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THE QUR'AN'S CONTRIBUTION TO THE DEVELOPMENT OF MATHEMATICS IN THE HISTORY OF ISLAMIC CIVILIZATION

Dedi Andrianto[a], Ibnu Imam Al Ayyubi[b], M. Latif Nawawi[c], Deden Hilmansah[d], Syed Muhammad Adib Termizi b Ahmad al-Jafari[e]
dediandrianto99@yahoo.com, ibnuimam996@staidaf.ac.id, latifnawawi@stitbustanulului.ac.id, dedenhilmansah@staidaf.ac.id, md_adib1@hotmail.com

[a,c] STIT Bustanul 'Ulum Lampung Tengah, Indonesia
[b,d] Sekolah Tinggi Agama Islam Darul Falah, Indonesia
[e] Institut Ramlah Daing Abdul Kadir, Singapura

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ABSTRACT

This study investigates the close relationship between science and religion in Islam by examining the Qur'an's contribution to the development of mathematics within Islamic civilization. Using a historical qualitative approach, this research explores how Qur'anic teachings inspired Muslim scholars to advance mathematical knowledge. The Qur'an contains numerous verses that encourage reflection, logical reasoning, and calculation. Concepts such as hisab (calculation), mizan (balance), and the order of the universe serve as important foundations that shaped the intellectual mindset of Muslim scholars. Data are collected from primary and secondary historical sources to trace the connection between Qur'anic values and mathematical progress. The study finds that the Qur'an not only guided religious life but also motivated scholars like Al-Khwarizmi and Al-Battani to pursue mathematical innovation. Mathematics in Islamic civilization developed as both a technical science and a medium to understand the signs of Allah in nature. This integration of scientific reasoning and spiritual insight contributed to the growth of modern mathematics and enriched the world's intellectual heritage. The study concludes that the Qur'an functioned as a catalyst for scientific development, proving that Islam encourages the pursuit of knowledge while maintaining harmony between science and faith.

***Keywords**: Qur'an, Mathematics, Islamic Civilization, Islamic Golden Age, Muslim Scholars.*

ABSTRAK

Penelitian ini mengkaji hubungan erat antara sains dan agama dalam Islam dengan menganalisis kontribusi Al-Qur'an terhadap perkembangan matematika dalam peradaban Islam. Dengan menggunakan pendekatan historis kualitatif, penelitian ini mengeksplorasi bagaimana ajaran Al-Qur'an menginspirasi para ulama Muslim untuk mengembangkan pengetahuan matematika. Al-Qur'an mengandung banyak ayat yang mendorong refleksi, penalaran logis, dan perhitungan. Konsep-konsep seperti hisab (perhitungan), mizan (keseimbangan), dan tatanan alam semesta menjadi landasan penting yang membentuk pola pikir intelektual para ulama Muslim. Data dikumpulkan dari sumber-sumber sejarah primer dan sekunder untuk melacak hubungan antara nilai-nilai Al-Qur'an dan kemajuan matematika. Studi ini menemukan bahwa Al-Qur'an tidak hanya membimbing kehidupan religius tetapi juga memotivasi ulama seperti Al-Khwarizmi dan Al-Battani untuk mengejar inovasi matematika. Matematika dalam peradaban Islam berkembang sebagai ilmu teknis dan sarana untuk memahami tanda-tanda Allah di alam. Integrasi antara penalaran ilmiah dan wawasan spiritual ini berkontribusi pada pertumbuhan matematika modern dan memperkaya warisan intelektual dunia. Studi ini menyimpulkan bahwa Al-Qur'an berfungsi sebagai katalisator bagi perkembangan ilmiah, membuktikan bahwa Islam mendorong pengejaran ilmu pengetahuan sambil menjaga harmoni antara sains dan keyakinan.

Kata kunci: *Al-Qur'an, Matematika, Peradaban Islam, Zaman Keemasan Islam, Cendekiawan*

PENDAHULUAN

Science and religion in Islam are inseparable elements that form a harmonious and mutually reinforcing relationship [1]. The Qur'an, as the central guide for Muslims, is not limited to providing spiritual and moral guidance but also contains various references that encourage the pursuit of knowledge. It promotes critical thinking, observation of nature, and logical reasoning as acts of worship. This holistic view positions science as a noble endeavor, with mathematics standing out as one of the key disciplines that experienced rapid growth during the Islamic Golden Age. The pursuit of knowledge is considered a form of devotion, and scientific exploration is seen as a means to understand and appreciate the greatness of Allah.

In the Qur'an, numerous verses highlight the importance of logic, reasoning, and calculation[2]. For example, discussions about inheritance laws (faraidh), the calculation of lunar cycles, and the precision of natural phenomena all point to the necessity of mathematical thinking. These teachings inspired Muslim scholars to study, develop, and refine mathematical concepts far beyond practical needs, embedding mathematics within a broader spiritual and philosophical framework. The Qur'an's emphasis on balance, justice, and order encouraged Muslims to seek harmony through knowledge, making mathematics not only a practical science but also a way to understand the divine order.

This Qur'anic encouragement laid a strong foundation for the development of various branches of mathematics, including algebra, geometry, trigonometry, and arithmetic. Pioneering Muslim mathematicians like Al-Khwarizmi, Al-Battani, and Umar Khayyam advanced these fields while maintaining a spiritual perspective in their scholarly work. Their contributions reflected the Islamic worldview that knowledge must lead to the betterment of humanity and deeper reflection on the signs of Allah's creation. Consequently, mathematics in Islamic civilization evolved into a discipline that was deeply rooted in both scientific inquiry and religious devotion, forming an integral part of the intellectual and cultural heritage of the Muslim world[3].

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[1] Hasan Bakti Nasution, M Fajri Syahroni Siregar, and Imron Bima Saputra, "The Distribution of Science According to Muslim Philosophers," *Ta Dib Jurnal Pendidikan Islam* 11, no. 1 (2022): 53–64, https://doi.org/https://doi.org/10.29313/tjpi.v11i1.9045.

[2] Salman Al Farisi Lingga et al., "History of the Development of Philosophy and Science in the Islamic Age," *Solo International Collaboration and Publication of Social Sciences and Humanities* 1, no. 1 (2023): 1–11, https://doi.org/https://doi.org/10.61455/sicopus.v1i01.5.

[3] Nurhikmah Nurhikmah et al., "The Interpretation of Patterns and Symmetry in the Qur'an: Does Mathematics Serve as Proof of Divinity or Merely an Aesthetic Interpretation?," *Borneo International Journal of Islamic Studies* 7, no. 1 (2025): 35–60, https://doi.org/https://doi.org/10.21093/bijis.v7i1.10061; Ibnu Imam Al Ayyubi et al., "Application of the Model-Eliciting Activities (MEAs) Learning Model on Mathematics Learning Based on Higher-Order Thinking Skills (HOTS)," *Noumerico: Journal of Technology in Mathematics Education* 2, no. 2 (2024): 82–95, https://doi.org/https://doi.org/10.33367/jtme.v2i2.5181; Ibnu Imam Al Ayyubi et al., "Application of Model-Eliciting Activities (MEAs) for Learning Mathematics Based on Students'initial Mathematical Abilities," *El Midad: Jurnal Jurusan PGMI* 16, no. 1 (2024): 72–90, https://doi.org/https://doi.org/10.20414/elmidad.v16i1.9654; Ibnu Imam Al Ayyubi et al., "Equilibrium of Faith and Logic: Integrating Islamic Moral Values and Mathematics Education in

Previous research has widely acknowledged the major contributions of Muslim scholars to the advancement of mathematics. Figures like Al-Khwarizmi, known as the father of algebra, and Al-Biruni, a pioneer in trigonometry and geodesy, played a crucial role in laying the groundwork for modern mathematical sciences. Their works not only advanced technical knowledge but also influenced the global scientific tradition, forming a bridge between ancient and modern mathematics. These scholars produced influential works that were later adopted and expanded upon by European scholars during the Renaissance.

However, despite these significant achievements, studies examining the Qur'an as the primary source of inspiration for mathematical development remain relatively scarce. Some scholars have suggested that values found in the Qur'an—such as the principles of order, balance, and reflection—shaped the worldview of Muslim scientists. These values encouraged them to study natural phenomena and seek rational explanations. Yet, most studies tend to focus on the technical contributions of these scholars rather than tracing how specific Qur'anic teachings may have influenced their intellectual pursuits.

This gap highlights the need for further research to explore the direct relationship between Qur'anic teachings and the scientific advancements made by Muslim scholars. A deeper investigation could reveal how particular verses inspired methods of reasoning, problem-solving, and the development of mathematical theories. Such studies would enrich the understanding of the intellectual foundations of Islamic civilization, showing that the development of mathematics was not only driven by practical needs but also by a profound spiritual motivation rooted in the Qur'an[4].

During the Islamic Golden Age, spanning from the 8th to the 14th centuries, Muslim civilization experienced remarkable progress in various fields of knowledge, with mathematics standing out as one of its most significant achievements. Muslim scholars developed advanced mathematical theories, not only to address practical needs such as trade calculations, astronomical observations, and geographical mapping, but also to enhance intellectual inquiry. Mathematics became an essential tool for solving real-world problems, contributing to the flourishing of science and technology within Islamic societies.

More importantly, the motivation behind this mathematical advancement was deeply rooted in Islamic teachings, particularly the Qur'an. The Qur'an consistently encourages the use of intellect, reasoning, and reflection on the natural world. Concepts such as balance (mizan), proportion, and order are frequently mentioned, instilling in Muslim scholars the importance of seeking knowledge with both rational and

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Various Contexts," *IJEMR: International Journal of Education Management and Religion* 1, no. 2 (2024): 127–44, https://doi.org/https://doi.org/10.71305/ijemr.v1i2.167; Ibnu Imam Al Ayyubi et al., "Application of The Brain-Based Learning Model on Students' Learning Outcomes and Initial Mathematical Abilities," *Tadrusuun: Jurnal Pendidikan Dasar* 3, no. 2 (2024): 246–59, https://doi.org/https://doi.org/10.62274/tadrusuun.v3i2.157.

[4] Hamid Sakti Wibowo, *Al-Khawarizmi: Bapak Aljabar Dan Algoritma.* (Tiram Media, 2023).

spiritual awareness. These Qur'anic principles fostered a culture of critical thinking and logical analysis, inspiring scholars to pursue mathematics not solely for worldly benefit but also as an act of devotion and a means of contemplating Allah's creation.

As a result, mathematics within Islamic civilization developed with a unique character that combined technical mastery with spiritual depth. Scholars like Al-Khwarizmi, Al-Battani, and Ibn al-Haytham viewed mathematical exploration as a path to understanding the harmony and precision of the universe, which ultimately pointed to the greatness of the Creator. This synthesis of science and faith enriched the Islamic intellectual tradition and left a lasting legacy, demonstrating that the pursuit of knowledge in Islam encompasses both practical utility and spiritual fulfillment[5].

This article seeks to explore in depth the contribution of the Qur'an to the development of mathematics in the history of Islamic civilization. The Qur'an, as a source of guidance for Muslims, not only contains moral and spiritual teachings but also encourages the use of reason and logical thinking. By examining specific Qur'anic verses that promote reflection, balance, and calculation, this study aims to reveal how these teachings became the foundation for the growth of mathematical knowledge among Muslim scholars throughout history.

In addition to discussing relevant Qur'anic verses, this article also highlights the groundbreaking works of prominent Muslim scholars who significantly advanced mathematics. Figures such as Al-Khwarizmi, Al-Battani, and Al-Biruni were not only inspired by practical needs but also driven by the spiritual motivation rooted in the Qur'an. Their contributions influenced the global development of mathematics, bridging the knowledge of ancient civilizations with the advancements of the modern world. The integration of religious values into scientific inquiry became a hallmark of Islamic intellectual tradition.

Through this approach, the article aims to offer a new perspective on the relationship between the Qur'an, mathematics, and Islamic civilization. By tracing the direct influence of the Qur'an on mathematical thought, this study serves as a reference to strengthen the integration of Islamic values in contemporary knowledge development. It emphasizes that scientific progress and religious faith can coexist harmoniously and even complement each other in fostering a balanced and civilized society.

METHOD

[5] Sriwahyuni Lubis et al., "Tradisi Menulis, Industri Buku Dan Perpustakaan Dalam Peradaban Islam Klasik," *EDU-RILIGIA: Jurnal Ilmu Pendidikan Islam Dan Keagamaan* 8, no. 3 (2024).

This study employs a historical qualitative approach[6], to analyze the contribution of the Qur'an to the development of mathematics in the history of Islamic civilization. This methodology is designed to understand the relationship between the teachings of the Qur'an and the development of mathematics through historical studies of relevant primary and secondary sources. The research utilizes a historical-thematic approach with the following objectives: 1) To identify Qur'anic verses that directly or indirectly inspire the development of mathematics. 2) To trace the role of Muslim scholars in advancing mathematics based on Qur'anic values. 3) To analyze the influence of the Qur'an on the innovations and development of mathematics in Islamic civilization.

This study uses two main types of data: 1) Primary Sources, including Qur'anic verses that encourage the development of knowledge, especially in mathematics, related to numbers, measurement, proportions, and natural phenomena. Manuscripts and scientific works of Muslim scholars, such as Al-Khwarizmi (the Father of Algebra), Al-Biruni, and Ibn al-Haytham, reflect the Qur'anic values in their mathematical approaches. 2) Secondary Sources, including literature and historical books discussing the influence of the Qur'an on the development of mathematics. Relevant journal articles, theses, and dissertations on this topic will also be consulted. Data is collected through: Library Research[7], which involves reviewing Qur'anic verses and classical and modern scientific works related to mathematics. Documentation, which involves gathering historical documents, such as ancient manuscripts and records from scientific institutions during the Islamic Golden Age. Contextual Analysis, which connects the social and cultural context of the Islamic Golden Age with mathematical thought derived from the Qur'an. This methodology aims to reveal the contribution of the Qur'an as an inspiration and philosophical foundation for the development of mathematics in the history of Islamic civilization.

RESULTS AND DISCUSSION

Mathematical Inspiration in the Qur'an

The Qur'an provides a strong philosophical foundation for the development of mathematics in the history of Islamic civilization. As a holy book containing guidance for humanity, the Qur'an addresses not only spiritual aspects but also principles relevant to knowledge, including mathematics. Several verses explicitly or implicitly contain concepts of calculation, proportion, and order, which served as inspiration

[6] John W Creswell, "Research Design: Pendekatan Kualitatif, Kuantitatif, Dan Metode Campuran," *Diterjemahkan Oleh Achmad Fawaid, Edisi Ke-3. Cet. Ke-1. Yogyakarta: Pustaka Setia*, 2010.

[7] Istianah Istianah and Lutfi Rahmatullah, "Abu Bakr Al-Razi Di Antara Agama Dan Sains," *Islamadina : Jurnal Pemikiran Islam* 22, no. 2 (2021): 209, https://doi.org/10.30595/islamadina.v22i2.10278; Kapur S Ahlawat and Victor Y Billeh, "Comparative Investigation of the Psychometric Properties of Three Tests of Logical Thinking," *Journal of Research in Science Teaching* 24, no. 2 (1987): 93–105, https://doi.org/https://doi.org/10.1002/tea.3660240202; Widia Putri, "Pemikiran Ibn Rushd Tentang Pendidikan Dan Relevansinya Dengan Dunia Modern," *Jurnal Manajemen Dan Pendidikan Islam* 6, no. 1 (2020): 92–105.

for Muslim scholars[8]. These verses encourage Muslims to develop knowledge as a form of worship and reflection on the greatness of Allah. One example is Surah Yunus: 5, which mentions the sun and the moon as markers for time calculation. This verse underscores the importance of understanding the movement of celestial bodies to organize calendars and determine prayer times and the beginning of Ramadan.

Surah Yunus: 5: "*He it is who made the sun a shining light, and the moon a light, and He appointed for it phases, that you might know the number of years and the calculation of time*", serves as a scientific basis for the development of astronomy and mathematics. The Islamic calendar, based on the lunar cycle, requires accuracy in time calculation. Muslim scientists, such as Al-Battani, developed precise astronomical tables to determine the phases (*manazil*) of the moon. This also demonstrates how the Qur'an motivated Muslims to create mathematical tools and methods beneficial in daily life. The use of numbers and calculations facilitated various social and religious needs.

Furthermore, Surah An-Nisa: 11-12 provides a clear example of the application of mathematics in Islamic law. This verse explains the division of inheritance with specific proportions for each heir, such as a son receiving double the portion of a daughter, or portions for parents and spouses. This division requires not only an understanding of Islamic law but also a mastery of mathematics. Muslim scholars like Al-Khwarizmi developed algebra to solve inheritance distribution problems systematically and fairly. The algebraic concepts pioneered by Al-Khwarizmi became the foundation for the development of modern mathematics[9], including solving linear equations and number theory[10].

Surah Al-Ankabut: 20 is also an inspirational verse that encourages empirical observation of the universe: "Travel through the earth and observe how Allah began creation." This verse contains an encouragement to understand the patterns and order in nature. In the context of mathematics, the observation of natural phenomena led to the development of concepts in geometry and symmetry. For example, the hexagonal structure of a beehive reflects spatial and material efficiency, which can be explained through the principles of geometry. Similarly, the Fibonacci patterns found in flowers and plants demonstrate the mathematical

[8] Syamsuddin Nurhikmah, Indo Santalia, "Membangun Kefahaman: Landasan Epistemlogi Kefilsafatan Dalam Islam," *Setyaki: Jurnal Studi Keagamaan Islam* 1 (2023): 87–96, https://doi.org/https://doi.org/10.59966/setyaki.v1i4.736.

[9] Zakiyah, "Problematika Guru Al-Quran Hadis Dalam Menggunakan Media Pembelajaran Berbasis Digital Di Mtsn 3 Padang Lawas," *Ikadi (Journal of Islamic Studies)* 2, no. 1 (2023): 14–27, https://doi.org/10.56672/alwasathiyah.v3i1.351.

[10] Steffi Van Bongga and Tanti Listiani, "Implementasi Strategi Integrasi Iman Dan Pembelajaran John W. Taylor Dalam Pembelajaran Matematika Pada Materi Bilangan [the Implementation of John W. Taylor'S Faith and Learning Integration Strategy in Learning Mathematics on Numbers]," *JOHME: Journal of Holistic Mathematics Education* 4, no. 1 (2020): 45, https://doi.org/10.19166/johme.v4i1.1987.

order in Allah's creation. This inspiration encouraged Muslim scholars to further explore the relationship between mathematics and nature, leading to a deeper understanding of how mathematical principles are embedded in the natural world[11].

Furthermore, the Qur'an teaches the concepts of balance and proportion, which serve as foundational principles in mathematics[12]. Surah Ar-Rahman: 7-9 states, "And the heaven He raised, and He has set the balance, that you may not transgress in the balance." This verse teaches the importance of maintaining harmony and proportion in all things, both in daily life and in mathematical calculations. This principle is relevant in various branches of mathematics, such as probability theory, statistical analysis, and Islamic economics. Muslim scholars translated this concept into the development of accurate and systematic measurement methods.[13].

The Qur'an's inspiration for mathematics is also evident in the use of symbolic numbers that carry philosophical meanings[14]. For example, the numbers 7 and 19 often appear in the Qur'an and Islamic tradition, encouraging thinkers to explore the hidden meanings behind these numerical patterns[15]. Research into these numerical patterns not only enhances understanding of the sacred text but also motivates exploration in fields such as cryptography and numerical analysis. This contribution has had a far-reaching impact on the field of science, including modern information technology[16].

Historically, the Qur'an played a role in fostering the establishment of educational institutions that integrated religious and scientific knowledge. Institutions such as madrasahs and the Bait al-Hikmah established by Islamic

[11] Mirna Kartika Mirna and Kristina Imron, "Metode Pembelajaran Karya Wisata (Studi Tour) Dalam Telaah Tafsir Al-Qur'an Surah Al-Ankabut Ayat 20 Dan Hadist," *Jurnal Ilmu Pendidikan Muhammadiyah Kramat Jati* 4, no. 2 (2023): 84–90, https://doi.org/https://doi.org/10.55943/jipmukjt.v4i2.90.

[12] Muhammad Fathurrahman et al., "Integrasi Teknologi Dalam Pendidikan Matematika: Wawasan Dari Tinjauan Literatur Sistematik," *KAMBIK: Journal of Mathematics Education Volume 2, No. 1, 2024, 66-79 ISSN* 2, no. 1 (2024): 66–79.

[13] Nailil Muna Allailiyah, "Peran Sains Dalam Membangun Kualitas Generasi Islam (Role of Science in Building Quality of Islamic Generations)," *Prosiding Konferensi Integrasi Interkoneksi Islam Dan Sains* 2 (2020): 321–29.

[14] Murharyana Murharyana et al., "Educational Values For Children Based On Qs. Luqman: 13-14 In Digital Era," *Al Muhafidz: Jurnal Ilmu Al-Qur'an Dan Tafsir* 4, no. 2 (2024): 184–200, https://doi.org/https://doi.org/10.57163/almuhafidz.v4i2.103; Abdullah Mahmud, "Multicultural Democratic and Tolerant: Qur'anic Perspectives and Islamic Education at the Universitas Muhammadiyah Surakarta," *Solo Universal Journal of Islamic Education and Multiculturalism* 1, no. 3 (2023): 205–20, https://doi.org/https://doi.org/10.61455/sujiem.v1i03.82; M Husnaini, Ahmad Syauqi Fuady, and Irnie Victorynie, "Multiple Intelligence in the Perspective of the Qur'an," *Indonesian Journal of Islamic Education Studies (IJIES)* 3, no. 2 (2020): 141–59, https://doi.org/https://doi.org/10.33367/ijies.v3i2.1358.

[15] Sainee Tamphu et al., "Building Bridges to the Future of Learning : Exploring Artificial Intelligence Research Using R- Studio Assisted Bibliometrics," *Cogent Education* 11, no. 1 (2024), https://doi.org/10.1080/2331186X.2024.2417623.

[16] Rani Khairun Nisa, "Ayat-Ayat Kauniyah Dan Implikasi Teologisnya Dalam Al-Qur'an" (UNIVERSITAS PTIQ JAKARTA, 2023); Abidin Nurdin and Sri Astuti, "Filsafat Ilmu Dan Agama: Paradigma Sains, Sosial Dan Budaya" (Zahir Publishing, 2024).

civilization became centers of study that produced great scholars like Ibn Sina, Al-Farabi, and Al-Khwarizmi. Their research involved a deep understanding of the Qur'an alongside mastery of mathematics. For instance, the concepts of logarithms and algorithms developed by Al-Khwarizmi were rooted in efforts to solve practical problems for Muslims, such as inheritance division and determining the direction of the Qibla[17].

Thus, the Qur'anic verses not only provide spiritual motivation but also serve as a philosophical foundation for the development of mathematics. This science is seen as a tool to understand the "open book" of the universe, filled with signs of Allah's greatness. It demonstrates how Islam harmonizes faith and reason, teaching its followers to continue learning and innovating. Mathematics becomes one of the means to unravel the beauty and order of His creation, thus reinforcing the belief in the greatness of the Creator.

Mathematics in the History of Islamic Civilization

During the Golden Age of Islamic civilization, between the 8th and 15th centuries, Muslim scholars not only translated the great works of Greek and Indian civilizations but also developed new concepts that laid the foundation for modern mathematics. This development was greatly influenced by the teachings of the Qur'an, which encouraged Muslims to advance knowledge and solve worldly problems using science. The motivation to address practical problems in line with societal needs, such as inheritance division and calendar calculations, became a primary driver of their innovation[18]. Along with this, many prominent figures played crucial roles in the development of mathematics, such as Al-Khwarizmi, Omar Khayyam, and Nasir al-Din al-Tusi, who utilized this knowledge to improve the quality of life for Muslims and made significant contributions to the global scientific community.

Al-Khwarizmi, one of the greatest scholars in the history of Islamic mathematics, made enormous contributions to the development of science. His most famous work, *Kitab al-Mukhtasar fi Hisab al-Jabr wal-Muqabala*, is considered the foundation for the development of modern algebra. The term "algebra" itself comes from the word used in the title of his book, referring to the process of systematic reconstruction or reorganization. Al-Khwarizmi was inspired by practical needs in Islamic society, such as the calculation of inheritance distribution (faraidh) mentioned in the Qur'an. Through his structured approach, he developed methods that made it easier for people to solve mathematical calculations systematically and efficiently. Additionally, he contributed to the refinement of the decimal numeral system, which became the foundation of modern mathematics. The concept of algorithms, now widely known, also stems from Al-Khwarizmi's name, providing a strong

[17] Pepep Puad Muslim, Tatang Farhanul Hakim, and Suparman Jassin, "Dinamika Dan Perkembangan Ilmu Falak Dari Era Pra Islam Hingga Era Kontemporer," *Al-Tsaqafa: Jurnal Ilmiah Peradaban Islam* 20, no. 1 (2023): 14–28, https://doi.org/https://doi.org/10.15575/al-tsaqafa.v20i1.27243.
[18] Nurhikmah Nurhikmah, "Character Education Islam From the Views of Imam Al-Ghazali," *Jurnal Al Burhan* 4, no. 1 (2024): 53–66, https://doi.org/10.58988/jab.v4i1.300.

foundation for the development of computer technology and programming systems[19].

In addition to Al-Khwarizmi, Omar Khayyam was also a significant figure in the history of Islamic mathematics. Khayyam was known for his ability to develop geometric solutions to cubic equations, which at the time were a major challenge for mathematicians. Through his visual approach, Khayyam was able to provide easily understandable solutions, thereby enriching the mathematical worldview of that era. He also contributed new ideas in number theory, which became the foundation for further developments in mathematics. Khayyam linked the concepts of justice and balance, frequently found in the teachings of the Qur'an, to the solving of mathematical problems. One of Khayyam's major achievements was the reform of the highly accurate Jalali Calendar, which, based on meticulous mathematical calculations, was more precise than the Gregorian Calendar used in the Western world, demonstrating his exceptional mathematical expertise[20].

Nasir al-Din al-Tusi was another influential Islamic scholar who made significant contributions to the development of trigonometry. Al-Tusi developed spherical trigonometry, a branch of mathematics that is crucial for navigation and astronomy[21]. The new methods he introduced, such as more accurate sine and cosine tables, became the foundation for various practical applications. The development of spherical trigonometry not only helped Muslims in determining the direction of the qibla, an essential need in religious practices, but also played a major role in the advancement of astronomy. Al-Tusi's works in trigonometry were used to study celestial movements, laying the groundwork for more precise astronomical knowledge in the future. One of al-Tusi's greatest legacies was the establishment of the Maragha Observatory, which became a center for the development of science and astronomy at the time, attracting scholars from around the world[22].

With the contributions made by great figures such as Al-Khwarizmi, Omar Khayyam, and Nasir al-Din al-Tusi, the development of mathematics in Islamic civilization was not limited to theory but also provided practical benefits that were directly felt by Muslims. Mathematics was not only used to deepen the understanding of the universe but also as a tool to meet practical needs in everyday life, such as

[19] Osman Birgin and Hatice Acar, "The Effect of Computer-Supported Collaborative Learning Using GeoGebra Software on 11th Grade Students' Mathematics Achievement in Exponential and Logarithmic Functions," *International Journal of Mathematical Education in Science and Technology* 53, no. 4 (2022): 872–89, https://doi.org/https://doi.org/10.1080/0020739X.2020.1788186.
[20] Anisa Anisa et al., "Ilmu Sains Dalam Prespektif Pendidikan Islam," *El-Fata: Journal of Sharia Economics and Islamic Education* 3, no. 1 (2024): 51–66, https://doi.org/https://doi.org/10.61169/el-fata.v3i1.85.
[21] I Nursalam., Nurhikmah., & Purnamasari, N, "Nilai Pendidikan Karakter Dalam Teks Sastra Lisan Kelong Makassar," *Jurnal Lingue : Bahasa, Budaya, Dan Sastra* 1, no. 1 (2019): 88–95.
[22] Hamid Sakti Wibowo, *Ilmuwan Muslim: Kontribusi Berharga Mereka Untuk Peradaban Dunia* (Tiram Media, 2023); M Arsyad Alkadafi et al., "Islam Dan Kontribusinya Terhadap Perkembangan Ilmu Pengetahuan: Suatu Telaah," *Jurnal Intelek Dan Cendikiawan Nusantara* 1, no. 5 (2024): 6325–34.

time calculation, inheritance distribution, and religious activity planning. This is also reflected in the development of scientific instruments, such as the astrolabe and other measuring tools, which accelerated technological progress. All of this shows that the teachings of the Qur'an motivated Muslims to study and develop knowledge for the benefit of humankind.

The integration of Qur'anic teachings and the advancement of science in Islamic civilization proves that Islam not only values knowledge but also encourages its followers to continually learn and innovate[23]. The concept of knowledge in Islam teaches that knowledge is a means to understand the greatness of Allah's creation and to improve human quality of life. Therefore, in the history of Islamic civilization, mathematics was not only viewed as an abstract discipline but also as a tool to address practical problems faced by Muslims, such as in the fields of economics, society, and religion. For example, the principles of justice in the distribution of zakat require careful and accurate calculations, which ultimately promoted further development in mathematics.

Over time, the works of these Islamic scholars continued to have a significant impact on the development of science in both the Western and Eastern worlds. Many of their works were translated and studied by Western scholars during the Renaissance, which in turn influenced scientific advancements in Europe. This shows that Islamic civilization not only contributed to the development of mathematics but also to the global development of science. Al-Khwarizmi's work, for instance, became the foundation for mathematics curricula in European universities during the Middle Ages. Therefore, the scientific legacy of Islamic civilization, particularly in mathematics, remains an essential part of world history.

Contributions of Islamic Mathematics to the World

The contributions of Islamic mathematics to the world have had a profound impact, not only within the context of Islamic civilization but also in the development of science in the Western world[24]. During the Middle Ages, Muslim scholars not only developed mathematics to meet the internal needs of their civilization but also played a crucial role in spreading this knowledge to Europe. This process occurred through regions such as Andalusia and Sicily, where Muslim and Christian translators collaborated to transfer scientific works from the Islamic world to the West. This collaboration played a central role in driving scientific progress in Europe, especially during the Renaissance, which then contributed to the scientific revolution that brought significant changes to the Western world[25].

[23] Victor J Katz, "Ideas of Calculus in Islam and India," *Mathematics Magazine* 68, no. 3 (June 1, 1995): 163–74, https://doi.org/10.1080/0025570X.1995.11996307; David A King, "Notes on the Sources for the History of Early Islamic Mathematics," ed. F Sezgin, *Journal of the American Oriental Society* 99, no. 3 (July 16, 2025): 450–59, https://doi.org/10.2307/602381.
[24] King, "Notes on the Sources for the History of Early Islamic Mathematics."
[25] Abid Nurhuda, "Peran Dan Kontribusi Islam Dalam Dunia Ilmu Pengetahuan," *Jurnal Pemikiran Islam* 2, no. 2 (2022): 222–32.

One of the greatest contributions of Islamic mathematics to the world was the introduction of the decimal number system to the West. Previously, the number system used in Europe was the Roman numeral system, which was very limited in its ability to solve more complex calculations. Muslim scholars adopted and refined numbers that had initially been introduced by Indian mathematicians, including the discovery of the number zero[26]. The concept of zero was extremely important because it allowed for more complex and efficient calculations. Through the works of Al-Khwarizmi and other scholars, this numeral system was eventually adopted in Europe, replacing the Roman numeral system, which was less efficient. The application of the decimal number system became the foundation for the modern number system still in use today.

In the field of trigonometry, Muslim scholars played a key role in developing fundamental concepts that are critical in astronomy and navigation. Scholars such as Al-Battani produced highly accurate trigonometric tables, which were used by astronomers and sailors to map stars and determine directions. Furthermore, Al-Battani also introduced new, more efficient trigonometric methods, which helped improve the accuracy of measurements and navigation. This contribution had a major impact on the development of astronomy, both in the Islamic world and in the West, and became the foundation for future scientific research[27].

Geometry also saw rapid development thanks to the contributions of Muslim scholars. In Islamic civilization, geometry was not only used for practical purposes, such as mosque architecture or Islamic art like arabesque, but also in scientific research. For example, the intricate geometric structures of mosque domes and mosaic designs demonstrate a deep understanding of mathematical principles. Scholars like Ibn al-Haytham used geometry to develop the theory of optics, which became the precursor to modern physics. Ibn al-Haytham's work on light and vision was highly influential in the development of physics, and his discoveries on the reflection and refraction of light were a major contribution to the world of science.

Additionally, Muslim scholars also made significant advances in algebra and number theory. Al-Karaji, a Muslim mathematician, developed the method of mathematical induction, which became the foundation for many branches of modern mathematics. This method helped mathematicians prove theorems in a more systematic and structured way. Other contributions came from the development of number theory, which was used in various applications, including in governance and administration. In this regard, Muslim mathematicians played an important role in the development of knowledge highly relevant to the practical needs of society, such as tax calculations or state financial management.

[26] Katz, “Ideas of Calculus in Islam and India.”
[27] Andriyanto Andriyanto, “Peran Ilmu Matematika Dalam Sejarah Peradaban Islam,” *Jurnal Dunia Ilmu* 1, no. 3 (2021).

Moreover, Muslim scholars were also instrumental in the development of statistics and probability. The probability calculation methods developed by scholars like Al-Khwarizmi and Al-Karaji were used in various aspects of life, from trade to government administration. The development of probability theory was also crucial in advancing economics and business, as it enabled more rational decision-making based on more accurate calculations. Thus, the contributions of Muslim scholars in the field of statistics had a long-term impact on data management and decision-making in various sectors.

The transfer of knowledge from the Islamic world to Europe was not limited to mathematics, but also encompassed other disciplines such as medicine, astronomy, and philosophy. This intellectual legacy was crucial to the development of global science. Muslim scholars demonstrated that mathematics is a universal language that can bridge various cultural and religious differences. Through mathematics, humanity can work together to understand the universe and solve the various challenges faced in life. Therefore, the contribution of Islamic mathematics is not only a valuable historical heritage but also a source of inspiration for future generations to continue exploring the potential of scientific knowledge[28].

Ultimately, the contributions of Muslim scholars in the fields of mathematics and science not only had a significant impact on the development of science in the Western world but also demonstrated the importance of cross-cultural collaboration in advancing human civilization. Islamic scholars taught us that knowledge should be seen as a tool to improve the quality of human life. In this context, mathematics becomes a means to answer the great questions about the universe and a tool to practically improve human life. Therefore, it is important for us to continue developing and utilizing scientific knowledge, as Muslim scholars have done throughout history.

The Role of Mathematics in Solving Practical Problems

In the history of Islamic civilization, the integration of the teachings of the Qur'an and scientific knowledge has played a vital role in driving the development of science. The Qur'an encourages Muslims to develop knowledge as a form of worship and a way to understand Allah’s creation. In many verses, the Qur'an calls on people to reflect, observe nature, and seek wisdom in every event, which has led to numerous scientific discoveries. This is reflected in verses that emphasize the importance of knowledge and learning. For example, in Surah Al-Alaq: 1-5, humanity is reminded of the importance of knowledge obtained through reading and

[28] Mumu Zainal Mutaqin et al., “Factors in Religious Culture to Increase Tolerant Attitude of Gen-Z Among Urban Muslims,” *Akademika: Jurnal Pemikiran Islam* 29, no. 1 (2024): 73–86, https://doi.org/https://doi.org/10.32332/akademika.v29i1.9145.

understanding Allah's creation. In this context, mathematics and natural sciences are seen as tools to explore the greatness of the Creator[29].

The relationship between the Qur'an and mathematics is particularly strong, especially when looking at how the Qur'an guides Muslims to understand order and proportion in the universe. The concept of balance and order, as explained in Surah Ar-Rahman: 7-9, teaches the importance of maintaining harmony in all things. This principle of balance can be applied to various branches of knowledge, especially mathematics, which focuses on finding patterns and relationships in the world. For instance, in the development of probability theory and statistics, Muslim scientists integrated the Qur'anic teachings of balance with mathematical understanding to make fairer and more accurate decisions[30].

The Qur'an not only teaches the basic principles of mathematics but also inspires Muslims to enrich their knowledge through empirical experiments and observations of nature. Surah Al-Ankabut: 20 encourages people to observe Allah's creations, which prompted Muslim scientists to study mathematical patterns in natural phenomena, such as the Fibonacci sequence found in flowers and plants. Thus, science in Islam is seen as a form of *tafakur* (contemplation) on Allah's greatness through scientific methods. This has driven many Muslim scholars to delve deeper into the mathematical principles found in the universe and apply them in daily life.

During the golden age of Islamic civilization, the development of knowledge, including mathematics, was closely tied to religious teachings. Educational institutions such as madrasahs and the Baitul Hikmah (House of Wisdom) became centers of learning that combined religious and scientific knowledge. Through education based on the Qur'an, Muslims were taught to use knowledge for the betterment of humanity. Scholars like Al-Khwarizmi, Omar Khayyam, and Ibn Sina utilized religious teachings to develop their knowledge, which led to numerous important discoveries in mathematics and science. Thus, the relationship between knowledge and religion became one of the main pillars of scientific development in the Islamic world.

A concrete example of applying Qur'anic teachings in mathematics is the development of algebra by Al-Khwarizmi. In his book, *Kitab al-Mukhtasar fi Hisab al-Jabr wal-Muqabala*, Al-Khwarizmi not only laid the foundations of algebra but also created systematic methods for solving mathematical problems, inspired by the practical demands of daily life, such as inheritance distribution (faraidh) as outlined

[29] M V Solodikhina, N I Odintsova, and E E Odintsova, "Natural-Scientific Cases as an Instrument for Assessment of Logical Thinking," in *Journal of Physics: Conference Series*, vol. 1691 (IOP Publishing, 2020), 12218, https://doi.org/10.1088/1742-6596/1691/1/012218.
[30] Zuhriyandi Zuhriyandi, "Harmoni Beragama Dan Pencegahan Konflik: Perspektif Moderasi Menurut Al-Qur'an Dan Alkitab," *MODERATIO: Jurnal Moderasi Beragama* 3, no. 2 (2023): 218–32, https://doi.org/https://doi.org/10.32332/moderatio.v3i2.8222.

in the Qur'an[31]. This concept of algebra was later translated into Latin and spread to the West, becoming the foundation for the development of modern mathematics. This illustrates how the Qur'an can serve as a strong foundation for scientific progress.

In addition to algebra, the rapidly advancing field of astronomy in the Islamic world was also deeply influenced by Qur'anic teachings, particularly in relation to the observation of celestial bodies and time calculations. Surah Yunus: 5 instructs Muslims to observe the movement of the sun and the moon, which formed the basis for developing the lunar calendar used in the daily lives of Muslims. Scholars like Al-Battani and Al-Farghani developed highly accurate astronomical tables, allowing Muslims to determine prayer times and start the month of Ramadan. This shows how the principles in the Qur'an can be applied for scientific advancements that benefit the lives of people.

The concept of balance and harmony in the Qur'an also had a significant influence on the development of mathematical theory in Islamic economics. Surah Al-Baqarah: 282 emphasizes the importance of justice and order in business transactions, which led to the development of concepts such as probability theory and statistical analysis in Islamic economics. Scholars like Ibn Khaldun developed economic theories based on the social justice principles taught in the Qur'an. Therefore, in the development of Islamic economics, mathematics was not only used for economic calculations but also as a means to achieve social balance and justice, which are core values of Islam.

Overall, the integration of Qur'anic teachings and the development of science in the Islamic world demonstrates that Islam not only values knowledge but also teaches its followers to develop knowledge for the welfare of humanity. In this context, mathematics is not merely an academic discipline but a tool for understanding the universe, managing daily life, and achieving religious and social goals. Thus, the teachings of the Qur'an have inspired Muslims to continue learning and innovating, creating a civilization based on scientific knowledge that benefits humanity worldwide.

From an Islamic perspective, knowledge, including mathematics, is viewed as a form of worship that brings people closer to Allah. The Qur'an itself stresses the importance of seeking knowledge as part of the effort to increase one’s piety. Surah Al-Mujadila: 11 teaches that Allah will raise the status of those who possess knowledge. Therefore, the learning process, including in mathematics, is not just about achieving intelligence or worldly advancement, but more importantly, it serves as a means to draw closer to Allah. In this context, mathematics becomes one

[31] Nurhikmah, “Maqashid Al-Shariah : Kerangka Adaptif Hukum Islam Untuk Menjawab Tantangan Kontemporer,” *Journal of Dual Legal System* 1, no. 2 (2024): 103–17, https://doi.org/10.58824/jdls.v1i2.226.

of the disciplines that can lead Muslims to better understand Allah's greatness through the order and beauty found in His creation[32].

Mathematics as a form of worship can be understood in how it is used to recognize the greatness of Allah. For example, observing the mathematical structure found in the universe, such as symmetry, patterns, and proportions, can serve as a reflection of the order created by God. In Surah Al-Anbiya: 30, Allah says that the heavens and the earth, which were once a chaotic mass, were then separated, indicating the existence of order[33]. Therefore, when Muslims study mathematics, they view numbers and formulas not just as part of science but also as a form of reflection on the order Allah created in the universe.

Mathematics teaches the importance of clarity, precision, and order in thinking, which aligns with the religious values in Islam. In the process of learning mathematics, a Muslim is required to pay attention to detail carefully, which in turn teaches them to be more meticulous in every step of life. This is in accordance with Islamic teachings that encourage honesty, accuracy, and fairness in all aspects of life. Learning mathematics also becomes a means of increasing discipline and obedience to Allah because every thought process and problem-solving step leads to the achievement of a correct goal[34].

From an Islamic viewpoint, mathematics can be seen as a way of understanding Allah's creation, which is highly orderly. Muslim scientists in the past, like Al-Khwarizmi, developed advanced mathematical concepts, including algebra, that not only helped Muslims in their daily lives but also served as a form of worship. They believed that by mastering mathematics, they could more easily understand the laws of Allah that govern the universe. Therefore, mathematics is not just a tool for solving worldly problems but also a medium for increasing piety and drawing closer to God.

An important example of how mathematics is viewed as a form of worship in Islam is in the field of inheritance law (faraidh). The distribution of inheritance in Islam is highly detailed, and precise mathematical calculations are required to ensure that every family member receives their due share, as prescribed in the Qur'an. In this case, mathematical calculations are not just seen as administrative

[32] Yusri Handayani and Nurfadilah Nurfadilah, "The Effect of Brain-Based Learning Model on Student Physics Learning Outcomes," *Kasuari: Physics Education Journal (KPEJ)* 4, no. 2 (2021): 110–17, http://journalfkipunipa.org/index.php/kpej/article/view/232.

[33] Mersi Hendra, "Konsep Penciptaan Bumi Dalam Alquran (Studi Terhadap QS. Al-Anbiya'[21]: 30) Menurut Hamka Dalam Tafsir Al-Azhar," *Jurnal Tafsere* 8, no. 2 (2020), https://doi.org/https://doi.org/10.24252/jt.v8i2.20400; Moh Jufriyadi Sholeh and Ramadhan Ramadhan, "Konsep Terpisahnya Langit Dan Bumi (Studi Analisis Atas Penafsiran Fakhruddin Ar-Razi Dalam Mafatih Al-Ghaib Terhadap Qs Al-Anbiya'ayat 30)," *El-Waroqoh: Jurnal Ushuluddin Dan Filsafat* 4, no. 1 (2020), https://doi.org/http://dx.doi.org/10.28944/el-waroqoh.v4i1.593.

[34] Khoirul Anisa, "Implementasi Nilai-Nilai Karakter Pada Pembelajaran Tematik Kelas V Melalui Problem Based Learning Di Ma'arif Mayak Tonatan Ponorogo" (IAIN PONOROGO, 2023); Mahdiyatus Salami, "Model Pembelajaran Matematika Berbasis Karakter," *Jurnal Ilmiah Mahasiswa Raushan Fikr* 9, no. 2 (2020): 98–111, https://doi.org/https://doi.org/10.24090/jimrf.v9i2.4154.

tasks but as part of the effort to uphold justice as established by Allah. Every number used in these calculations is considered a manifestation of obedience and justice, which must be applied in the social life of Muslims[35].

Mathematics education in Islam also serves a higher purpose: to shape the character of Muslims who think logically and systematically. Surah Al-Alaq: 1-5 teaches Muslims to use their intellect and knowledge to advance themselves and society. By studying mathematics, Muslims are taught to think rationally and make decisions based on clear and measurable principles. This is part of an effort to live a life in alignment with Islamic teachings, where every decision made must be in accordance with the guidance of Allah and His Messenger.

In the social context, mathematics also becomes a tool for improving society. For instance, in the field of economics, mathematics is used to plan a fair system of wealth distribution, which is in line with the principles of justice in Islam. Surah Al-Baqarah: 282 provides guidance on fair and transparent transactions, requiring Muslims to use accurate and fair calculations. Thus, mathematics is not only a tool to plan and organize worldly life, but also to ensure that life remains aligned with Islamic values[36].

The Qur'an encourages Muslims to continually learn and seek knowledge, which includes mathematical knowledge. Surah Al-Mujadila: 11 reminds us that those who possess knowledge will be elevated in status by Allah[37]. Therefore, every effort to study mathematics can be considered an act of worship that brings one closer to Allah. Knowledge, including mathematics, should be seen as a means to improve oneself, enhance the quality of life, and benefit others. In other words, mathematics studied with the right intention will bring great rewards and benefits, both in this world and the Hereafter.

The application of mathematics in daily life also becomes a means of fulfilling obedience to Allah. For example, the use of arithmetic in calculating zakat, organizing hajj obligations, and determining prayer times are some important applications of mathematics in the lives of Muslims. Each of these calculations is considered an act of obedience to Allah, because through precise calculations, a Muslim can perform religious duties perfectly. Therefore, learning and mastering

[35] Maisyifa Hayati and Najwa Putri, "Implementasi Prinsip-Prinsip Islam Dalam Pembelajaran Matematika Untuk Memperkokoh Kebangkitan Spiritual Siswa," *Religion: Jurnal Agama, Sosial, Dan Budaya* 3, no. 2 (2024): 43–54, https://doi.org/https://doi.org/10.55606/religion.v3i2.918; Randi Stiawan, "Peran Ilmuwan Muslim Dalam Kemajuan Ilmu-Ilmu Keislaman Pada Masa Dinasti Mamluk Di Mesir," *Local History & Heritage* 3, no. 2 (2023): 66–72, https://doi.org/https://doi.org/10.57251/lhh.v3i2.1093.

[36] Muhammad Saiful Khair and Nor Faridatunnisa, "Persaksian Dalam Hutang (Studi Komparatif QS. Al-Baqarah [2]: 282 Perspektif Tafsir Jalalain Dan Tarjuman Al-Mustafid)," in *Proceeding International Conference on Quranic Studies*, 2023; Atep Hendang Waluya and Aforisma Mulauddin, "Akuntansi: Akuntabilitas Dan Transparansi Dalam Qs. Al Baqarah (2): 282-284," *Muamalatuna* 12, no. 2 (2020): 15–35.

[37] Bukhari Umar, *Hadis Tarbawi: Pendidikan Dalam Perspektif Hadis* (Amzah, 2022).

mathematics is not only for worldly purposes but also as a tool for performing worship more effectively.

By understanding mathematics as a form of worship, Muslims are taught to appreciate the importance of knowledge in their lives. Mathematics is no longer viewed as a dry, technical field but as one of the paths to drawing closer to Allah. This science teaches discipline, accuracy, and the ability to think systematically—qualities that are highly valued in Islamic teachings. In this way, mathematics becomes a key pillar in creating a balanced, harmonious, and blessed life, both in this world and the Hereafter.

The Philosophical Dimension of Mathematics in Islamic Civilization

Mathematics in Islamic civilization is not only understood as an exact science but also possesses a profound philosophical dimension that reflects faith and belief in the greatness of Allah[38]. In Islam, mathematics is seen as a means to understand the signs of Allah's grandeur reflected in the harmony and order of the universe. The Qur'an often directs human attention to the beauty of the logic in Allah's creation, as seen in Surah Al-Mulk: 3-4, which describes the flawless balance of the cosmos[39]. By understanding the logic of mathematics, Muslims believe they can draw closer to Allah through reflection on the order in the natural world. Muslim scientists viewed numbers, geometry, and patterns as part of God's language in creating the world, where each element has a harmonious relationship and complements each other.

One tangible expression of the philosophical dimension of mathematics in Islam is its use as part of worship. For example, when determining prayer times based on the position of the sun, Muslims use precise mathematical calculations. Determining the direction of the qibla also requires knowledge of geometry and trigonometry, especially for regions far from Mecca. The Hijri calendar, which is based on lunar phases, shows how mathematics becomes an essential tool in the religious life of Muslims. In this context, mathematics is not merely a worldly science but also a spiritual tool that helps Muslims fulfill their religious duties accurately. This makes mathematics a form of worship because through its use, Muslims can demonstrate obedience to Allah's commands.

Additionally, the concept of harmony or *tawazun* as a universal value in Islam is reflected in the mathematical works of Muslim scholars. *Tawazun* teaches balance between various aspects of life, both spiritual and material. In mathematics, this concept is seen in symmetry, proportion, and order, which form the basis of various studies by Muslim scholars. For instance, Al-Kindi emphasized the importance of proportion in art and science as a reflection of the beauty of God's creation. In

[38] King, "Notes on the Sources for the History of Early Islamic Mathematics."
[39] Jaenudin Jaenudin, "Pendidikan Pariwisata Dalam Al-Qur'an: Telaah Ayat-Ayat Yang Berkaitan Dengan Pariwisata," *Andragogi: Jurnal Pendidikan Islam Dan Manajemen Pendidikan Islam* 3, no. 1 (2021): 73–93, https://doi.org/https://doi.org/10.36671/andragogi.v4i01.154; Hadi Asrori, "Proses Penciptaan Alam Dalam Enam Masa (Studi Komparatif Tafsir Al-Manār Dan Al-Jawāhir Fī Al-Tafsīr Al-Qur'ān Al-Karīm)," 2020.

Islamic architecture, such as in the design of mosques and palaces, the principles of symmetry and mathematical proportions were used to create structures that are not only aesthetically beautiful but also reflect the harmony of the cosmos. The concept of *tawazun* teaches that everything has a precise measure, which is a manifestation of Allah's wisdom.

Muslim scholars also used mathematics as a tool to explain the relationships between things in life[40]. Al-Farabi, for example, combined mathematical logic with philosophy to explain how harmony is created in society. In this way, mathematics is not only seen as a technical science but also as a reflection of ethical and moral values in Islam. This mathematical thinking then influenced the development of other sciences, such as astronomy, music, and economics, all of which are based on the principles of harmony and balance. This philosophical dimension shows how mathematics in Islam is not only practically useful but also provides a moral and spiritual foundation for understanding life[41].

Thus, mathematics in Islamic civilization holds a depth of meaning that transcends its worldly function. Through observation of the orderly universe, humanity is invited to reflect on Allah's greatness, while through its use in worship, mathematics becomes an integral part of devotion to the Creator. This philosophical dimension makes mathematics a science that is not only rational but also rich in values of faith, setting the Islamic approach to knowledge apart from other civilizations.

CONCLUSION

The Qur'an has played a significant role in the development of mathematics in the history of Islamic civilization. Through its verses, the Qur'an inspired Muslim scholars to observe, understand, and advance knowledge, including mathematics. Concepts such as *hisab* (calculation), *mizan* (balance), and the order of the universe mentioned in the Qur'an became philosophical foundations for the study of mathematics. The Qur'an's emphasis on the importance of reason and knowledge encouraged scholars such as Al-Khwarizmi, Al-Biruni, and Ibn Sina to explore mathematics as a means to understand natural phenomena and life. During the golden age of Islam, the contributions of Muslim scholars in mathematics were not only based on rational thought but also on spiritual values inspired by the Qur'an. Institutions like Bayt al-Hikmah played a crucial role as intellectual centers that facilitated the integration of Qur'anic teachings with the development of science. Mathematical innovations such as algebra, algorithms, and geometry became invaluable intellectual legacies that later influenced Western civilization during the Renaissance. Thus, the Qur'an is not only a theological scripture but also a primary source of inspiration for the advancement of knowledge, including mathematics. Its

[40] Katz, "Ideas of Calculus in Islam and India."
[41] Wahyu Saputra, "Peran Ilmu Matematika Dalam Membangung Peradaban Islam," *Jurnal Dunia Ilmu* 1, no. 2 (2021).

influence on the development of Islamic civilization shows how religious teachings can align with intellectual progress. The integration of Qur'anic values and mathematical science provides an important lesson that science and spirituality can complement each other to create an enlightened and civilized civilization.

REFERENCES

Ahlawat, Kapur S, and Victor Y Billeh. "Comparative Investigation of the Psychometric Properties of Three Tests of Logical Thinking." *Journal of Research in Science Teaching* 24, no. 2 (1987): 93–105. https://doi.org/https://doi.org/10.1002/tea.3660240202.

Alkadafi, M Arsyad, M Akmal Fatkhan Rifqi, Tiara Ananda Maulidia, Arditya Prayogi, Ridho Riyadi, Imam Prayogo Pujiono, and Riki Nasrullah. "Islam Dan Kontribusinya Terhadap Perkembangan Ilmu Pengetahuan: Suatu Telaah." *Jurnal Intelek Dan Cendikiawan Nusantara* 1, no. 5 (2024): 6325–34.

Allailiyah, Nailil Muna. "Peran Sains Dalam Membangun Kualitas Generasi Islam (Role of Science in Building Quality of Islamic Generations)." *Prosiding Konferensi Integrasi Interkoneksi Islam Dan Sains* 2 (2020): 321–29.

Andriyanto, Andriyanto. "Peran Ilmu Matematika Dalam Sejarah Peradaban Islam." *Jurnal Dunia Ilmu* 1, no. 3 (2021).

Anisa, Anisa, W H Ernita, H Z Laila, Rindiani Rindiani, and A Syaqiatul. "Ilmu Sains Dalam Prespektif Pendidikan Islam." *El-Fata: Journal of Sharia Economics and Islamic Education* 3, no. 1 (2024): 51–66. https://doi.org/https://doi.org/10.61169/el-fata.v3i1.85.

Anisa, Khoirul. "Implementasi Nilai-Nilai Karakter Pada Pembelajaran Tematik Kelas V Melalui Problem Based Learning Di Ma'arif Mayak Tonatan Ponorogo." IAIN PONOROGO, 2023.

Asrori, Hadi. "Proses Penciptaan Alam Dalam Enam Masa (Studi Komparatif Tafsir Al-Manār Dan Al-Jawāhir Fī Al-Tafsīr Al-Qur'ān Al-Karīm)," 2020.

Ayyubi, Ibnu Imam Al, Sofia Martini, Ai Sri Masfuroh, and Aulia Suwanti Nur Ramdani. "Application of The Brain-Based Learning Model on Students' Learning Outcomes and Initial Mathematical Abilities." *Tadrusuun: Jurnal Pendidikan Dasar* 3, no. 2 (2024): 246–59. https://doi.org/https://doi.org/10.62274/tadrusuun.v3i2.157.

Ayyubi, Ibnu Imam Al, Eko Prayetno, Desti Jamaliah, and Nabila Mumtazah. "Equilibrium of Faith and Logic: Integrating Islamic Moral Values and Mathematics Education in Various Contexts." *IJEMR: International Journal of Education Management and Religion* 1, no. 2 (2024): 127–44. https://doi.org/https://doi.org/10.71305/ijemr.v1i2.167.

Ayyubi, Ibnu Imam Al, Irfan Suryana, Tommy Tanu Wijaya, Firda Noerzanah, and Shoutika Nawadya Ikromi. "Application of Model-Eliciting Activities (MEAs) for Learning Mathematics Based on Students'initial Mathematical Abilities." *El Midad: Jurnal Jurusan PGMI* 16, no. 1 (2024): 72–90. https://doi.org/https://doi.org/10.20414/elmidad.v16i1.9654.

Ayyubi, Ibnu Imam Al, Erina Widiani, Irfan Suryana, Anita Andriani, and Desi Wulan Sari. "Application of the Model-Eliciting Activities (MEAs) Learning Model on

Mathematics Learning Based on Higher-Order Thinking Skills (HOTS)." *Noumerico: Journal of Technology in Mathematics Education* 2, no. 2 (2024): 82–95. https://doi.org/https://doi.org/10.33367/jtme.v2i2.5181.

Birgin, Osman, and Hatice Acar. "The Effect of Computer-Supported Collaborative Learning Using GeoGebra Software on 11th Grade Students' Mathematics Achievement in Exponential and Logarithmic Functions." *International Journal of Mathematical Education in Science and Technology* 53, no. 4 (2022): 872–89. https://doi.org/https://doi.org/10.1080/0020739X.2020.1788186.

Bongga, Steffi Van, and Tanti Listiani. "Implementasi Strategi Integrasi Iman Dan Pembelajaran John W. Taylor Dalam Pembelajaran Matematika Pada Materi Bilangan [the Implementation of John W. Taylor'S Faith and Learning Integration Strategy in Learning Mathematics on Numbers]." *JOHME: Journal of Holistic Mathematics Education* 4, no. 1 (2020): 45. https://doi.org/10.19166/johme.v4i1.1987.

Creswell, John W. "Research Design: Pendekatan Kualitatif, Kuantitatif, Dan Metode Campuran." *Diterjemahkan Oleh Achmad Fawaid, Edisi Ke-3. Cet. Ke-1. Yogyakarta: Pustaka Setia*, 2010.

Fathurrahman, Muhammad, Putri Dini Retno Pratiwi, Marice Awairaro, Nazmi Al-lahmadi, Salima Silayar, and Ismail Djakaria. "Integrasi Teknologi Dalam Pendidikan Matematika: Wawasan Dari Tinjauan Literatur Sistematik." *KAMBIK: Journal of Mathematics Education Volume 2, No. 1, 2024, 66-79 ISSN* 2, no. 1 (2024): 66–79.

Handayani, Yusri, and Nurfadilah Nurfadilah. "The Effect of Brain-Based Learning Model on Student Physics Learning Outcomes." *Kasuari: Physics Education Journal (KPEJ)* 4, no. 2 (2021): 110–17. http://journalfkipunipa.org/index.php/kpej/article/view/232.

Hayati, Maisyifa, and Najwa Putri. "Implementasi Prinsip-Prinsip Islam Dalam Pembelajaran Matematika Untuk Memperkokoh Kebangkitan Spiritual Siswa." *Religion: Jurnal Agama, Sosial, Dan Budaya* 3, no. 2 (2024): 43–54. https://doi.org/https://doi.org/10.55606/religion.v3i2.918.

Hendra, Mersi. "Konsep Penciptaan Bumi Dalam Alquran (Studi Terhadap QS. Al-Anbiya'[21]: 30) Menurut Hamka Dalam Tafsir Al-Azhar." *Jurnal Tafsere* 8, no. 2 (2020). https://doi.org/https://doi.org/10.24252/jt.v8i2.20400.

Husnaini, M, Ahmad Syauqi Fuady, and Irnie Victorynie. "Multiple Intelligence in the Perspective of the Qur'an." *Indonesian Journal of Islamic Education Studies (IJIES)* 3, no. 2 (2020): 141–59. https://doi.org/https://doi.org/10.33367/ijies.v3i2.1358.

Istianah, Istianah, and Lutfi Rahmatullah. "Abu Bakr Al-Razi Di Antara Agama Dan Sains." *Islamadina : Jurnal Pemikiran Islam* 22, no. 2 (2021): 209. https://doi.org/10.30595/islamadina.v22i2.10278.

Jaenudin, Jaenudin. "Pendidikan Pariwisata Dalam Al-Qur'an: Telaah Ayat-Ayat Yang Berkaitan Dengan Pariwisata." *Andragogi: Jurnal Pendidikan Islam Dan Manajemen Pendidikan Islam* 3, no. 1 (2021): 73–93. https://doi.org/https://doi.org/10.36671/andragogi.v4i01.154.

Katz, Victor J. "Ideas of Calculus in Islam and India." *Mathematics Magazine* 68, no. 3 (June 1, 1995): 163–74. https://doi.org/10.1080/0025570X.1995.11996307.

Khair, Muhammad Saiful, and Nor Faridatunnisa. "Persaksian Dalam Hutang (Studi Komparatif QS. Al-Baqarah [2]: 282 Perspektif Tafsir Jalalain Dan Tarjuman Al-Mustafid)." In *Proceeding International Conference on Quranic Studies*, 2023.

King, David A. "Notes on the Sources for the History of Early Islamic Mathematics." Edited by F Sezgin. *Journal of the American Oriental Society* 99, no. 3 (July 16, 2025): 450–59. https://doi.org/10.2307/602381.

Lingga, Salman Al Farisi, Salminawati Salminawati, Ahmad Mustaqim, and Pandi Kurniawan. "History of the Development of Philosophy and Science in the Islamic Age." *Solo International Collaboration and Publication of Social Sciences and Humanities* 1, no. 1 (2023): 1–11. https://doi.org/https://doi.org/10.61455/sicopus.v1i01.5.

Lubis, Sriwahyuni, Annisa Caniago, Yusnidar Gea, and Yusnaili Budianti. "Tradisi Menulis, Industri Buku Dan Perpustakaan Dalam Peradaban Islam Klasik." *EDU-RILIGIA: Jurnal Ilmu Pendidikan Islam Dan Keagamaan* 8, no. 3 (2024).

Mahmud, Abdullah. "Multicultural Democratic and Tolerant: Qur'anic Perspectives and Islamic Education at the Universitas Muhammadiyah Surakarta." *Solo Universal Journal of Islamic Education and Multiculturalism* 1, no. 3 (2023): 205–20. https://doi.org/https://doi.org/10.61455/sujiem.v1i03.82.

Mirna, Mirna Kartika, and Kristina Imron. "Metode Pembelajaran Karya Wisata (Studi Tour) Dalam Telaah Tafsir Al-Qur'an Surah Al-Ankabut Ayat 20 Dan Hadist." *Jurnal Ilmu Pendidikan Muhammadiyah Kramat Jati* 4, no. 2 (2023): 84–90. https://doi.org/https://doi.org/10.55943/jipmukjt.v4i2.90.

Murharyana, Murharyana, Ibnu Imam Al Ayyubi, Sabrina Yasmin, Dede Ahmad Riyadi, and Cep Hasbi Maulana. "Educational Values For Children Based On Qs. Luqman: 13-14 In Digital Era." *Al Muhafidz: Jurnal Ilmu Al-Qur'an Dan Tafsir* 4, no. 2 (2024): 184–200. https://doi.org/https://doi.org/10.57163/almuhafidz.v4i2.103.

Muslim, Pepep Puad, Tatang Farhanul Hakim, and Suparman Jassin. "Dinamika Dan Perkembangan Ilmu Falak Dari Era Pra Islam Hingga Era Kontemporer." *Al-Tsaqafa: Jurnal Ilmiah Peradaban Islam* 20, no. 1 (2023): 14–28. https://doi.org/https://doi.org/10.15575/al-tsaqafa.v20i1.27243.

Mutaqin, Mumu Zainal, Dirga Ayu Lestari, Solihin Solihin, Ibnu Imam Al-Ayyubi, and Siti Rahmawati. "Factors in Religious Culture to Increase Tolerant Attitude of Gen-Z Among Urban Muslims." *Akademika: Jurnal Pemikiran Islam* 29, no. 1 (2024): 73–86. https://doi.org/https://doi.org/10.32332/akademika.v29i1.9145.

Nasution, Hasan Bakti, M Fajri Syahroni Siregar, and Imron Bima Saputra. "The Distribution of Science According to Muslim Philosophers." *Ta Dib Jurnal Pendidikan Islam* 11, no. 1 (2022): 53–64. https://doi.org/https://doi.org/10.29313/tjpi.v11i1.9045.

Nisa, Rani Khairun. "Ayat-Ayat Kauniyah Dan Implikasi Teologisnya Dalam Al-Qur'an." UNIVERSITAS PTIQ JAKARTA, 2023.

Nurdin, Abidin, and Sri Astuti. "Filsafat Ilmu Dan Agama: Paradigma Sains, Sosial Dan Budaya." Zahir Publishing, 2024.

Nurhikmah, Indo Santalia, Syamsuddin. "Membangun Kefahaman: Landasan Epistemlogi Kefilsafatan Dalam Islam." *Setyaki: Jurnal Studi Keagamaan Islam*

1 (2023): 87–96. https://doi.org/https://doi.org/10.59966/setyaki.v1i4.736.

Nurhikmah. "Maqashid Al-Shariah : Kerangka Adaptif Hukum Islam Untuk Menjawab Tantangan Kontemporer." *Journal of Dual Legal System* 1, no. 2 (2024): 103–17. https://doi.org/10.58824/jdls.v1i2.226.

Nurhikmah, Nurhikmah. "Character Education Islam From the Views of Imam Al-Ghazali." *Jurnal Al Burhan* 4, no. 1 (2024): 53–66. https://doi.org/10.58988/jab.v4i1.300.

Nurhikmah, Nurhikmah, Ibnu Imam Al Ayyubi, Ai Sri Masfuroh, Firda Noerzanah, and Siti Rahmawati. "The Interpretation of Patterns and Symmetry in the Qur'an: Does Mathematics Serve as Proof of Divinity or Merely an Aesthetic Interpretation?" *Borneo International Journal of Islamic Studies* 7, no. 1 (2025): 35–60. https://doi.org/https://doi.org/10.21093/bijis.v7i1.10061.

Nurhuda, Abid. "Peran Dan Kontribusi Islam Dalam Dunia Ilmu Pengetahuan." *Jurnal Pemikiran Islam* 2, no. 2 (2022): 222–32.

Nursalam., Nurhikmah., & Purnamasari, N, I. "Nilai Pendidikan Karakter Dalam Teks Sastra Lisan Kelong Makassar." *Jurnal Lingue : Bahasa, Budaya, Dan Sastra* 1, no. 1 (2019): 88–95.

Putri, Widia. "Pemikiran Ibn Rushd Tentang Pendidikan Dan Relevansinya Dengan Dunia Modern." *Jurnal Manajemen Dan Pendidikan Islam* 6, no. 1 (2020): 92–105.

Salami, Mahdiyatus. "Model Pembelajaran Matematika Berbasis Karakter." *Jurnal Ilmiah Mahasiswa Raushan Fikr* 9, no. 2 (2020): 98–111. https://doi.org/https://doi.org/10.24090/jimrf.v9i2.4154.

Saputra, Wahyu. "Peran Ilmu Matematika Dalam Membangung Peradaban Islam." *Jurnal Dunia Ilmu* 1, no. 2 (2021).

Sholeh, Moh Jufriyadi, and Ramadhan Ramadhan. "Konsep Terpisahnya Langit Dan Bumi (Studi Analisis Atas Penafsiran Fakhruddin Ar-Razi Dalam Mafatih Al-Ghaib Terhadap Qs Al-Anbiya'ayat 30)." *El-Waroqoh: Jurnal Ushuluddin Dan Filsafat* 4, no. 1 (2020). https://doi.org/http://dx.doi.org/10.28944/el-waroqoh.v4i1.593.

Solodikhina, M V, N I Odintsova, and E E Odintsova. "Natural-Scientific Cases as an Instrument for Assessment of Logical Thinking." In *Journal of Physics: Conference Series*, 1691:12218. IOP Publishing, 2020. https://doi.org/10.1088/1742-6596/1691/1/012218.

Stiawan, Randi. "Peran Ilmuwan Muslim Dalam Kemajuan Ilmu-Ilmu Keislaman Pada Masa Dinasti Mamluk Di Mesir." *Local History & Heritage* 3, no. 2 (2023): 66–72. https://doi.org/https://doi.org/10.57251/lhh.v3i2.1093.

Tamphu, Sainee, Imam Suyitno, Gatut Susanto, Nia Budiana, and M Rais Salim. "Building Bridges to the Future of Learning : Exploring Artificial Intelligence Research Using R- Studio Assisted Bibliometrics." *Cogent Education* 11, no. 1 (2024). https://doi.org/10.1080/2331186X.2024.2417623.

Umar, Bukhari. *Hadis Tarbawi: Pendidikan Dalam Perspektif Hadis*. Amzah, 2022.

Waluya, Atep Hendang, and Aforisma Mulauddin. "Akuntansi: Akuntabilitas Dan Transparansi Dalam Qs. Al Baqarah (2): 282-284." *Muamalatuna* 12, no. 2 (2020): 15–35.

Wibowo, Hamid Sakti. *Al-Khawarizmi: Bapak Aljabar Dan Algoritma*. Tiram Media, 2023.

———. *Ilmuwan Muslim: Kontribusi Berharga Mereka Untuk Peradaban Dunia*. Tiram Media, 2023.

Zakiyah. "Problematika Guru Al-Quran Hadis Dalam Menggunakan Media Pembelajaran Berbasis Digital Di Mtsn 3 Padang Lawas." *Ikadi (Journal of Islamic Studies)* 2, no. 1 (2023): 14–27. https://doi.org/10.56672/alwasathiyah.v3i1.351.

Zuhriyandi, Zuhriyandi. "Harmoni Beragama Dan Pencegahan Konflik: Perspektif Moderasi Menurut Al-Qur'an Dan Alkitab." *MODERATIO: Jurnal Moderasi Beragama* 3, no. 2 (2023): 218–32. https://doi.org/https://doi.org/10.32332/moderatio.v3i2.8222.