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Bridging Islamic Technological Heritage with Modern Innovations: Ethical and Practical Perspectives

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Abstract

This study aims to analyse the role of technology in the Muslim society, particularly in the fields of education, health and banking. The study employs a secondary qualitative research technique where the literature is reviewed to establish the prospects and issues surrounding the adoption of modern technology in the Islamic context. As a result, themes are identified, for instance, the ethical issues of artificial intelligence, biotechnology and fintech in Islamic law. The study also underscores the important role played by scholars and Islamic institutions by explaining how growing technological advancements can be controlled to conform to Shariah. Analysing the historical contributions made during the Islamic Golden Age, the study compares the past achievements with the modern-day technological problems. It shows the way to integrate Islamic principles into technological advancement. The study is meant to offer a detailed account of how Muslims can embrace the use of technologies to enhance their lives while maintaining and upholding their belief system. Finally, the study ensures that the technology is incorporated in a manner that will be appropriate to the Islamic ethical standards while at the same time improving the society.

Keywords: Islam and Technology, Tradition and Modernity, Islamic Ethics, Religious Practices, Shariah Compliance

Introduction

The intersection of technology and Islam is a multifaceted and dynamic discourse in which many modern developments in the Muslim world are integrated with the traditional outlook. Throughout history, Islamic practice has been in a state of tension with the conditions imposed by various forms of progress. While technology may not have been the central concern in earlier periods, the 21st century has ushered in technological changes into almost every aspect of human life.[1] Beyond that, being highly popular worldwide, they have also become an integral part of Islam as a religion and a social system. Therefore, the following research aims to deal with the role of technology in mediating Islam's relationship with its traditional identity and the modern world. Islam is inherently rooted in tradition as such, drawing from divine sources while simultaneously stressing knowledge and progress for the long-term benefit of society.[2] In Islamic history, the Muslim people made significant advances in the sciences such as medicine, mathematics, and geography. The glorious Islamic history known as the Golden Age lasted between the 8th and 14th centuries.[3] These advancements created social, cultural, and economic foundations for the modern Islamic

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[1] Muhammad Rifat et al., "Digital Transformation in Islamic Da'wah: Uncovering the Dynamics of 21st Century Communication," *JIM: Jurnal Ilmiah Mahasiswa Pendidikan Sejarah* 8, no. 3 (2023): 2933–2941.

[2] Mohammad Rahman, "Islam: The Complete, Functional and Practical Guide to Life," *International Journal of Education, Culture and Society* 9, no. 3 (2024): 87–108.

[3] Gelar Taufiq Kusumawardhana et al., "Tracing the 'Islamic Golden Age' to Revitalize the Scientific Paradigm," *IJoLaC: International Journal of Language and Culture* 2, no. 1 (2024): 25–46.

world. In the modern-day world, there are vital challenges related to technological modernity, in particular, current rapid changes, the fast growth and development of the internet, digital technology, and AI. Approximately 1.9 billion Muslims worldwide benefit from the latest digital technologies to a certain degree.[4] Many Muslims use mobile phones and digital media in their worship and religious practice. Thus, the Muslim Pro and Quran Majeed apps are quite famous as they provide instant access to religious texts and features.[5] Moreover, the Salama app uses AI facial recognition to help Muslims during Hajj. Although these technologies help many people, they equally raise the pressing ethical, epistemological and theological challenges that scholars face in their efforts to balance tradition with the current reality in their daily lives.

The conflict between tradition and modernity is a vivid issue in the domain of the permission of certain technologies according to Islamic law. There have been questions about the permissibility of the use of cryptocurrencies in Islamic finance, the accomplishment of AI-based surveillance systems in several predominantly Muslim countries, or the ethical issues concerning genetic engineering, cloning, and biotechnology. The fatwa, is among the primary instruments used to address such contemporary issues. The fatwa is a religious ruling issued by Islamic scholars. It plays a pivotal role in addressing the potential fintech challenges. In the year 2020, the Shariah Advisory Council (SAC) of Malaysia's Central Bank approved the permissibility of e-wallets and digital payment systems under specific conditions of transparency and Shariah-compliance.[6] This ruling provided a legal framework for the Islamic fintech platforms, including Ethics and Wahed Invest, which now serve over 300,000 users worldwide.[7] The Islamic fintech sector was valued at USD 79 billion in 2021, with projected growth to USD 179 billion by 2026.[8] However, in the rapidly developing technology market, issues of such kind are relatively new, which creates a necessity for more dynamic interpretations of Islamic law, or Shariah. Technology has great potential for supporting Islamic practices and simplifying religious observance; however, at the same time, it can raise serious difficulties owing to its rapid growth. The question is how Muslims can integrate modern technologies into their lives without losing their rich tradition and paying less attention to the faith, as well as avoiding moving away from the true Muslim principles. Needless to say, modern technologies have their moral challenges, and all of them should be focused on under Islamic jurisprudence. As such, issues concerning the harmful impact of social media on Muslim youth, the spread of Western cultural values due to technology, and the commercialisation of faith are among the most urgent issues in the ethically dubious social and religious domains, which require more scrutiny.

Social media platforms, while increasingly used as new forms of *da'wah* (the preaching of Islam), can also be misleading, contribute to identity alienation, and propagate non-Islamic values. Almost 85% of young people in the Arab and North African region use social media on a daily basis.[9] People in other Islamic areas, apart from the Arab and North African region, also make heavy use

[4] Hussain Mohi-ud-Din Qadri and Fareed Ahmad Malik, "Emergence of Islamic Digital Economy," in *Islamic Finance in the Modern Era* (London: Routledge, 2024), 12–25.
[5] Hafisa Saeed et al., "Impact of Smartphone on Human Rights from Islamic Perspective," *Russian Law Journal* 10, no. 2 (2022): 86–94.
[6] Rafisah Mat Radzi, Wan Nurliza W. Ramli, Lilik Rahmawati, and Deasy Tantriana, "Structuring E-Wallet Shariah Parameters: Comparative Insights Based on Indonesian and Malaysian Electronic-Money Rulings with a Focus on the LinkAja Syariah E-Wallet," *Journal of Islamic Accounting and Business Research*, accessed June 4, 2025, https://www.emerald.com/insight/content/doi/10.1108/JIABR-07-2024-0249/full/html
[7] Radzi et al., "Structuring E-Wallet Shariah Parameters."
[8] IBS Intelligence, "A $4 Trillion Islamic Banking Market to Be Driven by FinTech, Study Shows," accessed June 5, 2025,https://ibsintelligence.com/ibsi-news/a-4-trillion-islamic-banking-market-to-be-driven-by-fintech-study-shows.
[9] Emad Farouk Saleh, "Adolescent Socialization in the Digital Age: The Role of Internet Usage and Social Networks," in *Recent Research Advances in Arts and Social Studies* (2024), 66–98.

of social media. Even though Muslims account for most of the population in Malaysia, almost all people use social media. Out of all Malaysians, a total of 28.68 million, which is 83.1%, used social media platforms.[10] According to a report, 60.4% of people in Indonesia used social media in 2023.[11] Turkey used the internet at a rate of 73.1% in 2023, as per the statistics from Data Reportal.[12] In Pakistan, social media penetration stood at 35.3%, yet its usage among urban Muslim youth was growing relatively fast.[13] It shows that Muslim youth all over the world are influenced more by digital media, leading to problems related to ethics and identity in their Islamic communities. As it is a digital sphere, it is an underregulated space from the perspective of Islamic ethics.

The contemporary environment is marked by the significant development of financial technologies, or fintech, which also brings Islamic finance to the digital sphere, among other consequences. However, this practice is unregulated, and its shaping depends on a range of jurisdictions. Hence, irregularities in Islamic financial practices occur frequently. The purpose of the research is to uncover how the Islamic world can deal with increased pressure from technological solutions while preserving the foundations of religious practices. The research shed light on how the Islamic world adapts to the changes imposed by new technologies. It also explores effective ways for Islamic scholars to engage with and understand new technologies so that they can influence their development in the right direction. The goal of the research is to narrow the gap between Islamic values and the growing technological changes.

Objectives

- To explore the historical contributions of Islamic technological heritage and their relevance to contemporary innovation.
- To critically examine how emerging technologies (e.g., AI, fintech, social media) are ethically evaluated within Islamic jurisprudence.
- To analyse the challenges and opportunities of integrating modern digital technologies into Islamic practices and institutions.
- To assess scholarly interpretations and fatwas on the use of modern technologies in Muslim-majority societies.

This research points out that technology, guided by Islamic values, can be helpful in addressing issues that matter to contemporary Muslim communities. For many centuries, Islamic civilisation proved its dedication to new scientific findings and useful inventions.[14] Nowadays, efforts are made to link the traditional customs with new developments. In countries where Muslims make up the majority, experts and authorities are trying to make sure that AI, biotechnology, and digital finance match Islamic values and beliefs.[15] This work looks into the application of Islamic ethics

[10] Simon Kemp, "Digital 2024: Malaysia," *DataReportal*, accessed June 4, 2025, https://datareportal.com/reports/digital-2024-malaysia.
[11] Simon Kemp, "Digital 2023: Indonesia," *DataReportal*, accessed June 4, 2025, https://datareportal.com/reports/digital-2023-indonesia.
[12] Simon Kemp, "Digital 2023: Turkey," *DataReportal*, accessed June 5, 2025, https://datareportal.com/reports/digital-2023-turkey.
[13] Simon Kemp, "Digital 2023: Pakistan," *DataReportal*, accessed June 5, 2025, https://datareportal.com/reports/digital-2023-pakistan
[14] Hafiz Amjad Hussain and Hafiz Masood Qasim, "Contribution of Islamic Civilization to the Scientific Enterprise of the Modern World," *Journal of Religious and Social Studies* 4, no. 1 (2024): 1–15.
[15] Erdal Harunoğullari, "An Analysis of Disruptive Technologies in Muslim Societies: Economic, Financial, and Ethical Implications," in *Disruptive Technologies and Muslim Societies: From AI and Education to Food and Fintech* (2025), 389–416.

to direct technology-related changes made in education, healthcare, and financial settings. It argues that technology only brings difficulties and benefits when it is designed according to important ethical guidelines.

Methodology

This research incorporates a secondary qualitative research design, which is appropriate for the goal of exploring the complex relationship between technology and Islamic tradition.[16] Specifically, the choice of design is associated with the opportunity to uncover the issue in-depth, reviewing and comparing numerous academic articles, journals, and external sources that have addressed similar themes. This significantly helped to identify key patterns and trends from existing literature in this arena. It also ensures that context-specific literature is analysed in a comprehensive manner. The research is based on interpretivism research philosophy, as the relationship between technology and Islam is complex and deeply integrated with the culture, religion, and values of societies.[17] The interpretivist philosophy implies that the researcher can explore how technology tools and devices are viewed by Muslims based on the subjective interpretations of this issue provided by various scholars, theologians, and practitioners.[18] This approach ensures that the findings of research will be aligned with the specifics of cultural and religious contexts of the analysed issue.

The research is guided by an inductive approach, whereby insights and theories emerge from the existing data rather than being tested against predefined hypotheses.[19] This approach aligns well with the secondary qualitative design of the research; simultaneously, it allowed for the exploration of the themes in the literature related to technology and Islam.[20] Purposive sampling has been used to select the relevant articles, journals, and other external sources.[21] The non-probability method has been appropriate in selecting deliberately chosen sources closely related to the topic; therefore, the data collected is rich and contextually relevant for examining to what extent technology and Islamic understanding can be reconciled. In order to carry forward this research, thematic analysis has been followed by Braun and Clarke's six-phase framework.

Firstly, the selected literature has been thoroughly reviewed through repeated readings to achieve deeper familiarity with the research content. Secondly, the initial codes were generated through the identification of relevant concepts such as ethical dilemmas, Islamic jurisprudence, and technological adaptation. Thirdly, these codes have been collated into broader themes such as "Islamic Ethical Evaluation of Technology" and "Tension Between Tradition and Innovation." Fourthly, the themes have been reviewed thoroughly and refined for coherence. Then, the themes

[16] Monanol Terfa Chali, Shimekit Kelkay Eshete, and Kenenisa Lemi Debela, "Learning How Research Design Methods Work: A Review of Creswell's Research Design: Qualitative, Quantitative and Mixed Methods Approaches," *The Qualitative Report* 27, no. 12 (2022): 2956–2960.
[17] Uche M. Mbanaso, Lucienne Abrahams, and Kennedy Chinedu Okafor, "Research Philosophy, Design and Methodology," in *Research Techniques for Computer Science, Information Systems and Cybersecurity* (Cham: Springer Nature, 2023), 81–113.
[18] Ma Junjie and Ma Yingxin, "The Discussions of Positivism and Interpretivism," *Online Submission* 4, no. 1 (2022): 10–14.
[19] Danya F. Vears and Lynn Gillam, "Inductive Content Analysis: A Guide for Beginning Qualitative Researchers," *Focus on Health Professional Education* 23, no. 1 (2022): 111–127.
[20] Louise Corti, "Secondary Qualitative Data Analysis," in *The SAGE Handbook of Qualitative Research Design* (London: SAGE Publications, 2022), 535–554.
[21] Friday Nyimbili and Leah Nyimbili, "Types of Purposive Sampling Techniques with Their Examples and Application in Qualitative Research Studies," *British Journal of Multidisciplinary and Advanced Studies* 5, no. 1 (2024): 90–99.

have been clearly defined and named based on the recurring ideas across all sources.[22] The findings have been compiled into a narrative that effectively connects Islamic tradition with contemporary technological discourse.

The collected data was analysed through the incorporation of thematic analysis, which is suitable for any kind of qualitative research. This approach helps to identify, analyse, and report patterns or themes within the data.[23] As a result of applying this approach, the researcher was able to identify the recurring themes associated with the inclusion of modern technology in the place of modern technology in Islamic practice, the significance of technological advances in terms of ethics and balancing the traditional and the modern.[24] As a result of carrying out such an analysis, the author aims to contribute to the discussion of the place of technology in Islam and bring some valuable insight from the existing research. The study adhered to ethical research standards by correctly referencing all secondary sources and respecting authors' intellectual property. Careful selection of materials was undertaken to minimise bias and ensure the inclusion of credible, relevant, and balanced perspectives. The approach outlined in the study allowed for the preservation of a respectful attitude to Islamic values and the interpretation of sensitive religious subjects. It was through careful selection guided by criteria of relevance, credibility, and depth that only the most appropriate sources were chosen. Only scholarly articles published in peer-reviewed journals, books, issues from reliable Muslim authorities, and reports by credible organisations were incorporated. The inclusion criteria included sources that shed light on both Islamic aspects and technological advancements, including AI, fintech, and social media. Recent publications from the past five years were emphasised to maintain contemporary relevance, though select historical texts were included to provide essential background and context. Any material that was an opinion, not verified, or did not relate to the culture was excluded through the exclusion criteria. As a result, the information collected was accurate and included enough background context.

Findings

Historical Contributions to Technology during the Golden Age of Islam

The Golden Age of Islam from the 8th to 14th century was one of the most extraordinary periods in the history of Islamic civilisation, where numerous and important advances were made in the field of science and technology. These advances were crucial for Islamic societies and the entire course of the global development of science and technology. Reviewing both modern and Islamic perspectives within the research context is important to ensure that understanding the peculiarities and features of the historical advances developed during the Golden Age would provide the researchers with extensive information and insights about how Islamic civilisation considers the balance between religious values and technological developments. One of the Golden Age's key achievements is the ability to be open to any kind of knowledge, which was an immense advantage over other civilisations even at the present moment. In other words, based on the profound religious zeal for understanding, Islamic scholars were not only capable of accepting the earlier advances of the Greeks, Persians, and Indians as the basis for practical improvements; however, they also made technology a central priority for Islamic teachings in daily life. During the 8th to 14th century, the Islamic Golden Age gave rise to major advances in science and technology that

[22] Virginia Braun and Victoria Clarke, "Supporting Best Practice in Reflexive Thematic Analysis Reporting in *Palliative Medicine*: A Review of Published Research and Introduction to the Reflexive Thematic Analysis Reporting Guidelines (RTARG)," *Palliative Medicine* 38, no. 6 (2024): 608–616.
[23] Adamu Adamu Habu and Tristan Henderson, "Data Subject Rights as a Research Methodology: A Systematic Literature Review," *Journal of Responsible Technology* 16 (2023): 100070.
[24] Pia Sundqvist, "Extramural English as an Individual Difference Variable in L2 Research: Methodology Matters," *Annual Review of Applied Linguistics* (2024): 1–13.

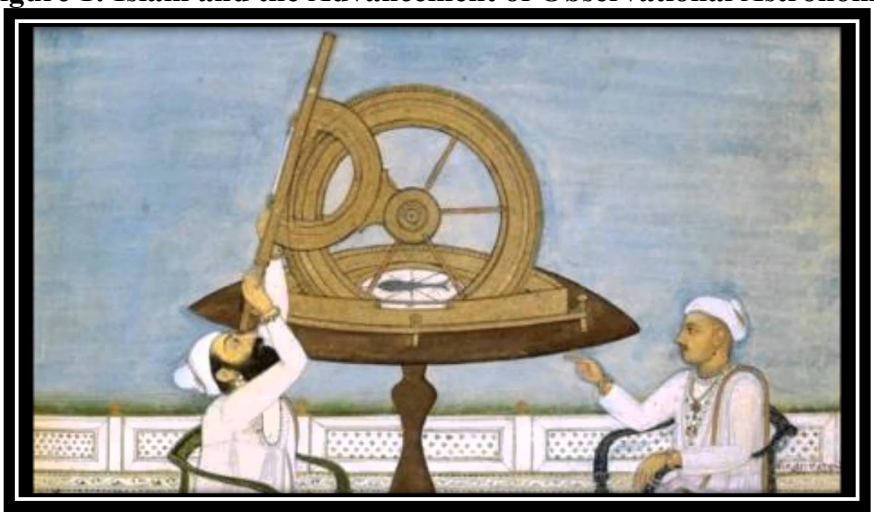
affected the world's understanding for many years. Many Islamic scholars at this time added to and went beyond the achievements of nations such as the Greeks, Persians, and Indians by blending their faith with inventions.[25] There was a major impact in agriculture from technological progress. Muslims pioneered advanced irrigation techniques, including the widespread use of the Noria (water wheel) and sophisticated qanat systems (underground channels), enabling efficient water management in arid regions.[26] Irrigation made it possible for more people and communities to flourish by making food production reliable and waste-free.[27] For example, historical texts describe how the irrigation system in the region of Al-Andalus (modern Spain) increased crop yields substantially, supporting thriving cities like Cordoba.[28] Such water conservation efforts aligned with Islamic principles of stewardship (*khilafah*) and resource fairness.

The Golden Age saw critical changes and breakthroughs in medicine. Renowned physician Al-Razi (Rhazes) authored *Al-Hawi*, an extensive medical encyclopaedia that compiled knowledge from Greek, Persian, and Indian sources and introduced novel clinical practices.[29] Ibn Sina's (Avicenna's) The Canon of Medicine became a medical authority in both the Islamic world and Europe for centuries.[30] Hospitals (*bimaristans*) during this era were equipped with innovative surgical instruments, and physicians implemented techniques like cataract surgery and anaesthesia.[31] The Islamic emphasis on preserving life (*hifz al-nafs*) motivated these advances. Astronomy flourished due to religious obligations requiring precise prayer timings and *Qibla* (direction of the Kaabah) determination.[32] Islamic astronomers, such as Al-Battani and Al-Tusi, developed instruments like the astrolabe, which could calculate latitude, time, and celestial positions. The development of observational observatories, such as the Maragha Observatory in the 13th century, enabled precise celestial measurements.[33] Due to these steps, people could use the Islamic lunar calendar, improve navigation, and take part in long-distance trade while spreading Islam. In mathematics, the Islamic world introduced algebra (*al-jabr*), named after Al-Khwarizmi's seminal works, which laid the foundation for modern mathematics.[34] Using algebraic methods in the laws of inheritance points to a clear connection between religious doctrines and the use of technology.[35] Additionally, advancements in geometry and trigonometry aided architectural achievements, such as mosque construction. Knowledge was shared and passed from generation to generation to promote technological advances. At the House of Wisdom in Baghdad, translations and the sharing of knowledge allowed for brain exchange among scholars from many

[25] Habibullah Haqparast and Mohammad Mollah Salangi, "The Impact of Islamic Civilization on the European Intellectual Awakening: An Analytical Study," *Sprin Journal of Arts, Humanities and Social Sciences* 3, no. 1 (2024): 57–62.
[26] Dale Lightfoot, "Qanat: Stream of Wells," 2024, https://www.torrossa.com/it/resources/an/5868945.
[27] Marwan Haddad, "Balancing Roles: Individual's and State's Contributions to Achieving Food Production and Security in the OIC Member Countries," 2024, https://en-asc.modares.ac.ir/uploads/Eri.News.030919.2.pdf.
[28] Helena Kirchner, "The Archaeology of Field Systems in Al-Andalus," *Agronomy* 14, no. 1 (2024): 196.
[29] Jaafar O. Ahmed, Karwan K. Kakamad, Zana B. Najmadden, and Sarhang I. Saeed, "Abu Bakr Muhammad Ibn Zakariya Al-Razi (Rhazes) (865–925): The Founder of the First Psychiatric Ward," *Cureus* 16, no. 7 (2024): e64601.
[30] Patrick Chiu, "The Beginnings of Western Influence on Chinese Medicine," in *A History of Western Pharmacy in China* (Singapore: Springer Nature, 2024), 1–21.
[31] Kadhim Mustafa Taqi and Noor AlNasrallah, "A Journey in Time: Muslim, Arab, and Persian Physicians and the History of Surgery," *Journal of Research on History of Medicine* 14, no. 1 (2025): 19–32.
[32] David A. King, *Astronomy in the Service of Islam* (London: Taylor & Francis, 2024).
[33] S. Mohammad Mozaffari, *Reflections on Observational Astronomy in the Medieval Islamic Period* (London: Taylor & Francis, 2024).
[34] Davron Aslonqulovich Juraev and Murot Nashvandovich Bozorov, "The Role of Algebra and Its Application in Modern Sciences," *Engineering Applications* 3, no. 1 (2024): 59–67.
[35] Mekki Klaina, "The Mathematical Thinking Among Muslims and Its Impact on the Science of Inheritance," *MAQOLAT: Journal of Islamic Studies* 2, no. 3 (2024): 122–138.

different lands.[36] Due to this, technological advances began to spread from the Middle East to Europe and North Africa. At the time of the Islamic Golden Age, people were actively using their technology as an extension of their faith and ethics. The outcomes of these innovations have led to modern science and prove that Islam and technological developments have complemented one another historically.

Figure 1: Islam and the Advancement of Observational Astronomy



Source: Fineartamerica (2024)

Technological advancements throughout this era were not limited to a single field but extended across numerous areas such as agriculture, medicine, astronomy, and mathematics. In agriculture, Muslims adopted advanced irrigation systems that featured water-wheels and aqueducts. When fields are irrigated with such tools, the water is distributed evenly, and no water is wasted. Such processes helped them have enough food and avoid famine, thus promoting the growth of their cities. Such an approach can hardly be separated from the Muslim belief of ensuring the welfare of society members and guaranteeing the fairness of the distribution of resources. Given Islam's emphasis on treating the earth with respect, such processes also align with Islamic principles by ensuring a sufficient food supply using the available resources. Islamic agricultural innovation during the Golden Age broadly included sophisticated irrigation systems such as the qanat and the Noria water wheels.[37] These two efficiently transported water over long distances with minimal loss. The qanat system, underground channels tapping aquifers, allowed sustainable water use in arid regions, preserving soil moisture and preventing evaporation.[38] The Noria, a water wheel powered by river flow, lifted water for irrigation without any external energy, promoting equitable water distribution.[39] These technologies effectively enhance crop yields. Historical records from Al-Andalus report up to a 30% increase in agricultural productivity, supporting food security while aligning with Islamic principles of stewardship (*Khalifa*) over the earth.[40] Many modern medical technologies were developed during the Islamic Golden Age and were used for the first and only time in history. Surgery was facilitated with new tools and inventions that had never been seen

[36] Khalid Hussain Mir and Md Rafique Anjum, "The Role of Translation in the Development of Scientific Knowledge in the Premodern Islamic World," *MAQOLAT: Journal of Islamic Studies* 3, no. 1 (2025): 31–43.
[37] Michael J. Decker, "The Islamic Agricultural Revolution," in *The Oxford Handbook of Agricultural History* (Oxford: Oxford University Press, 2024), 463.
[38] Dale Lightfoot, "Qanat: Stream of Wells," 2024, https://www.torrossa.com/it/resources/an/5868945
[39] Lightfoot, "Qanat: Stream of Wells."
[40] Muaz Nasir, "Caretakers of the Earth: An Islamic Perspective," *Khaleafa*, October 1, 2016, accessed June 8, 2025, https://www.khaleafa.com/khaleafacom/caretakers-of-the-earth-an-islamic-perspective

before, hospitals proliferated across the Muslim world, and treatment and understanding of it became more systematic and technologically advanced. The Muslim belief demands life to be preserved, so the development of medical technologies can be closely tied to it as well.[41] It is interesting that Islam's past relationship with technology affects the whole world, as it is the foundation of many modern concepts and practices. In the era of Islamic Golden Age, Muslim physicians such as Al-Zahrawi (Albucasis) revolutionised surgical practice by inventing over 200 surgical tools, many of which laid the groundwork for modern medicine.[42] His illustrated medical encyclopaedia, *Al-Tasrif*, documented a range of surgical instruments such as scalpels, forceps, and bone saws, many of which remained unchanged until the 20th century.[43] These tools effectively helped to allow more precise surgeries, such as cataract removal as well as cauterisation. It enhanced the hospitals, including those in Baghdad and Cairo, institutionalised patient care with dedicated wards and trained staff. This medical innovation reflects Islam's strong focus on preserving life (*hifz al-nafs*).[44] In the field of astronomy, technological advancements were due to the demand for precise celestial observations by the Muslims. Observing celestial bodies appeared to be central for specifying the time and location of prayer; the types of celestial events could be perceived merely once the sky had been observed. Perhaps the observation of the celestial events became fundamental as the Muslim calendar relied on the observational nature of moons, with the visibility of moons differing during the month. In addition, the Muslims needed to recognise the place in Mecca which they had to face during the prayer.[45] Consequently, Islamic astronomers were able to make large technological advancements in observatories, astronomical tools, and mathematics to calculate the place of celestial bodies. Astrolabes that became a key innovation in the Golden Age enabled the calculation of latitude, assisted in navigation for sailing, and facilitated the transmission of prayer times across vast distances. As the pourers of the faith to the spreading Islam, a flying Islamic movement needed these new technological methods to make the long distances traversed. Thus, such technological advancements show that religious activities during the Golden Age entailed a lot of technological and scientific development. The discovery of mathematics was the other significant foundation for such technological progress as it helped to sustain Islamic law, selling passengers, and the mechanics of architecture. One of the major achievements was the discovery of algebra and geometry, which allowed astronomers to calculate the Islamic system of inheritance. The advancements in mathematics show that such progress entailed all the religious-related needs.

The most significant impact of technological progress during this period is related to the spread of knowledge across the Islamic world. The development of libraries and centres of learning, and especially the House of Wisdom, allowed the accumulation, translation, and spread of knowledge. This network of knowledge centres ensures that information about technological advances is transferred across regions, including the Middle East, North Africa, and parts of Europe. The dissemination of knowledge allowed the diffusion of technologies, and these were not only practical technologies that improved the daily lives of people, but also technologies that enriched the Islamic cultural and religious life. The spread of more advanced water management systems across the Islamic world led to the construction of cities with amenities, and they became thriving cities and centres of the Islamic religious, political, and cultural life. In this way, during the Golden

[41] Alan S. Weber, "Clinical Applications of the History of Medicine in Muslim-Majority Nations," *Journal of the History of Medicine and Allied Sciences* 78, no. 1 (2023): 46–61.
[42] PubMed Central (PMC), "Ibn Al-Haytham: Father of Modern Optics," accessed June 7, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC6074172
[43] PMC, "Ibn Al-Haytham," 22.
[44] PMC, "Ibn Al-Haytham," 22.
[45] Kholoud Al-Ajarma and Marjo Buitelaar, "Studying Mecca Elsewhere: Exploring the Meanings of the Hajj for Muslims in Morocco and the Netherlands," in *Approaching Pilgrimage* (London: Routledge, 2023), 166–182.

Age of Islam, technology was becoming the product of not only societal development but also the development of understanding of the philosophical and religious nature of the world.[46] Technology was used to help people explore God's creation, with the Quran as the first example of religious scripture that places great emphasis on observing nature, and the Hadiths also sometimes seek knowledge. Such a theological framework enabled and even necessitated scientific inquiry, since it was a way of fulfilling one's religious duties. Technological progress was necessary for the development of societies and for the fulfilment of the requirements of religion together. It was integral to the well-being of society, and it was the responsibility of the rulers. Despite the challenges modern Islamic societies have in integrating contemporary technology, they have a tradition of incorporating innovations within ethical and religious boundaries. Drawing a clear historical line, the innovations of the Islamic Golden Age include Al-Khwarizmi's algebra, Ibn al-Haytham's experimental optics, and Al-Jazari's mechanical automata, which broadly provided foundational principles along with methods that resonate in the contemporary technological advancements.[47] Al-Khwarizmi's work underpins modern algorithms; Ibn al-Haytham's empirical methods inform scientific inquiry; and Al-Jazari's creations foreshadow robotics are evident of this.[48] This enduring legacy shapes how Muslim societies engage with current technologies such as AI, biotechnology, and fintech by drawing on a tradition that appropriately balances ethical stewardship, empirical rigour, as well as creative problem-solving. Understanding this continuum is extremely pivotal to framing the ethical and practical perspectives explored in the next section.

The Development of Modern Technology

Modern technology has profoundly impacted multiple spheres within Muslim societies, including education, healthcare, and finance. The rise of artificial intelligence, biotechnology, and digital financial platforms is both a blessing and a challenge, as it forces Islamic states and thinkers to determine how these recent advances relate to existing values and ethical principles. The relevance of understanding the role and purpose of modern technology in key sectors of Muslim societies will be central to this research. The role and purpose of modern technology in Muslim education are extensive, as the usage of AI in conjunction with the most innovative learning and teaching platforms is associated with this sphere.[49] It is suggested that AI-driven learning ecosystems should be consistently adopted by the educational sector. It has been reported that there is a consistently rising number of AI-driven adaptive learning technologies used for several specific applications for the benefit of students. In Muslim-majority regions of the world, advanced AI is indispensable for the delivery of high-quality education in underserved as well as rural areas. Due to the use of AI, learning content is adapted based on the students' diverse educational needs. This approach has significantly increased access to the previously underserved regions, enabling students to access core subjects, such as mathematics, science, and religion. For instance, advanced AI used in a digital learning platform could offer teaching of the Quran and Islamic jurisprudence in multiple languages.[50]

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[46] Darek Hans, "The Golden Age of Islam and Its Impact on European Technology: A Historical Analysis," *Endless: International Journal of Future Studies* 6, no. 3 (2023): 218–227.

[47] *History Tools*, "12 Groundbreaking Inventions and Innovations from the Islamic Golden Age," accessed June 8, 2025, https://www.historytools.org/stories/12-groundbreaking-inventions-and-innovations-from-the-islamic-golden-age.

[48] *History Tools*, "12 Groundbreaking Inventions."

[49] Maulana Andinata Dalimunthe et al., "Challenges of Islamic Education in the New Era of Information and Communication Technologies," *HTS Teologiese Studies/Theological Studies* 79, no. 1 (2023): 8608.

[50] Astri Dwi Andriani and Sudirman Sudirman, "Cyberreligion: The Role of Artificial Intelligence as a Communication Medium for Religious Education Learning in the Digital Era," *TARBAWY: Indonesian Journal of Islamic Education* 10, no. 2 (2023): 145–153.

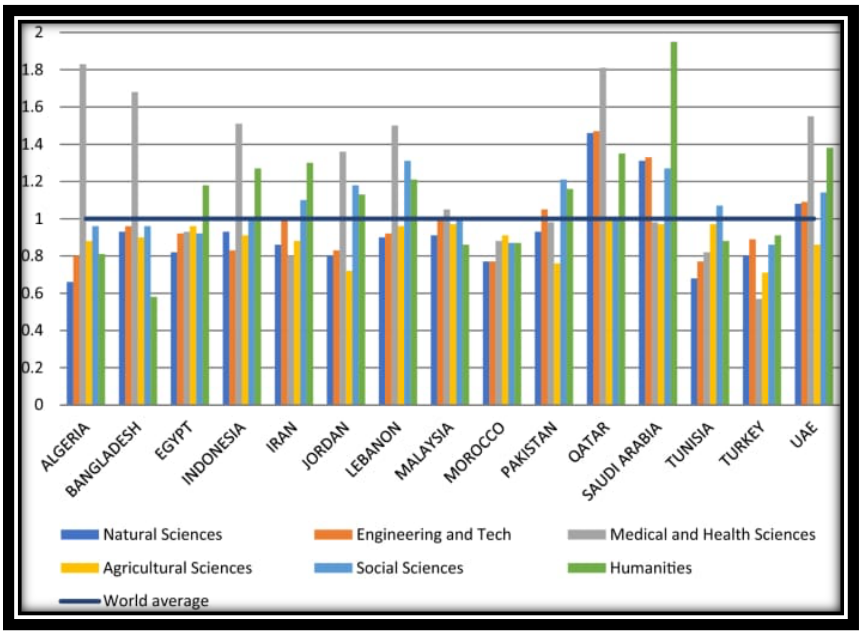
Besides, Islamic teaching is also simplified by AI-driven tools. Online courses and virtual classrooms are becoming more and more widespread, especially in higher educational establishments. This way, with such a platform, students get an opportunity to access Islamic knowledge wherever they live, as this information gives people all over the world a common ground in understanding some values.[51] This trend is consistent with the Islamic idea that learning is crucial, and thus technology, if rightly employed, simplifies the process of absorbing information and understanding one's place in the world.[52] However, the aforementioned AI-driven tools have become controversial within Muslim communities, as they raise several ethical questions. Teachers need to ensure that the digital learning and AI platforms comply with a specific Islamic worldview and ethics.[53] In order to make the AI-driven tools acceptable for use, developers need to ensure the content does not contradict Islamic ethics and the information about the students is kept confidential, as it is a major concern among Muslims according to Islamic Law.

From the Islamic ethical perspective, the integration of AI and biotechnology into education, healthcare, and finance needs to align with the *maqasid al-shariah* (the higher objectives of Islamic law), which emphasise the preservation of life, intellect, faith, lineage, and wealth.[54] In education, AI needs to promote equitable access while also preserving intellectual integrity as well as preventing misuse of student data. It reflects the Islamic values of knowledge (*'ilm*), justice (*'adl*), and privacy (*sitr*). In healthcare, AI and biotechnology need to uphold the sanctity of life (*hifz al-nafs*) and avoid harm (*darar*).[55] While AI-driven diagnostics and telemedicine improve care access, concerns about data privacy and algorithmic bias need to be mitigated through Shariah-compliant ethical governance.[56] Similarly, biotechnology innovations such as genetic editing or stem cell research must not transgress divine boundaries, such as altering creation (*taghyir khalq Allah*), unless justified for saving lives. Islamic scholars advocate a cautious, purpose-driven approach to biotechnological applications, relying on ijtihad (independent reasoning) and *maslahah* (public benefit) to determine permissibility.[57] In finance, AI and blockchain should reinforce transparency and fairness, which are key principles in Islamic economics. Ethical integration strongly requires interdisciplinary collaboration between technologists, scholars, and jurists to ensure that modern innovations serve human dignity within the framework of divine law. In the context of healthcare, modern technology has affected the way people receive medical services. In the Muslim world as well as in Muslim communities, modern technology has had an impact on people's lives. Biotechnology and AI have impacted diagnostics, treatment, and care of patients, making healthcare more efficient and, as a result, more accessible. By allowing the rapid analysis of medical data, AI has helped doctors make informed decisions and has potentially improved patient outcomes. This is especially true for underserved regions where access to qualified medical advice can be limited. AI-driven tools have helped people to diagnose and treat diseases without the assistance of a practitioner. AI-driven diagnostic tools have made it easier for

[51] Malik Ibrahim and Agus Riyadi, "Concepts and Principles of Da'wah in the Frame of Islamic Community Development," *Prosperity: Journal of Society and Empowerment* 3, no. 1 (2023): 30–42.
[52] Ezieddin Elmahjub, "Artificial Intelligence (AI) in Islamic Ethics: Towards Pluralist Ethical Benchmarking for AI," *Philosophy & Technology* 36, no. 4 (2023): 73.
[53] Hero Gefthi Firnando and Muhammad Wahyudi, "The Role of Artificial Intelligence in Shaping the Islamic Worldview of the Digital Economy," *Journal of Islamic Economics and Philanthropy* 6, no. 3 (2024): 231–249.
[54] Aasim I. Padela, *Maqasid al-Shariah and Biomedicine: Bridging Moral, Ethical, and Policy Discourses* (Herndon, VA: International Institute of Islamic Thought, 2025).
[55] Khalid Hussain Mir and Md Rafique Anjum, "The Role of Translation in the Development of Scientific Knowledge in the Premodern Islamic World," *MAQOLAT: Journal of Islamic Studies* 3, no. 1 (2025): 31–43.
[56] Md Mahfujur Rahman, "Ethical and Technological Convergence: AI and Blockchain in Halal Healthcare," in *Artificial Intelligence-Enabled Blockchain Technology and Digital Twin for Smart Hospitals* (2024), 451–466.
[57] Aasim I. Padela, *Maqasid al-Shariah and Biomedicine: Bridging Moral, Ethical, and Policy Discourses* (Herndon, VA: International Institute of Islamic Thought, 2025).

people to get expert medical advice on their chronic conditions. This, in turn, has helped people to understand their condition better and to comply with doctors' orders, which is aligned with the Islamic principle of preserving life and maintaining well-being. Biotechnology has revolutionised the field of medicine as well. The matters such as genetic engineering, stem cell research, as well as organ transplantation are all subject to discussion in the realm of Islamic jurisprudence.

Figure 2: Involvement of Muslims in Different Streams of Science and Technology from Different Countries



Source: Springer (2024)

The above diagram illustrates how Muslims flourish in different arenas of science and technology. One such area is telemedicine, where modern technologies provide substantial input into healthcare in Muslim societies. Telemedicine platforms allow patients to connect with their doctors remotely, hence reducing the need for people to be physically present in health facilities. This is particularly beneficial for rural or underserved communities, as it improves accessibility and ensures more equitable healthcare provision. Accessible health services have a strong connection with the Islamic doctrine and the fair presence of care services across the given community.[58] In such a way, telemedicine is expected to have a positive impact on the well-being of every individual, contributing to the fulfilment of social justice goals. There are evident benefits and some concerns associated with the use of modern technologies and their effects on healthcare by Muslims.[59] The use of AI and biotechnologies should be strictly regulated so as not to be applied for harmful purposes. Another concern is related to the accessible character of modern health care services for all people and in all aspects, including the cultural component. Data storage and protection, as well as informed consent, are essential concepts in the sphere of Islamic medical ethics. Positive changes can be achieved if frameworks are developed to manage the use of modern technological achievements in medicine in accordance with Islamic ethics.[60]

[58] Azreen Zuhairi Abu Bakar et al., "Comprehensive Review on Islamic Ethics and the Rise of Technology," *Journal of Advanced Research in Applied Sciences and Engineering Technology* 51, no. 1 (2025): 184–194.
[59] Mohammed Ahmed, "The Application of Artificial Intelligence (AI) in Mobile Learning (M-Learning)," *Journal of Science and Technology* 28, no. 1 (2023): 12–23.
[60] Ali Muhammad Isa Gamon, "Ethics of Digital Health in Islamic Perspective," *Journal of Science and Technology* 28, no. 1 (2023): 1–11.

Modern technology has affected the financial sector in Muslim communities, with digital financial platforms, AI-run financial services, and blockchain technologies contributing to the advancement and wider reach of Islamic finance.[61] This progress is made possible as the principles of Islamic finance are firmly grounded in Sharia law.[62] In this way, technology has been used to respond to the demand for financial services that are not in conflict with the binding religious regulations.

Thus, technologies such as digital banking platforms, including mobile payment systems as one of the most popular types of financial services among Muslims, and AI-run instruments to manage investments have popularised and expanded the accessibility of financial services. These services support economic development and growth in Muslim communities. AI technology has been used to automate such processes in financial services as risk assessment and management, investment analysis and management, and fraud detection. This implies that Islamic financial institutions utilise the technologies to make the principles of risk-sharing and the prohibition of unethical investment to be more efficient. AI-driven platforms can analyse large datasets to identify investment opportunities that address the criteria of Shariah compliance, ensuring that financial transactions avoid interest (+) and unethical practices.[63] Due to the involvement of modern technology, Islamic finance has been accelerated and experienced faster growth and popularity.

Contemporarily, new technologies make it possible to achieve a high level of efficiency when managing financial resources. AI allows for accurate financial decision-making, providing people with a reliable and handy tool. Blockchain, in turn, is increasingly employed in Islamic Finances, as it offers transparency and safety concerning financial transactions.[64] Within this paradigm, it can be used to create smart contracts that would be compliant with Islamic law, thereby enhancing trust and reducing the potential for risks or fraud. Digital currencies based on blockchain are also being adopted in Muslim communities as they offer new perspectives on trade and investment that would be consistent with Islamic financial outlooks.[65]

These technologies allow for highly efficient financial services and support, such as AI, which improves financial decision-making outcomes, while blockchain increases system trustworthiness and is entirely Shariah-compliant. They also help underpin the ethical essence and orientation of Islamic Finance and make it more transparent and safer for individuals and communities. Despite many modern technologies that have been implemented in the financial systems of Muslim communities, the risks of employing AI, blockchain, and digital technologies remain.[66] On one hand, AI makes it possible to enhance financial outcomes and bring the transparency that many Muslim scholars aim to achieve. On the other hand, there are concerns about the ethical risks of AI, such as biased algorithms, lack of human control, and decisions that may not align with Islamic values.

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[61] Ezieddin Elmahjub, "Artificial Intelligence (AI) in Islamic Ethics: Towards Pluralist Ethical Benchmarking for AI," *Philosophy & Technology* 36, no. 4 (2023): 73.
[62] Fadia Fitriyanti et al., "Application of Sharia Principles in Sharia Financial Institutions," *Fiat Justisia: Jurnal Ilmu Hukum* 17, no. 2 (2023): 157–166.
[63] M. Kabir Hassan, Aishath Muneeza, and Ismail Mohamed, "Cryptocurrencies from Islamic Perspective," *Journal of Islamic Accounting and Business Research* 16, no. 2 (2025): 390–410.
[64] Ica Cahayani, Arina Nihayati, and Elyana Ade Pertiwi, "Does Blockchain Break Down or Transform the Islamic Financial System?" in *Proceeding International Seminar of Islamic Studies* (2023), 28–40.
[65] Muhammad Shahid Siddique and Hassan Shakeel Shah, "Blockchain and Cryptocurrency for Islamic Finance: A Perspective of Scholars," *Integrated Business and Financial Studies* 1, no. 2 (2023): 1–16.
[66] Muhammad Akhlaq and Muhammad Asif, "The Importance of Sharia Compliance in Islamic Finance," *Tanazur* 5, no. 1 (2024): 195–212.

Discussions

The notion of "bridging" between the Islamic Golden Age and the contemporary era of technological innovation is extremely essential to understanding how historical Islamic contributions can inspire modern solutions. During the Golden Age (8th–14th centuries), Muslim scholars who pioneered advancements in medicine, astronomy, mathematics, and engineering were extensively motivated by the Islamic principles such as the pursuit of knowledge (*'ilm*), preservation of life (*hifz al-nafs*), as well as the societal welfare (*maslahah*).[67] All of these values formed the ethical, along with the intellectual foundation for technological development. Modern Muslim societies can and increasingly do draw from this legacy to shape the present, along with future innovation through Islamic frameworks. In medicine, the diagnostic techniques and hospital systems introduced by figures such as Al-Razi and Ibn Sina laid a foundation for ethical, science-based healthcare.[68] In the contemporary situation, AI-powered diagnostics and telemedicine in the Muslim world, such as Saudi Arabia's Seha Virtual Hospital, continue this trajectory by using advanced algorithms to reach underserved communities.[69] These tools are effectively designed with ethical safeguards, including privacy, consent, and patient dignity—core Islamic values. The Seha platform, which handled over 2 million consultations in its first year, reflects a continuity between historical and modern Islamic approaches to accessible, ethical healthcare.[70] Malaysia's approach to technology is another contemporary example of the Islamic principles. The Islamic Digital Economy (IDE) initiative by the Malaysian Digital Economy Corporation (MDEC) promotes the development of AI and blockchain-based platforms that comply with the Shariah.[71] The IDE aims to align fintech with Islamic ethics.

It also helps to encourage innovations such as AI-driven zakat distribution platforms and halal verification apps. Malaysia's adoption of AI in education, including tools such as EduTech Malaysia, is also inspired by the Islamic imperative for continuous learning. These tools use adaptive learning technology to customise religious and secular education for diverse student populations while ensuring the content aligns with Islamic moral codes.[72] The United Arab Emirates (UAE) has similarly invested in bridging historical values with future technologies. The Mohammed bin Zayed University of Artificial Intelligence (MBZUAI) in Abu Dhabi is the world's first graduate-level AI research institution and actively collaborates with Islamic ethicists to ensure responsible AI development.[73] The UAE also supports biotechnology research that adheres to Islamic bioethics, including stem cell research governed by *fatwas* from credible Islamic councils. They illustrate how present-day Muslim societies take part in the ethical developments of technology, instead of only using them. Because of this tradition, scholars and technologists can rethink traditional Islamic teachings to address problems in the modern world. This way, Golden

[67] Egyptian Knowledge Bank (EKB), "10.21608/ejhps.2025.345250.1012," accessed June 8, 2025, https://ejhps.journals.ekb.eg/article_423948_2467a316c5d3fd14748fe2697ba3f26c.pdf

[68] Reza Dashti, "Investigating the State of Medicine and Hospitals in the Islamic Maghreb from the Arrival of Islam to the End of the Fourth Century Hijri," *Journal of Research on History of Medicine* 13, no. 3 (2024): 153–166.

[69] Haytham A. Sheerah et al., "The Rise of Virtual Health Care: Transforming the Health Care Landscape in the Kingdom of Saudi Arabia," *Telemedicine and e-Health* 30, no. 10 (2024): 2545–2554.

[70] *Entrepreneur*, "Seha Virtual Hospital: The AI-Driven Healthcare Revolution in Saudi Arabia," accessed June 6, 2025, https://www.entrepreneur.com/en-ae/growth-strategies/seha-virtual-hospital-the-ai-driven-healthcare-revolution/487392

[71] Syed Zahiruddin bin Syed Musa et al., "Comparative Analysis of Artificial Intelligence (AI) Transformation in Islamic Financial Sector Products and Its Implications on Economic Growth in Indonesia and Malaysia," 2025, https://www.researchgate.net/profile/Syed-Syed-Musa-2/publication/389045963.

[72] Nisar Ahmad and Muhammad Usman Khalid, "Digitalization of Religious (Islamic) Education: Bridging Tradition and Innovation for Global Learning," *ĪQĀN* 6, no. 2 (2024): 1–14.

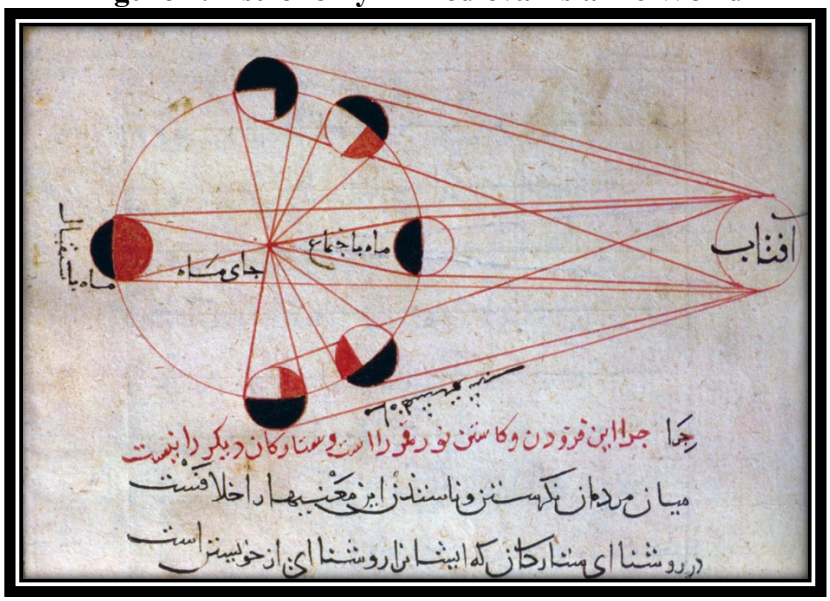
[73] Media Office Abu Dhabi, "MBZUAI," https://www.mediaoffice.abudhabi.

Age science and today's research are closely connected in a way that matters. In the contemporary Islamic world, technology is guided by the morals and ideas of Islam from the past, so it does not compromise religious or moral values. Muslim societies can guide ethical development by mixing their ancient traditions with the latest scientific insights.

Bridging the History of Technology in Islam with Modernity

The history of technology in Islam is rich and multifaceted. It encompasses the groundbreaking innovations during the Islamic Golden Age that set the backdrop for the modern scientific and technological revolution. Islam's technological legacy represents a complex interplay of advancements in mathematics and astronomy, along with breakthroughs in medicine and engineering, that was transformative and steeped in ethical and philosophical considerations derived from its Islamic knowledge base.[74] To bridge this technological legacy to the ever-approaching advancements of modernity is to understand the history of technology as it is seen through the Islamic lens, where this interpretation incorporates the ethical considerations and the role of Islamic scholars and institutions due to the relative context.[75] During the Islamic Golden Age from the 8th to the 14th century, the Islamic civilisation emerged as the foremost leader in scientific and technological advancements.[76] This golden era saw the development of advanced techniques in agriculture, architecture, and mechanics. This era also witnessed the extant contribution to optics, algebra, and chemistry. Islamic scholars and engineers utilised the earlier civilisations, translating Greek, Persian, and Indian texts into Arabic knowledge, along with original contributions that built upon current human knowledge.

Figure 4: Astronomy in Medieval Islamic World



Source: Space (2024)

One of the key elements that made Islamic approaches to technology different from other civilisations was the ethical and philosophical foundations derived from Islamic teachings. Mediaeval scholars and their contemporary interpreters viewed the development of technologies

[74] Mohammaddin Abdul Niri et al., "Astronomy Development since Antiquity to Islamic Civilization from the Perspective of Islamic Historiography," *Journal of Al-Tamaddun* 18, no. 1 (2023): 169–177.
[75] Maulana Andinata Dalimunthe et al., "Corrigendum: Challenges of Islamic Education in the New Era of Information and Communication Technologies," *HTS Teologiese Studies/Theological Studies* 80, no. 1 (2024): a8608.
[76] Reda Ibrahim Ibrahim Elsayed Abdelgalil, "The Philosophy of Creativity, Innovation, and Technology from an Islāmic Perspective," *Journal of Islamic Thought and Civilization* 13, no. 1 (2023): 218–244.

and scientific discoveries as an extension of the divine commandment to seek knowledge (*'ilm*) and help society to develop.[77] The goal of all technologies was not only to push progress or material development, but also to contribute to the higher justice, equality, and man's dignity, thus enabling their development on a moral and spiritual level compatible with Islamic teachings. In interconnecting the medieval Islamic civilisation's activity with the modern technological breakthrough, one of the more critical challenges is ensuring that these milestones comply with the Islamic ethical code. Modern technology, such as artificial intelligence, biotechnology and digital finance, presents unique opportunities and challenges. AI is revolutionising the approach to education, healthcare, and finance, as it enables personalisation on a previously unattainable level. These usages also broadly raise ethical concerns, such as information privacy, mass unemployment due to the automation of work by AI, and the perpetuation of biases in AI algorithms. All of these concerns must be addressed through careful ethics regarding the use of AI in Islam.

In the contemporary world, Islamic scholars and institutions increasingly assist Muslim communities in dealing with innovations and modern technology. This assistance is crucial for making sure that the development of new technologies complies with Islamic moral values. Islamic legal experts (*fuqaha*) and scholars in various arenas assess technologies through the lens of Shariah, examining both their benefits and potential harms. In the case of biotechnologies, innovations in medicine include potential practices based on the possibility of editing genes and making a clone. Islam has supported medical innovations; however, discussions arose with regard to the use of technologies in changing the nature created by Allah.

In this way, the ruling role of Islamic institutions, and particularly fatwa councils, has become crucial. They regularly announce their judgments concerning whether or not Muslims should approve a new technology and how to use it in a context of Shariah law. This implies that interest or "*riba*" cannot be present in their transactions as it is not allowed by Shariah.[78] Digital banking and blockchain technologies can also be supported, and the prohibition of "*gharar*" or speculation is to be preserved.[79] Islamic institutions make sure that modern financial technology can serve social welfare needs and, at the same time, be ethical.

Ethics must be a central concern when connecting past Islamic contributions to technology and present Islamic innovations. One of the most significant aspects of Islamic ethics is the concept of "*maslahah*", which promotes public welfare.[80] Technologies aimed at improving the general quality of life, preventing suffering, and improving access to education and health are generally accepted by Islamic ethics. Regarding the emergence of modern technologies such as AI and biotechnology, a new category of ethical dilemmas has arisen and relies on Islamic scholars and bodies to examine.[81] AI has the potential to greatly advance the arena of education and health. Concerns also exist related to the potential of unequal access to technology, as it can be used to

[77] Abdelgalil, "Philosophy of Creativity, Innovation and Technology," 235.
[78] Zujajatul Ilmi, "The Application of Fiqh Principles in Contemporary Sharia Transactions in the Development of Innovative Products of Islamic Financial Institutions in Indonesia," *Oeconomicus Journal of Economics* 7, no. 2 (2023): 142–156.
[79] Abdullah Raden Aji Haqqi, "The Application of Cryptocurrency in the Islamic Banking and Finance in the Era of Digitalization," in *Proceeding International Conference on Law, Economy, Social and Sharia (ICLESS)*, vol. 2 (2024), 108–120.
[80] Iman Fauzi Sudirman, "Analyze the Impact of Islamic Work Ethic on Maslahah-Based Job Performance and Islamic Family Well-Being," *Jurnal Ilmiah Ekonomi Islam* 10, no. 2 (2024): 1524–1538.
[81] Azreen Zuhairi Abu Bakar et al., "Comprehensive Review on Islamic Ethics and the Rise of Technology," *Journal of Advanced Research in Applied Sciences and Engineering Technology* 51, no. 1 (2025): 184–194.

control and suppress the majority of the population. AI cannot be used to target individuals unjustly, even if doing so provides some societal benefit. Just as importantly, the benefits of AI must be widely available, not restricted to a few individuals and groups.

At the same time, biotechnology, which has reached great heights in medicine, also poses ethical problems.[82] The greatest concerns are related to genetic manipulation and human reproductive technologies. On both issues, it has been reflected in great detail about whether it is permissible to change human genes and whether it is permissible to interfere in the reproductive process. The Islamic faith encourages the possibility of developing medicine to save human lives.[83] Any technology that has the potential to harm the human body needs thoughtful analysis. The main idea of Islamic bioethics is to expand opportunities to extend life while preserving human nature and the integrity of life.[84] In order to allow this technology in the process and keep it from harming humans, Islamic scholars and institutions have become a vital part of analysing the impact and effects of modern technology. This way, the scholars' work not only makes it possible to apply new technologies primarily for their function, yet also to place them in society in a way that coincides with Islamic principles.[85]

Islamic institutions such as fatwa councils and religious seminaries are helping Muslims deal with the new technological problems. Realising the needs of their communities as well as being aware of what digital advances can do for the important cause of complying with the Shariah, they issue *fatwas* that contain information on how technologies are to be used following the law.[86] In the field of digital finance, Islamic scholars have been particularly active. They devised a way to employ blockchain and cryptocurrency in compliance with Islam. They make sure that no interest and speculation take place in any financial transaction and that all payments are conducted fairly, transparently, and in accordance with Islamic ethical principles. Digital finance brings together Islamic scholars and fintech programmers to design blockchain programmes that align with the Shariah so they become transparent, share risks, and never include *riba* (interest). With the help of blockchain, HelloGold from Malaysia allows customers to invest in gold while remaining in line with Islam.[87] This way, the currency stays away from speculation (*gharar*) and is secured by the full assets of the issuers. Just like Grams, OneGram from the UAE is also backed by physical gold and given a stamp of approval by Shariah experts.[88] Due to these innovations, blockchain potentially matches Islamic ethics, which encourages both trust and equality in the financial field of Muslim communities. Islamic scholars have also played a significant role in modernising Muslim educational institutions by bringing modern technologies into the course of studies. Thus, today's students can learn about the latest scientific advances, interact in virtual environments and

[82] Mohammed Nurul Alam, "The Prohibition of 'Riba' in Islam and Its Elimination through Islamic Financing Techniques," in *The Law of Riba in Islamic Banking* (London: Routledge, 2024), 27–57.
[83] Siti Nurma Hanim Hadie et al., "From Generosity to Gratitude: Exploring Islamic Views on Body Donation, Human Dissection, and Honoring the Gift of Life," *Anatomical Sciences Education* 17, no. 8 (2024): 1569–1578.
[84] Josep Casulleras, "From Ancient to Modern: Astronomy in Medieval Islam," *Journal of Physics: Conference Series* 2877, no. 1 (2024): 012031.
[85] Mohammed Mashary Alnaim, Ghazy Albaqawy, Mohammed Bay, and Abdelhakim Mesloub, "The Impact of Generative Principles on the Traditional Islamic Built Environment: The Context of the Saudi Arabian Built Environment," *Ain Shams Engineering Journal* 14, no. 4 (2023): 101914.
[86] Ipuk Widayanti and S. W. H. P. Sari, "The Role of DSN-MUI Fatwa in Indonesian Sharia Banking Development Flows in the Industrial Revolution 4.0," *El-Qish: Journal of Islamic Economics* 3, no. 1 (2023): 29–44.
[87] *FinTech Futures*, "Malaysian Fintech HelloGold Winds Down Core Business," accessed June 7, 2025, https://www.fintechfutures.com/fintech/malaysian-fintech-hellogold-winds-down-core-business
[88] *Business Standard*, "Dubai-Based Firm Issues Gold-Backed Cryptocurrency to Draw Muslim Investors," accessed June 9, 2025, https://www.business-standard.com/article/international/dubai-based-firm-issues-gold-backed-cryptocurrency-to-draw-muslim-investors-118040800292_1.html.

learn with the help of AI and digital apps without losing connection to their faith. Providing access to the most relevant information and safety in new communication tools is still ongoing; however, e-learning is already one of the modes of learning in many educational institutions in Muslim-majority countries.[89]

In terms of technology, the relation between Islamic civilisation—which made it a historical achievement, and modernity, in which rapid advancement in technology is presently observed—should be seen as a combination of ethical and functional concerns.[90] Since its inception, Islamic scholars and institutions have been playing an essential role in moderating the ethical context in which technology exists. Islamic researchers and institutions like the Islamic Fiqh Academy (OIC) and International Islamic Fiqh Academy have talked about the issue of AI, biotechnology, and emerging technologies and set guidelines. For instance, in 2021, ICESCO launched the "Ethical Charter for Artificial Intelligence" to ensure AI development aligns with Islamic ethics focused on justice, confidentiality, and the principle of not harming anyone.[91] Just like the UAE, Saudi Arabia's Data and AI Authority (SDAIA) includes Islamic ethics in strategic plans for AI, to prevent its use from going against human dignity or Islamic law.[92] Such initiatives work to ensure that faith and technology go well together. From an ethical viewpoint, such a restrained approach to technology is justified due to the essentialism of maintaining the harmony of the will of Allah and protecting the spiritual realities of Islam. However, the legacy of the Golden Age of Islamic civilisation creates an excellent starting point for modern Muslim societies in addressing modern digital technologies.[93] AI, biotechnology, digital finance, and other types of technology need to be taken with sufficient consideration. The tools born out of this approach should be limited to technology that is ethically sound from an Islamic viewpoint. The development of such technology should be geared to widespread use that benefits the general public and increases access to education, health, and economic prosperity. This means that the use of technology should remain consistent with the Islamic concept of justice, social responsibility, human dignity, care, and material and spiritual welfare.

Conclusion

It is vital to integrate technological innovation with Islamic values and history in order to create a fair and just society. The Golden Age of Islam indicates that faith and innovation can be adequately balanced, as the religion boasts an impressive history of scientific progress. As technology is changing the way that education, healthcare, and finance are organised, improvements in these fields have to comply with Islamic moral standards. Through pushing for importing Islamic values into technological progress, Muslim societies will prove that these innovations are invented with bettering humanity in mind, without losing their attachment to the faith's spiritual life. The fine balance between the past and the modern age is bound to benefit both individuals and entire communities. The study points out that in the Islamic view, science is closely tied to religion because learning and discoveries are considered worship and a way to learn about God. Muslims such as Ibn Sina and Al-Razi made scientific progress that was not in conflict with their religion

[89] Byrad Yyelland et al., "Privacy Concerns during Remote Emergency Learning in Higher Education in Qatar," International Association for Development of the Information Society, 2023, https://eric.ed.gov/?id=ED636453.
[90] Sekinat Adejoke Kola-Aderoju, "The Muslim World and the Development of Science and Technology: Phase in History," *South Florida Journal of Development* 4, no. 2 (2023): 737–754.
[91] ICESCO, "ICESCO Director-General: Riyadh Charter on AI Ethics a Moral Compass Anchored in Islamic World Values," accessed June 9, 2025, https://icesco.org.
[92] SDAIA, "About," accessed June 9, 2025, https://sdaia.gov.sa.
[93] Uthman Okanlawon Sidiq, Haruna Zagoon-Sayeed, and Taiwo Moshood Salisu, "Diagnosing Qur'anic Precepts on Wealth Creation in the Digital Age," *INVEST Journal of Sharia and Economic Law* 4 (2024): 1.

since it helped them perform their religious duties and look for truth. Even today, many Islamic teachings urge people to invent new ideas that are trustworthy and responsible to the community. Science here helps achieve the *maqasid al-shariah*, for example, preserving life, intellect, and wealth. Since religion provides a sense of morality, it supports science to benefit everyone. Therefore, when they are based on common values, science and faith can cooperate, making sure technology is developed consciously and spreads evenly among different people.

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