

The Development of Islamic Civilization in the World: Knowledge, Integration, and Innovation (750-1258 CE)

Ajid Thohir* & Muhammad Andi Septiadi**

Abstract

The rise of Islamic civilization marked a significant transformation in global history, replacing the dominance of the Persian and Roman Empires with an extensive rule spanning half of Asia, Africa, and parts of Europe in a remarkably short period. This study employs historical research methods structured through four critical steps: heuristics, criticism, interpretation, and historiography. It aims to explore the interconnected processes of conquest, cultural assimilation, and the flourishing of knowledge by analysing the key mechanisms and sociopolitical factors that facilitated these developments. Unlike previous studies, this research highlights the direct impact of cultural assimilation on scientific, technological, and economic advancements in Islamic civilization. Specifically, it investigates how the integration of local traditions with Islamic principles contributed to the development of algebra, medicine, optics, engineering, and economic models, many of which laid the foundation for modern disciplines. Additionally, this study highlights the pivotal role of Islamic history as a catalyst for innovation, demonstrating how early Islamic societies developed sophisticated trade networks, advanced industrial production methods, and innovative financial institutions that significantly influenced global economic structures. By providing new insights into the mechanisms through which Islamic civilization absorbed and enhanced existing knowledge systems, this research contributes to a deeper understanding of its enduring legacy in shaping modern scientific and economic thought.

Keywords: Conquest, assimilation, science, art, technology, economy

Introduction

Since the death of the Prophet Muhammad, Islam expanded beyond Arab civilization into territories under the reign of Rome and Persia, such as Iraq, Persia, Syria, and Egypt.¹ The conquests of those regions led to a complex rule of Islam, incorporating external cultural influences, including interactions between various ethnic groups, encompassing language, ethnicity, race, science, and religion.² This conquest marked the beginning of the development of cultural formation and the assimilation of Arabs and non-Arabs.³ The interplay between Islamic values and the local cultures of conquered territories resulted in a dynamic synthesis that redefined social, intellectual, and cultural paradigms. Arab traditions merged with the philosophical and scientific heritage of Greek, Persian, and Indian civilizations, creating a unique environment for knowledge exchange and innovation. This fusion facilitated the flourishing of disciplines such as mathematics, medicine, astronomy, and architecture, which not only enriched Islamic civilization but also provided a foundation for the later development of the Renaissance in Europe.⁴ The assimilation process demonstrates Islam's inherent adaptability and its role as a unifying force capable of integrating diverse cultural legacies while fostering the growth of a global civilization.

According to anthropological studies, assimilation is the process of interaction between two cultural entities within a region, aiming to mutually accept, unify, and complement one another.⁵ In Islamic history, this process is evident through intermarriage between Arabs and Persians, as well as Romans,

* Ajid Thohir (corresponding author), UIN Sunan Gunung Djati Bandung, Indonesia. Email: ajid.thohir@uinsgd.ac.id.

** Muhammad Andi Septiadi, UIN Sunan Gunung Djati Bandung, Indonesia. Email: Septiadi.andi90@uinsgd.ac.id.

¹ Robert G Hoyland, *In God's Path: The Arab Conquests and the Creation of an Islamic Empire* (Oxford University Press, 2015).

² Muhammad Aliyu Gambari and Muhammad Kanneke Hassan, "The Role of Elijah Muhammad to Spread Islām in Modern America: An Analysis of His Efforts and Approaches," *International Journal of Islamic Khazanah* 13, no. 2 (2023): 88–97.

³ A Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyat* (Syirkah al-Thaba'ah al-Faniyah, 1975); A. Ibn Khaldun, *Kitāb Al-Muqaddimah* (Dar Pole Ilimiyah, 2006).

⁴ Ahmed Renima, Habib Tiliouine, and Richard J Estes, "The Islamic Golden Age: A Story of the Triumph of the Islamic Civilization," *The State of Social Progress of Islamic Societies: Social, Economic, Political, and Ideological Challenges*, 2016, 25–52.

⁵ Thomas Hylland Eriksen, *Ethnicity and Nationalism: Anthropological Perspectives* (Pluto Press, 2002).

Syrians, Egyptians, and other nations under the control of the caliphates.⁶ For instance, during the Umayyad and Abbasid Caliphates, marriages between Arab elites and Persian nobility accelerated social and cultural integration.⁷ This process significantly influenced the Islamic administrative structure, such as the adoption of the Persian *diwan* system,⁸ which introduced advanced methods of record-keeping and management. Furthermore, acculturation also occurred in the realms of art, science, religion, and social systems. In Egypt, for example, Coptic artistic traditions blended with Islamic styles, resulting in innovations in decorative arts such as wood carvings and geometric designs.⁹ In the region of *Syam* (Syria), advancements in medicine reflected the contributions of Greek physicians who collaborated with Muslim scholars, such as Hunayn ibn Ishaq, who translated Galen's medical works into Arabic.¹⁰ This process created what is often referred to as a *melting pot*—a cultural crucible where diverse populations merged, acculturated, and assimilated. A prime example of this can be seen in Baghdad during the Abbasid Caliphate era. The Bayt al-Hikmah (House of Wisdom) in Baghdad served as a hub for integrating knowledge from Greek, Indian, and Persian civilizations. Muslim scholars such as Al-Khwarizmi built upon these foundations, particularly in the development of mathematics. The success of this assimilation was influenced by the socio-economic and political dynamics of these societies, with local scholars playing a key role in shaping the inclusive intellectual identity of Islamic civilization.

Physical assimilation, formed by the conquest, mixing, and marriage between Arabs with non-Arabs, is not something simple and trivial. Because each entity in genetics, language, social systems, and religiosity is tightly linked to belief, faith, and religiosity, all of them contribute to a complex accumulation.¹¹ To better understand this phenomenon, three key factors can be identified in the formation of a distinct cultural assimilation in the Islamic world, which contributes to the creation of a 'new culture.'

These three factors are: 1) The doctrine or principle of Islamic teachings in the conquest, 2) The widespread conversion of the conquered populations to Islam, and 3) The assimilation between Arabs and non-Arabs in the country. Thus, all these aspects may quickly facilitate the ongoing relationship between the two groups and contribute to the new territories they conquered.¹² Including the development of science, the tradition of conquest and assimilation of ethnic Muslims has had a significant influence on the development of science, technology, arts, culture, and the evolution of law and economics.¹³ The emerging Muslim communities, characterised by an openness to integrating diverse ethnic and genealogical backgrounds, fostered an environment of cultural creativity. This dynamic exchange was particularly evident in various scientific disciplines, where knowledge from different civilizations was synthesised and expanded.¹⁴

Previous studies on Islamic civilization have explored various important aspects, including the dynamics of expansion and conquest, cultural assimilation, and the development of knowledge. Fred M. Donner in "*The Early Islamic Conquests*" and "*Hugh Kennedy in The Great Arab Conquests*" describe how Islamic conquests in the 7th century were driven by military strategies and diplomacy; however, their focus remains limited to the political and military aspects without delving further into the connections with cultural and intellectual development. Marshall Hodgson in "*The Venture of Islam*"¹⁵ and Richard Bulliet in "*Islam: The View from the Edge*"¹⁶ examine cultural assimilation between local traditions and Islam in conquered territories, yet their studies are primarily socially oriented and fail to highlight the cultural contributions to intellectual growth. On the other hand, George

⁶ Robert Hoyland, *Muslims and Others in Early Islamic Society* (Routledge, 2021).

⁷ Fatmawati Fatmawati, "Social Dynamics and Intellectual Traditions During the Umayyad Dynasty," *Ishlah: Jurnal Ilmu Ushuluddin, Adab Dan Dakwah* 5, no. 2 (2023): 337–56.

⁸ Thibaut d'Hubert, "Persian at the Court or in the Village?," *The Elusive Present of Persian in Bengal.* In *The Persianate World*, Edited by Nile Green, n.d., 93–112.

⁹ Mohamed Hamed Dief-Allah, "Rooting through the Egyptian Identity Symbol in Coptic Art and Its Effect on Interior Design," *Majallat Al-'Imarah Wa Al-Funun Wa Al-'Ulum Al-Insaniyah* 4, no. 17 (2019): 404–21.

¹⁰ Hawa Edriss et al., "Islamic Medicine in the Middle Ages" (Elsevier, 2017).

¹¹ Navid Kermani, *Between Quran and Kafka: West-Eastern Affinities* (John Wiley & Sons, 2017).

¹² Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyyat.*

¹³ Labonno Saha, "The Role of Civil Society and Religious Organizations in Shaping Environmental Policy in Bangladesh," *Religion and Policy Journal* 2, no. 1 (2024): 41–48.

¹⁴ H Hasan, *Tārīkh Al-Islāmy; Al-Siyasy Wa Al-Diny Wa Al-Tsaqafy Wa Al-Ijtima'iy Juz 1-4* (Nahdlah al-Mishriyyah, 2001); Ibn Khaldun, *Kitāb Al-Muqaddimah.*

¹⁵ Marshall G Hodgson, *The Venture of Islam* (University of Chicago Press, 1974).

¹⁶ Richard W Bulliet, *Islam: The View from the Edge* (Columbia University Press, 1994).

Saliba in “*Islamic Science and the Making of the European Renaissance*”¹⁷ and Dimitri Gutas in “*Greek Thought, Arabic Culture*”¹⁸ provide in-depth insights into the development of Islamic science, particularly during the Abbasid era but often isolate intellectual processes from broader social and cultural contexts. Recent research, such as Rifkatul Mahfudah et al.¹⁹ in “*History of Islamic Civilization: A Study of the Ottoman, Safavid, and Muqal Dynasty Phases*,” highlights the contribution of the Ottoman Empire to the spread of Islam, while Hidayat²⁰ in “*The Development of Science in the History of Islamic Civilization*” examines scientific progress in specific historical periods. Amat Suroso et al., in “*Challenges and opportunities towards an Islamic cultured generation: socio-cultural analysis*,” explain the impact of digital technology on elementary school-aged children and its challenges and opportunities in shaping an Islamic cultured generation. However, these studies reveal a lack of holistic research linking the processes of conquest, cultural assimilation, and the flourishing of knowledge in the formation of Islamic civilization.

This present study aims to enhance the understanding of Islam’s pivotal role in shaping global civilization by highlighting its significant contributions to various domains of human advancement. This research employs a historical methodology structured into four key stages: heuristics (data collection), source criticism, contextual interpretation, and historiography (synthesising findings into a historical narrative). This research examines Islamic civilization through four stages: heuristics (collection of primary and secondary sources), source criticism (analysis of reliability and bias), contextual interpretation (using theories of historical sociology²¹ and institutional economics²²), and historiography (narrative synthesis to connect historical developments with contemporary impacts). This study explores how conquest, cultural assimilation, and intellectual exchange within Islamic civilization drove advancements in science, technology, art, and economy. By merging Islamic principles with local traditions, it highlights Islam’s lasting influence on global development and provides a framework for understanding sustainable progress across civilizations.

Islamic Civilization

Islam teaches that every Muslim who intends to conquer a territory must first invite its people to embrace Islam. If they willingly accept Islam, they are granted the same rights and status as other Muslims. In Islam, war is considered a last resort, not the primary or only means of expanding into other regions.²³ A hadith states: “I am commanded to fight against people until they declare, “*Lā ilāha illā Allāh.*” If they make this declaration, their blood and property are protected. If they reject it, they should hand over the country to be ruled by Muslims, while still being allowed to practice their religion, provided they agree to pay taxes. If they accept the invitation to convert to Islam, their rights and obligations are equal to those of other Muslims.”²⁴

The tradition of conquest in Islam eventually led to significant changes in the systems of slavery and captivity, becoming a major factor in ethnic assimilation. The first form of the slavery system is called the *al-wila* system, which unconditionally grants freedom to slaves and establishes a connection between the freed individual and the family that emancipated them. The second is known as *asabiyyah*, which fosters strong emotional bonds of brotherhood between the conquerors and the conquered. This system facilitates a smooth assimilation process, influencing traditions, shaping mental attitudes, and even altering perspectives and ways of thinking.²⁵

The majority of the population in the regions that were conquered integrated extensively into Islam and mingled with the Arabs, as if they were part of the Arab conquerors. Al-Baladzuri²⁶ claims that when

¹⁷ George Saliba, *Islamic Science and the Making of the European Renaissance* (MIT Press, 2007).

¹⁸ Dimitri Gutas, *Greek Thought, Arabic Culture* (Routledge, 1998).

¹⁹ Rifkatul Mahfudah, Muh Rizal, and Umar Sulaiman, “History of Islamic Civilization: A Study of the Ottoman, Safavid, and Muqal Dynasty Phases,” *Socius: Jurnal Penelitian Ilmu-Ilmu Sosial* 1, no. 12 (2024).

²⁰ Cecep Hidayat, “The Development of Science in the History of Islamic Civilization,” *AT-THARIQ: Jurnal Studi Islam Dan Budaya* 4, no. 02 (2024).

²¹ Marshall G S Hodgson, *The Venture of Islam: Conscience and History in a World Civilization* (The University of Chicago Press, 1974).

²² Douglass C North, *Institutions, Institutional Change and Economic Performance* (Cambridge University Press, 1990).

²³ Mohammed Houmine, “Protection of Civilians and Treatment of Prisoners during War Are at Stake: A Comparative Study,” *Journal of Current Social and Political Issues* 2, no. 1 (2024): 34–47.

²⁴ Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyyat*; Hasan, *Tārikh Al-Islāmy; Al-Siyasy Wa Al-Diny Wa Al-Tsaqafy Wa Al-Ijtima'iy Juz 1-4*.

²⁵ Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyyat*.

²⁶ *Kitab Al-Buldan Wa Futuha Wa Ahkamuha Juz 2* (DarFik, 1992).

the Muslims entered the Persian region of Dailam, approximately four thousand people embraced Islam. Additionally, after the defeat of their undefeated leader, Rustam, in Qadisiyah, many followers of *Majusi* converted to Islam under the protection of Saad bin Abi Waqas. There were several reasons and motivations that led to their conversion to Islam at the time. First, they genuinely believed in Islam, recognising the goodness and truth of the religion. Second, they accepted Islam to avoid paying the tax (*jizyah*) imposed on non-Muslims, which was usually levied on the head of the family and exempted women and children.²⁷ Each family was required to pay between 1 and 13 *dirhams*, while wealthier individuals could be charged up to 24 *dinars*. Those unable to afford the tax were forced to leave the Muslim-conquered territories and forfeited security guarantees. Third, some converted to Islam to avoid the lower social status associated with being a protected group (*ahl al-dhimma*).²⁸

Hellenism and Renaissance in Islamic Culture

Hellenism, coined by 18th-century German historians, describes the cultural integration during Alexander the Great's reign around 350 BC. He unified Eastern and Western cultures through policies like mass marriages between his soldiers and locals—Egyptians, Syrians, Persians—promoting societal amalgamation across Mediterranean regions in Europe, Asia, and Africa.²⁹ While the Roman-Byzantine Empire (150 BC to 6 AD) continued some of these practices, their efforts were not as successful as those during Dzulkaena's period. Muslims also appear to have engaged in similar cultural integration efforts, echoing the strategies implemented during the era of *Dzulkaena's* empire.³⁰

The Umayyad and Abbasid caliphates expanded Islam beyond Arabia, integrating diverse cultures and knowledge systems. By adopting and assimilating external traditions, Islamic civilization advanced intellectually and scientifically. Unlike Europe's Renaissance after stagnation, Islamic progress was continuous, fostering lasting contributions to science, philosophy, and the arts.³¹

Hellenism significantly influenced the conquered regions by introducing Greek philosophy, art, and governance structures, which often reshaped local traditions and cultures.³² In Persia and Egypt, Greek governance and education merged with local traditions, forming hybrid systems. This selective integration reemerged under the Umayyads and Abbasids. The Abbasids, echoing Alexander the Great, founded institutions like Bayt al-Hikmah, while adopting Persian administrative models, exemplifying cultural synthesis and fostering intellectual advancement.

During the Abbasid era, Islamic civilization preserved and expanded Greek knowledge through critical analysis and innovation. Thinkers like Al-Kindi and Al-Farabi blended Greek and Islamic thought, influencing Europe's intellectual revival. This sustained progress bridged classical traditions and the Renaissance, shaping Western philosophy, science, and scholarly development. Al-Khawarizmi's contributions to mathematics, particularly the development of algebra, had a profound impact on both Islamic and European intellectual traditions.³³ This historical interaction highlights the significance of cultural integration as a catalyst for scientific advancement. In today's globalised world, these lessons emphasise the value of embracing diversity and fostering collaborative innovation across cultures, providing a blueprint for navigating contemporary challenges in cultural and intellectual exchanges.

Cultural Assimilation in Islamic Civilization

When Islam expanded into the broader world, particularly in Egypt, Syria, and Persia, from the mid-7th to the mid-8th century, its sociology and anthropology entered a new phase of intellectual engagement with external traditions, especially those rooted in the legacy of Greek *Hellenism*.

²⁷ Mohd Anuar Ramli et al., "Women's Right of Inheritance in Islam: Between the Sharia Provision and Demand of Socio-Cultural Changes," *Khazanah Hukum* 5, no. 2 (2023): 171–82.

²⁸ Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyyat*.

²⁹ Mohamad Ichsana Nur, "Understanding the Interplay of Religion and Social Policy: Challenges and Opportunities," *Religion and Policy Journal* 1, no. 2 (2023): 42–46.

³⁰ A Hourani, *History of Muslim Nations*. (Bandung: Mizan, 2004); O Nasr, S., & Leaman, *Thematic Encyclopedia of Islamic Philosophy* (Mizan, 2003).

³¹ J Kraemer, *Islamic Renaissance* (Mizan, 2003).

³² Paul Cartledge, Peter Garnsey, and Erich S Gruen, *Hellenistic Constructs: Essays in Culture, History, and Historiography* (University of California Press, 1997).

³³ Basit B Koshul, "The Islamic Impact on Western Civilization Reconsidered," *American Journal of Islamic Social Sciences* 12, no. 1 (1995): 36.

Previously, Islamic knowledge was primarily derived from the natural environment of the Arab world and the heritage of the *Al-Qur'an* and *Sunnah*. Interaction with Greek culture introduced new perspectives, particularly regarding concepts of existence and the reasoning process, alongside revelation.³⁴ Nevertheless, in many aspects, the revelation itself (Qur'an and Sunnah) contains undeniable truths that remain foundational.³⁵

Muslims encountered knowledge centres like Alexandria, Syria, and Jundishapur, founded by Greeks, Romans, and others. They valued this intellectual wealth beyond material spoils, using it to deepen understanding of revelation. Umar bin Khattab urged respectful engagement with scholars, highlighting knowledge's sacred role in Islamic civilization's growth.³⁶

From the 8th century, Muslims adopted and translated 'ulum al-awail, ancient sciences from non-Muslim scholars, into Arabic. These complemented 'ulum al-akhir, rooted in revelation. Greek works in medicine, philosophy, and mathematics enriched Islamic thought, supporting tafsir, kalam, and fiqh, and fostering a unified, dynamic epistemological tradition.³⁷

Not only the fields of philosophy, science, and medicine, but other areas have also appeared to have been acquired, such as knowledge of sports, psychology, literature, rhetoric, history, politics, and various other areas of science that are relevant to the needs of Muslims.³⁸ Many models of knowledge were discovered, but Muslim scholars did not adopt them in their entirety. Instead, they carefully selected knowledge based on its relevance to religious purposes and its contribution to the welfare of society. They excluded elements that fell outside these requirements, particularly those that were unrelated or could potentially harm Islamic religious beliefs. This approach embodies the concept of Islamic cultural dialogue, which is both open and closed to external influences.³⁹ It is "open" in its willingness to engage with beneficial knowledge from the outside world and "closed" in its protection of core Islamic principles and values.⁴⁰ The early texts of Islamic thought rarely addressed Greek mythology, while narratives related to *isra'iliyyat* were widely known. Similarly, performing arts such as theatre, gladiator games, melodrama, and staged Homeric tales of tragedy and comedy, which were prominent in Greek and Roman cultures, seemed to garner little interest in the Arab world, Muslim communities, and Persia. Instead, there was a greater focus on the sagas of the East, particularly in the realms of literature and storytelling. This is exemplified by Ibn Muqaffa (720–756), a Persian scholar who translated the *Kalilah wa Dimnah* from its original Indian language into Arabic. In addition, areas such as grammar and philology, as demonstrated by Imam Sibawaih, reveal a preference for incorporating Persian traditions or selectively adopting elements of Greek logic, rather than fully embracing the Greek intellectual legacy.⁴¹

Key Drivers of Islamic Cultural Development

The Islamic Renaissance thrived through openness to diverse sciences, grounded in Qur'anic and prophetic encouragement of knowledge. Under Caliph Al-Ma'mun, translations at Bayt al-Hikmah integrated Greek and Persian works. Scholars like Al-Kindi and Al-Farabi advanced philosophy and medicine, embedding revelation-based inquiry into a lasting intellectual legacy.⁴²

Muslim figures, including the caliphate, scholars, scientists, and theologians, agreed to give each of their roles an opportunity. Consequently, substantial government funding was allocated to translation efforts, ensuring that resources were effectively utilised.⁴³ In appointing professional translators of knowledge, the caliphates were remarkably open, selecting not only Muslims but also non-Muslims, including Jewish, Christian, and *Majusi* scholars. The caliphates demonstrated a profound appreciation

³⁴ Jean-Pierre Vernant, *The Origins of Greek Thought* (Cornell University Press, 1984).

³⁵ Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyat*.

³⁶ Kraemer, *Islamic Renaissance*; Nurcholish Madjid, "Indonesian Muslims Enter a New Age," *Islamic Perspectives on the New Millennium*, 2004, 74–88.

³⁷ Ibn Khaldun, *Kitab Al-Muqaddimah*; S Nasr, *Science and Civilization in Islam* (Pustaka Publishers, 1997).

³⁸ Ibn Khaldun, *Kitab Al-Muqaddimah*.

³⁹ Muhibudin Wijaya Laksana and Muhammad Abduh, "The Power of Social Movements: Activism in the Age of Connectivity," *Journal of Current Social and Political Issues* 1, no. 1 (2023): 18–23.

⁴⁰ Kuntowijoyo, *Islamic Paradigm: Interpretation for Action* (Mizan, 1991).

⁴¹ Nasr, *Science and Civilization in Islam*; J Zaidan, *Date of Adab Al-Lughah Al-'Arabiyyah* (Dar Fikr, 1996).

⁴² Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyat*.

⁴³ Nasr, *Science and Civilization in Islam*.

for science and actively supported those engaged in intellectual pursuits. Notably, there are accounts that Caliph Harun al-Rashid and his son al-Ma'mun valued manuscripts so highly that they were reportedly exchanged for their weight in gold, symbolising the immense regard they held for knowledge and scholarship.⁴⁴

The efforts at *Bayt al-Hikmah* extended far beyond translation. The institution became a hub for collaboration and innovation, where scholars not only translated ancient texts but also wrote commentaries, synthesised knowledge, and generated new ideas. For instance, Al-Khwarizmi developed algebra and introduced the decimal positional number system, which would later influence both Islamic and European mathematics.⁴⁵ Similarly, Ibn Sina's work in medicine, particularly "*The Canon of Medicine*", became a standard reference in both the Islamic world and Europe for centuries. These contributions highlight the active role Muslim scholars played in advancing global intellectual traditions.

The legacy of this intellectual tradition extended beyond the Islamic world, significantly influencing the European Renaissance.⁴⁶ Translations of Arabic texts into Latin, especially those on philosophy, astronomy, and medicine, introduced Europe to the works of Aristotle, Ptolemy, and Galen, as well as the commentaries and innovations of Muslim scholars. Figures like Alhazen influenced European developments in optics, while Averroes' (Ibn Rushd) commentaries on Aristotle shaped the intellectual foundation of medieval European universities. This dynamic exchange highlights the significance of Islamic culture not only in preserving ancient knowledge but also in fostering the conditions for its dissemination and transmission to future civilizations.⁴⁷

The lessons from this era of Islamic cultural flourishing remain relevant today. The emphasis on openness to knowledge, cross-cultural collaboration, and investment in intellectual pursuits serves as a model for addressing global challenges in our modern, interconnected world. By appreciating and building upon this legacy, societies can create environments where innovation and learning thrive across boundaries.

The Distribution Centres of Islamic Culture

Due to the influence of Islam world unification, the most dominant aspects can be seen in science and philosophy. The cultural centres of Greek, Persian, and Christian have many studies and laboratory locations. They developed alongside scholars in the field.⁴⁸ One such centre was in Jundishapur, a location established by Kisra Anusyirwan, the Caesar of Persia, to promote the culture and tradition of Greek science, utilising the Aramiyah language. Situated in Maritan, this centre gained prominence for its contributions to the development of medical science and practice. Madrasah Jundishapur is particularly renowned for its contributions to the advancement of Greek culture in the fields of medicine and philosophy.

Harran, near Iraq, was a major centre of Greek, Roman, and Babylonian thought, blending Hellenistic and Neoplatonic traditions. Its diverse population preserved these ideas into the Abbasid era. Influential scholars like Thabit ibn Qurra emerged, contributing significantly to Islamic advances in astronomy, mathematics, physics, and agriculture.⁴⁹ a renowned astronomer and teacher of Caliph al-Ma'mun, Ibn Sinan, a distinguished physician, and the family of Ibrahim ibn Hilal, experts in medicine, literature, mathematics, and physics. Under the reign of al-Ma'mun, a translation service centre was established in this region, further integrating Greek and Roman scientific heritage into Islamic intellectual traditions.⁵⁰

⁴⁴ Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyyat*; Brockelmann, *History Of The Islamic People* (Routledge & Kegan, 1989).

⁴⁵ Aydin Sayili, "Al-Khwarizmi, Abu'l-Hamid Ibn Turk and the Place of Central Asia in the History of Science and Culture," *Erdem* 10, no. 19 (1991).

⁴⁶ Margaret Meserve, *Empires of Islam in Renaissance Historical Thought* (Harvard University Press, 2008).

⁴⁷ Si Shi and Zhuo Yang, "Philosophical Analysis of Cultural Diversity and Globalization: Intersecting and Conflicting Values in Contemporary Society," *Cultura: International Journal of Philosophy of Culture and Axiology* 22, no. 1 (2025).

⁴⁸ Brockelmann, *History Of The Islamic People*; Nasr, *Science and Civilization in Islam*.

⁴⁹ G Vincenzi, "On a Proof of the Thabit Ibn Qurra's Generalization of the Pythagorean Theorem," *Journal for Geometry and Graphics* 52, no. 2 (2021): 231–41.

⁵⁰ Brockelmann, *History Of The Islamic People*.

Alexandria in Egypt was a key Greek and Roman capital during their colonisation of the region, serving as one of the most important cultural and intellectual centres.⁵¹ It became a hub for the development of Neo-Platonism philosophy, also known as the Alexandria *madhhab*. This school of thought was founded by Plotinus (205–269 AD) and synthesised various Greek philosophies, including those of Plato and Aristotle, with Christian doctrines. Neo-Platonism had a significant influence on Islamic thought, particularly in the realm of theosophy (*Sufi madhhab*), with a particular emphasis on concepts such as *lahut* (divinity) and *nasut* (humanity). One of Plotinus' students, Phosphorus, maintained substantial influence for over two centuries until the reign of the Roman Emperor Justinian in 529 AD. Other notable students, such as Clement of Alexandria (150 AD) and Origen (185–254 AD), integrated philosophical ideas with Christian theological doctrines.

The intellectual activity in Alexandria primarily focused on the development of religious and philosophical ideas.⁵² Similarly, Christian traditions using the Suryani (Syriac) and Qibthi (Coptic) languages, as seen in the Nestorian and Yaqobiyah madhhab of Christianity, also engaged deeply with these philosophical traditions. Additionally, Jewish scholars, such as Philo (*Philon*), merged Greek philosophy with Jewish thought. This blend of religion and philosophy extended beyond Alexandria to churches across Egypt, Palestine, Aleppo, and Homs, continuing to shape intellectual discourse in the region.⁵³

Knowledge Translation and Transmission into the Islamic world

After Persia, the Levant, and Egypt came under Islamic rule, the Umayyad (Amawiyah) government began translating some of their works into Arabic. For instance, Khalid bin Yazid bin Mu'awiyah translated the "*Kitab Ishthafan*", a healing guidebook. However, the translation process accelerated significantly during the Abbasid (Abbasiyah) era, evolving in three major waves that began under Caliph al-Mansur and extended to the era of Harun al-Rashid between 136–193 H. During this period, key texts such as "*Kalilah wa al-Dimnah*" from Persian, al-Sindhind from Indian sources, Aristotle's works on logic, and "*Kitab al-Majesti*" (The Almagest) on astronomy were translated into Arabic. Prominent translators of this era included Ibn al-Muqaffa, Jurjis bin Jibrail, and Ruhana bin Masawaih, both of whom were Christian physicians. These translators played a critical role in transferring knowledge from various civilizations to the Islamic world. During this time, the Mu'tazilah movement regularly engaged with Aristotle's works, such as al-Nidzom, which addressed logic and philosophical methods, using them as tools to develop their theological and philosophical arguments.⁵⁴

During the reign of al-Ma'mun (198 -198 H) to 300 H, numerous notable figures emerged in the fields of translation and knowledge dissemination. Among them were Yuhana or Yahya al-Bithriq, who specialised in philosophy more than medicine and translated various works of Aristotle. Other distinguished translators included Hajaj bin Yusuf bin Mathar al-Waraq al-Kufi (d. 214 H), Qostho bin Luqo al-Ba'labaky (d. 220 H), Abdul Masih bin Nami'ah (d. 220 H), Hunain bin Ishaq (d. 260 H) and his son Ishaq bin Hunain (d. 298 H), Thabit bin Qurra (d. 288 H), and Jaisy al-A'sham, among others. During this period, almost all the significant works of Greek thought were translated into Arabic. These included the philosophies of Pythagoras, the teachings of Socrates, and the medical texts of Galen. Additionally, the *Noumous* and *Oikos* (urban management) by Thomas, works of Plato, and "*Kitab al-Majesti*" (The Almagest) were re-translated. Notably, Hunain bin Ishaq and his son Ishaq bin Hunain undertook the translation of Aristotle's "*al-Muqawwilat*" and many other works, ensuring these foundational texts became accessible and influential in the Islamic intellectual tradition.⁵⁵

In the subsequent era, the work of translation was carried on by notable figures such as Matta bin Yunus in Baghdad (d. 320 H), Sinan bin Thabit bin Qurrah (d. 360 H), Yahya bin 'Adi (d. 364 H), and Ibn Zur'ah (d. 398 H). These scholars continued to focus on translating numerous works of Aristotle,

⁵¹ Judith McKenzie and Peter Roger Stuart Moorey, *The Architecture of Alexandria and Egypt, c. 300 BC to AD 700*, vol. 63 (Yale University Press, 2007).

⁵² Peder Borgen, "Philo of Alexandria," in *The Literature of the Jewish People in the Period of the Second Temple and the Talmud, Volume 2 Jewish Writings of the Second Temple Period* (Brill, 1984), 233–82.

⁵³ Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyyat*; P Hitty, *History of the Arabs* (Macmillian Press, 1974); Ibn Khaldun, *Kitab Al-Muqaddimah*; Nasr, *Science and Civilization in Islam*.

⁵⁴ Amin, *Fajr Al-Islam; Bahts' An Al-Hidayat Al-Aqliyyat Fi Shadr Al-Islam Ila Akhir Al-Daulat Al-Amawiyyat*; Kraemer, *Islamic Renaissance*.

⁵⁵ Kraemer, *Islamic Renaissance*.

particularly in the fields of logic and psychology. In addition to their translation efforts, they provided insightful commentaries on these works, enriching their interpretations and ensuring their relevance in the context of Islamic intellectual traditions.⁵⁶

From the wealth of external works, Muslims not only learned but were also inspired to uncover deeper secrets—both those within their own religious doctrines and those concerning the mysteries of the universe. Their intellectual pursuits extended to understanding the hereafter, alongside mastering various philosophical paradigms.⁵⁷ Through disciplines such as medicine, mathematics, physics, and astronomy, they were able to correct many limitations and errors of their predecessors. The epistemology of philosophy, as developed by figures such as the Mu'tazilah, al-Ghazali, Ibn Sina, Ikhwan al-Safa, Suhrawardi, Ibn Rushd, and Ibn Hazm, effectively integrated philosophical inquiries with religious values, creating a harmonious blend of faith and reason. As al-Ghazali stated: “*The ultimate aim of knowledge is to lead to the worship of God and the good of society.*”

Similarly, the epistemology of science, as advanced by scholars such as Jabir ibn Hayyan, al-Kindi, and Abu Ma'shar al-Falaki, consistently aligned with human needs and religious obligations. For instance, astronomy was utilised to determine accurate prayer times, reflecting the Qur'anic command to observe the natural order: “*He created the sun and the moon for reckoning*” (*Surah Yunus*, 10:5). Arithmetic, meanwhile, was employed to resolve inheritance calculations as prescribed in *Surah An-Nisa* (4:11–12). These integrations demonstrate the profound way in which Islamic scholars unified their pursuit of scientific knowledge with their practical and spiritual lives, exemplifying Ibn Sina's statement: “*The world is divided into the seen and the unseen, and knowledge binds the two.*”⁵⁸

The Universalism of Islamic Civilization: Science, Technology, Arts, and Economy

The history of Islamic civilization shows great contributions in various fields of science that are still influential today. One of the most outstanding achievements was the development of the decimal number system and the concept of zero by Al-Khwarizmi, which became the basis for the binary number system in modern digital technology, including computers and programming.⁵⁹ In addition, Al-Khwarizmi also introduced algebra and algorithms, which are now fundamental parts of artificial intelligence (AI), data analysis, and computer technology.⁶⁰ In the field of chemistry, Jabir ibn Hayyan developed experimental methods and a classification of substances that became the basis for the periodic table of elements, which is still used in science education today.⁶¹ Meanwhile, in the field of optics, Ibn al-Haytham's research on light and vision paved the way for the development of cameras, telescopes, and modern imaging technology.⁶² Another very influential contribution is in the world of medicine, where Ibn Sina, through *The Canon of Medicine*, provided the basis for medical science that continued to develop and was used until the 17th century.⁶³ On the other hand, astronomical advances made by scientists such as Al-Battani and Al-Tusi contributed to the development of modern navigation and the heliocentric theory, which was later further developed by European scientists.⁶⁴ Thus, the science developed by Muslim scientists not only formed the foundation of science but also continues to contribute to various aspects of life in the current digital and modern era.

They first mastered the foundational sciences before advancing technological developments, as these sciences serve as the basis for subsequent technological progress. The essential difference between science and technology lies in their focus and application. Science primarily concerns itself with theories and knowledge about various objects in a fundamental, universal, objective, and systematic manner. In contrast, technology is more practical, involving the methods and processes used to apply scientific knowledge to utilise the universe's resources for human well-being, convenience, and

⁵⁶ Hitty, *History of the Arabs*; Kraemer, *Islamic Renaissance*.

⁵⁷ Mohammad Iqbal, *The Reconstruction of Religious Thought in Islam* (Stanford University Press, 2013).

⁵⁸ Ibn Khaldun, *Kitāb Al-Muqaddimah*; Nasr, S., & Leaman, *Thematic Encyclopedia of Islamic Philosophy*.

⁵⁹ R Rashed, *The Development of Arabic Mathematics: Between Arithmetic and Algebra* (Springer, 2002).

⁶⁰ G J Toomer, *Mathematics and Astronomy in Medieval Islamic Civilization* (Variorum, 1990).

⁶¹ P Kraus, *Jabir Ibn Hayyan: Contribution to Chemistry and Alchemy* (Cairo University Press, 1942).

⁶² A I Sabra, *The Optics of Ibn Al-Haytham: Books I-III on Direct Vision* (The Warburg Institute, 2003).

⁶³ D Gutas, *Avicenna and the Aristotelian Tradition: Introduction to Reading Avicenna's Philosophical Works* (Brill, 2001).

⁶⁴ Saliba, *Islamic Science and the Making of the European Renaissance*.

comfort. Both science and technology are neutral in their essence, whether regarded as knowledge systems or as tools for enhancing human life and making it more manageable.⁶⁵

Some examples of Islamic contributions to science and technology, influenced by the heritage of Greek Hellenism, include advancements in philosophy, astronomy, physics, geometry, chemistry, mining and metallurgy, mathematics, medicine, and agriculture. In mathematics, Islamic scholars introduced the Indian numeral system, which included the revolutionary concept of the number zero (0), represented by a dot (.). This innovation significantly simplified calculations, even for complex multiplication processes. Key contributors in this field include Muhammad bin Musa al-Khawarizmi (d. 875 AD), Abul Hasan al-Uqlidisi (d. 953), and Umar Khayyam (d. 1131). In astronomy, Babylonian and Indian influences were particularly strong, especially after the translation of Indian manuscripts, such as “*Siddhanta*”, into Arabic in Baghdad around 711 AD. Abu Ma’shar al-Falaki al-Balkhi was among the most renowned figures in astrology, known for his predictions and his significant work, “*Kitab al-Uluf*”. These contributions highlight the synthesis of knowledge from various civilizations and the innovative spirit of Islamic scholars in advancing science and technology.⁶⁶

One of the most significant periods in Islamic civilization was between the 9th and 13th centuries. During this era, scholars from the Islamic world authored medical texts that would have a profound influence on the modern world. Among these scholars was Al-Razi (Rhazes), who wrote “*Al-Mansuri*,” a comprehensive work that detailed various aspects of medicine.⁶⁷ However, he is renowned for his expertise in human anatomy and function.⁶⁸ In Spain, Avicenna contributed to the development of cardiovascular anatomy, including the Willis circle, capillary circulation, and the understanding of arterial and ventricular contraction.⁶⁹ Another significant contribution was his work on the urinary system and urinal diseases.⁷⁰ Furthermore, the caliph supported them by building hospitals for medical care and the centre of medicinal education.⁷¹

The most prominent contributions to physics during the Islamic Golden Age include the optical theory developed by Ibn al-Haytham in his seminal work “*Kitab al-Manazir*” (Book of Optics) and the study of specific gravity by al-Khazini (d. 1040 AD) in his “*Kitab Mizan al-Hikmah*” (The Book of the Balance of Wisdom). Islamic scholars also drew extensively on medical and scientific knowledge from Persia, Mesopotamia, India, and other regions. Notable figures include Muhammad Ibn Zakariya al-Razi (Rhazes, d. 925 AD), a renowned physician and author of influential medical texts, and Ibn Sina (Avicenna), whose “*Qanun fi al-Tibb*” (The Canon of Medicine) became a foundational text in pharmaceutical and medical technology. Both scholars demonstrated exceptional expertise in their fields, pioneering advancements that had a profound influence on both Islamic and European medicine. It was a common practice during this period for experts in pharmacy and medicine to also be well-versed in philosophy and astronomy, reflecting the interdisciplinary nature of Islamic intellectual traditions.⁷²

One example of technological advancements in the Islamic world is the application of physical theories to timekeeping devices. In the 11th century AD, al-Muradi developed a clock mechanism using an escapement system with mercury to regulate motion. Similarly, Ridwan and al-Jazari created water clocks that utilised segmented gear mechanisms and epicycles to maintain precise timekeeping. In addition to clocks, water wheels were designed to lift water from lower channels to higher locations, an innovation widely used in Murcia, Spain. These water wheels were highly efficient and remained operational until the 13th century AD, demonstrating the ingenuity and practicality of Islamic engineers

⁶⁵ Nasr, *Science and Civilization in Islam*.

⁶⁶ A Al-Hasan and D Hill, *Technology in Islamic History* (Mizan, 1993); Ibn Khaldun, *Kitab Al-Muqaddimah*; Nasr, *Science and Civilization in Islam*.

⁶⁷ James Tait Goodrich, “A Medieval Approach to Head Injuries from the Golden Era of Islamic Medicine from the Writings of Abn Bakr Muhammad Ibn Zakariya Al-Razi-Rhazes (865-925),” *World Neurosurgery* 82, no. 6 (2014): 1045.

⁶⁸ Golnoush Sadat Mahmoudi Nezhad and Behnam Dalfardi, “Rhazes (865–925 AD), the Icon of Persian Cardiology,” *International Journal of Cardiology* 177, no. 3 (2014): 744–47.

⁶⁹ Mohammad M Zarshenas and Arman Zargaran, “A Review on the Avicenna’s Contribution to the Field of Cardiology,” *International Journal of Cardiology* 182 (2015): 237–41.

⁷⁰ Sina Kardeh et al., “The Urinary Catheter and Its Significant Applications Described by Avicenna (980-1037 AD) in the Canon of Medicine,” *Urology* 84, no. 5 (2014): 993–96; Nezhad and Dalfardi, “Rhazes (865–925 AD), the Icon of Persian Cardiology.”

⁷¹ David Tranfield, David Denyer, and Palminder Smart, “Towards a Methodology for Developing Evidence-informed Management Knowledge by Means of Systematic Review,” *British Journal of Management* 14, no. 3 (2003): 207–22.

⁷² Al-Hasan and Hill, *Technology in Islamic History*; Nasr, *Science and Civilization in Islam*.

in developing technologies to harness natural resources effectively.⁷³ Thus, the development of science, art, and technology in Islamic culture encapsulates the nature of Islamic society in its time.

In one of his writings, Grabbar⁷⁴ explained that the science, arts, and culture of Islam clearly have distinct patterns and characteristics compared to the arts and culture of other preceding communities in the world. Islamic culture possesses unique features and defining elements, much like those found in Christian, Buddhist, European, and Chinese traditions. This difference is understandable because all forms of art and culture, including science and technology, were not born from an empty world but from the manifestation of dialogue between idealistic thought, religious belief systems, and the realities and requirements of history surrounding their creators. Nevertheless, it does not mean that the science, technology, arts, and culture of Islam were not adopted outside its doctrines, even though most of its technical aspects may have originated from external beliefs. This exchange occurred because the principles of Islam are inherently universal and globally oriented. Islamic teachings emphasise intellectual advancement and encourage critical thinking rather than prescribing specific technical or practical details. Therefore, Muslim scholars, as the creators, have taken and adopted external elements enthusiastically and then adapted them to Islamic concepts.⁷⁵

Inspired by Qur'anic imagery and the hadith "Allah is Beautiful and loves beauty," Muslim artists created works reflecting divine beauty within Islamic principles. Palaces, like those of Prophet Sulaiman, influenced architecture. Prohibitions on depicting living beings shaped artistic focus, emphasizing abstract, geometric, and interior aesthetic expressions.⁷⁶

The creation and potential of art in Islam were channelled into various forms, particularly Islamic calligraphy, characterised by intricate and beautiful patterns. These artistic expressions extended to distinctive decorative styles for room accessories and antique ornaments, such as glassware, jars, and carpets, adorned with floral or plant motifs, intentionally avoiding depictions of animals or humans. In specific rooms or appropriate spaces, Qur'anic verses, hadiths, or meaningful phrases were often displayed in the form of artistic calligraphy. These works were executed in various styles, including *divani*, *kufi*, *riq'a*, *naskh*, *thuluth*, and others, showcasing the diversity and sophistication of Islamic calligraphic traditions.⁷⁷

All of these represent an integration of artistic expression with spiritual values, including the overarching principles of *dakwah* (Islamic preaching). Muslim interior designs, whether for prayer spaces, palaces, or public areas, consistently embody a sense of reverence and connection, reflecting a deep relationship with the Creator of all spaces and the universe, *Allah Rabb al-'alamin* (Lord of the Worlds). This integration is especially evident in the architecture of prayer spaces, such as mosques and sacred sites, including cemeteries, which are often adorned with intricate artistic creations that harmonise beauty and devotion.⁷⁸

Islamic architecture, as exemplified in mosques throughout the Islamic world, consistently reflects motivational values and inspires a love for beauty. Even Imam al-Shafi'i, a prominent theologian of the 8th century AD with significant influence in the Sunni tradition, emphasised the connection between the religious spirit of a community and the architecture of its mosque. He likened the mosque to the heart of society, suggesting that if the users (the community) are spiritually healthy, the "heart" (the mosque) will also thrive, and vice versa. To enhance the mosque's beauty, intricate interior designs with geometric and floral patterns are a hallmark of Islamic architectural tradition. These designs are found in many great mosques across the Islamic world, including those in Cordova, Morocco, Egypt, Damascus, Medina, Mecca, Baghdad, Kufa, India, and Indonesia, showcasing the universal appeal and creativity of Islamic art and architecture.⁷⁹

⁷³ Al-Hasan and Hill, *Technology in Islamic History*.

⁷⁴ O Grabar, *Art and Culture in the Islamic World* (Phaidon, 1997).

⁷⁵ Grabar.

⁷⁶ Nasr, *Science and Civilization in Islam*.

⁷⁷ O Hosain, *Islamic Culture* (Bekasi: Moon and Star, 1964).

⁷⁸ O Leaman, *Interpreting the Art and Beauty of Islamic Aesthetics* (Mizan, 2005).

⁷⁹ Hosain, *Islamic Culture*.

Various forms of mosque interiors have adapted to local needs and cultural trends, but the main architectural elements remain consistent. The primary structure is typically square, with a protruding niche at the front designated for the *imam*. Another common feature is the *mihrab*, historically introduced during the Umayyad Dynasty in Damascus, serving as a safe and honourable space for a preacher to deliver *fatwas* and offer spiritual guidance to the congregation. Additionally, pools or designated areas for *wudu* (ablution), as part of the *taharah* (purification) process, are essential components found in every grand mosque in the Islamic world. The spiritual and architectural focus of mosques in the Islamic world is often centred on the three most sacred Islamic sites: *Masjid al-Haram* in Makkah, *Masjid al-Nabawi* in Medina, and *Masjid al-Aqsa* in Jerusalem. These mosques not only hold profound historical and doctrinal significance in Islam but also represent unparalleled aesthetic and architectural values. Their design and function as sacred spaces embody an artistic and spiritual legacy that is rarely matched by other religious structures.⁸⁰

Policy and Ethics in Economic Development

Muhammad,⁸¹ in his work “*Al-Hayat al-Siyasah wa Mandzahir al-Hadlarah*,” analysed the developmental patterns and economic systems of Islamic civilization, highlighting its significant social contributions. The author vividly describes the economic and political dynamics from the early 4th century to the rise of the Seljuk Dynasty, discussing various aspects of the period. One notable topic was the issue of retribution in trade and commerce. This retribution was a tax imposed in regions like Iraq on imported goods entering the domestic market via land and sea.⁸² However, the obligation to pay this tax could be waived if agreements were reached with the authorities. Maskawaih, in his work *Tajârib al-Umam*, noted: “...in 335 H, an agreement was made between Mu’izz al-Dawla ibn Buwaih and Nasir al-Dawla al-Hamdani to exempt Nasir al-Dawla’s goods from retribution when sent to Baghdad.” This example reflects the negotiation-based economic practices prevalent during that era.⁸³

This retribution was not only applied to international trade but also to trade between cities within the same governmental control. For instance, retribution was collected on goods traded along the Tigris (*Dijlah*) River between Baghdad and Basra. Pilgrimage groups returning to Kufa and Basra with woven fabrics and goods were charged 100 dirhams for each piece of fabric they carried. Additionally, retribution was imposed on the trade of farm animals such as camels, horses, and donkeys, as well as on transactions conducted in local markets. This system highlights the structured approach to economic regulation during this period, ensuring revenue generation from various commercial activities.⁸⁴

The retribution policy was upheld by successive governments as a means of boosting state or regional income. However, some authorities abolished these taxes, arguing that retribution policies often burdened the populace. The retribution system, which generated substantial revenues, sometimes became excessive. For example, in 306 H, a total of 60,370 dinars was collected from cities such as Baghdad, Basra, Wasit, Samarra, and Kufa. Yet, the excessive levies on small transactions increased shipping costs, thereby complicating trade and making life more difficult for both merchants and consumers.

In the Islamic world, various technological tools were developed to facilitate trade and commerce, including instruments for measuring quantities, weights, and distances. For instance:

1. Dosage Measurement Tools: The *Sha’*, equivalent to eight *rithl* (Kufa), was a common measure for content. The *Jarib* held 29.5 liters or 22.715 kilograms, and the *Kailajah* was equivalent to five *rithl* or 600 dirhams. The *Kir*, a Babylonian measure, equaled 30 *Karah*.
2. Scales: Weighing devices distinguished between wet and dry materials. The most widely used unit was the *rithl*, equal to 130 dirhams or approximately 406.25 grams.
3. Distance Measurement Tools: The standard unit for measuring distance was the “foot,” equivalent to 24 fingers.

⁸⁰ Grabar, *Art and Culture in the Islamic World*.

⁸¹ *Al-Hayat Al-Siyasah Wa Mandzahir Al-Hadlarah* (Dar Nahdlah al- ‘Arabiyah, 1999).

⁸² Reza Fahlevi Reza, Muhammad Thoriq, and Rd Imam Saepul Millah, “Sentiment Analysis of Marketplace Review with Islamic Perspective Using Fine-Tuning DistilBERT,” *Khazanah Journal of Religion and Technology* 2, no. 2 (2024): 45–54.

⁸³ Tranfield, Denyer, and Smart, “Towards a Methodology for Developing Evidence-informed Management Knowledge by Means of Systematic Review.”

⁸⁴ Muhammad, *Al-Hayat Al-Siyasah Wa Mandzahir Al-Hadlarah*.

The current international standard of weight is based on the International System of Units (SI), which uses the kilogram (kg) as the base unit of mass. This system was developed through precise scientific research and is used globally in trade, industry, and science. However, the concept of a standard of weight is not new, as Muslims in the past developed structured systems of measurement, such as the *rithl*, *dirham*, *sha'*, and *jarib*, which were used in trade and science. Some of these units have relatively close equivalencies to the modern metric system, such as 1 *rithl* which is approximately 400 grams, indicating continuity between Islamic systems of measurement and modern standards. This relationship can be demonstrated through metrological analysis, by comparing the weights of extant historical objects, testing the accuracy of Islamic weighing units through experimental methods, and examining the scientific records of Muslim scholars such as Al-Biruni and Al-Khwarizmi, who documented systematic weight measurements.⁸⁵ Al-Biruni, in his work “*The Book of Precious Stones*,” compiled a table of weights for various materials based on careful metrological experiments. Meanwhile, Al-Khwarizmi, in “*The Book of Indian Calculation*,” introduced a number system and measurement standards that supported the development of Islamic mathematics and trade.⁸⁶ Thus, although the SI system developed independently through modern scientific processes, Islamic weight measurement has an influence and relevance in the history of the development of global metrological standards.

Currency also played a pivotal role in facilitating trade. Different regions used distinct currencies: Egypt and Syria employed the gold dinar, while Persia used the silver dirham. Gold coins became widely used in Islamic states by the early 4th century AH.⁸⁷ However, the use of currency fluctuated over time, and rulers often leveraged monetary policy for political advantage. For example, during the Buwayhid dynasty, copper coins were minted without maintaining parity with gold reserves, which risked economic instability. In contrast, the Abbasid authorities issued large and heavy dinars, often intended for storage or as gifts. These coins frequently featured the ruler’s image or Qur’anic verses on one side. A single *dinar* was equivalent to 100 *mithqal*, underscoring its value and significance in the Islamic economy.⁸⁸

During the Buwayhid dynasty, the printing of money was strictly regulated to ensure the stability and value of the currency.⁸⁹ Only official government institutions were authorised to mint coins, and stringent measures were in place to prevent counterfeiting or unauthorised production. To maintain the integrity of this system, officials assigned to supervise the process were often *faqih* (knowledgeable) and individuals of *wara'* (pious). The Buwayhid rulers were uncompromising in enforcing these rules, going as far as imposing the death penalty on violators. Uncontrolled money printing, if left unchecked, could have led to severe economic instability, including inflation, depreciation of currency value, and loss of public confidence in the financial system, potentially disrupting trade and weakening state authority.

During the Abbasid period, approximately 150 official mints were in operation, highlighting the extensive scale of currency production.⁹⁰ It was also during this time that the concept of checks (*sakk*) was introduced into the Islamic world, reportedly brought by Persian merchants visiting Baghdad. These *sakk* facilitated trade transactions by allowing money and goods to be transferred efficiently without the need for physical currency. By the early fourth century *Hijriyah*, the economic transaction systems in Islamic societies had adopted mechanisms resembling modern systems.⁹¹ However, these systems were heavily influenced by the cultural and political context of the time, in which trade and monetary policies were closely tied to the ruling authority’s efforts to consolidate and maintain power. This fusion of economic, cultural, and political elements underscores the sophistication and adaptability of Islamic economic practices during this era.

⁸⁵ Rashed, *The Development of Arabic Mathematics: Between Arithmetic and Algebra*; Toomer, *Mathematics and Astronomy in Medieval Islamic Civilization*.

⁸⁶ Saliba, *Islamic Science and the Making of the European Renaissance*.

⁸⁷ Adam Abdullah, “The Islamic Monetary Standard: The Dinar and Dirham,” *International Journal of Islamic Economics and Finance Studies* 6, no. 1 (2020): 1–29.

⁸⁸ Muhammad, *Al-Hayat Al-Siyasah Wa Mandzahir Al-Hadljarah*.

⁸⁹ Abd al-Aziz Duri, *Early Islamic Institutions: Administration and Taxation from the Caliphate to the Umayyads and Abbasids* (Bloomsbury Publishing, 2011).

⁹⁰ Brian Davin Johnson, *The Ottoman Currency System (1687-1754)* (University of Washington, 1999).

⁹¹ Timur Kuran, “The Economic System in Contemporary Islamic Thought: Interpretation and Assessment,” *International Journal of Middle East Studies* 18, no. 2 (1986): 135–64.

Conclusion

Historically, Islam has served as a transformative cultural force, shaping social development, science, law, technology, economics, and other fields of human endeavour. The legacy of Islamic civilization—its contributions to knowledge, art, and societal structures—remains noble and influential, even as Western modernity has left its mark on many aspects of global culture. For the present generation of Muslims, the achievements of Islamic civilization should not be seen as mere myths of the past but as an ethos that inspires intellectual and spiritual growth. The pioneering efforts of early Muslim scholars, who integrated revelation and rational inquiry to explore the grandeur of *Kalam* and the natural world, offer a profound example of how knowledge can be harnessed for human benefit. This study has highlighted the interconnectedness of science, art, and spirituality in Islamic culture, illustrating how these elements were harmonised to create a vibrant civilization. From the development of advanced technologies and economic systems to the creation of awe-inspiring architecture and art, Islamic principles guided these achievements, demonstrating their universal and enduring relevance. The “revelation-guiding-science” tradition remains a model for modern challenges, showcasing how faith and reason can coexist to promote societal well-being.

To ensure that this legacy remains relevant in today’s rapidly evolving world, there is a need for its practical application in a global context. Islamic values can contribute to modern technology through the principle of sustainability, ensuring that scientific progress aligns with ethical and environmental responsibility. In economic systems, the emphasis on social justice, zakat, and ethical trade offers an alternative to exploitative economic models, fostering equitable wealth distribution. In education, the integration of science and spirituality can create a holistic learning approach, nurturing both intellectual excellence and moral integrity. However, the realisation of this legacy faces significant challenges, including the dominance of secular values, cultural barriers, and the lack of a collective understanding of the integration between faith and science. Overcoming these obstacles requires a renewed intellectual movement where contemporary Muslim scholars, educators, and policymakers actively engage in reviving and adapting Islamic principles to meet modern needs. By addressing these challenges, the legacy of Islamic civilization can serve as a solid foundation of values, helping societies navigate an increasingly complex and dynamic world while preserving ethical and spiritual dimensions in global progress.

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