

The Historical Development of Tafsir 'Ilmi: From Classical Scientific Exegesis to Contemporary Scientific Interpretation

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Abstract

Scientific exegesis (*tafsir 'ilmi*) has become one of the most debated approaches in Qur'anic interpretation due to its attempt to correlate Qur'anic verses with scientific knowledge. While this interpretive trend has attracted considerable scholarly attention, existing studies have predominantly examined individual exegetes, methodological issues, or the compatibility between the Qur'an and modern science, leaving the historical evolution of *tafsir 'ilmi* across different intellectual periods insufficiently explored. This study aims to examine the historical development of *tafsir 'ilmi* from the classical period to the contemporary era while identifying the epistemological shifts that have shaped its interpretive paradigm. Employing a qualitative library research approach with historical and philosophical perspectives, this study analyzes primary and secondary sources on the history of Qur'anic exegesis and scientific interpretation. The findings reveal that the development of *tafsir 'ilmi* has undergone four major phases. During the classical period, scientific reasoning functioned primarily to reinforce theological arguments concerning divine creation. The medieval period witnessed a decline in scientific interpretation due to the dominance of sectarian and ideological tendencies. In the modern period, scientific exegesis re-emerged as a response to modernity and Western scientific advancement through figures such as Muhammad Abduh and Tantawi Jawhari. Subsequently, the contemporary period transformed *tafsir 'ilmi* into a more systematic and interdisciplinary approach, represented prominently by Zaghlul al-Najjar, while simultaneously generating enduring debates regarding the epistemological limits of integrating scientific theories into Qur'anic interpretation. This study contributes to the field of Qur'anic studies by offering a comprehensive historical framework that explains the evolution of scientific exegesis and clarifies the changing relationship between revelation, reason, and scientific knowledge across different periods of Islamic intellectual history.

Keywords: Scientific Exegesis (*Tafsir 'Ilmi*); Qur'anic Interpretation; History of Tafsir; Epistemology of Tafsir; Science and the Qur'an

Abstrak

Tafsir 'ilmi merupakan salah satu corak penafsiran Al-Qur'an yang paling banyak diperdebatkan karena berupaya menghubungkan ayat-ayat Al-Qur'an dengan perkembangan ilmu pengetahuan. Meskipun kajian mengenai *tafsir 'ilmi* telah banyak dilakukan, penelitian sebelumnya umumnya berfokus pada tokoh tertentu, metodologi penafsiran, atau relasi antara Al-Qur'an dan sains modern, sementara kajian yang menguraikan perkembangan historis *tafsir 'ilmi* beserta perubahan epistemologinya dari periode klasik hingga kontemporer masih relatif terbatas. Penelitian ini bertujuan untuk menganalisis sejarah perkembangan *tafsir 'ilmi* sekaligus mengidentifikasi transformasi epistemologis yang membentuk paradigma penafsirannya pada setiap periode. Penelitian ini merupakan penelitian kepustakaan (*library research*) dengan pendekatan historis dan filosofis. Data diperoleh dari berbagai literatur

primer dan sekunder mengenai sejarah tafsir serta pemikiran para mufasir yang mengembangkan penafsiran saintifik, kemudian dianalisis secara deskriptif-analitis. Hasil penelitian menunjukkan bahwa perkembangan *tafsir 'ilmi* mengalami empat fase utama. Pada periode klasik, pendekatan ilmiah digunakan terutama untuk memperkuat argumentasi teologis mengenai kekuasaan Allah. Periode pertengahan ditandai oleh melemahnya perkembangan *tafsir 'ilmi* akibat dominasi kepentingan mazhab dan ideologi. Pada periode modern, *tafsir 'ilmi* kembali berkembang sebagai respons terhadap kemajuan sains modern dan tantangan modernitas melalui pemikiran tokoh-tokoh seperti Muhammad Abduh dan Tantawi Jauhari. Selanjutnya, pada periode kontemporer, *tafsir 'ilmi* berkembang menjadi pendekatan yang lebih sistematis dan interdisipliner, sebagaimana tampak dalam karya Zaghlul al-Najjar, sekaligus memunculkan perdebatan mengenai batas-batas penggunaan teori ilmiah dalam penafsiran Al-Qur'an. Penelitian ini memberikan kontribusi berupa kerangka historis yang komprehensif mengenai evolusi *tafsir 'ilmi* serta memperjelas dinamika hubungan antara wahyu, akal, dan ilmu pengetahuan dalam tradisi tafsir Al-Qur'an.

Katakunci: *Tafsir 'Ilmi*; Sejarah Tafsir; Penafsiran Al-Qur'an; Epistemologi Tafsir; Sains dan Al-Qur'an.

Introduction

The relationship between the Qur'an and scientific knowledge has remained one of the most enduring themes in Islamic intellectual history. Rather than functioning as a scientific textbook, the Qur'an repeatedly encourages human beings to observe the natural world, contemplate the order of creation, and employ reason in understanding God's signs. This epistemological orientation stimulated generations of Muslim scholars to investigate the relationship between revelation and human knowledge, leading to diverse interpretative approaches toward verses concerning nature (*āyāt kawniyyah*). As scientific knowledge has continued to evolve, particularly since the modern scientific revolution, this relationship has become increasingly significant within Qur'anic studies, giving rise to renewed discussions regarding whether and to what extent contemporary scientific discoveries may contribute to the interpretation of the Qur'an (Mustakim, 2022). Among the various interpretative approaches that emerged from this discourse, *tafsīr 'ilmī* (scientific exegesis) occupies a particularly prominent position because it seeks to establish a constructive dialogue between revelation and scientific inquiry while demonstrating the continuing relevance of the Qur'an in an age shaped by scientific advancement (Mohd et al., 2023).

Although *tafsīr 'ilmī* is frequently regarded as a modern exegetical approach, its intellectual foundations can be traced to the classical period of Islamic scholarship. Medieval Muslim scholars generally perceived philosophy, astronomy, medicine, mathematics, and other branches of knowledge as complementary instruments for understanding divine revelation rather than as disciplines independent from religion (OP, 2024). This integrative

intellectual tradition is clearly reflected in the works of Fakhr al-Dīn al-Rāzī, whose *Mafātīḥ al-Ghayb* incorporated extensive philosophical and scientific discussions into Qur'anic interpretation without claiming that the Qur'an functioned as a repository of scientific theories. During the late nineteenth and early twentieth centuries, however, the encounter between Islamic civilization and Western modernity transformed the orientation of scientific exegesis. Reformist scholars such as Muhammad 'Abduh and Tantawi Jawhari increasingly employed scientific knowledge to demonstrate the rationality of Islam and respond to colonial narratives that portrayed Muslim societies as intellectually backward. In the contemporary period, this tendency became even more systematic through the works of Zaghlul al-Najjar and other proponents of *i'jāz 'ilmī*, who attempted to correlate established scientific discoveries with Qur'anic verses concerning cosmology, embryology, geology, and other natural phenomena (Amir et al., 2012; Syakuro, 2023). These developments demonstrate that *tafsīr 'ilmī* has not remained static but has undergone substantial methodological and epistemological transformation across successive historical periods.

The expansion of scientific exegesis has simultaneously generated one of the most important methodological debates in contemporary Qur'anic studies. Supporters argue that scientific interpretation strengthens the universality of the Qur'an, confirms its compatibility with rational inquiry, and provides an effective bridge between religious belief and modern scientific knowledge (Mohd et al., 2023; Amir et al., 2012). Conversely, critics maintain that scientific theories are provisional and therefore cannot serve as stable interpretative foundations for a revealed text whose meanings transcend changing scientific paradigms. Naguib (2019) demonstrates that the literary school of tafsir, represented by Amin al-Khuli and Bint al-Shati', rejected the tendency to prioritize scientific explanations over the linguistic, literary, and historical dimensions of the Qur'an. Similar concerns have also been raised regarding the growing popularity of *i'jāz 'ilmī*, which is often criticized for reading contemporary scientific concepts retrospectively into Qur'anic verses. Consequently, the debate surrounding *tafsīr 'ilmī* extends beyond questions of scientific compatibility to encompass broader epistemological issues concerning the relationship between revelation, reason, and scientific knowledge.

Existing scholarship has made significant contributions to understanding scientific exegesis from several complementary perspectives. Conceptual studies have refined the definition and scope of *tafsīr 'ilmī* within the framework of *tawhidic science* (Mohd et al., 2023), while historical investigations have traced its emergence through influential exegetes

such as Fakhr al-Dīn al-Rāzī and Tantawi Jawhari (OP, 2024; Syakuro, 2023). Other studies have focused on methodological applications of scientific interpretation in specific scientific fields, including embryology and oceanography (Amir et al., 2012; Admizal & Munawaroh, 2023), whereas critical scholarship has examined its epistemological limitations and hermeneutical implications (Naguib, 2019). More recently, bibliometric mapping has shown that interdisciplinary research linking the Qur'an with science continues to expand within international scholarship, reflecting growing academic interest in the relationship between Islamic studies and contemporary scientific discourse (Jamil & Khaled, 2025). Nevertheless, these studies generally examine conceptual definitions, individual exegetes, methodological applications, or epistemological debates separately. As a result, the historical evolution of *tafsīr 'ilmī* as a continuous intellectual tradition has received comparatively limited attention.

This study argues that understanding *tafsīr 'ilmī* requires more than documenting chronological developments or comparing individual scholars. It also requires reconstructing the epistemological transformation that reshaped the relationship between revelation and scientific knowledge across different periods of Islamic intellectual history. Accordingly, this article addresses an important gap in the existing literature by examining how scientific exegesis evolved from its classical foundations through the reformist period to its contemporary manifestations, while simultaneously identifying the changing assumptions, objectives, and methodological orientations that characterized each phase of its development. By integrating historical reconstruction with epistemological analysis and scholarly debates within a single analytical framework, this study offers a more comprehensive understanding of the evolution of *tafsīr 'ilmī* than studies focusing exclusively on particular figures, concepts, or scientific themes.

Based on this framework, the present study aims to analyze the historical development of *tafsīr 'ilmī* from the classical period to the contemporary era, to explain the epistemological transformation underlying its evolution, and to evaluate the principal arguments advanced by both its proponents and critics. Through this historical-epistemological approach, the study seeks to contribute not only to the historiography of Qur'anic exegesis but also to broader discussions concerning the dynamic relationship between revelation, reason, and scientific knowledge in contemporary Islamic thought. Ultimately, it argues that the development of *tafsīr 'ilmī* should be understood as a continuous process of intellectual negotiation in which changing scientific paradigms, socio-historical contexts, and exegetical methodologies collectively shape the interpretation of the Qur'an across time.

Methodology

This study employs a qualitative historical research design to examine the evolution of *tafsīr 'ilmī* (scientific exegesis) from the classical period to the contemporary era. Rather than merely presenting a chronological description of major exegetes, the study adopts an intellectual-historical approach to investigate how changing scientific paradigms, socio-historical contexts, and epistemological assumptions influenced the development of scientific interpretation within the broader tradition of Qur'anic exegesis. This approach enables the study to explain both continuity and transformation in the methodological orientation of *tafsīr 'ilmī* across different historical periods.

The research is based on documentary analysis of both primary and secondary sources. Primary sources consist of representative works of scientific exegesis from different historical periods, including Fakhr al-Dīn al-Rāzī's *Mafātīḥ al-Ghayb* as a classical reference, Tantawi Jawhari's *Al-Jawāhir fī Tafsīr al-Qur'ān al-Karīm* as a major work of modern scientific exegesis, and Zaghlul al-Najjar's *Tafsīr al-Āyāt al-Kawniyyah fī al-Qur'ān al-Karīm* as a contemporary representation of scientific interpretation. To provide a balanced analysis, the study also examines critical perspectives on scientific exegesis, particularly the writings of Amin al-Khuli, Bint al-Shati', and other scholars who question the methodological legitimacy of integrating scientific theories into Qur'anic interpretation.

Secondary sources include peer-reviewed journal articles, scholarly books, conference proceedings, and doctoral theses discussing scientific exegesis, the history of Qur'anic interpretation, philosophy of science, and the relationship between Islam and scientific knowledge. Priority was given to publications indexed in Scopus and other internationally recognized academic databases to ensure the reliability, quality, and contemporary relevance of the literature.

Data were collected through systematic literature review procedures involving four stages: identification, selection, organization, and critical reading of relevant literature. Publications were selected based on three inclusion criteria: (1) direct relevance to *tafsīr 'ilmī* or scientific interpretation of the Qur'an; (2) substantial discussion of its historical development, methodology, or epistemological foundations; and (3) publication in credible academic sources. Works that discussed scientific miracles only from devotional or popular perspectives without scholarly analysis were excluded from the review.

The collected data were analyzed using qualitative content analysis combined with historical-comparative analysis. The analytical process consisted of four interrelated stages.

First, the historical trajectory of *tafsīr 'ilmī* was reconstructed by identifying major phases of its development from the classical, modern, and contemporary periods. Second, the methodological characteristics of each period were compared to identify patterns of continuity and change in exegetical orientation. Third, the epistemological assumptions underlying each phase were examined to explain how different conceptions of revelation, reason, and scientific knowledge shaped scientific interpretation. Finally, the arguments advanced by proponents and critics of *tafsīr 'ilmī* were synthesized to evaluate the contribution, limitations, and contemporary relevance of scientific exegesis within Qur'anic studies.

To enhance the trustworthiness of the findings, source triangulation was employed by comparing primary exegetical works with contemporary scholarly analyses and historical studies. Interpretations were continuously cross-checked across multiple academic sources to minimize subjective bias and to ensure that the reconstruction of the historical development of *tafsīr 'ilmī* was supported by consistent documentary evidence.

Results and Discussion

A. Historical Evolution of *Tafsīr 'Ilmi* Across Four Intellectual Periods

The historical analysis reveals that the development of *tafsīr 'ilmī* (scientific exegesis) did not follow a linear trajectory but evolved through successive epistemological transformations shaped by the intellectual, socio-political, and scientific contexts of different periods in Islamic civilization. Rather than emerging as an exclusively modern interpretive approach, *tafsīr 'ilmī* represents a cumulative intellectual tradition whose characteristics changed alongside the evolution of Islamic scholarship and scientific knowledge. Based on the analysis of classical, modern, and contemporary literature, the historical development of *tafsīr 'ilmī* can be classified into four major phases: the Classical Period, the Medieval (or Middle) Period, the Modern Period, and the Contemporary Period. Each phase exhibits distinctive methodological orientations, epistemological assumptions, and patterns of interaction between revelation and scientific knowledge.

The Classical Period constituted the formative stage of scientific interpretation. During this phase, scientific reasoning was not employed as the primary framework for interpreting the Qur'an but rather as an intellectual instrument to strengthen theological arguments concerning the unity, wisdom, and omnipotence of God. Qur'anic interpretation during the prophetic era, the Companions, and the Tābi'ūn primarily relied on the Qur'an itself, Prophetic traditions, independent reasoning (*ijtihād*), variant readings (*qirā'āt*), and occasionally reports from earlier scriptural traditions (Mustakim, 2022; Idris, 2019). Although

no independent scientific exegetical school existed during this period, several interpretations of cosmological and natural phenomena indicate the early integration of rational observation into Qur'anic exegesis. This tendency reached its highest expression in the works of Fakhr al-Dīn al-Rāzī (d. 606 H/1210 CE), whose *Mafātīḥ al-Ghayb* incorporated philosophy, astronomy, medicine, natural sciences, and logic into the interpretation of Qur'anic verses (Al-Muḥtasib, 1997; Mustakim, 2022). Nevertheless, al-Rāzī did not claim that the Qur'an literally contained scientific theories. Instead, scientific knowledge functioned as supporting evidence to explain the order of creation and reinforce theological reflection on divine sovereignty (Nafisah, 2023; OP, 2024).

The Medieval Period witnessed a relative stagnation in the development of *tafsīr 'ilmī*. Although the codification of Qur'anic commentaries expanded significantly after the second Islamic century, exegetical scholarship increasingly became dominated by theological disputes, legal schools, sectarian interests, and mystical ideologies rather than scientific inquiry (Mustakim, 2022). During this period, scientific interpretation ceased to be a major intellectual concern as scholars focused primarily on defending particular doctrinal positions. Exegetical works often reflected ideological commitments, including kalām debates, juridical reasoning, and Sufi metaphysics. Consequently, scientific observations that had previously served as complementary explanatory tools became largely marginalized. This finding suggests that the decline of scientific exegesis during the medieval period was not caused by the rejection of science itself, but rather by the shifting priorities of Islamic intellectual life toward theological and political controversies.

A significant transformation occurred during the Modern Period, coinciding with the rise of Islamic modernism, European colonial expansion, and the rapid advancement of Western science during the nineteenth and early twentieth centuries. In response to accusations that Islam was incompatible with rationality and scientific progress, Muslim reformers sought to demonstrate the harmony between revelation and modern science. Thinkers such as Muḥammad 'Abduh, Rashīd Riḍā, Sayyid Ahmad Khan, and particularly Tantawi Jawhari pioneered a new orientation of scientific exegesis that explicitly incorporated contemporary scientific knowledge into Qur'anic interpretation (Mustakim, 2006). Among them, Tantawi Jawhari's *Al-Jawāhir fī Tafsīr al-Qur'ān al-Karīm* represented the most comprehensive scientific commentary of its time. He argued that approximately 750 Qur'anic verses address natural phenomena and therefore deserve greater scholarly attention than the relatively limited number of legal verses (Syakuro, 2023). Unlike al-Rāzī, whose scientific

discussions primarily supported theological reflection, Tantawi employed astronomy, geology, biology, and other natural sciences as systematic interpretive frameworks for explaining *āyāt kawniyyah* (cosmological verses). His methodology marked a fundamental shift in which scientific knowledge became an explicit hermeneutical instrument rather than merely supplementary information (Firmansyah, 2021).

The Contemporary Period demonstrates the most systematic and institutionalized stage in the evolution of *tafsīr 'ilmī*. The analysis identifies two dominant approaches that characterize this phase: *scientific exegesis*, which interprets Qur'anic verses through established scientific discoveries, and *i'jāz 'ilmī* (scientific miracles), which seeks to demonstrate that the Qur'an anticipated scientific facts long before their modern discovery (Mustakim, 2022; Mohd et al., 2023). This paradigm is represented most prominently by Zaghlul al-Najjar, whose *Tafsīr al-Āyāt al-Kawniyyah fī al-Qur'ān al-Karīm* systematically correlates Qur'anic cosmological verses with contemporary findings in geology, oceanography, embryology, astronomy, and environmental science (Amir et al., 2012). In interpreting Q. 52:6 (*al-baḥr al-maṣjūr*), for example, al-Najjar combines linguistic analysis with modern geological evidence regarding underwater volcanic activity to argue that recent scientific discoveries confirm the Qur'anic description of the natural world (Al-Najjar, 2007). The contemporary period has also been influenced by non-Muslim scholars such as Maurice Bucaille, whose influential work *The Bible, the Qur'an and Science* argues that the Qur'an demonstrates remarkable consistency with modern scientific knowledge while identifying numerous scientific inaccuracies within the Biblical text (Bucaille, 2009). These developments illustrate the globalization of scientific exegesis beyond traditional Islamic scholarship.

Overall, the findings demonstrate a clear historical transformation in the function of science within Qur'anic interpretation. During the Classical Period, science primarily served as an auxiliary tool to strengthen theological reasoning and explain the signs of divine creation. In the Medieval Period, scientific engagement declined as exegetical discourse became increasingly dominated by theological and ideological concerns. The Modern Period transformed science into an instrument of Islamic intellectual reform designed to reconcile revelation with modern rationality, whereas the Contemporary Period further expanded this orientation by institutionalizing scientific exegesis and emphasizing the scientific miraculousness (*i'jāz 'ilmī*) of the Qur'an. These findings indicate that the historical evolution of *tafsīr 'ilmī* has been closely intertwined with broader intellectual developments within

Muslim societies, particularly changing conceptions of knowledge, scientific authority, and the relationship between revelation and reason.

The classification of these four historical phases also demonstrates a gradual shift in the epistemological role assigned to scientific knowledge. Early Muslim exegetes viewed scientific inquiry primarily as a means of contemplating God's creation, whereas modern and contemporary interpreters increasingly positioned science as a hermeneutical framework for explaining—or even verifying—the meanings of Qur'anic verses. This transformation constitutes one of the most significant findings of the present study because it reveals that debates surrounding *tafsīr 'ilmī* are rooted not merely in differing exegetical techniques but in fundamentally different conceptions of the relationship between revelation, human reason, and scientific knowledge. This historical trajectory provides the analytical foundation for the subsequent discussion on the diverse paradigms adopted by Muslim scholars regarding the legitimacy, scope, and methodological limitations of scientific exegesis.

Table 1. Historical Development of *Tafsīr 'Ilmi* Across Four Periods

Period	Main Characteristics	Representative Figures	Scientific Orientation	Primary Function
Classical	Science integrated into theological reflection	Fakhr al-Dīn al-Rāzī, Ibn Sīnā, Bīrūnī	Philosophy, astronomy, medicine	Explaining divine signs
Medieval	Relative stagnation due to theological and sectarian dominance	Ibn 'Arabī and later exegetes	Limited scientific engagement	Ideological and doctrinal interpretation
Modern	Islamic reform and reconciliation with modern science	Muhammad 'Abduh, Riḍā, Ahmad Khan, Tantawi Jawhari	Modern natural sciences	Demonstrating compatibility between Islam and science
Contemporary	Systematic scientific exegesis and <i>i'jāz 'ilmī</i>	Zaghlul al-Najjar, Maurice Bucaille	Interdisciplinary scientific discoveries	Demonstrating scientific miracles

Period	Main Characteristics	Representative Figures	Scientific Orientation	Primary Function and contemporary relevance
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B. The Epistemological Transformation of *Tafsir 'Ilmi*

The findings demonstrate that the historical evolution of *tafsir 'ilmī* represents not merely the chronological development of a particular exegetical approach but a profound transformation in the epistemological relationship between revelation and scientific knowledge. Across the four historical periods identified in this study, the function of science gradually shifted from an auxiliary explanatory instrument to an increasingly influential hermeneutical framework. During the classical period, scientific knowledge was primarily employed to strengthen theological reflection on God's creation, whereas modern and contemporary scholars increasingly positioned science as an interpretive authority capable of explaining—and in some cases validating—the meanings of Qur'anic verses. This gradual transformation constitutes one of the most significant patterns emerging from the historical analysis.

This pattern reflects broader intellectual changes within Islamic civilization. Classical Muslim scholars developed scientific inquiry within a holistic worldview in which philosophy, medicine, astronomy, mathematics, and theology formed an integrated system of knowledge. Consequently, figures such as Fakhr al-Dīn al-Rāzī viewed scientific inquiry as complementary to revelation rather than as an independent source of religious authority. However, the encounter with European colonialism, the rise of scientific positivism, and the global prestige of modern science during the nineteenth century fundamentally altered Muslim intellectual priorities. Reformist scholars increasingly sought to demonstrate that Islam was fully compatible with scientific progress, transforming scientific interpretation into an intellectual response to modernity rather than merely an exegetical preference (Nasr, 1996; Iqbal, 1930).

From a theoretical perspective, this transformation can be understood through Thomas Kuhn's (1962) concept of paradigm shifts, which explains that knowledge develops through changing epistemological frameworks rather than through simple accumulation. Likewise, the history of *tafsir 'ilmī* illustrates that Qur'anic interpretation is continually reconstructed according to the dominant intellectual paradigm of each era. Gadamer's (2004) philosophical

hermeneutics further supports this interpretation by arguing that every act of understanding is historically conditioned by the interpreter's horizon (*Wirkungsgeschichte*). Accordingly, scientific exegesis should not be regarded as uncovering fixed scientific meanings embedded within the Qur'an, but rather as reflecting an ongoing dialogue between the immutable Qur'anic text and the evolving nature of human knowledge. This interpretation is consistent with Mohd et al. (2023), who argue that *tafsīr 'ilmī* should be grounded within *tawhīdic science*, where empirical knowledge remains integrated with theological principles rather than replacing them.

More broadly, these findings suggest that *tafsīr 'ilmī* should be understood as a dynamic intellectual tradition whose methodological legitimacy depends on its historical and epistemological context. Rather than evaluating scientific exegesis solely according to contemporary scientific standards, future scholarship should recognize its role as one manifestation of the continuing interaction between revelation and human reason throughout Islamic intellectual history.

C. Negotiating Revelation and Scientific Authority

A second pattern emerging from this study concerns the changing status of scientific knowledge within Qur'anic interpretation. The historical findings reveal a gradual expansion of scientific authority, particularly during the modern and contemporary periods, when empirical discoveries increasingly became central interpretive references. While classical exegetes generally employed science to illustrate divine wisdom, contemporary proponents of *tafsīr 'ilmī* frequently present scientific discoveries as empirical evidence supporting the miraculous nature (*i'jāz 'ilmī*) of the Qur'an.

This development reflects the growing social authority of science in the modern world. Scientific achievement has become widely associated with rationality, progress, and intellectual legitimacy, encouraging Muslim scholars to engage scientific discourse as a means of demonstrating the continuing relevance of Islam. Consequently, scientific exegesis has expanded beyond academic scholarship into educational institutions, public preaching, digital media, and international organizations promoting the scientific miracles of the Qur'an (Bucaille, 2009; Jamil & Khaled, 2025). The increasing popularity of scientific exegesis therefore cannot be separated from broader processes of globalization, educational reform, and the growing demand for religious narratives compatible with contemporary scientific understanding.

Nevertheless, this expansion of scientific authority has generated significant methodological debate. Naguib (2019) demonstrates that the literary school of tafsir, represented by Amin al-Khuli and Bint al-Shati', criticized scientific exegesis not because of its engagement with science, but because it allowed external scientific theories to dominate textual interpretation. Similar reservations were articulated much earlier by al-Shāṭibī in *Al-Muwāfaqāt*, who argued that the Qur'an was revealed primarily as guidance (*hudā*) rather than as a comprehensive scientific encyclopedia. Contemporary Muslim philosophers including Osman Bakar (1999), Ziauddin Sardar (2011), and Seyyed Hossein Nasr (1996) likewise emphasize that Islamic epistemology recognizes multiple interconnected sources of knowledge—revelation, reason, empirical observation, and spiritual experience. Consequently, elevating science to the sole interpretive authority risks reducing the Qur'an's ethical, literary, theological, and spiritual dimensions.

The present findings therefore indicate that productive dialogue between science and revelation requires epistemological balance rather than methodological domination. Scientific knowledge can substantially enrich Qur'anic interpretation when employed as contextual explanatory evidence, yet it should remain integrated with linguistic, historical, theological, and literary approaches that constitute the foundations of classical Qur'anic hermeneutics.

D. Scientific Exegesis in Contemporary Qur'anic Scholarship

Another important pattern identified in this study is the increasing institutionalization of *tafsīr 'ilmī* within contemporary Qur'anic studies. Unlike earlier periods in which scientific interpretation was primarily associated with individual scholars, contemporary scientific exegesis has become embedded within academic research, governmental initiatives, university curricula, and international scholarly networks. Bibliometric evidence demonstrates that interdisciplinary research connecting the Qur'an with medicine, environmental studies, astronomy, education, digital technology, and artificial intelligence has expanded considerably over the last decade (Jamil & Khaled, 2025).

This institutional growth reflects broader transformations in global higher education and the increasing emphasis on interdisciplinary research. Contemporary universities encourage collaboration across disciplinary boundaries, enabling Qur'anic studies to engage more actively with natural sciences, social sciences, and digital humanities. Such developments have broadened the scope of *tafsīr 'ilmī*, allowing it to address contemporary challenges including environmental sustainability, bioethics, public health, and technological innovation. Rather than remaining confined to apologetic debates concerning scientific

miracles, scientific exegesis increasingly contributes to wider discussions regarding Islam's role in addressing global problems.

These developments correspond with broader theoretical discussions regarding the Islamization and integration of knowledge proposed by scholars such as Syed Muhammad Naquib al-Attas (1995), Ismail Raji al-Faruqi (1982), and Osman Bakar (1999). Their frameworks advocate constructive interaction between revelation and scientific inquiry without subordinating either domain. The present findings similarly indicate that the future development of *tafsīr 'ilmī* depends less on demonstrating miraculous predictions than on fostering meaningful interdisciplinary dialogue capable of addressing contemporary intellectual and societal issues.

Accordingly, scientific exegesis should increasingly be evaluated according to its capacity to generate ethical insight, interdisciplinary understanding, and intellectual contribution rather than merely its ability to identify scientific correspondences within Qur'anic verses.

E. Toward an Integrative Framework for Scientific Exegesis

The historical trajectory identified in this study ultimately demonstrates that neither unconditional acceptance nor complete rejection of *tafsīr 'ilmī* adequately reflects the complexity of the relationship between revelation and science. The evidence indicates that scientific exegesis has generated valuable intellectual contributions throughout Islamic history while simultaneously raising legitimate methodological concerns regarding interpretive authority, epistemological certainty, and the provisional character of scientific theories.

This dual reality suggests that future Qur'anic scholarship should move beyond the longstanding binary opposition between proponents and critics of scientific exegesis. Instead of treating science as either the ultimate validator of revelation or an external threat to textual integrity, a more constructive approach recognizes both revelation and science as complementary yet epistemologically distinct sources of knowledge. Such a framework encourages dialogue rather than competition between the two domains.

Hermeneutically, this perspective aligns with contemporary developments in philosophical hermeneutics and interdisciplinary Qur'anic studies, emphasizing that every interpretation is historically situated while remaining accountable to the linguistic, literary, theological, and historical dimensions of the Qur'anic text (Gadamer, 2004; Naguib, 2019). Scientific discoveries may therefore function as contextual resources that illuminate Qur'anic

meanings without becoming absolute interpretive criteria. This approach also resonates with the principles of *maqāṣid al-shar'ah*, which prioritize the ethical and civilizational objectives of revelation over narrowly literal or apologetic readings.

The broader implication of this study is that the future of *tafsīr 'ilmī* lies in developing an integrative hermeneutical framework grounded in four principles: epistemological humility, recognizing the provisional nature of scientific knowledge; methodological pluralism, integrating linguistic, historical, theological, and empirical approaches; interdisciplinary collaboration, promoting dialogue between Qur'anic scholarship and contemporary sciences; and ethical orientation, ensuring that scientific interpretation contributes to the Qur'an's overarching objectives of guidance, justice, and human flourishing. Such a framework enables *tafsīr 'ilmī* to remain intellectually relevant while preserving the interpretive integrity of the Qur'an in an era of rapidly evolving scientific knowledge.

Conclusion

The historical development of *tafsīr 'ilmī* demonstrates that scientific interpretation of the Qur'an is neither a purely contemporary phenomenon nor a static exegetical tradition. Rather, it represents a dynamic intellectual enterprise that has continuously evolved in response to changing scientific paradigms, socio-political contexts, and epistemological orientations within Islamic scholarship. Beginning with the integrative intellectual tradition of Fakhr al-Dīn al-Rāzī, scientific knowledge functioned primarily as an auxiliary instrument to strengthen theological reflection and explain the signs of God in nature. During the modern reformist period, particularly through the works of Muhammad 'Abduh and Tantawi Jawhari, scientific exegesis assumed a more explicit role in demonstrating the compatibility of Islam with modern scientific rationality and responding to colonial narratives concerning the intellectual decline of Muslim societies. In the contemporary era, represented by Zaghlul al-Najjar and other proponents of *ijāz 'ilmī*, scientific exegesis has become increasingly systematic and interdisciplinary, emphasizing the correspondence between Qur'anic verses and established scientific discoveries.

The study further reveals that the evolution of *tafsīr 'ilmī* reflects a broader epistemological transformation in the relationship between revelation and scientific knowledge. Whereas classical scholars generally regarded scientific knowledge as a complementary means of understanding divine revelation, many contemporary approaches increasingly position scientific discoveries as interpretative references for explaining Qur'anic verses. This transformation has generated enduring methodological debates concerning the

legitimacy, scope, and limitations of scientific interpretation. Supporters regard *tafsīr 'ilmī* as an effective medium for demonstrating the universality and continuing relevance of the Qur'an, while critics argue that reliance on provisional scientific theories risks reducing the multidimensional meanings of the Qur'an and subordinating revelation to changing scientific paradigms. These debates indicate that the controversy surrounding scientific exegesis is fundamentally epistemological rather than merely scientific.

This study contributes to the existing literature by reconstructing the historical evolution of *tafsīr 'ilmī* within a unified historical-epistemological framework rather than treating its development as isolated discussions of individual exegetes or specific scientific themes. Such an approach demonstrates that scientific exegesis should be understood as an evolving intellectual tradition shaped by continuous interaction between scriptural interpretation, scientific knowledge, and historical context. Consequently, the future development of *tafsīr 'ilmī* requires a balanced methodological framework that preserves the linguistic, literary, and theological integrity of the Qur'an while remaining open to constructive engagement with well-established scientific knowledge. Such an approach offers greater potential for fostering a productive dialogue between revelation and science without reducing either to the framework of the other.

Despite these contributions, this study has several limitations. It focuses primarily on major representatives of scientific exegesis and relies on documentary analysis of selected classical and contemporary sources. Future research may expand this historical reconstruction by incorporating broader regional traditions of scientific exegesis, comparative analyses across different Muslim intellectual contexts, or bibliometric investigations of the global development of *tafsīr 'ilmī*. Such studies would further enrich our understanding of how scientific interpretation continues to evolve in response to emerging scientific discoveries and contemporary hermeneutical challenges.

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