-Mas'udi, Ibn al-Nadim, and early manuscripts on scientific activities at Bayt al-Hikmah. Meanwhile, secondary sources were obtained from modern scientific journals, academic books (Hashim et al., 2024), research reports, and contemporary historical articles that reviewed the dynamics of translation, scientific developments, and intellectual interactions during the Abbasid era.

Data Analysis Technique

Data analysis was carried out in several stages: 1) data reduction, which involved sorting and selecting information most relevant to the research focus, such as caliphate policies, the role of Bayt al-Hikmah, and the dynamics of translation and integration of foreign knowledge; 2) presentation of data in the form of a coherent and thematic narrative description in accordance with the aspects being studied; and 3) drawing descriptive-interpretative conclusions to understand how the process of Islamization of science took place during the reign of Harun al-Rashid. Data validity is maintained through source triangulation, which involves comparing information from various classical literature and modern academic findings to ensure historical consistency and analytical accuracy. This method allows the research to not only describe historical facts, but also provide in-depth scientific interpretations of the integration of foreign knowledge into Islamic civilization and its relevance to the modern scientific context (Osman et al., 2018).

RESULTS AND DISCUSSION

Political and Civilizational Context during the Reign of Harun al-Rashid

The reign of Caliph Harun al-Rashid (786–809 AD) marked one of the most stable phases in the history of the Abbasid Dynasty, when political, economic, and administrative structures reached a high level of stability. Harun al-Rashid ruled during a period historically known as the Early Abbasid Power (750–847 AD), a time when the caliph's authority was at its peak and he was able to control various regions from North Africa to Central Asia. This political stability became the main foundation that enabled the development of an Islamic civilization based on science (Hasanah, 2022). The Abbasid power structure at this time had reached its most mature form, with a strengthened Persian administrative model and a highly efficient taxation system. This stability facilitated the implementation of policies aimed at building a science-based center of civilization (Lapidus, 1988).

Politically, the Abbasids carried out major reforms in the structure of government, including strengthening the Persian-based bureaucracy, establishing a finance department (diwan), and professionalizing the armed forces. The Abbasid administrative system during the era of Harun al-Rashid was one of the most efficient systems ever, as it was able to mobilize taxes, logistics, and social control in a coordinated manner. This efficiency ensured the continuity of large-scale scientific and cultural programs such as the construction of libraries, observatories, and translation institutions (Irfan, 2016).

Baghdad, founded by al-Mansur but reaching its peak during the reign of Harun al-Rashid, was designed as both a center of power and a center of learning. The city was circular in shape (city of the round), demonstrating highly advanced urban planning. The structure of

Baghdad allowed for the formation of a cosmopolitan intellectual community due to its location at the crossroads of international trade routes. This environment facilitated cultural interaction, which became a source of various types of foreign knowledge (Algeriani, Adel Abdul-Aziz, 2017).

To clarify the relationship between political stability, institutional development, and scientific advancement during this period, Table 1 summarizes the key stages that shaped the Abbasid scientific ecosystem under Harun al-Rashid.

Table 1. Stage of Knowledge Integration and Islamization during the Reignof Harun al-Rashid

No.	Stage	Scientific Activity	Key Actors	Sources of Foreign Knowledge	Contribution to Islamic Civilization
1	Political Stability	Bureaucratic reform and scientific patronage	Harun al-Rashid	Persian administrative system	A conducive environment for scientific development
2	Translation	Translation of scientific texts	Hunayn ibn Ishaq et al.	Greek, Persian, Indian sciences	Transfer of scientific methods and epistemic structures
3	Epistemological Critique	Evaluation and selection of concepts	Muslim scholars and philosophers	Greek philosophy	Knowledge filtering based on Islamic worldview
4	Knowledge Integration	Synthesis of science and Sharia	Al-Kindi, Al-Khawarizmi	Selected foreign sciences	Emergence of new scientific disciplines
5	Institutionalization	Bayt al-Hikmah	State and multi-faith scholars	Multi-civilizational knowledge	A cosmopolitan scientific ecosystem

Harun al-Rashid ruled from Baghdad, a city designed by al-Mansur as the political, economic, and scientific center of the caliphate. Baghdad became the “most cosmopolitan” city of the 8th century, inhabited by merchants, scholars, and scientists from various nations such as Arabia, Persia, India, Greece, and China (Mez, 1937). This diversity created a rich social ecosystem that supported the exchange of intellectual ideas across cultures. Thus, the urban environment of Baghdad was a strategic factor in the development of Islamic civilization.

Under the leadership of Harun al-Rashid, the caliph's palace served as a center for scientific discussion. Many scientists were invited to discuss with the caliph, including doctors, mathematicians, philosophers, and jurists. Harun al-Rashid regularly invited Nestorian and Persian scientists to his palace, as a symbol of the intellectual openness of the Abbasid government. The caliph's patronage was a driving factor in the development of scientific tradition at that time (Irfan, 2016). Harun al-Rashid was known as a caliph who had a great interest in science, religion, and philosophy, so he regularly invited scientists, medical experts, logicians, and theologians to discuss at his palace. This patronage made the palace not only a center of government, but also an intellectual salon that accommodated cross-disciplinary dialogue (Brown, 2009).

The cumulative effect of political stability, urban cosmopolitanism, and institutional patronage can be conceptually illustrated in Figure 1, which demonstrate the dynamics between political authority and scientific production.

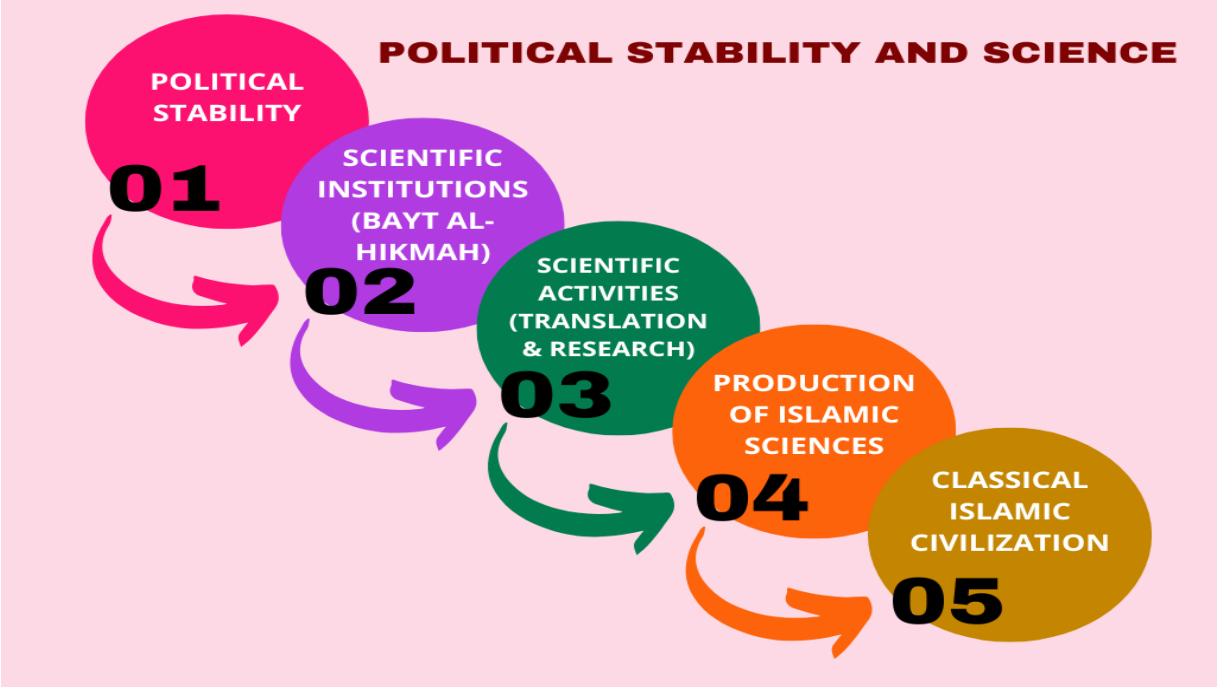

Figure 1. Dynamics of Political Stability and Scientific Production during the Reign of Harun al-Rashid

With increasing interaction between the Islamic world and Persian, Indian, and Greek civilizations, the process of translation became one of the main foundations for the formation of the Abbasid civilization. Translation activities not only served to transfer knowledge, but also to improve governance. Persian Sasanid administrative works, for example, were used as a reference for reforming the tax and bureaucratic systems. Thus, translation was not only a scientific endeavor, but also a strategic political policy (Hasanah, 2022). One of the most monumental achievements of this period was the development of the Bayt al-Hikmah (House of Wisdom) institution. Bayt al-Hikmah not only served as a library, but also as a translation center, scientific laboratory, and research academy. During the reign of Harun al-Rashid, this institution began to flourish before reaching its peak during the reign of al-Ma'mun. The role of this institution was very important in the process of Islamization of science (Gutas, 1998).

The translation of Greek, Persian, and Indian works was at the heart of Abbasid scientific civilization. The philosophical works of Aristotle, the medical works of Galen, Indian mathematics, and Persian astronomy were translated with the full support of the caliph. This translation policy was not merely a transfer of texts, but a transfer of "methods and structures of thought" into Islamic knowledge. Thus, the integration of foreign knowledge became the foundation for the birth of a new scientific tradition (Rsenthal, 1975). Socio-culturally, the era of Harun al-Rashid saw an increase in literacy and intellectual activity in society. Mosques, scientific assemblies, and libraries became centers of learning. The use of paper, which was introduced from China via Samarkand, accelerated the spread of knowledge. As Jonathan Bloom explains, paper technology in Baghdad produced an intellectual revolution by increasing the production of manuscripts. This made knowledge more accessible to the public (Bloom, 2001).

As the center of Islamic civilization, Baghdad became the birthplace of both rational and traditional thinking. This period marked the early development of Mu'tazilah rational theology

alongside the emergence of traditional Ahl al-Hadith scholars. The debate between the two took place in a scientific and constructive manner, enriching the dynamics of Abbasid religious thought. This discourse became an important part of the intellectual development of Islam during the reign of Harun al-Rashid (Wilferd Madelung, 1997). Overall, the political and civilizational context during the reign of Harun al-Rashid showed a close relationship between state power, scientific patronage, and the integration of global knowledge. Strong political support, economic stability, a cosmopolitan intellectual network, and scientific institutions such as Bayt al-Hikmah made this period a major milestone in the glory of Islamic civilization. The success of the Abbasid era was not only due to its material wealth, but also to the ability of Muslims to process world knowledge within the framework of Islamic values. Thus, the era of Harun al-Rashid is an ideal model of how a state can create an environment conducive to the advancement of science and civilization (Gutas, 1998).

The Entry of Foreign Knowledge into the Islamic World

The entry of foreign knowledge into the Islamic world during the reign of Harun al-Rashid was a very significant intellectual phenomenon and became the foundation for the development of Abbasid civilization. At the end of the 8th century, the Islamic world was in a strategic position as a center of international trade, enabling intensive encounters between scientists from Persia, Greece, India, and Rome. The initial phase of foreign knowledge acceptance was triggered by administrative and astronomical needs, which later developed into a systematic movement to collect and master global knowledge. The cosmopolitan social environment made Baghdad an intellectual magnet for many scientists (Gutas, 1998).

The introduction of foreign knowledge during the reign of Harun al-Rashid reached its most mature form through a systematic translation movement that became the foundation for the development of classical Islamic science. This movement was not merely a translation, but also an epistemological process that transferred Greek, Persian, and Indian methods, analytical frameworks, and intellectual traditions into Arabic. Astronomical works such as Ptolemy's Almagest and Galen's medical texts were translated to meet the Islamic state's needs for scientific calendars, public health, and administrative geometric calculations (Al-Kaabi, 2021). Bayt al-Hikmah scientists such as Hunayn ibn Ishaq developed modern standards of textual criticism, including the comparison of Greek-Syriac-Arabic manuscripts to maintain the accuracy of scientific terminology (Najafizadeh, M., & Fallah, 2020).

The translation of Indian mathematics, particularly the positional system and the concept of zero, became the foundation for al-Khawarizmi's work in Al-Jabr, a transformation of knowledge that would have been impossible without cross-cultural integration (Ouerfelli, 2022). The Abbasid translation movement was actually a “proto-global scientific exchange,” as it involved Muslim and non-Muslim scientists from Persia, Syria, Judaism, and India working in a cosmopolitan scientific ecosystem. Therefore, it can be concluded that the era of Harun al-Rashid was not merely a phase of receiving foreign knowledge, but rather an era of forming a new scientific paradigm that integrated global heritage within an Islamic value framework through mechanisms of selection, criticism, and epistemological reconstruction (Mohammad, A. & Nour, 2023).

Baghdad became a center for international knowledge transfer due to its location on the Silk Road and its proximity to ancient intellectual centers such as Jundishapur and Harran. In Jundishapur, Nestorian physicians and scientists had developed Greek medical and philosophical traditions since the 6th century. The migration of Jundishapur academics to Baghdad during the Abbasid period accelerated the migration of knowledge to the Islamic world. The integration of scientists from various traditions contributed greatly to the development of medicine and astronomy in Baghdad (Lozoya, 1980).

Bayt al-Hikmah during the reign of Harun al-Rashid played a fundamental role as a center for global scientific integration through its dual functions as a library, research institute, and translation academy managed with high scientific standards. Recent research shows that

Bayt al-Hikmah was not only a repository of classical texts, but also an active research institution that facilitated collaboration between Muslim and non-Muslim scientists in translating, commenting on, and developing Greek, Persian, and Indian thought. Bayt al-Hikmah's facilities included study rooms, copy rooms, text criticism rooms, and an astronomical observatory used to refine astronomical tables and test Ptolemy's theories (Al-Khazraji, 2022).

Translators such as Hunayn ibn Ishaq applied comparative philological methods, comparing three to five Greek and Syriac manuscripts to produce scientific Arabic translations, making Bayt al-Hikmah a center for the standardization of Arabic scientific terminology (Al-Sarraf, Layla, & Basheer, 2021). Bayt al-Hikmah functioned as a "global hub of knowledge" that integrated Indian astronomy, Persian mathematics, and Greek philosophy into the Islamic epistemological system. With the absolute financial support of the Abbasid court and a professional organizational structure, Bayt al-Hikmah became an institution that not only transferred foreign knowledge but also created new scientific syntheses that became the basis for the birth of classical Islamic science (Najafipour, 2023).

Translators played a central role in the transmission of knowledge. Figures such as Hunayn ibn Ishaq, Qusta ibn Luqa, and Tsabit ibn Qurrah translated the works of Aristotle, Hippocrates, Galen, Euclid, and Archimedes. Hunayn translated more than 95 medical works and ensured the accuracy of scientific terms through textual criticism and consultation with the best Greek manuscripts. The standardization of Arabic scientific terminology that they created enabled the birth of a new universal scientific tradition (Gutas, 1998). The influx of Indian knowledge also had a major influence, particularly in mathematics and astronomy. The Siddhanta was translated by Muhammad ibn Ibrahim al-Fazari, who later introduced the concept of decimal numbers and the algebraic system to the Islamic world. The interaction of Muslim scientists with Indian mathematics became the basis for the emergence of Al-Khawarizmi's monumental work, Hisab al-Jabr wa al-Muqabalah. This shows that the transmission of knowledge was not only from Greece, but was multicultural in nature (Irfan, 2016).

The Process of Islamization of Science

The process of Islamization of science during the reign of Harun al-Rashid took place as a structured intellectual movement, marking a major transformation in the history of Islamic civilization. By the end of the 8th century, the Islamic world had become a meeting point for world civilizations, enabling the integration of Greek, Persian, Indian, and Roman science into the Islamic context. Intense cultural interaction in Baghdad led to an increased need to harmonize foreign knowledge with the principles of tawhid and Islamic epistemology. Thus, the Islamization of knowledge was not born out of a rejection of foreign knowledge, but rather as an epistemic control mechanism to ensure that the adopted knowledge remained in line with Islamic values (Nawaz, M., & Farooq, 2021).

The first stage of the Islamization of knowledge was translation. During the reign of Harun al-Rashid, the state funded a massive translation of works on philosophy, astronomy, mathematics, and medicine. Translators such as Hunayn ibn Ishaq and Qusta ibn Luqa did not simply translate Greek and Syriac texts into Arabic, but also standardized scientific terms so that they could be understood by Muslim scientists. The translation method during the Abbasid period was philological-critical, which involved comparing various manuscripts to obtain the most authentic meaning. This phase opened the door to a more in-depth epistemological evaluation process (Al-Kaabi, 2021).

The second stage is critical evaluation, which involves screening and assessing foreign scientific ideas. Muslim scholars and philosophers assess which concepts are acceptable and which should be rejected. For example, Aristotle's idea of the eternity of nature was rejected because it contradicted the doctrine of creation (creatio ex nihilo). This evaluative phase is at the heart of the Islamization of science because it places revelation as the highest epistemic

standard. This process shows that Muslim scientists were not passive, but actively criticized non-Islamic intellectual traditions (Hanapi, 2020).

The synthesis of filtered knowledge resulted in the emergence of new scientific disciplines, including algebra, clinical medicine, and optics. The structured process of Islamization of science is illustrated in Figure 2.

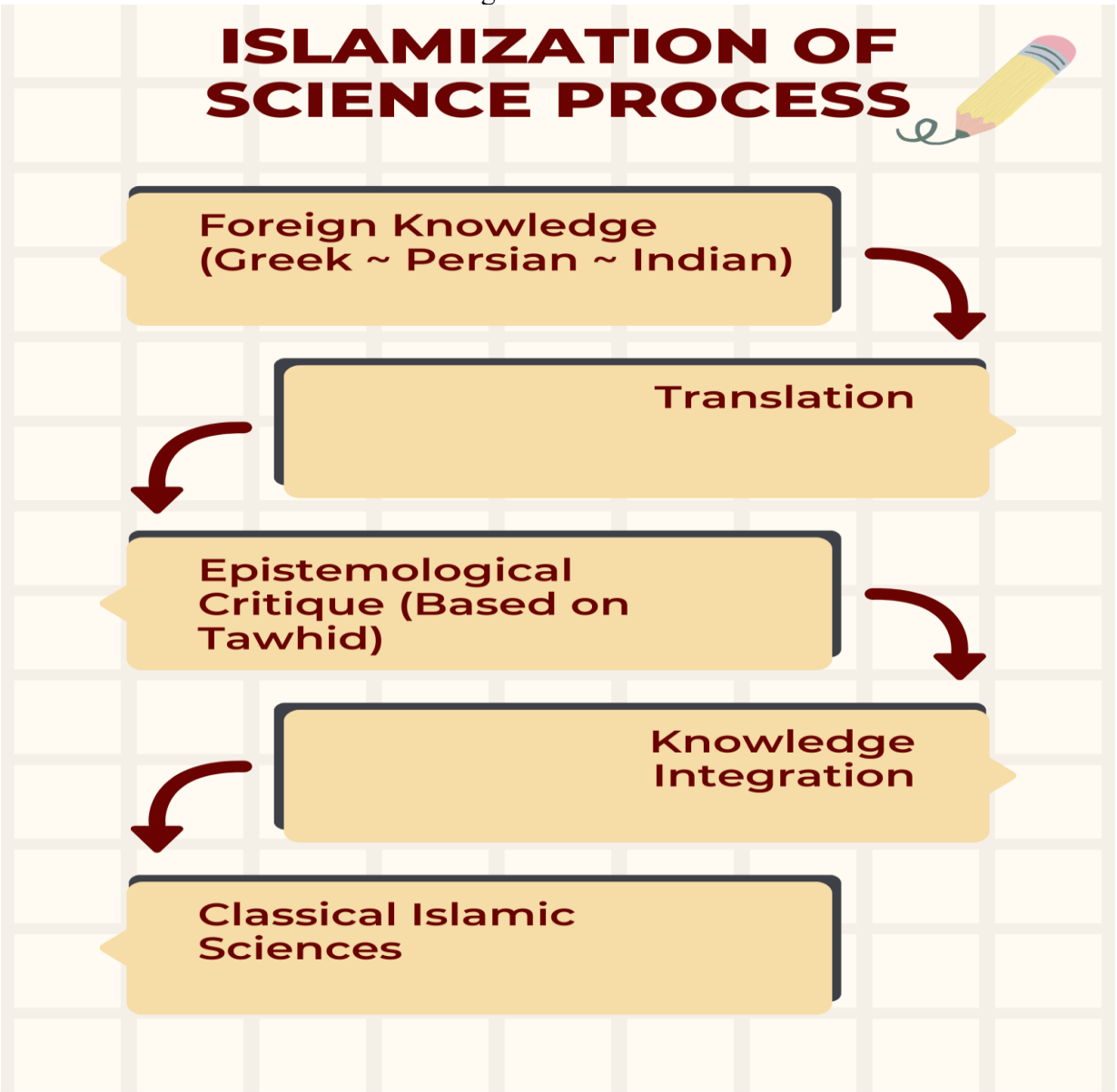

Figure 2. The Process of the Islamization of Science

The third stage is integration, which involves incorporating filtered scientific ideas into the Islamic framework of thought. At this stage, Muslim scientists formulated new theories that combined foreign elements with Sharia principles. Hunayn ibn Ishaq not only translated Galen's medical texts, but also interpreted them according to the needs of medicine in the Islamic world. Similarly, Al-Kindi integrated Greek philosophy with Islamic theology, creating a new intellectual synthesis that enriched the Islamic philosophical tradition (Najafizadeh, M., & Fallah, 2020).

This integration resulted in the birth of new disciplines, such as algebra by Al-Khawarizmi, clinical medicine by Ar-Razi, optics by Ibn al-Haytham, and experimental chemistry by Jabir ibn Hayyan. The development of science during the Abbasid period would not have been possible without the process of adapting and reconstructing foreign knowledge through the filter of Islamic values. In other words, the Islamization of science produced

scientific creativity, not merely the borrowing of concepts from other civilizations (Ouerfelli, 2022). The Islamization of science also had an impact on religious disciplines. The methods of usul al-fiqh, hadith science, and kalam theology underwent rationalization through the use of Greek logic. The methods of qiyas and istidlal in usul al-fiqh developed rapidly as a result of the interaction of scholars with Aristotelian logic. This proves that the integration of foreign knowledge strengthened Islamic intellectual tradition rather than weakening it (Ismail, Z. & Abdullah, 2019).

One of the main centers of the Islamization of science was Bayt al-Hikmah, a scientific institution that functioned as a library, translation center, and scientific academy. Bayt al-Hikmah was the most cosmopolitan scientific ecosystem of the 9th century, bringing together Muslim, Christian, Jewish, and Persian scientists in a productive intellectual network. It was here that the processes of filtering, comparing texts, and integrating ideas took place in a systematic and organized manner (Mohammad, A. & Nour, 2023). Nevertheless, the Islamization of science did not take place without criticism. Some traditional scholars were concerned about the dominance of Greek philosophy. The debate between the rationalists (Mu'tazilah) and the traditionalists (Ahl al-Hadith) actually enriched the methodology of scientific criticism in Islam. The debate clarified the epistemological boundaries between rational science and revelation, while ensuring that the integration of foreign knowledge did not compromise the purity of faith (Yusof, A., & Rahman, 2020).

The process of Islamization of science also had a global impact. After undergoing a phase of filtering and integration, the modified sciences were then transmitted back to Europe via Andalusia and Sicily. The European Renaissance was greatly influenced by Abbasid science that had undergone the process of Islamization, especially in the fields of medicine, mathematics, and astronomy. This shows that the Islamization of science played a role in shaping world science, not just Islamic science (Creswell, 2021). Overall, the process of Islamization of science during the reign of Harun al-Rashid was a model of global knowledge integration within a framework of divine values. This movement did not merely copy foreign knowledge, but criticized, filtered, and developed new concepts in accordance with Islamic epistemology. The Islamization of science is evidence of the Islamic civilization's ability to process the world's heritage creatively and productively. Thus, the Islamization of science was one of the key elements of the Abbasid civilization's success and remains relevant as a model of scientific integration for the modern Muslim world (Al-Kaabi, 2021).

The Impact of Foreign Scientific Integration on Islamic Civilization

The integration of foreign science during the reign of Harun al-Rashid had a fundamental impact on the development of Islamic civilization, especially in the formation of a cosmopolitan and transdisciplinary scientific tradition. At the end of the 8th century, the Islamic world was at the meeting point of various civilizations, so that the process of adopting Greek, Persian, and Indian knowledge resulted in a major transformation in the mindset and social structure of Muslims. The integration of foreign knowledge created an “epistemic shift” that allowed Muslims to expand their intellectual horizons without abandoning the principle of tawhid. This change became the initial foundation for the birth of classical Islamic science (Nawaz, M., & Farooq, 2021).

One of the most important impacts of the integration of foreign knowledge was the development of new disciplines, particularly mathematics, astronomy, medicine, and chemistry. Al-Khawarizmi, for example, combined Indian and Persian mathematics to create al-jabr, which later became the basis of modern algebra. The innovations of Abbasid scientists would not have been possible without intensive interaction with foreign sciences, which were then processed and adapted to the Islamic scientific framework. This shows that integration is not merely acceptance, but the production of new knowledge (Ouerfelli, 2022).

In the field of medicine, the integration of foreign knowledge led to significant progress. The works of Galen, Hippocrates, and Indian medical scientists were adapted and

developed by Muslim scientists such as Hunayn ibn Ishaq and Ar-Razi. Medical works during the Abbasid period not only translated foreign theories but also corrected and expanded them through clinical observation. As a result, the Islamic world became the center of global medicine until the 12th century (Najafizadeh, M., & Fallah, 2020). In the field of astronomy, the integration of knowledge from India and Persia brought new developments in methods of observation and calculation of the heavens. Scientists such as Al-Fazari and Yahya ibn Abi Mansur produced astronomical tables that were more accurate than the original sources. The development of observatories in Baghdad and the compilation of astronomical tables were a direct response to the scientific and administrative needs of the state, such as determining prayer times and navigation (Al-Kaabi, 2021).

The integration of foreign knowledge also had a major impact on strengthening scientific institutions. Bayt al-Hikmah became an intellectual laboratory that facilitated collaboration between Muslim, Syriac, Jewish, and Persian scientists. This institution served as a multidisciplinary research center that brought together mathematicians, doctors, philosophers, and translators in one scientific space. The impact was the creation of a new scientific culture that was collective and collaborative, rather than individual (Mohammad, A. & Nour, 2023).

The integration of foreign knowledge also led to the standardization of scientific terminology in Arabic. Translators such as Hunayn ibn Ishaq developed a methodology of textual criticism that ensured the accuracy of technical terms in the fields of medicine and philosophy. It was this standardization of terminology that enabled Islamic science to develop into a consistent scientific tradition that could be passed on to future generations. Arabic then became the lingua franca of science in the world (Najafizadeh, M., & Fallah, 2020). Islamic civilization also experienced significant advances in practical technology, such as the creation of astrolabes, navigational instruments, water clocks, mechanical devices, and scientific measuring instruments. Technological advances during the Abbasid period were the result of the integration of Greek science with Persian techniques and mechanical knowledge that developed in the Islamic world. This technology was then used in maritime navigation, agriculture, architecture, and the military (Ouerfelli, 2022).

The integration of foreign knowledge strengthened the religious intellectual tradition. Greek logic enriched kalam, while rational methods broadened the approach to usul al-fiqh. Fierce debates between traditionalists and rationalists laid the foundation for scientific critical methodology in Islam. This created a productive space for dialogue for the development of Islamic theology and law (Yusof, A., & Rahman, 2020). The impact of the integration of foreign knowledge was also global. After undergoing the process of Islamization, many works by Muslim scientists were translated into Latin and Hebrew via Andalusia in the 11th to 13th centuries. The works of Ibn Sina, Al-Khawarizmi, and Ar-Razi formed the early foundations of the European Renaissance. This shows that the process of scientific integration during the reign of Harun al-Rashid not only built Islamic civilization, but also influenced the birth of modern science (Creswell, 2021).

Overall, the integration of foreign sciences during the reign of Harun al-Rashid created the most advanced scientific ecosystem in Islamic history and became the pinnacle of intellectual achievement in the medieval world. Through translation, criticism, and the development of new sciences, Islamic civilization demonstrated a high capacity to process world knowledge into a scientific system that was in harmony with Islamic values. This success proves that intellectual openness, when combined with religious values, can give birth to a globally superior civilization (Nawaz, M., & Farooq, 2021).

Challenges and Criticism at That Time

The movement to translate and integrate foreign knowledge during the Abbasid period, which gained strength since Harun al-Rashid and reached its peak during al-Ma'mun's reign, did not proceed without resistance. Behind the enthusiasm for Greek-Persian philosophy, logic, medicine, and astronomy, there was anxiety among traditional scholars about the possibility of

the authority of revelation being displaced by speculative rationality. A number of contemporary researchers assert that from the outset, the acceptance of foreign knowledge in the Islamic world was always accompanied by "creative tension" between reason and naql (revelation/hadith), so that the project of integrating knowledge went hand in hand with a discourse of criticism of philosophy and 'ilm al-kalām (rational theology). Theologically, the main challenge came from the Ahl al-Hadith and traditional scholars who viewed kalām and philosophy as innovations that had the potential to undermine the purity of faith. Studies on the development of 'ilm al-kalām show that Mu'tazilah rationalism, which used Greek logic to explain the concepts of tawhid and divine justice, immediately sparked a fierce reaction from traditionalists who demanded a return to the literal text. They were concerned that borrowing foreign metaphysical categories would force verses and hadith to be interpreted according to complex philosophical schemes, rather than the other way around (M. R. Khan, 2024).

This conceptual challenge is formulated in a classic debate: can reason be the judge of revelation, or does it merely serve revelation? The Mu'tazilah tend to give reason a high position; they believe that God's justice and wisdom must be rationally understandable. The Mu'tazilah interpret al-'adl (divine justice) and al-tawhid within a highly systematic logical framework. However, this view is accused by traditionalists of being "too philosophical" and considered to be influenced by Greek thinking, giving rise to criticism that they actually reduce submission to the text (Martin, Richard, Mark Woodward, 1997).

One of the most controversial issues that sparked fierce rejection was the doctrine of "khalq al-Qur'an" (the Qur'an is a creation) put forward by the Mu'tazilah and some Hanafi fuqaha. The Mu'tazilah mutakallimun built their argument about the "creation" of Allah's words using dialectics that drew heavily on Greek philosophical logic and metaphysical concepts. For them, defending this doctrine was considered important to maintain the purity of tawhid. However, for traditional scholars, this view threatened the sanctity of the holy text and was considered a deviation from the understanding of the early generations. *Rehan Khan, 'Al-Ma'mun and the Islamic Inquisition: Unravelling the Threads of His Motives', Pakistan Journal of Society, Education and Language, 9.2 (2023), 435–448.*

This theological tension then culminated in the mihnah (inquisition), which officially began during the reign of al-Ma'mun (833 AD), but whose roots stemmed from the climate of rationalism that had been growing since the time of Harun al-Rashid. In the mihnah, the state imposed the doctrine of the created nature of the Qur'an and tested the scholars; those who refused were punished or imprisoned. The mihnah was a political attempt to shift the center of scientific authority from traditional scholars (such as Ahmad ibn Hanbal) to the caliph's palace and rationalist scholars who were close to the rulers. This event shows that criticism of the rationalization and integration of science was not only scientific in nature, but also related to the struggle for political and religious authority (R. Khan, 2023).

From a socio-religious perspective, another challenge arose in the form of concerns that openness to foreign philosophy and science would give rise to the elitism of science: only certain circles (the caliph, palace intellectuals, and philosophers) would master complex cosmology and metaphysics, while the general public would continue to adhere to a simple textual understanding. Research on the Abbasid translation movement shows a gap between the scientific culture of the court, which was strongly rational and philosophical, and the more textual scientific traditions of mosques and madrasas. This gap fueled suspicions that some philosophical discourse was no longer based on the needs of da'wah and the ummah (Gutas, 1998).

On the other hand, some challenges arose from internal criticism of philosophy, which only became strong several centuries after Harun, but crystallized pre-existing concerns. Al-Ghazali, for example, in Tahāfut al-Falāsifah, strongly criticized some philosophical views (especially regarding the eternity of nature, God's knowledge of particulars, and physical resurrection), even though he himself used sophisticated logical methodologies. Al-Ghazali's

criticism was an attempt to "correct" philosophy so that it would submit to the limits of revelation, not to completely shut down rationality. This criticism shows that even among highly rational scholars, there were epistemological boundaries that were upheld (Griffel, 2009).

Recent research also highlights that suspicion of philosophy did not only come from pre-modern traditionalists, but was reinforced by the narratives of some 19th-century Orientalists who considered Islamic philosophy to be merely an imitation of Greek philosophy. G.T. Tennemann and Ernest Renan accused Islamic philosophy of being unoriginal and hampered by the "shackles of theology," a view that later influenced some Muslims who saw the integration of philosophy as a threat rather than an opportunity. Although this is a modern criticism, it is often projected onto the classical period and makes the discourse on Islamic rationalism increasingly questionable in its legitimacy (Hamzah, Hamka, A. Khudori Soleh, 2024).

However, the response to these challenges and criticisms was not uniform. The Asy'ariyah tradition, for example, emerged as a middle ground that attempted to respond to Mu'tazilah rationalism by acknowledging the role of reason, but affirming the supremacy of revelation. Articles on the evolution of 'ilm al-kalām show that Asy'ariyah used some logical tools, but developed doctrines such as bi-lā kayf to limit rational speculation about the nature of God. This position eventually became mainstream Sunni and served as a "filter" against philosophical elements that were considered too speculative (M. R. Khan, 2024).

Overall, it can be concluded that the challenges and criticisms of that period, both from traditional scholars who were suspicious of kalam and philosophy, and from political struggles such as the mihnah, did not stop, but rather shaped the distinctive character of the Islamization of science. The conflict between rationalism and traditionalism gave birth to filtering mechanisms, epistemological boundaries, and creative models of integration between reason and revelation. It was precisely because of harsh criticism that knowledge adopted from outside was not accepted wholesale, but rather through a rigorous theological and methodological negotiation process. Thus, "challenges and criticism" were an inherent part of the success of the Islamization of science in Abbasid civilization (Ouerfelli, 2022).

CONCLUSION

The study of the Islamization of science during the reign of Caliph Harun al-Rashid shows that the development of science in the Islamic world was the result of creative interaction between political, social, economic, and intellectual factors that were well managed. The stability of the Abbasid government, as described in the discussion, provided a solid foundation for the growth of a scientific culture oriented towards cross-civilizational collaboration. Political support, effective bureaucracy, and economic prosperity made Baghdad not only a center of power, but also a center of global civilization. The city developed as a cosmopolitan space that brought together scientists from various nations, creating a dynamic and productive scientific ecosystem.

The influx of foreign knowledge from Greece, Persia, India, and Rome was an important turning point in the intellectual history of Islam. The large-scale translation project initiated by the state not only served as an effort to transfer texts into Arabic, but also opened up opportunities for the birth of a scientific dialectical process involving criticism, reinterpretation, and the development of new concepts. The presence of Bayt al-Hikmah as a multidisciplinary scientific institution showed that the integration of global knowledge was managed systematically. This institution functioned as a library, translation center, research academy, and observatory that gave birth to new methodological standards in the management of science. With such a comprehensive structure, Bayt al-Hikmah became the epicenter of intellectual development during the era of Harun al-Rashid and beyond.

The Islamization of science during the Abbasid period was not a passive process or merely the acceptance of knowledge from outside, but rather an epistemological mechanism involving three important stages: translation, critical filtering, and creative integration. In the screening stage, Muslim scientists tested foreign scientific ideas based on the principles of tawhid and revelatory values. Thus, only elements compatible with Islamic principles were adopted, while contradictory aspects were criticized or rejected. The integration stage became the phase of forming new sciences that were more in line with the Islamic worldview. For example, algebraic mathematics by Al-Khawarizmi, clinical medicine by Ar-Razi, and the development of experimental methods by Jabir ibn Hayyan were direct products of the creative and innovative process of Islamization of science.

The impact of the integration of foreign knowledge was not only felt in the Islamic world, but also had a broad influence on the development of global science. The works of Muslim scientists were later translated into Latin and Hebrew, becoming a major source for the development of the European Renaissance. This process shows that Islamic civilization acted as a bridge connecting ancient and modern science. Furthermore, the development of logic, kalam, and usul al-fiqh, which were influenced by interactions with Greek philosophy, shows that the integration of foreign knowledge enriched the Islamic scientific tradition without eliminating its religious identity.

The challenges and criticisms that arose at that time, especially from traditionalist groups who were concerned about the penetration of Greek philosophy, actually strengthened the mechanisms of selection and epistemological boundaries in Islam. The fierce debate between rationalists and traditionalists resulted in a more mature, critical, and measured system of thinking. Intellectual conflicts such as mihnah show that the dialectic between reason and revelation is an important part of the formation of Islamic scientific identity. From this process, the Islamic scientific tradition grew to have a balanced character: open but selective, rational but based on revelation.

Overall, the discussion of the Islamization of science during the reign of Harun al-Rashid reveals that the glory of Islamic civilization was based on the ability to absorb, critique, and develop science within the framework of Islamic values. This process shows that the integration of foreign science did not threaten Islamic identity, but rather strengthened the intellectual and spiritual capacity of the ummah. Thus, the Abbasid experience provides a valuable lesson for the modern Islamic world: that scientific progress can only be achieved through openness, dialogue, and creative integration between tradition and innovation. The model of the Islamization of science during the reign of Harun al-Rashid can serve as inspiration in developing education, research, and science policy systems that are relevant to contemporary global challenges.

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Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.
Author 4: Formal analysis; Methodology; Writing - original draft.
Author 5: Supervision; Validation.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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