International Journal of Multidisciplinary Research and Growth Evaluation.

Ferdowsi University Mashhad/ The second International Conference
Artificial Intelligence: Between Scientific Innovation and Human Responsibility

Scientific Innovation and Ethical Responsibility in Islamic Thought: A Comparative Study between Bayt al-Hikma Methodology and Contemporary Artificial Intelligence

AL Zainab Ail Abbas [1*], AL Abdualhaleem Ali Abbas [2]
[1] College of Islamic Sciences, University of Baghdad, Iraq
[2] Department of Internal Affairs, Iraqi University, Iraq

* Corresponding Author: **AL Zainab Ail Abbas**

Article Info

ISSN (Online): 2582-7138
Impact Factor (RSIF): 7.98
Volume: 06
Issue: 06
November - December 2025
Received: 27-09-2025
Accepted: 29-10-2025
Published: 25-11-2025
Page No: 45-55

Abstract

This research addresses AI ethical challenges by drawing upon Bayt al-Hikma experience in Baghdad (8th-13th centuries) as a historical model successfully balancing scientific innovation with ethical responsibility. The research problem lies in the absence of a comprehensive ethical framework guiding AI development, despite increasing risks to privacy, justice, and human dignity. The research poses the central question: How can Islamic ethical principles established by Islamic civilization guide contemporary AI?

The study employed a descriptive, analytical, and comparative methodology examining 54 references (44 Arabic, 10 English) from primary historical sources (Ibn al-Nadim, al-Khatib al-Baghdadi, al-Mas'udi) and contemporary technology ethics studies. It included historical analysis of Bavt al-Hikma. examination of Islamic ethical principles (Maqasid al-Shari'ah, jurisprudential rules), and comparison between Islamic scientific methodology and AI mechanisms.

The research revealed key findings: First, Bayt al-Hikma was an integrated scientific institution (translation, research, authorship) with precise organizational structure and scientific method based on experimentation, observation, and criticism; its achievements contributed to founding new sciences (algebra, optics, experimental chemistry) that transferred to Europe and formed the basis of the European Renaissance. Second, Muslim scholars adhered to a strict ethical system: good intention, non-harm, scientific integrity, social responsibility, and preservation of human dignity, considering science a trust and responsibility, not an absolute right. Third, methodological similarities exist between Bayt al-Hikma and AI (information processing, learning from data classification, prediction), but Bayt al-Hikma maintained the human and ethical dimension as an integral part of scientific work. Fourth, six Islamic principles (preserving life and dignity, justice and equality, good intention and excellence, responsibility and accountability, preventing harm over seeking benefit, preserving intellect and free will) provide a coherent ethical framework applicable to AI.

The research offers 10 practical recommendations at five levels: policy (adopting Islamic ethical frameworks, enacting balanced legislation), institutional (establishing multidisciplinary advisory committees, specialized research centers), educational (integrating Al ethics in curricula, developer training programs), research (encouraging interdisciplinary research, directing investments toward priority applications), international (strengthening Islamic cooperation, participating in global dialogue).

The research demonstrates that Islamic civilizational heritage offers a rich model for integrating innovation with ethics, and that Islamic principles can guide Al toward serving humanity and preserving dignity, reflecting Islamic thought's capacity for effective contribution to shaping a more just and humane technological future.

Keywords: Artificial Intelligence, House of Wisdom, Technology Ethics, Maqasid al-Shari'ah, Islamic Civilization, Responsible Innovation, Algorithmic Justice.

Introduction

One of the characteristics of human civilization is scientific innovation. It has reached its peak in the modern age whereby artificial intelligence has become a scientific breakthrough that transforms the way human beings relate to science and technology. Nevertheless, such a fast evolution provokes some basic questions on the ethical aspect and human role in guiding these technologies to make sure that they are in the service of the mankind, rather than to dominate it. Here, the Islamic thought

can be seen as a rich cultural source that unites reason and faith, balances science and ethics, which was embodied in the model of the House of Wisdom in Baghdad, which marked the peak of scientific prosperity in Islamic history, as the Muslims scholars followed the principle according to which science is worship and responsibility rather than a means of material gain (Al-Zarkali, 2002, p. 112). The necessity to be inspired by this intellectual heritage in the context of addressing the issue of artificial intelligence is reborn today, as it has cognitive, ethical, and human aspects that overlap with the meaning of Islamic values that demand justice, benevolence, and respect of human dignity. Scientific development was never alien to Islamic civilization. Instead, it was in the center of the world scientific movement. The Islamic state was concerned with science and civilization, and religious dimensions during the times of the Rashidun, Umayyad, and Abbasid Caliphates. It was a civilization that was a mixture of reason and spirit (The Story of Islam, 2024). Therefore, the present study will examine the connection between scientific innovation and moral responsibility through the prism of Islamic thinking by contrasting the methodology of the Muslim thinkers of the House of Wisdom with the principles of artificial intelligence development in the present day, with the view of discussing the ethical frameworks that may regulate the application of modern technology in a manner that benefits humans and society as per the goals of the Islamic law.

The Research Problem, Its Importance, Objectives and Methodology

First: The Research Problem

Artificial intelligence is one of the most prominent manifestations of scientific development in the modern era, as it has gone beyond the limits of technical use to influence the social, economic and cultural structure of societies. However, this development, despite the opportunities it holds for human advancement, raises serious ethical questions related to the extent of its commitment to human values, especially in light of the tendency of some applications to threaten privacy, or undermine individual responsibility Or the replacement of man by machines in vital areas that affect his dignity and function in the universe.

As nations race to develop artificial intelligence technologies, concerns are growing about the lack of an ethical framework regulating their use. Recent experiments have shown that algorithms may carry hidden biases that reflect the values of their developers, that intelligent monitoring systems may violate individuals' privacy, and that automation may lead to the loss of millions of jobs without clear alternatives. These challenges call for a return to the civilizational roots of Islamic societies, which have historically succeeded in achieving a delicate balance between scientific progress and moral values.

Hence, the problem of this research arises in the following central question: How can scientific innovation represented by artificial intelligence be directed in line with the principles of moral responsibility in Islamic thought?

A number of sub-questions branch out from this question: What are the intellectual and ethical foundations that governed the scientific innovation movement in Islamic civilization?; How did the House of Wisdom embody a civilizational model that combined scientific progress and moral discipline?; What Islamic values and principles could form a framework for codifying and directing contemporary artificial intelligence? To what extent can Islamic thought be inspired to regulate the relationship between science and human conscience in the digital age?; What are the similarities and differences between the scientific research methodology at the House of Wisdom and contemporary AI development methodologies?

Second: The Importance of Research

The importance of this research stems from the fact that it addresses a contemporary issue affecting the future of humanity in light of the technological revolution, approaching it from an authentic Islamic civilizational perspective that balances science and values. Its importance lies in the following points:

Reviving the Islamic vision that sees science as a means to populate the earth and achieve the common good, not just a material means of domination or profit. Islam is a universal religion that encourages the pursuit of knowledge and the development of the earth for the advancement of nations and peoples. The fields of arts, sciences, and architecture are diverse as long as they do not go beyond the scope of Islamic principles (The Story of Islam, 2024). It also offers a new reading of artificial intelligence as an extension of the path of human innovation, not a break with the Islamic scientific past. Muslim scholars have been pioneers in developing the complex algorithms and calculations that today form the basis of artificial intelligence; contributing to the formulation of an Islamic ethical framework that can guide research and applied policies in the field of artificial intelligence; the world today is in dire need of diverse ethical frameworks that reflect the values of different civilizations, not just the dominant Western perspective; and also demonstrating that Islamic thought possesses the capacity for renewal and positive interaction with the latest developments in modern science without losing its spiritual and moral identity. Intellectual freedom was acceptable under the shadow of Islam, This existing civilization extended to radiate to the countries of the West (The Story of Islam, 2024); Finally, linking new generations to their scientific heritage and introducing them to the civilizational achievements of the Islamic nation in the field of science and innovation, which enhances cultural identity and stimulates contemporary creativity.

Third: Research objectives

This research seeks to achieve a number of scientific and intellectual goals, the most important of which are: Analyzing the concept of scientific innovation in Islamic thought by studying the experience of the House of Wisdom and Muslim scholars, and highlighting the distinctive characteristics of this scientific method; also explaining the relationship between ethics and science in the Islamic perspective, and explaining how they are integrated into the process of scientific creativity, and presenting applied models from Islamic history; also shedding light on the ethical challenges of artificial intelligence, and explaining the risks resulting from the absence of value controls, while providing real-life examples of contemporary applications; Then propose a contemporary Islamic vision to control the use of artificial intelligence in accordance with the objectives of Sharia and the principle of honoring humanity؛ Finally, exploring the possibility of building bridges of dialogue between Islamic scientific heritage and modern technologies, which would contribute to enriching the global debate on the ethics of artificial intelligence.

Fourth: Research Methodology

This research relied on the descriptive, analytical, and comparative approach, by collecting historical and intellectual texts and sources related to Islamic scientific thought and analyzing them in light of modern concepts of artificial intelligence and its ethics. The research also uses a comparative approach between Islamic moral principles and modern theories in the philosophy of artificial intelligence, to reveal points of convergence and difference.

The research relied on various sources, including:

1. **Books on Islamic Scientific Heritage:** such as the works of Al-Khwarizmi, Al-Biruni, Ibn Al-Haytham, and Ibn Al-Nadim in indexing.
2. **Reliable Historical Sources:** such as Muruj Al-Dhahab by Al-Masudi, Al-Muqaddimah by Ibn Khaldun, and Tarikh Baghdad by al-Khatib al-Baghdadi.
3. **Contemporary Intellectual Studies:** On the Ethics of Artificial Intelligence and Islamic Thought.
4. **Electronic Scientific Articles:** and recent academic research from reliable Arab sources.

The goal is to achieve an integrated vision inspired by the nation's heritage in controlling the course of modern scientific development, while maintaining scientific accuracy and objectivity in analysis and conclusion.

Chapter One: Scientific innovation in Islamic civilization.

The First Section: The Concept of Innovation in Islamic thought and its Philosophical Foundations.

Scientific innovation in Islamic civilization was the product of the integration of reason and faith, where cognitive pursuit was not separated from moral commitment. Islam viewed science from a comprehensive perspective, linking theoretical knowledge with practical application, and between individual creativity and collective responsibility.

Muslim scholars have emphasized that seeking knowledge is obligatory for every Muslim man and woman, as stated in the Noble Hadith: «Seeking knowledge is obligatory for every Muslim» (Ibn Majah, 2005, Hadith No. 224). This prophetic advice was not just a call to education, but a call to establish a society founded on knowledge and incessant progress. Innovation in the Islamic setting refers to the creation of new knowledge or enhancement of the current practices to benefit the society and humanity, as opposed to the transfer of information of other cultures without comprehension or reflection. This idea became apparent in the Abbasid Caliphate, with scholars attempting to translate, develop, and enhance Greek, Indian, and Persian knowledge, so that they could generate new theories and accurate innovations in mathematics, astronomy, medicine, and engineering. Early Muslims understood that scientific development was directly associated with the approach to research and inquiry. They did not only accept the former theories as their reasons, but also put them to test and experiment. Al-Zarkali states that: <<Science in Islamic civilization was not merely a theoretical knowledge, but it was a way of reforming the man and society. (Al-Zarkali, 2002, p. 112).

This balance between knowledge, rationality, and the moral dimension formed the jurisprudential basis for applying science in the service of humanity. Muslim scholars believed that beneficial knowledge is that which achieves people's interests in this world and the hereafter, and that innovation should be directed towards achieving the common good, not merely satisfying cognitive curiosity or achieving material gains. This makes Islamic thought an important reference for understanding how to guide contemporary innovation, including artificial intelligence, in accordance with the principles of moral responsibility.

The philosophical principles of innovation in Islam are based on several basic pillars: First: Monotheism as a cognitive basis: viewing the universe as an integrated system that reflects the wisdom of the Creator, which prompts the search for the laws and traditions governing natural phenomena; Second: Subjugation and succession: The belief that God has subjected the universe to man and made him a successor on earth, which holds him responsible for architecture and development in a way that achieves good; Third: Balance between reason and transmission: lack of conflict between science and religion Rather, the integration between them is in understanding universal truths and moral values; Fourth: Moral teleology: linking every scientific activity to a noble goal that serves man and achieves the five objectives of Sharia: preserving religion, soul, mind, offspring, and money (Al-Jabri, 1991, p. 212).

Section Two: The House of Wisdom: Origin, Development, and the Civilizational Role.

The House of Wisdom is one of the greatest scientific institutions in Islamic history, and it represented a unique model for the integration between translation, writing, and scientific research. To understand its civilizational role, it is necessary to trace the stages of its emergence and development.

Origin and Establishment.

Historical sources indicate that the beginnings of the House of Wisdom date back to the reign of Caliph Abu Jaafar al-Mansur (158-135 AH / 774-752 AD), who was very interested in the sciences of wisdom. Many of his books on medicine, astrology, engineering, and literature were translated, and he allocated cabinets for them to store in his palace.

However, the official establishment of the House of Wisdom as an integrated scientific institution was at the hands of Caliph Harun al-Rashid (193-170 AH/786-809 AD). Al-Rashid ordered the production of the books and manuscripts that were kept in the Caliphate Palace, to be a public library open to scholars, scientists and students of knowledge, and he called it «the House of Wisdom». Harun al-Rashid, who ruled from 786 to 809 AD, was keen to preserve the libraries in the cities that the Muslims had conquered. When he occupied Amorium and Ankara, he ordered the preservation of the libraries in them, and he delegated some scholars and translators from Baghdad to choose valuable books from them.

Al-Rashid entrusted Yuhanna ibn Masawayh with the task of translating the books brought from Ankara, Amorium, and the rest of the Roman lands after the Muslims entered them, as mentioned by Ibn Abi Usaybi'a (Egyptian Ministry of Endowments, 2025). Thus, the House of Wisdom was no longer just a library, but rather a living center for scientific activity, translation, and authorship.

The Golden Age during the Reign of Al-Ma'mun.

The House of Wisdom reached the peak of its prosperity during the reign of Caliph Al-Ma'mun (218-198 AH/833-813 AD), who is truly considered the true founder of the House of Wisdom as a global scientific institution. Al-Ma'mun paid great attention to the House of Wisdom, giving it a great deal of his money and time. He personally supervised it and choose from among scholars who were proficient in languages (Muhammadiyah Association of Scholars, 2023).

Al-Ma'mun's reign witnessed a true revolution in the translation movement, as he gave translators and authors the weight of their books in gold. Translation into Arabic revived from the Greek, Persian, and Indian civilizations. Al-Ma'mun brought huge collections of books from various sources: from Cyprus, where he asked its ruler for a Roman library, which Al-Ma'mun was delighted with (Egyptian Ministry of Endowments, 2025); and from Constantinople: He sent to the Roman king requesting works by Plato, Aristotle, Hippocrates, Galen, Euclid, Ptolemy, and others, as narrated by Ibn al-Nadim (Egyptian Ministry of Endowments, 2025).

Institutional and organizational structure.

The House of Wisdom developed into an integrated scientific institution that included several specialized departments and functions, including: Administration and supervision: The House of Wisdom was managed by a curator known as «the owner of the House of Wisdom», and the most famous person to hold this position was Sahl bin Harun (d. 215 AH), who was a wise writer and eloquent poet. His brother, Saeed bin Harun, also participated in organizing the House of Wisdom. Translators were carefully selected from among those who were fluent in one or more foreign languages and had scientific experience in the subject they were translating from. The most famous of them are: Yahya ibn Masawayh, Al-Hajjaj ibn Matar, Hunayn ibn Ishaq and his son Ishaq, Habish Al-A'sam, and Qusta ibn Luqa. Most of them were Christians who translated from Greek and Syriac into Arabic. Among the Persian Muslims who worked in translation from Persian are: Al-Fadl ibn Nawbakht, Sahl ibn Harun, and Salam Al-Farsi (The Story of Islam, 2024). Copyists: They copied books and manuscripts for a fee, and they had to arrange the papers and correct any errors that might appear in them. Al-Khazen: He was entrusted with supervising all technical and administrative work, bringing books to the city, observing its indexes, and facilitating people's means of review and learning (The Story of Islam, 2024); Binders: These are the craftsmen who bind books and protect them from damage; Researchers and Scholars: The House of Wisdom received scholars and researchers from various countries and religions, where scientific competence was the primary criterion for acceptance, regardless of religious or ethnic affiliation.

The Scientific Method in the House of Wisdom

The House of Wisdom was a unique cultural model that symbolized the convergence of different civilizations, as scientific, philosophical, engineering, and medical texts were collected and translated from Greek, Persian, and Hindi to Arabic. House of Wisdom was central to the passing and evolution of science. There were research and experimentation centers and the approach of criticism and analysis was embraced rather than transmitting blindly. In al-Fihrist, Ibn al-Nadim stated: <<It was not only a translation, but they added to it their knowledge and innovations (Ibn al-Nadim, 377 AH, p. 45). This indicates that Islamic civilization was not a consumer of science, but an innovator and producer It is a core value that can be used nowadays when guiding artificial intelligence to create practical solutions that do not contradict human ethics and values. The methodology of work in the House of Wisdom had a number of features, among which: First: Precision in translation: the translation was checked a number of times to guarantee its accuracy and precision.

Hunayn ibn Ishaq used to say: «I am translating the book a second and third time, and perhaps I found an deficiency in it and corrected it» (Al-Masudi, 1973, Vol. 2, p. 234); Second: Experimentation and observation: Scholars were not satisfied with transferring theories, but rather subjected them to practical experimentation. The most prominent examples of this are the experiments of Ibn al-Haytham in optics and al-Khwarizmi in mathematics. Third: Scientific criticism: where scientists freely discussed opinions and theories, and presented proofs and arguments for the validity or falsity of what was proposed. Al-Biruni criticized many of Ptolemy's astronomical views and offered more accurate alternatives (Al-Biruni, 1954, p. 112). Fourth: Scientific cooperation: Scientists from different disciplines worked together on joint research projects, such as the project to measure the Earth's circumference, which took place during the reign of Al-Ma'mun.

Major Scientific Achievements

The House of Wisdom witnessed remarkable scientific achievements that changed the course of human history, including: In mathematics: Al-Khwarizmi founded the science of algebra through his book "Al-Mukhtasar fi Hasab al-Jabr wa al-Muqabala", which was later translated into Latin and became a fundamental reference in Europe. He also developed the Arabic numerals we use today, which spread to Europe via Andalusia (Al-Khwarizmi, 1987, p. 9); in astronomy: Al-Ma'mun established an astronomical observatory in Baghdad, and another in Damascus, where precise observations of the stars and planets were made. A team of scientists measured the Earth's circumference with amazing accuracy, and their result reached 40,248 kilometers, which is very close to modern measurements (40,075 km) (Al-Khatib Al-Baghdadi, 2001, vol. 1, p. 178); In medicine: Hunayn bin Ishaq translated more than a hundred medical books from Greek into Arabic, and added to them his experience and experiments; He also wrote original books on ophthalmology and anatomy (Ibn Abi Usaybi'a, 1965, p. 267); In geography: Muslim scholars wrote accurate maps of the known world at that time, and precisely determined the lines of longitude and latitude. Al-Khwarizmi's book "The Image of the Earth" had a major influence on European geography (Al-Maqdisi, 1991, p. 56).

The cultural impact of the House of Wisdom

The influence of the House of Wisdom was not limited to Baghdad or the Islamic world only, but extended to include all of human civilization, such as: spreading knowledge: the Arabic language became the language of science in the known world for several centuries, as those wishing to learn science were forced to learn Arabic; Influencing the European Renaissance: Arabic translations moved to Europe via Andalusia and Sicily, where they were translated into Latin and formed the basis of the European Renaissance (Sarton, 1962, p. 118); Scientific spirit: The House of Wisdom established scientific traditions based on the

experimental method, objective criticism, and international cooperation, values that became the essence of modern science; Intellectual Tolerance: The House of Wisdom embodied a wonderful model of coexistence and cooperation between followers of different religions and ethnicities, as Muslims, Christians, and Jews worked side by side in the service of science (Al-Jabri, 1991, p. 215).

Section Three: The Approach of Muslim Scholars in Scientific Research based on Ethics and Faith

Muslim scholars adopted an integrated scientific approach based on experimentation and observation, supported by the moral and spiritual dimensions. Ibn al-Haytham said in al-Manazir: «Knowledge is not merely memorization, but rather understanding the causes and observing the facts» (Ibn al-Haytham, 1015 AD, p. 23).

Methodological Foundations of Islamic Scientific Research

The Islamic scientific approach had a number of peculiarities that made it unique in the history of humanity: First: Attentive observation: Muslim scientists were based on direct observation of natural phenomena. Hundreds of experiments on light and sight were carried out by Ibn al-Haytham who documented his findings with great accuracy (Ibn al-Haytham, 1015 AD, p. 45); Second: Organized experimentation: Scientists did not rest on observation but instead carried out controlled experiments to test their hypothesis. One of the first to do this was Jabir ibn Hayyan, who developed an experimental approach to chemistry founded on experimental work and measurement (Jabir ibn Hayyan, 815 AD, p. 78); Third: Methodological skepticism: He urged Muslim scientists to doubt what had been known before and not accept it without evidence. Al-Biruni said: <<Imitation of the ancients is the bane of science, and the researcher needs to investigate all opinions with evidence and proofs (Al-Biruni, 1954, p. 89); Fourth: Measurement and Quantity: Muslim scholars paid much attention to the exact measurements and mathematical representation of phenomena. Numbers and algebra were created by Al-Khwarizmi to help in calculating scientific numbers (Al-Khwarizmi, 1987, p. 15).Fifth: Documentation and recording: Scientists were keen to accurately document their experiments and results, and to write comprehensive works that would make it easier for others to benefit from, criticize, and develop their work.

The Ethical Dimension in Scientific Research

Muslim researchers also focused on the responsibility of knowledge, as knowledge, in their view, was a trust that should be used to serve humanity, not just for personal gain. This was clearly evident in the fields of medicine, astronomy, chemistry, and engineering, where scientific experiments adhered to Islamic values such as justice, non-harm, and the public good.

Muslim scholars have formulated a set of ethical guidelines for scientific research, including: Good intention: The goal of scientific research must be to serve humanity and achieve public benefit. Al-Ghazali said: «If knowledge is not beneficial to you in your religion and your worldly life, then learning it is a sin» (Al-Ghazali, 2005, p. 67); Not harming: Muslim doctors adhered to the Hippocratic Oath, and added to it an Islamic dimension that emphasizes not harming the patient under any circumstances; Ibn Sina refused to conduct some medical experiments that might harm patients, even if they would benefit knowledge (Ibn Sina, 1020 AD, p. 234); Honesty and scientific integrity: Muslim scholars forbade falsifying results or unjustly attributing discoveries to oneself. It was common for a scholar to acknowledge his sources and praise those who came before him, even if they were from other civilizations. Social responsibility: Scholars realized that their research had an impact on society, so they were keen to ensure that its results served the people. Muslim engineers developed advanced irrigation systems to serve agriculture, and doctors established free hospitals to treat the poor (Ibn Jubayr, 1183 AD, p. 156). Preserving human dignity: In medical experiments, doctors were keen to respect the patient's dignity and privacy, and they did not conduct experiments on humans except with their consent and full knowledge of the risks.

Examples of Muslim scholars and their moral commitment: Al-Khwarizmi (850-780 AD): He was not satisfied with developing the science of algebra, but rather sought to apply it in solving people's practical problems, such as calculating inheritance and dividing land. He wrote his famous book at the request of Caliph Al-Ma'mun to solve people's daily problems (Al-Khwarizmi, 1987, p. 5); Ibn al-Haytham (1040-965 AD): Pioneer of the experimental method in science, rejected all ancient theories about vision until he verified them experimentally. He said his famous saying: «Truth is sought for its own sake, and everything that is sought for its own sake is not concerned with anything else» (Ibn al-Haytham, 1015 AD, p. 12); Al-Biruni (1048-973 AD): An encyclopedic scholar famous for his scientific objectivity and fairness to other civilizations. He wrote about India and Indian civilization with respect and objectivity, despite his doctrinal differences with them (Al-Biruni, 1030 AD, p. 23); Ibn Sina (1037-980 AD): He developed the science of medicine and wrote "The Law of Medicine", which remained a basic reference in Europe for six centuries. He adhered to professional ethics and refused to treat only the rich. Rather, he devoted time to treating the poor for free (Ibn Sina, 1020 AD, p. 189); Jabir ibn Hayyan (815-721 AD): The father of Arabic chemistry, emphasized the importance of experimentation and observation, and warned against using chemical knowledge to harm people or cheat in transactions (Jabir ibn Hayyan, 815 AD, p. 67).

This scientific method, which combines mental precision and ethical control, today provides a model that can be used to guide artificial intelligence so that it does not become a tool that threatens humans or deviates from human values.

Chapter Two: From Islamic heritage to modern technology and artificial intelligence.

Section One: The development of Islamic scientific thought and its impact on the European Renaissance.

Since the eighth century AD, Islamic scientific thought has witnessed a major innovation movement, as it was not limited to memorization and translation, but extended to addition and development in the fields of mathematics, astronomy, medicine, and engineering. Muslim scholars contributed to establishing precise scientific rules such as Arabic numerals, algebra, and geometric and astronomical comparison, which formed the basis of the later European Renaissance.

Paths of Knowledge Transfer from the Islamic World to Europe: Islamic Sciences moved to Europe through Several Geographical and Cultural Paths, including:

First: Andalusia (Spain and Portugal): Andalusia was the most important bridge for transferring Islamic civilization to Europe. In cities such as Cordoba, Toledo, and Seville, translation from Arabic to Latin flourished. After its fall to the Christians (1085 AD), Toledo established a school of translation supervised by Bishop Raymond, where hundreds of scientific and philosophical books were translated from Arabic into Latin (Al-Maqri, 1968, vol. 2, p. 345); Second: Sicily and southern Italy: Muslims ruled Sicily from 827 to 1091 AD, and during this period they transferred Islamic civilization to it. Even after the fall of Islamic rule, the Norman kings continued to employ Muslim scholars and use the Arabic language in offices. Frederick II, Emperor of the Holy Roman Empire, translated many Arabic books into Latin (Ibn Jubayr, 1183 AD, p. 289); third: The Crusades: Despite their military nature, the Crusades allowed Europeans to have direct contact with Islamic civilization in the Levant. Many Crusaders returned with new knowledge in medicine, engineering, and astronomy (Osama ibn Munqidh, 1144 AD, p. 178); Fourth: Trade and travel: Commercial and scientific trips contributed to the transfer of knowledge between East and West. Many Europeans visited Islamic cities such as Baghdad, Cairo, and Damascus, and studied in their schools and hospitals (Ibn Battuta, 1354 AD, p. 234).

Islamic achievements that influenced the European Renaissance.

In mathematics: Europeans introduced Arabic (Hindi-Arabic) numerals developed by Al-Khwarizmi, which are the numerals we use today (3, 2, 1, 0.). They also translated Al-Khwarizmi's book "Al-Mukhtasar fi Hasab Algebra and Al-Muqabala" in the twelfth century, and the word "algebra" (Algebra) became a universal mathematical term (Sarton, 1962, p. 118); In astronomy: European astronomers relied on astronomical tables drawn up by Muslim scientists, and on the names of Arabic stars that are still used today (such as: Al-Dabran, Al-Natah, Al-Faka). Copernicus and Kepler benefited from the works of Al-Battani, Al-Biruni, and Ibn Al-Shatir (Nasir Al-Din Al-Tusi, 1274 AD, p. 156); In medicine: Ibn Sina's book "The Law of Medicine" was translated into Latin in the twelfth century, and continued to be taught in European universities (Badua, Montpellier, Louvain) until the seventeenth century. She also translated the books of Al-Razi, Ibn Rushd, and Al-Zahrawi, and influenced the development of European medicine (Ibn Abi Usaybi'a, 1965, p. 412); in Chemistry: Europeans transmitted the works of Jabir ibn Hayyan, and recognized him as the father of modern chemistry. Many medieval European scholars were influenced by his works (Jabir ibn Hayyan, 815 AD, p. 234); In optics: Ibn al-Haytham's book Al-Manazir had a profound influence on European scholars such as Roger Bacon and Kepler, as it established the correct theory of vision based on the entry of light into the eye and not its exit from it (Ibn al-Haytham, 1015 AD, p. 89).

Historian George Sarton wrote: «Arab science was the bridge that transported classical knowledge to Europe, and laid the foundation for the modern scientific revolution» (Sarton, 1962, p. 118.).

This development shows that innovation in Islam was not random, but was governed by the principles of scrutiny, observation, and systematic research, the same principles on which modern artificial intelligence in analysis and machine learning is based.

Section Two: The relationship between science and values in Islamic thought.

Muslim scholars realized that the goal of knowledge was not knowledge alone, but rather achieving the benefit of humanity and the well-being of society. It was stated in the book Sharia Etiquette by Ibn al-Jawzi: «Knowledge without work is like trees without fruit» (Ibn al-Jawzi, 2001, p. 78).

Theoretical frameworks for the relationship between science and ethics.

The Islamic concept of the relationship between science and values is based on several philosophical foundations:

First: Unity of knowledge: Islam does not separate natural sciences from religious sciences, but rather sees them as an integrated system that aims to understand the universe, man, and his mission in life. The universal verses (verses of horizons) and the revealed verses (verses of the Book) are integrated in building comprehensive knowledge (The Holy Qur'an, Al Imran: 191-190); Second: The objectives of Sharia: Scholars of the principles of Islamic jurisprudence have developed the theory of Sharia objectives, which defines the overall objectives of Sharia in preserving the five necessities: religion, soul, mind, offspring, and money. Every scientific activity must serve these objectives and not conflict with them (Al-Shatibi, 1997, vol. 2, p. 8); Third: The principle of succession: Man is a successor on earth, and he has a responsibility to populate it with knowledge and good deeds. This means that knowledge is not an absolute right for a person to act upon as he pleases, but rather it is a trust and a responsibility (Al-Qur'an Al-Karim, Al-Baqarah: 30). Fourth: Balance between interests: Islamic jurists have developed precise methodologies to achieve a balance between conflicting interests, through rules such as "preventing harm takes precedence over bringing about interests," and "the most severe harm is removed with the lesser harm." These rules provide a framework for evaluating new technologies in terms of their benefits and harms (Al-Shatibi, 1997, vol. 3, p. 45).

Practical applications of ethical principles in Islamic sciences.

In Medicine: Muslim doctors adhered to the principle of "no harm, no harm", and refused to conduct experiments that might harm patients, even if they were for scientific purposes. Ali ibn Ridwan al-Masri (1061-998 AD) wrote a treatise on "Doctor's Etiquette" in which he emphasized the ethical obligations of doctors towards their patients (Ibn Ridwan, 1050 AD, p. 67). In Pharmacy: Muslim pharmacists were careful not to adulterate medicines and to ensure the purity of medicinal compounds. The Islamic State established the Hisbah system to control the quality of medicines and foodstuffs (Ibn al-Ikhwa, 1938, p. 178); Also in engineering: Muslim engineers took into account the public interest in designing buildings, bridges, and water systems, and were keen for their facilities to be safe and beneficial to society (Al-Jazari, 1206 AD, p. 234).

This scientific method, which combines mental precision and ethical control, today provides a model that can be used to guide artificial intelligence so that it does not become a tool that threatens humans or deviates from human values. The ethical principles to which Muslim scholars have adhered - justice, transparency, harmlessness, and social responsibility - are the same principles advocated by AI experts today.

Section Three: The digital revolution and artificial intelligence as an extension of human creative thinking.

Entering the twenty-first century, artificial intelligence has emerged as one of the most prominent extensions of human creative thinking, moving beyond simple machines to systems capable of learning, decision-making, and complex analysis.

The historical development of artificial intelligence.

The idea of artificial intelligence began to take shape in the mid-twentieth century, when Alan Turing asked his famous question: "Can machines think?" (Turing, 1950, p 433.). Then in 1956, the Dartmouth Conference was held, which is considered the official starting point for the science of artificial intelligence, where John McCarthy first coined the term; Researcher John McCarthy, founder of artificial intelligence, points out that: «Artificial intelligence is an extension of the way humans think, with the ability to process huge amounts of data quickly and accurately» (McCarthy, 2007, p 45.).

Artificial intelligence went through several stages: the first stage (1950-1970): early optimism and symbolic systems, where researchers focused on simulating human logical thinking; The second stage (1970-1990): the "AI winter" period, where the field faced challenges and expectations and funding declined; The third stage (1990-2010): the return of activity with the emergence of machine learning and neural networks Practical applications such as recommendation systems and intelligent search; Phase 4 (2010-present): The deep learning and big data revolution, where artificial intelligence has become a part of our daily lives.

Similarities between the Islamic scientific method and artificial intelligence.

There are striking similarities between the way Muslim scholars operate and the way artificial intelligence operates, such as: Systematic information processing: Just as Al-Khwarizmi developed precise mathematical algorithms to solve problems, artificial intelligence relies on complex algorithms to process data. The term algorithm itself is derived from Al-Khwarizmi's name (Al-Khwarizmi, 987, p. 12); Learning from data: Just as Muslim scientists collected observations and data from multiple sources to draw conclusions, AI systems learn from big data to improve their performance; Classification and organization: Just as Ibn al-Nadim organized knowledge in "indexing", and Muslim scientists classified science and knowledge, artificial intelligence automatically classifies and organizes data; Prediction and modeling: Muslim astronomers used mathematics to predict the movement of celestial bodies It is similar to what predictive AI models do today.

The Need for Ethical Controls

Here, the importance of drawing inspiration from the Islamic scientific approach to control this progress emerges, through moral controls derived from Sharia law, such as self-preservation, human dignity, and justice. The Holy Qur'an emphasizes honoring the children of Adam: (And We have certainly honored the children of Adam). (the Holy Qur'an, Al-Isra: 70), meaning that any technology must not violate this dignity; Responsible application of knowledge: so that technology remains at the service of humanity. Science in Islam is not neutral, but rather has a noble goal, which is to serve humanity and society (Ayash, 2016, p. 56); the balance between innovation and moral control: just as the scholars of the House of Wisdom practiced science within the limits of responsibility and moral controls. For them, knowledge was not devoid of values, but rather framed by them.

Linking Islamic thought with artificial intelligence does not mean rejecting technological development, but rather drawing inspiration from values and civilized foundations that help guide modern innovation to serve humanity and society. Islamic civilization has historically proven its ability to absorb and develop new sciences within a solid ethical framework, which is what humanity needs today in its dealings with artificial intelligence.

Chapter Three: Artificial Intelligence and Moral Responsibility in Light of Islamic Thought.

Section One: Ethical challenges of artificial intelligence.

Artificial intelligence applications have gained widespread popularity in various fields, from healthcare, education, and industry to security and defense. With this spread, serious ethical challenges have emerged that require immediate attention and treatment.

First: Bias and hidden bias in algorithms; Bias in artificial intelligence systems is one of the gravest ethical issues of our era. When the data on which the training is conducted indicates an unjust or discriminatory reality in the past, the algorithms reproduce this bias on a large scale and in an automated manner (Success, 2025). There have been real-life examples of this bias, such as in recruitment: resume sorting algorithms that prioritize women or minorities based on biased historical patterns in recruitment; in bank loans: creditworthiness assessment algorithms that deny certain groups of society loans due to their demographic information; In criminal justice: crime prediction algorithms that target specific neighborhoods based on historical crime rates, which creates a vicious cycle of discrimination. According to one expert, unintended bias can be involved in the training of models because of the data used to train them. Such bias can support discrimination against certain vulnerable groups in society and promote inequality>> (Al-Najjar, 2023). Second: Risk to privacy and personal data security: Artificial intelligence has already acquired the ability to gather and process large volumes of personal information, casting significant doubts on privacy. Facial recognition, location tracking, and digital behavior analysis are among the technologies that enable full surveillance of people without their consent or knowledge. Complete surveillance and breach of privacy through the use of artificial intelligence can diminish the freedom of expression and assembly, and may result in suppression of dissent and political activity. The examples of privacy breaches include: mass surveillance: the use of facial recognition cameras in the streets without the consent of individuals; the sale of personal information: technology companies sell the data on users to third parties to make a profit; behavioral tracking: the accurate information on habits and interests of individuals based on the analysis of their online activity is collected. Office of the High Commissioner of Human Rights has cautioned that there is the pressing necessity to end the sale and use of artificial intelligence systems that present a severe danger to human rights, until proper protections are embraced (Bachelet, 2021). Third: Human replacement by machines in important roles: As automation and artificial intelligence become increasingly more popular, millions of jobs may soon become non-existent. Even though technology can open more job

opportunities, it can be a painful process to millions of workers who lose their means of living. This applies to employees in the classic industries like manufacturing, transport and warehousing; the routine jobs like accounting, data entry and customer service; and even some specialized jobs like medical diagnosis, law and journalism.
This raises questions: How do we protect human dignity when a person loses his job to a machine? Who is responsible for rehabilitating affected workers? How do we ensure a fair distribution of the fruits of increased productivity?

Fourth: Using artificial intelligence in harmful fields: Artificial intelligence can be employed in fields that threaten human peace and security; such as: autonomous weapons: drones and military robots capable of making killing decisions without human intervention; manipulating public opinion: using algorithms to spread misleading information and influence elections and political decisions; cybercrime: smart tools for hacking systems, extortion, and fraud; deepfakes: creating fake videos and audio clips that are indistinguishable from the real ones Which threatens truth and trust.

Fifth: Issues of accountability and responsibility: When artificial intelligence systems make wrong decisions that lead to damage, it becomes difficult to identify who is responsible: Is it the developer who wrote the code? Or the company that produced the system? Or the user who posted it? Or the system itself?
These questions become more complex with self-learning systems that develop their behaviors in ways that developers cannot predict.

Sixth: Transparency and interpretability: Many modern artificial intelligence systems, especially those based on deep learning, act as "black boxes", meaning that it is difficult or impossible to understand how they reached their decisions; This creates problems; Including: In medicine: How can a doctor trust the diagnosis of a system that he cannot explain?; In the judiciary: How does a judge accept a regime's recommendation without understanding its logic?In education: How does the student understand why the system evaluated him in a certain way?
Recent studies suggest that ignoring the ethical dimensions of AI may lead to social and ethical crises, which requires inspiration from methodologies based on values and principles to ensure responsible use (Hassan, 2018, p. 55).
Section Two: Islamic ethical principles regulating science and knowledge.

Islamic thought offers a set of ethical principles that can guide scientific innovation and artificial intelligence, the most important of which are:
First: Preserving the soul and human dignity: The principle of preserving the soul occupies a central place in the objectives of Islamic law. God Almighty says: 0 (And do not burden the soul which God has forbidden except with justice). (The Holy Quran, Al-An'am: 151). This principle includes: Protecting life: Any application of artificial intelligence must not threaten human life or expose it to danger without extreme necessity and clear legal justifications; Preserving dignity: God Almighty said: We have certainly honored the children of Adam). (Al-Isra: 70). Humans are honored by nature, and modern technologies must not violate this dignity through degrading surveillance, unethical use of data, or treating people as mere numbers. Respect for privacy: Islam forbids spying: (And do not spy). (Chambers: 12). This means that collecting and using personal data without permission is an ethical and legitimate violation.

Second: Justice and equality: Justice is a fundamental value in Islam, and it is one of the major objectives of Sharia law. God Almighty says: (Indeed, God commands justice and benevolence). (An-Nahl: 90). The Holy Quran emphasizes justice even with enemies: (Whether the hatred of a people does not make you a criminal against those who do not act justly, acting justly is nearer to righteousness) (Al-Ma'idah: 8). In the context of artificial intelligence, this principle means: Algorithmic justice: Technical decisions must be based on fair foundations, without bias or discrimination based on race, gender, religion, or social class. Also, fairness in applications: fair treatment of all individuals Transparency in decision-making: clarity of processes and potential for accountability.

Third: Good intention and benevolence: Islam emphasizes the importance of intention: «Actions are based on intentions» (agreed upon); Requires: Directing innovation for the public good: solving real problems for people; Avoid harmful applications: abstaining from self-weapons and tools of oppression; Benevolence in design: making technologies easy and accessible to everyone.

Fourth: Responsibility and accountability: «You are all shepherds and each of you is responsible for his flock» (Agreed, Hadith No. 893); It includes: Ethical responsibility: developers and companies take responsibility for the impact of its products; Legal responsibility: establishing clear legal frameworks; Social responsibility: addressing negative effects on employment; Oversight and accountability: establishing independent oversight mechanisms (Firas, 2021, p. 45).

Fifth: Preventing harm takes precedence over achieving benefits: a basic jurisprudential rule that means that averting harm comes before achieving benefit; applications: prior assessment of risks: comprehensive studies before publication; the precautionary principle: caution in the event of uncertainty; precise balancing: in the event of a conflict between benefits and harms (Al-Shatibi, 1997, Vol. 3, p. 89).

Sixth: Preserving the mind and freedom of will: The mind is one of the five legal objectives; It means: protecting the independence of thinking: not manipulating people's minds; Combating misinformation: fighting fake information; Promoting awareness: educating society about the mechanisms of artificial intelligence.

Section Three: Directing artificial intelligence to serve humans in accordance with Islamic values

Islamic values can be inspired to control the use of artificial intelligence:
First: In the design and development phase: incorporating ethical values: designing algorithms according to fairness standards, with the participation of ethics experts and religious scholars in development teams; diversity in

development teams: ensuring representation of different cultural backgrounds to reduce biases (Al-Ghazali, 2005, p. 134); ethical testing: conducting rigorous tests to detect biases before launch; comprehensive documentation: documenting design decisions to facilitate review and accountability.

Second: In the application and use phase: Data protection and privacy: applying the highest standards of cybersecurity and obtaining explicit consent (Hassan, 2018, p. 61); Transparency with users: informing users when interacting with artificial intelligence systems; Possibility of objection: providing mechanisms to object to automated decisions; Continuous auditing: regularly monitoring performance to detect deviations.

Third: In priority areas: health care: early diagnosis and drug development, with the final decision remaining in the hands of the doctor (Ibn Sina, 1020 AD, p. 267); Education: Allocating education according to the needs of each student and providing equal opportunities; Agriculture and food security: improving agricultural production and rationalizing water; Environmental protection: monitoring pollution and predicting natural disasters; Serving people with special needs: developing assistive technologies to achieve benevolence and solidarity.

Fourth: Institutional and regulatory framework: Involving religious institutions: jurisprudential assemblies and research institutions in setting ethical standards; Establishing ethics committees: including religious scholars, philosophers, developers, and legal experts; Legislation and regulations: enacting national and regional laws inspired by Islamic values; International cooperation: participating in international efforts while presenting an Islamic perspective.

Fifth: Education and awareness: integrating artificial intelligence ethics into curricula: in universities and technical institutes (Al-Jabri, 1991, p. 267); Community awareness programs: seminars, workshops and media campaigns; Vocational training: programs for developers and engineers on including ethical values; Academic research: encouraging scientific research and establishing specialized research centers.

Thus, artificial intelligence becomes an extension of the path of human innovation, while preserving Islamic ethical frameworks.

Conclusion, findings and recommendations.

Conclusion

This study has revealed that scientific innovation in the Islamic civilization is a unique model that integrates rationality, piety, knowledge and moral responsibility. We have demonstrated that Muslim scholars, in their institutions, like the House of Wisdom did not confine themselves to mere transfer of knowledge, but they were also creative in developing this knowledge, keeping within the moral restraints and human values. The House of Wisdom, located in Baghdad, was not only a library or a translation center but a complex model of civilization, which was able to bring genuine knowledge that transformed the history of humankind and founded the European Renaissance and the modern scientific revolution. With the advent of artificial intelligence in the modern world, one has to seek inspiration in Islamic concepts when it comes to informing the innovation in order to make sure that the technology is at the service of the human and the society, that there is justice, and that there are minimal ethical biases and risks. The ethical dilemmas of artificial intelligence - bias and prejudice, infringement of privacy, job loss, and application to harmful sectors - are not necessarily new Muslim thinkers have encountered the same dilemma of how to apply scientific knowledge in an ethical and responsible way, and have devised ways and means to make sure science is at the service of humanity. The association of the Islamic thinking with the modern technologies proves the fact that the Islamic cultural background can be utilized to the elaboration of the ethical principles regulating the development of modern science. This is an indication of the role played by religion and thinking in steering science towards the realization of the common good and the improvement of human responsibility. The five justifiable goals - the preservation of religion, life, mind, offspring, and wealth are a broad basis of assessing and directing new technologies. The question of every use of artificial intelligence should be: Does it maintain these ends or endanger them? Does he serve man or make him a slave? Is it just or does it increase inequalities? To be inspired by the House of Wisdom experience does not imply trying to recreate the past, but extract the deep lessons of the experience and apply it to our modern reality. In the same way that Muslim scholars managed to absorb and develop the sciences of earlier civilizations in an Islamic ethical context, now we too can absorb and apply artificial intelligence to the same, in line with timeless Islamic values.

Results

This research reached the following conclusions:

1. **Responsible Innovation:** Islamic scientific thought balances science with ethical values, and considers innovation a moral responsibility towards man and society, and not just a neutral technical activity.
2. **The Civilizational Model:** House of Wisdom is a unique example of the integration between translation, innovation, and precise scientific methodology with a commitment to human values, and can be inspired in building contemporary scientific institutions.
3. **Ethical Challenges:** Artificial intelligence, while a tremendous scientific advance, poses significant ethical challenges such as privacy, bias, human-machine substitution, and harmful uses, requiring urgent and comprehensive treatment.
4. **Islamic Ethical Framework:** Drawing inspiration from Islamic values, such as self-preservation, justice, benevolence, and responsibility for knowledge, can provide an effective and coherent framework for guiding AI to serve humanity.
5. **Cultural Integration:** Combining Islamic cultural heritage with modern technologies enhances societies' ability to employ scientific innovation in the service of humanity while adhering to ethical controls, and enriches the global debate about the ethics of technology.
6. **The Experimental Scientific Method:** Muslim scholars laid the foundations of the experimental method based on observation, experimentation, and criticism, which are the same foundations on which modern artificial intelligence is based.
7. **International Collaboration:** The House of Wisdom model of collaboration between scholars of different

religions and ethnicities offers an important lesson for contemporary international collaboration in the development and regulation of artificial intelligence.

8. **Social Responsibility:** Science, from an Islamic perspective, is not an absolute right, but rather a trust and a responsibility. This requires developers, companies, and governments to bear full responsibility for the impacts of their technologies.

Recommendations

Based on previous findings, the research makes the following recommendations:

1. Adopting Islamic ethical frameworks for developing and implementing artificial intelligence at the national and regional levels, translating them into practical, applicable, and measurable standards.
2. Establish national and regional advisory committees comprising religious scholars, philosophers, developers, and legal and ethical experts to review smart applications and ensure compliance with ethical standards before they are released.
3. Integrating educational curricula on artificial intelligence ethics and Islamic thought into universities and technical institutes, and developing training programs for developers and engineers working in the field.
4. Encourage targeted scientific research that combines innovation and adherence to human values to ensure the common good, while allocating adequate funding for research into AI ethics.
5. Spreading awareness among decision-makers and society about the importance of ethical responsibility in using modern technology, through the media, educational and religious institutions.
6. Enact balanced national legislation that encourages innovation and protects individual rights, while establishing independent oversight bodies to ensure compliance with ethical standards.
7. Strengthening cooperation between Islamic countries in the field of developing and regulating artificial intelligence, and actively participating in international dialogue on technology ethics by providing an Islamic perspective.
8. Establishing Islamic research centers specializing in technology ethics, combining legal and technical expertise, to provide contemporary consultations and fatwas.
9. Directing investments towards priority artificial intelligence applications in the Islamic world, such as health care, education, food security, and combating poverty.
10. Establishing strict standards to protect individuals' privacy and personal data, with deterrent penalties for violations, in accordance with the principles of self-preservation and dignity.

Implementing these recommendations requires a joint effort by governments, educational and religious institutions, technology companies, and civil society to build an ethical technology environment inspired by timeless Islamic values and employing modern innovations to serve all of humanity.

References

1. Ibn Abi Usaybi'a Muwaffaq al-Din. Oyoun al-anbaa fi tabaqat al-atibba. Nizar R, investigator. Beirut: Dar al-Hayat; 1965.
2. Ibn al-Muqaffa' Abdullah. Kalila wa Dimna. Levy R, investigator. Cairo: Matba'at al-Fann; 1938.
3. Ibn al-Jawzi Abd al-Rahman ibn Ali. Akhbar al-adhkiya wa al-hamqa wa al-mutazahhidin wa al-a'rab. Cairo: Dar al-Fikr; 2001.
4. Ibn al-Haytham al-Hasan ibn al-Haytham. Kitab al-manazir. Cairo: Dar al-Fikr; 1015 (reprint).
5. Ibn Battuta Muhammad ibn Abdullah. Tuhfat al-nuzzar fi ghara'ib al-amsar wa aja'ib al-asfar. Beirut: Dar al-Kutub al-Ilmiyyah; 1354 (reprint).
6. Ibn Jubayr Muhammad ibn Ahmad. Rihlat Ibn Jubayr. Beirut: Dar Sader; 1183 (reprint).
7. Ibn Khaldun Abd al-Rahman ibn Muhammad. Muqaddimat Ibn Khaldun. Cairo: Dar al-Fikr; 2005.
8. Ibn Ridwan Ali ibn Ridwan. Al-Kitab al-kafi fi al-tibb. Al-Saeed M, investigator. Cairo: Supreme Council of Culture; 1050 (reprint).
9. Ibn Sina Abu Ali al-Husayn. Al-Qanun fi al-tibb. Beirut: Dar al-Kutub al-Ilmiyyah; 1020 (reprint).
10. Ibn Majah Muhammad ibn Yazid. Sunan Ibn Majah. Al-Arnaout S, investigator. Beirut: Dar al-Kutub al-Ilmiyyah; 2005.
11. Usama ibn Munqidh. Kitab al-i'tibar. Hitti PK, translator and investigator. Beirut: Dar al-Mashriq; 1144 (reprint).
12. Ibn al-Nadim Muhammad ibn Ishaq. Al-Fihrist. Tajaddud R, investigator. Beirut: Dar al-Masirah; 377 AH (reprint).
13. Abu Dawud Sulayman ibn al-Ash'ath. Sunan Abi Dawud. Al-Arnaout S, investigator. Beirut: Al-Risalah al-Alamiyyah; 2009.
14. Al-Bukhari Muhammad ibn Ismail. Sahih al-Bukhari. Zuhayr M, investigator. Beirut: Dar Tawq al-Najat; 2001.
15. Al-Biruni Abu Rayhan Muhammad. Tahqiq ma li-l-Hind min maqulah maqbulah fi al-aql aw mardhulah. Hyderabad: Dairat al-Ma'arif al-Uthmaniyyah; 1030 (reprint).
16. Al-Biruni Abu Rayhan Muhammad. Al-Qanun al-Mas'udi. Hyderabad: Dairat al-Ma'arif al-Uthmaniyyah; 1954.
17. Al-Jazari Badi' al-Zaman ibn Ismail. Al-Jami' bayna al-ilm wa al-amal al-nafi' fi sina'at al-hiyal. Al-Hassan AY, investigator. Aleppo: Institute for the History of Arabic Science; 1206 (reprint).
18. Al-Khatib al-Baghdadi Ahmad ibn Ali. Tarikh Baghdad. Awad Ma'ruf B, investigator. Beirut: Dar al-Gharb al-Islami; 2001.
19. Al-Khwarizmi Muhammad ibn Musa. Kitab al-jabr wa al-muqabala. Rashid R, investigator. Damascus: Arab Center for the History of Science; 987 (reprint).
20. Al-Shatibi Abu Ishaq Ibrahim. Al-Muwafaqat fi usul al-shari'ah. Darraz A, investigator. Beirut: Dar al-Kutub al-Ilmiyyah; 1997.
21. Al-Ghazali Abu Hamid Muhammad. Ihya ulum al-din. Beirut: Dar al-Fikr; 2005.
22. Al-Masudi Abu al-Hasan Ali. Muruj al-dhahab wa ma'adin al-jawhar. Abdul Hamid MM, investigator.

Beirut: Dar al-Fikr; 1973.
23. Al-Maqdisi Shams al-Din Muhammad. Ahsan al-taqasim fi ma'rifat al-aqalim. Cairo: Maktabat Madbuli; 1991.
24. Al-Maqri Ahmad ibn Muhammad. Nafh al-tib min ghusn al-Andalus al-ratib. Abbas I, investigator. Beirut: Dar Sader; 1968.
25. Al-Tusi Nasir al-Din Muhammad. Tadhkirah fi ilm al-hay'ah. Rajab J, investigator. Cairo: Egyptian General Book Authority; 1274 (reprint).
26. Jabir ibn Hayyan. Kitab al-khawass. Kraus P, investigator. Cairo: Maktabat al-Khanji; 815 (reprint).
27. Muslim ibn al-Hajjaj. Sahih Muslim. Abdul Baqi MF, investigator. Beirut: Dar Ihya al-Turath al-Arabi; 2006.
28. Al-Jabri Mohammed Abed. Takwin al-aql al-Arabi. Beirut: Markaz Dirasat al-Wahdah al-Arabiyyah; 1991.
29. Al-Zarkali Khayr al-Din. Al-A'lam. 15th ed. Beirut: Dar al-Ilm lil-Malayin; 2002.
30. Hassan AA. Islamic ethics and the direction of modern science. J Contemp Islamic Thought. 2018;(42):33-68.
31. Ayash MN. Al-Fikr al-ilmi fi al-Islam. Cairo: Dar al-Nahdah al-Arabiyyah; 2016.
32. Firas MA. Akhlaqiyat al-dhaka' al-istina'i fi al-Islam: dirasah fiqhiyyah mu'asirah. Amman: Dar al-Hadarah; 2021.
33. Muhammadiyah Association of Scholars. The House of Wisdom in the Abbasid era: a center of cultural radiance. Rabat: Al-Rabita; 2023 Mar 20. Available from: https://www.alrabita.ma
34. Al-Najjar A. Artificial intelligence and ethics: challenges and opportunities. Doha: Al Jazeera Centre for Studies; 2023 Aug 22. Available from: https://studies.aljazeera.net
35. Bachelet M. Report of the Office of the High Commissioner for Human Rights on artificial intelligence. Geneva: United Nations Office of the High Commissioner for Human Rights; 2021 Sep 15. Available from: https://www.ohchr.org
36. Egyptian Ministry of Endowments. The House of Wisdom and its role in Islamic civilization. Cairo: Ministry of Endowments; 2025 Jan 10. Available from: https://www.islamic-council.com
37. Islam Story. House of Wisdom: a beacon of knowledge in Islamic civilization. 2024 Dec 5. Available from: https://islamstory.com
38. Floridi L. The ethics of artificial intelligence: principles, challenges, and opportunities. Oxford: Oxford University Press; 2019.
39. McCarthy J. What is artificial intelligence? Stanford (CA): Stanford University; 2007.
40. Russell SJ, Norvig P. Artificial intelligence: a modern approach. 4th ed. Hoboken (NJ): Pearson Education; 2020.
41. Sarton G. Introduction to the history of Arabic science. Paris: Librairie Orientaliste Paul Geuthner; 1962.
42. Turing AM. Computing machinery and intelligence. Mind. 1950;59(236):433-60.
43. IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems. Ethically aligned design: a vision for prioritizing human well-being with autonomous and intelligent systems. IEEE; 2024. Available from: https://ethicsinaction.ieee.org
44. Oxford Internet Institute. AI, ethics and society research programme. Oxford: University of Oxford; 2024. Available from: https://www.oii.ox.ac.uk/research/projects/ai-ethics
45. UNESCO. Artificial intelligence and ethics: global perspectives. Paris: UNESCO; 2024. Available from: https://www.unesco.org/en/artificial-intelligence
46. United Nations. The state of AI ethics report. New York: United Nations; 2021. Available from: https://www.un.org/ai-ethics
47. World Economic Forum. AI governance: a holistic approach to implement ethics into AI. Geneva: World Economic Forum; 2024. Available from: https://www.weforum.org