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REORIENTING SCIENTIFIC EXEGESIS: A LAKATOSIAN ANALYSIS OF THE QUR'AN-SCIENCE RELATIONSHIP IN THE INDONESIAN MINISTRY OF RELIGIOUS AFFAIRS' SCIENTIFIC EXEGESIS

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Abstract: This study examines the practice of *tafsīr 'ilmī* (scientific exegesis) in several series of "*Tafsir Ilmi*" books issued by the Indonesian Ministry of Religious Affairs as a contemporary model for relating the Qur'an and science, a project that articulates explicit interpretive principles meant to mediate between the integrity of revelation and the provisional nature of scientific knowledge. This study aims to assess the consistency between the foundational principles and interpretive practice of *tafsīr 'ilmī*, and to evaluate the epistemological implications of this structure for the relationship it constructs between the Qur'an and science. The analysis is taken from three thematic volumes, namely the volumes entitled "*Penciptaan Manusia*" (The Creation of Humankind), "*Penciptaan Bumi*" (The Creation of the Earth), and "*Kepunahan Makhluk Hidup*" (The Extinction of Living Creatures). The data are read through content analysis, drawing analogically on Imre Lakatos's account of research programmes, in which the foundational principles form a hard core safeguarded by methodological heuristics and the thematic interpretations constitute the protective belt those heuristics produce, so as to test how far practice remains consistent with principle. The study finds that *tafsīr 'ilmī* guards the meaning of the Qur'an effectively against scientific reductionism, yet its interpretation remains largely explanatory and confirmatory, leaving the Qur'an's capacity to raise new scientific questions unactivated. On this basis the article proposes reorienting *tafsīr 'ilmī* to affirm the Qur'an as a source of research inspiration, so that scientific interpretation may become a more productive, two-directional exchange between revelation and science.

Keywords: Apologetic Interpretation; Imre Lakatos; Qur'an-Science Relationship; Scientific Exegesis

Introduction

Scientific exegesis (*tafsīr 'ilmi*) has long occupied a contested position within the tradition of Qur'anic scholarship. A number of classical and modern scholars, including al-Shāṭibī (d. 790 H) (Al-Shatibi, 1997), Maḥmūd Shaltūt (d. 1964) (Shaltut, 2024), and Amīn al-Khūlī (d. 1965) (Al-Khuli, 1961) have expressed reservations about this approach on the grounds that it risks reducing the absolute meaning of divine revelation to explanations contingent upon scientific theories that are provisional and subject to constant revision. By contrast, scholars such as al-Ghazālī (d. 505 H)) (Al-Ghazali, 2000), Fakhr al-Dīn al-Rāzī (d. 606 H) (Al-Razi, 1999), and al-Zarkashī (d. 794 H) (Al-Zarkashi, 2009) regard *tafsīr 'ilmī* as a legitimate means of uncovering the evidences of the Qur'an's miraculous nature and manifestations of God's power, thereby strengthening

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the faith of believers. This enduring tension between skeptics and proponents of scientific interpretation has not been resolved within the tradition, yet it finds a distinctive and consequential form in the contemporary Indonesian context.

Initiated in 2009, The "*Tafsir Ilmi*" published by the Indonesian Ministry of Religious Affairs (Kemenag) is a collaborative project between the Lajnah Pentashihan Mushaf al-Qur'an (LPMQ) and the Indonesian Institute of Sciences (LIPI). It covers eighteen major thematic domains of *āyāt kauniyyah*, ranging from human creation and cosmology to natural history and environmental phenomena (LPMQ, 2010c). What distinguishes this work from other contemporary scientific commentaries is the explicit formulation of foundational interpretive principles by its editorial team, a set of methodological commitments governing how Qur'anic verses may and may not be brought into relation with scientific knowledge. These principles reflect a conscious effort to navigate between the two positions outlined above: neither endorsing the apologetic use of science to justify the Qur'an, nor rejecting the dialogue between revelation and the natural sciences altogether (LPMQ, 2010a). In this sense, *Tafsir Ilmi* represents a distinctive institutional attempt within Indonesian Islamic scholarship to give scientific exegesis a principled methodological footing, one that takes seriously both the integrity of the Qur'anic text and the provisional nature of scientific knowledge. Yet, while these principles are ideal at the level of rules, in practice the interpretation tends to be apologetic and verificatory.

Scientific exegesis as one model of integrating the Qur'an and science has been widely discussed in existing scholarship. However, most studies remain largely descriptive and normative in nature, while explicitly epistemological elaborations have received relatively little attention. Normative studies examining how the Ministry's *Tafsir Ilmi* interprets verses related to particular problems have been undertaken, as in Fajariyah and Masuwd on agricultural verses read as a response to environmental crisis and global warming (Fajariyah & Masuwd, 2024), and Nirwana and Kusumaningrum on food and nutrition, who characterize the work as deductive-confirmatory in linking Qur'anic verses to modern scientific findings (Nirwana & Kusumaningrum, 2025). Analytical and descriptive studies of *Tafsir Ilmi* as a work in itself have likewise been conducted, Faizin views it as an integrative effort that avoids conflict between revelation and science through a harmonizing approach, particularly in interpreting Qur'anic narratives and natural phenomena (Faizin, 2020); Putra and Hidayaturrahman (2020) show that technology functions mainly as a supporting system in its production; (Putra & Hidayaturrahman, 2020); and Balqis read *Tafsir Ilmi* comparatively against the Egyptian *al-Muntakhab* and Saudi *al-Muyassar*, situates its positioning within a framework of science-religion integration and moderate Islam (Balqis, 2025). In the broader Indonesian setting, Firmansyah traces the history, paradigms, and dynamics of *tafsīr ʿilmī* as a product that evolves with changing contexts (Firmansyah, 2021), and Rawanita and Syabuddin acknowledge its potential to foster dialogue between the Qur'an and science (Firmansyah, 2021), though their discussion remains largely conceptual and affirmative.

A deeper analysis of *Tafsir Ilmi* at the epistemological level requires a relevant analytical framework, and Lakatos's methodology of scientific research programmes provides one. Lakatos distinguishes between a *hard core* of foundational commitments

protected from revision and a *protective belt* of auxiliary practices that adapt to new problems, with the former kept stable and the latter left flexible (Lakatos, 1978). Applying this framework to a religious text has a strong precedent. Murphy used it to analyze theological reasoning as a research programme (Murphy, 1999), and it has been extended to Islamic contexts in Indonesia, as in Muslih et al.'s study of the scientific paradigm at the Al-Qur'an Science University (Muslih et al., 2024).

Building on this framework, this study aims to examine two things: first, whether the interpretive practice of the Ministry's *Tafsir Ilmi* remains consistent with its foundational principles; and second, whether the resulting relationship between the Qur'an and science is epistemically productive, opening the Qur'an as a source of inspiration for inquiry, or merely apologetic, confining it to the confirmation of scientific findings.

To answer them, the study employs a qualitative approach within a critical-analytical paradigm, which reads a text not as a neutral object but as a structure carrying particular epistemic assumptions worth examining (Creswell & Poth, 2018; Lewis, 2015; Staller & Chen, 2022). The research subject is the *Tafsir Ilmi* published by the Indonesian Ministry of Religious Affairs, while its object is the work's interpretation of *āyāt kauniyyah*, limited to three representative themes: the creation of humankind, the creation of the Earth, and the extinction of living beings. The primary data are drawn from the three corresponding thematic volumes together with the foundational principles set out in their editorial introduction and supplemented by secondary literature on the relationship between the Qur'an and science. The data are examined through content analysis (Schreier, 2012), with Lakatos's methodology of scientific research programmes serving as the analytical framework (Lakatos, 1978). The analysis proceeds in two stages, first assessing the consistency between principle and practice, then evaluating the epistemological implications of this structure for the relationship between the Qur'an and science.

Tafsir Ilmi of the Ministry of Religious Affairs and Its Foundational Methodological Principles

The *Tafsir Ilmi* published by the Ministry of Religious Affairs of the Republic of Indonesia emerged from a collaboration between the Lajnah Pentashihan Mushaf al-Qur'an (LPMQ) and the Indonesian Institute of Sciences (LIPI) initiated in 2009. This project represents an integrative effort between the Qur'an and science, grounded in the view that the Qur'an does not speak exclusively about Islamic law and ethics. This style of interpretation can help confirm the truth of the Qur'an, while also making it a moral and ethical foundation for modern civilization (LPMQ, 2010b). The thematic scope of this *Tafsir Ilmi* is extensive, covering eighteen major themes, including time, plants, sexuality, oceans, the creation of the universe, the creation of the Earth, the functions of celestial bodies, food and drink, prophetic narratives, the Day of Judgment, the extinction of living beings, microorganisms, animals, mountains, human psychological phenomena, the existence of life, light, and the creation of humankind.

To analyze how this corpus operates as a coherent interpretive programme, this study draws on Imre Lakatos's account of scientific research programmes as an

analogical framework. Lakatos identifies four interlocking elements that together sustain a programme over time. The *hard core* is a set of theoretical commitments that defines the identity of the programme and is treated by its adherents as irrefutable. The *negative heuristic* is a methodological injunction that directs criticism away from this core whenever anomalies arise. The *positive heuristic* is a set of guidelines for how the core should be developed and extended to new problems. The *protective belt* consists of the auxiliary hypotheses produced under the guidance of the positive heuristic and shielded from refutation by the negative heuristic (Lakatos, 1978). Read together, the hard core and protective belt constitute the substantive content of a programme, its commitments and its interpretive outputs, while the two heuristics constitute the methodological apparatus governing how that content is produced and defended.

Read against this framework, the eight foundational principles of *Tafsir Ilmi* distribute across all four Lakatosian categories rather than collapsing into a single hard core. Three principles function as the hard core, fixing the meaning of a verse in its language, its place within the Qur'an's internal coherence, and the authority of classical exegesis. One principle functions as a negative heuristic, decoupling the meaning of verses from the truth-value of scientific theories. The remaining four function as a positive heuristic, guiding how the thematic interpretation of *āyāt kauniyyah* -the protective belt- is conducted (LPMQ, 2010c). This mapping is summarized in Table 1.

Table 1. Mapping the Eight Foundational Principles of *Tafsīr Ilmī* Onto Lakatosian Categories

No.	Principle (Summary)	Lakatosian Category	Function
1	Attentiveness to lexical meaning and Arabic linguistic rules	*Hard Core*	Anchors meaning in language, not in scientific theory
2	Attentiveness to context and inter-verse correlation (comprehensive, non-partial reading)	*Hard Core*	Anchors meaning in the Qur'an's internal coherence
3	Attentiveness to the exegetical authority of the Prophet, companions, successors, and classical exegetes	*Hard Core*	Anchors meaning in interpretive tradition
4	Verses must not be used to adjudicate the truth or falsity of scientific findings; the Qur'an's function is far greater than merely affirming or denying scientific theories	*Negative Heuristic*	Decouples the meaning/truth of verses from the truth-value of scientific theories
5	Attentiveness to the possibility that a word or expression may carry multiple meanings	*Positive Heuristic*	Provides linguistic flexibility in constructing thematic interpretation
6	Substantive understanding of each verse's subject matter, including relevant scientific findings	*Positive Heuristic*	Guides how scientific data is incorporated into thematic interpretation
7	Caution (*iḥtiyaṭ*) toward unsettled scientific theories and hypotheses	*Positive Heuristic*	Restricts which scientific materials are admissible

8	Collaborative process between the religious scholars and scientists	*Positive Heuristic* (Procedural)	Governs how the protective belt is institutionally produced

Table 1 establishes the baseline against which the interpretive patterns identified in the following sections are read. Each principle's place in this mapping fixes what counts as compliance for that principle: a thematic interpretation that alters the meaning secured by principles 1-3 breaches the hard core, one that lets scientific findings adjudicate a verse's truth breaches the negative heuristic of principle 4, and one that develops the protective belt without regard to linguistic flexibility, scientific caution, or collaborative production departs from the positive heuristic of principles 5-8.

Methodological Consistency of *Tafsir Ilmi* in Interpretive Practice

This section examines the extent to which the interpretive practice of *Tafsir Ilmi* is consistent with the Lakatosian categories established above. Examination of the thematic interpretations across the three volumes reveals four recurring patterns in how science is brought into relation with the verses under discussion. The first, Elucidative, is found where scientific findings illustrate a meaning already fixed by language and exegetical tradition, without altering that meaning. The second, Verificatory, is found where the interpretation goes further, asserting that the Qur'an anticipated a scientific finding before it was discovered, or that the finding subsequently confirms the truth of the verse. The third, Bounded, is found where the verse itself places its subject beyond the reach of scientific inquiry, so that no such relation is established at all. The fourth, Teleological, is found where scientific content is incorporated but reframed toward a purpose that science itself does not supply. Table 2 maps one representative case per pattern, selection reflects the depth of dialectical engagement available, not the volume from which the case is drawn, since each volume may contain more than one pattern. Each entry is given with the textual evidence supporting its classification and its implication:

Table 2. Case Analysis Matrix: Patterns of the Qur'an-Science Relationship in Tafsīr Ilmī

No	Theme	Verse	Pattern	Evidence in *Tafsīr Ilmī*	Epistemological Implication
1	Earth as habitable dwelling	QS. (2): 22 (*Firāshan*); QS. (20): 53 (*Mahdan*); QS. (71): 19-20 (*Bisāṭan*)	Elucidative	Earth's features explained to illustrate habitability	Meaning independent of scientific detail, science illustrates an established meaning
2	Embryonic development	QS. (23): 14; QS. (76): 2	Verificatory	*Nuṭfah*, *ʿalaqah*, *muḍghah* matched to embryology; Qur'an said	Second-order claim of precedence/confirmation, separable from lexical meaning

				to precede, and be confirmed by, science	
3	The spirit (*rūḥ*)	QS. (17): 85	Bounded	*R ūḥ* affirmed as beyond human knowledge; no scientific equivalent sought	Science excluded by the verse itself
4	Mass extinction	QS. (15): 20	Teleological	Extinction data framed as stages toward perfection	Mechanism explained by science; purpose reframed independent of mechanism

The four patterns are not categories drawn from existing literature but classifications arrived at through close reading of how each volume relates science to the verses it treats, guided by the Lakatosian framework established above. Another reader could draw the classification differently. The patterns aim to capture the range of ways *Tafsīr Ilmī* relates science to verse, not a fixed taxonomy.

Science as a Medium for Meaning Elucidation in Tafsīr Ilmī

One of the dominant patterns evident in the interpretive practice of the Ministry of Religious Affairs' *Tafsīr Ilmī* is the positioning of science as a medium for elucidating the meanings of Qur'anic verses rather than as a source for the formation or determination of meaning itself. What separates these two roles is precisely what the literary school of *tafsīr* found objectionable in scientific exegesis. Naguib observes that the school's critique was provoked by the tendency of *al-I'jāz al-'ilmī* to privilege science over language, letting scientific claims govern what a verse means rather than allowing meaning to arise first from the language of the text (Naguib, 2019). *Tafsīr Ilmī* proceeds the other way around. The basic meaning of a verse is established first through linguistic analysis and the internal contextual coherence of the Qur'an, and only afterward is contemporary scientific knowledge introduced as an illustrative and enriching medium. The relationship between the Qur'an and science at this stage is therefore descriptive-explanatory in nature, aimed at helping readers grasp the meaning of the verse in a more concrete manner without displacing the locus of meaning, which remains anchored in the revealed text.

The pattern of positioning science as a medium for meaning elucidation is observable in the interpretation of verses concerning the Earth as a dwelling place for humankind. In QS. al-Baqarah (2): 22, the term *firāshan* is understood as an image of the Earth being spread out as a stable and comfortable foundation for life. *Tafsīr Ilmī* emphasizes that this expression is not intended as a technical description of the Earth's geometric form, but rather as an affirmation of its functional role in sustaining human life. To clarify this meaning, *Tafsīr Ilmī* relates the verse to scientific knowledge

concerning the structure of the Earth's surface and the natural conditions that enable the continuity of life. Science is thus employed to explain how the Earth becomes a habitable environment, rather than to reinterpret or redefine the verse's basic meaning (LPMQ, 2010b).

This functional paradigm observed in *Tafsīr Ilmī* demonstrates a profound continuity with the hermeneutical framework established in classical exegesis. Classical commentators consistently interpreted the term *firāshan* through the lens of habitability and divine providence, prioritizing its life-sustaining properties over literal topography. For instance, Muḥammad ibn Jarīr al-Ṭabarī explicitly defined *firāshan* in functional terms, conceptualizing it as a resting place (*mihādan*) and a meticulously stabilized ground for human settlement (*qarāran*) (al-Ṭabari, 2000a).This interpretation is corroborated by Ibn Kathīr, who characterized the Earth as an established cradle, secured by towering mountains to facilitate human existence (Ibn Kathīr, 1999a). Furthermore, Fakhr al-Dīn al-Rāzī systematically detailed the physical prerequisites for the Earth to serve as a *firāsh*, emphasizing essential conditions such as absolute stability, optimal surface density, and terrestrial emergence from water. In the other hand, al-Rāzī resolved the potential geometric dichotomy by arguing that the designation of the Earth as a *firāsh* does not negate its spherical nature; he posited that a sphere of colossal magnitude inherently presents itself as a boundless, flat expanse to its inhabitants, thereby perfectly fulfilling its functional purpose for settlement (Al-Rāzī, 1999a). This epistemological stance is similarly reaffirmed in later scholarship by al-Ṭanṭāwī (Ṭanṭāwī, 1998a). Consequently, the modern scientific approach does not constitute a semantic rupture. Rather, it operationalizes contemporary empirical knowledge to substantiate the classical consensus: the verse fundamentally delineates the Earth's meticulously calibrated ecological conditions for life, rather than its absolute geometric form.

A similar mode of interpretation is also found in the reading of the terms *mahdan* in QS. Ṭāhā (20): 53 and *bisāṭan* in QS. Nūḥ (71): 19-20. Both terms are understood within the framework of human experience of the Earth as a space that has been arranged to ensure comfort and ease of living. *Tafsīr Ilmī* employs scientific explanation in a limited manner to illustrate natural conditions that support life, without treating these verses as technical cosmological or astronomical statements. Accordingly, the meaning of the verses remains oriented toward function and human experience, while science operates as an explanatory medium that enriches the reader's understanding (LPMQ, 2010b). This pattern is in accordance with the classical consensus of commentators like al-Ṭabarī (al-Ṭabari, 2000c), Ibn Kathīr (Ibn Kathīr, 1999c), and al-Qurṭubī (al-Qurṭubī, 1964b), who systematically defined these terms as a stabilized expanse meticulously designed for human settlement, agriculture, and mobility (*subulan fijājan*).

Overall, the positioning of science as a medium for meaning elucidation demonstrates the strength of *Tafsīr Ilmī* in preserving the stability of the Qur'anic text's meaning. In Lakatosian terms, this pattern shows the *hard core* operating exactly as intended. The meaning of the verse, anchored in linguistic analysis and the internal coherence of the Qur'an, remains fixed and protected, while science enters only through the *positive heuristic* as auxiliary material that develops the *protective belt*. Science is employed selectively to clarify and illustrate the content of the verses, without reducing the Qur'an

to a scientific manual or imposing rigid forms of technical correspondence, and the *negative heuristic* holds firmly, since no scientific finding is permitted to revise or determine what the verse means. The continuity with classical exegesis observed above confirms this stability, as the elucidative reading carries forward the same functional meaning established by al-Ṭabarī, al-Rāzī, al-Qurṭubī, and Ibn Kathīr rather than displacing it. At the same time, this pattern indicates that, at this stage, the relationship between the Qur'an and science remains largely confined to the domains of explanation and visualization of meaning.

Verificatory Tendencies in the Interpretation of Āyāt Kauniyyah

In mapping the methodological spectrum of contemporary *āyāt kauniyyah* interpretation, it is imperative to distinguish between scientific elucidation and the more assertive mode of verification, often associated with *I'jāz 'ilmī* (scientific miraculousness). As emphasized by contemporary scholars such as Azlan et al., there is a strict demarcation "between scientific exegesis as a hermeneutical tool employing science for interpretive support, and *I'jāz 'ilmī* as a theological project that positions science as proof of Qur'anic miraculousness (Azlan et al., 2026). To ensure analytical objectivity and avoid subjective bias, this study classifies an interpretive practice as verificatory only when it exhibits clear methodological indicators. Specifically, this tendency is identified when an exegesis demonstrates one or more of the following parameters: (1) a definitive claim that the Qur'an anticipated or preceded modern scientific discoveries; (2) the assertion that contemporary scientific findings objectively prove the literal truth of the verse; (3) the establishment of a direct, rigid correspondence between general Qur'anic vocabulary and highly technical scientific concepts; and (4) the tendency to interpret the linguistic structure or sequence of a verse as an exact representation of a biological or technical cosmological sequence.

This verificatory pattern is clearly observable in the interpretation of *nuṭfah* and *nuṭfatin amsyāj* in QS. al-Insān (76): 2. *Tafsīr Ilmī* does not confine itself to explaining these terms as a drop of fluid formed through the mixture of male and female elements, but aligns them directly with the technical vocabulary of reproductive biology, glossing *nuṭfah* as "*konsentrasi fluida yang mengandung sperma*" (a concentration of fluid containing spermatozoa) (LPMQ, 2010c). This gloss establishes precisely the kind of direct correspondence between a Qur'anic term and a specific scientific concept that constitutes the third indicator identified above. The interpretation then advances an explicit claim of confirmation. Having described the fertilization of the ovum by a single sperm, it characterizes this as "*suatu hal yang bertepatan dengan temuan dalam disiplin ilmu embriologi*" (a matter coinciding with the findings of the discipline of embryology) (LPMQ, 2010c), a formulation that positions revelation as having stated a fact which science would only later establish. The same orientation governs the reading of *sulālah*, or essence in QS. al-Sajdah (32): 8. Drawing on quantitative data from reproductive biology, *Tafsīr Ilmī* observes that a single ejaculation contains between 500 and 600 million sperm, of which only one completes fertilization, and identifies this datum as the very meaning the verse intends, concluding that "*hal inilah yang hendak Allah sampaikan*" (this is precisely what God intends to convey) (LPMQ, 2010c). At this point, science ceases to function as

an illustrative aid and instead operates as an instrument that legitimates the truth of the verse.

The verificatory tendency is more pronounced still in the interpretation of the stages of human creation in QS. al-Mu'minūn (23): 14, particularly the terms *ʿalaqah* and *muḍghah*. *Tafsīr Ilmī* recognizes that *ʿalaqah* carries several lexical senses, including a leech-like form, a suspended thing, and a clot of blood, yet it privileges the first and develops it through a correspondence with embryonic morphology. Citing Moore and al-Zindānī (1982), it argues that "*sifat dan bentuk lintah ini dapat diterapkan pada ʿalaqah*" (the characteristics and form of the leech can be applied to the *ʿalaqah*) (LPMQ, 2010c), thereby binding a Qur'anic term to a specific anatomical description. The interpretation then maps the Qur'anic sequence of *nuṭfah*, *ʿalaqah*, *muḍghah*, bone, and the clothing of bone with flesh onto a dated embryological chronology measured in days, so that the linguistic order of the verse is read as a precise biological sequence open to empirical verification. This construal of a grammatical sequence as a technical developmental chronology constitutes the fourth indicator identified above, and it emerges most clearly in the treatment of the mention of bones before muscles, which *Tafsīr Ilmī* presents as corresponding to modern embryological findings on the order of tissue formation. The grammatical sequence of the verse is thereby taken to encode a technical chronology that science can test and confirm (LPMQ, 2010c). At this stage, the linguistic structure of the Qur'an is treated as though it contained technical biological information awaiting scientific corroboration, and the relationship between the Qur'an and science shifts decisively from illustration toward verification.

The relationship between *Tafsīr Ilmī* and classical exegesis regarding this developmental stage is best characterized not as a departure from the established lexicon, but rather as a shift in which specific semantic dimension of the term is actualized. Linguistically, the Arabic word *ʿalaqah* encompasses several valid meanings, primarily "congealed blood" and "a leech" (a blood-sucking aquatic organism). As noted in classical lexicons such as Ibn Manẓūr's *Lisān al-ʿArab*, these two senses share a unified semantic field, since the organism itself is named *ʿalaqah* due to its blood-red appearance (Manẓūr, 1994). Thus, both interpretive readings remain fundamentally sound. However, classical commentators consistently prioritized the macroscopic sense of congealed blood. Muḥammad ibn Jarīr al-Ṭabarī explicitly glosses *ʿalaqah* as a piece or clot of blood (al-Ṭabari, 2000d), a definition systematically echoed by Fakhr al-Dīn al-Rāzī, who identifies it as congealed blood (Al-Rāzī, 1999b). Similarly, while Ibn Kathīr acknowledges its elongated, reddish shape resembling the organism, he ultimately anchors its primary meaning through the report of ʿIkrimah, confirming that it fundamentally denotes blood (Ibn Kathīr, 1999b). Even in the modern era, al-Ṭanṭāwī retains this traditional gloss, defining it strictly as congealed blood (Ṭanṭāwī, 1998c). The bone-and-muscle sequence calls for a further qualification. The verificatory reading of this sequence is not original to *Tafsīr Ilmī*, since it already appears in Ṭanṭāwī Jawharī, who held the bone cells are the first to form in the embryo and that this fact was not known precisely until the recent advance of embryology. *Tafsīr Ilmī* therefore stands

within an established verificatory current in modern scientific exegesis rather than initiating one (Ṭanṭāwī, 1998c).

In Lakatosian terms, this pattern reveals the *positive heuristic* operating in a markedly different register from the elucidative case. The *hard core* and the linguistic anchoring of meaning remain formally in place, since the interpretation still begins from the lexical senses of *'alaqah* and *muḍghah*. Yet the *protective belt* is no longer developed merely to illustrate that meaning, but is extended to assert a correspondence between the verse and modern science and then to claim that science confirms what the verse had already stated. At this point the *negative heuristic*, which forbids science from determining the meaning of the text, is formally respected but functionally circumvented, for no scientific finding is permitted to revise the verse, yet the verse is made to depend on scientific findings for its vindication. This reversal reaches its most consequential point in the reading of *sulālah*, where a specific empirical datum is identified as the very meaning God intends to convey, so that the content of divine intent is fixed by a contemporary scientific finding rather than by the language of the verse. The programme nonetheless remains internally consistent, since no foundational principle is formally violated, even as its interpretive output arrives at precisely the apologetic orientation those principles were designed to prevent.

Metaphysical Boundary: The Case of Rūḥ

A third pattern emerges where a verse situates its subject beyond the reach of empirical inquiry, so that no relationship between text and science is constructed at all. The clearest instance is the treatment of the spirit (*rūh*) in QS. al-Isrā' (17): 85. *Tafsīr Ilmī* does not seek scientific, psychological, or neurological correlates for the *rūḥ*. It invokes the verse, rather, to mark the very limit of scientific knowledge (LPMQ, 2010c). Its methodological introduction states that the metaphysical domain lies beyond observation and experiment, and that a scientist may not invoke science in order to deny what is non-empirical (LPMQ, 2010c). Science is thus not admitted and subsequently bounded, but excluded from the outset by the terms of the verse.

This restraint places *Tafsīr Ilmī* in continuity with the classical exegetical consensus. Al-Ṭabarī reads the verse as a direct declaration that the *rūḥ* belongs to the order of divine command and that humankind has been granted only little knowledge of it (Al-Ṭabari, 2000b). The position of Ṭanṭāwī Jawharī is more telling still. Elsewhere the most expansive of scientific exegetes, he nonetheless halts at this threshold. He acknowledges that the *rūḥ* is that by which the human body lives, but identifies the question as one concerning the reality of the spirit (*ḥaqīqat al-rūḥ*), and on that ground declines to pursue it scientifically, preferring the majority view because the phrase *min amri rabbī* supports it (Ṭanṭāwī, 1998b). Even the exegete most disposed to enlist science thus exercises the same restraint as the tradition before him.

In Lakatosian terms, this pattern shows *Tafsīr Ilmī* restraining itself before the non-material, a restraint that is not chosen but dictated by the *hard core* itself. The verse states the limitation of human knowledge directly through *min amri rabbī*, so the meaning is fixed at the level of the *hard core* and the *protective belt* is never developed. The *positive heuristic*, which would otherwise bring science in to elaborate the meaning, has no material to work on and remains inactive, while the *negative heuristic* is satisfied without effort, since

no scientific claim is raised that the verse would need to be protected from. The reading therefore halts exactly where the text halts, and on this point the programme is wholly consistent with its own principles.

Teleological Reframing: The Case of Extinction

The fourth pattern evident in *Tafsīr Ilmī* appears when science is made a supporting element within a teleological reframing, where the meaning of a verse is directed toward divine purpose rather than toward scientific confirmation. This is observable in the interpretation of QS. al-Ḥijr (15): 20, in which God declares that He has placed in the earth the means of livelihood for humankind. To explain this verse, *Tafsīr Ilmī* presents geological and paleontological data on the four eons of Earth's history, on fossil deposits, and on the mechanisms of mass extinction. Yet this scientific material is not used to explain extinction as a neutral natural process. It serves instead as a supporting backdrop for a larger claim about purpose, namely that the eons represent stages leading toward the perfection of human life, and that extinction is the mechanism through which this progression occurs. The emphasis thus shifts from how extinction happens to why it happens within the order of creation (LPMQ, 2010a).

The classical exegetical tradition reads QS. Al-Ḥijr (15): 20 in considerably narrower terms than *Tafsīr Ilmī* does. For al-Ṭabarī (Al-Ṭabarī, 2000b) and al-Qurṭubī (al-Qurṭubī, 1964a), *ma'āyish* denotes simply the food, drink, and necessities by which human beings live, and Ṭanṭāwī Jawharī emphasizes that God alone, not humankind, is their ultimate provider (Ṭanṭāwī, 1998b). Al-Rāzī adds only that the earth's produce is apportioned "*bi-qadar al-ḥājah*" (in the measure of need). In none of these readings is the verse connected to extinction, to the history of earlier life forms, or to any geological process. The tradition reads it as a statement about divine provision in the present, not about the deep past through which that provision came to be.

The teleological reading advanced by *Tafsīr Ilmī* therefore goes well beyond the established interpretation of this verse. It retains the verse's basic sense of divine provision but extends it into a domain the tradition never associated with it, reading into 15:20 an account of how, across billions of years, the extinction of earlier organisms prepared the very resources on which human life would depend. In Lakatosian terms, this is the *protective belt* being actively developed, not merely to illustrate a settled meaning as in the elucidative case, nor to seek scientific confirmation as in the verificatory one, but to extend the verse into a new explanatory domain. The *hard core* and the *negative heuristic* remain intact, since the meaning of divine provision is preserved and no scientific finding is challenged or used to determine the text. What is novel is the direction of the extension, in which an inherited theme of provision is recast as a teleological reading of deep time. This marks the closest the programme comes to releasing science from a confirmatory role, since here the verse frames the data rather than the data vindicating the verse; yet the reading remains retrospective, conferring purpose on a record already established rather than generating new inquiry, and so approaches without reaching the inspirational orientation examined below.

Epistemological Implications of the Foundational Principles of *Tafsir Ilmi* for the Qur'an-Science Relationship

Read through Lakatos's account of scientific research programmes, *Tafsīr Ilmī* reveals a clear tension between its stated principles and its practice. Its introduction explicitly forbids scientific exegesis in both directions, undertaking neither to justify scientific findings through Qur'anic verses nor to force verses into agreement with science (LPMQ, 2010c). The verificatory move is therefore proscribed on its own terms. Yet the analysis above has shown it recurring in practice, in the readings of *ʿalaqah* and the bone-muscle sequence, where linguistic detail is mapped onto an embryological chronology, and in the reading of *sulālah*, where a quantitative datum is identified as the very meaning God intends. The problem lies not in the principles, which are sound, but in their application. In Lakatosian terms, the *negative heuristic* is declared but not enforced, so that the foundational principles remain coherent as rules even as interpretive practice drifts toward the orientation they were meant to prevent. This is the point at which interpretation crosses what Azlan, Mohd Yusoff, and Ariffin (2026) describe as the demarcation between using science for interpretive support and pursuing *I'jāz ʿilmī*, the theological project that treats empirical data as proof of the Qur'an's miraculousness (Azlan et al., 2026).

To understand why this verificatory drift occurs despite explicit institutional safeguards, one must trace the historical genesis of modern scientific exegesis. The tendency to employ empirical science as a validating instrument for the Qur'an did not organically emerge from classical Islamic epistemology, which traditionally viewed nature simply as *āyāt* (signs) without seeking to subject the text to empirical validation. Rather, it was born as a defensive reaction during the nineteenth-century colonial encounter. Facing the supremacy of European scientific advancement, the Muslim world experienced a profound post-colonial identity crisis that fostered an "us-versus-them" mentality. This psychological pressure drove an apologetic project to systematically prove the "scientific miraculousness" (*i'jāz ʿilmi*) of the Qur'an, a movement pioneered largely by political activists, army physicians, and figures lacking rigorous scientific backgrounds. This defensive paradigm was rapidly exported to the Malay-Indonesian world through early twentieth-century translations of Egyptian commentaries, establishing a lasting apologetic framework that influenced modern local exegesis (Daneshgar, 2023b). Ultimately, this verificatory reflex is rooted in what Sayyid Qutb diagnosed as an "internal defeatism" (Khir, 2000) and Ziauddin Sardar termed an "inferiority complex", a psychological posture that implicitly subjugates the absolute authority of divine revelation to the transient benchmark of modern science (Bigliardi, 2017).

The most severe epistemological implication of the verificatory pattern is the inadvertent displacement of divine authority onto the transient domain of science By rigidly mapping Qur'anic terms onto specific contemporary scientific theories, whether by equating the *ʿalaqah* stage with a microscopic leech or by asserting that a specific scientific theory is precisely what God intends to convey through *sulālah*, this exegesis forcibly locks the absolute meaning of revelation into a provisional scientific paradigm. As Mahmud Shaltut warned, because scientific knowledge is inherently dynamic and subject to constant revision, tethering the Qur'an to such theories is a dangerous route

that risks assigning errors to the divine text should those theories be falsified (Khir, 2000). Furthermore, Ziauddin Sardar emphasize, this approach directly contradicts the essence of the Qur'an's miraculousness, as it implicitly subordinates the sacred text by granting modern science the supreme power to validate its divine origin (Guessoum & Bigliardi, 2023).

However, the foundational principles of Tafsīr Ilmī structurally confine its interpretive practice to four distinct patterns, each bearing different epistemological weight. The elucidative pattern is widely accepted as methodologically sound; as noted by Azlan et al. and echoed in the classical continuity of the text, this approach aligns with the cautious framework of scholars like Elmalılı Hamdi Yazır and even skeptics like Sayyid Qutb, who concede that using empirical science merely as an auxiliary tool to illustrate and enrich established Qur'anic meanings is entirely legitimate (Azlan et al., 2026). Conversely, the verificatory pattern draws severe epistemological criticism. By forcing the text to either validate or be validated by transient scientific theories, it falls into the very trap warned against by Maḥmūd Syaltūt and Amīn al-Khūlī: risking semantic anachronism and subjugating the absolute authority of revelation to the fluctuating paradigms of modern science (Naguib, 2019). Meanwhile, the bounded and teleological patterns demonstrate commendable methodological integrity; they successfully honor metaphysical boundaries (as seen in the limitation on the *rūḥ*) and actively reframe scientific data toward divine purpose (as in the mass extinction narrative) without forcing artificial empirical correspondences. However, despite the success of these principles in maintaining a stable defensive boundary, a crucial element remains entirely absent from the Ministry's framework: the positioning of the Qur'an as an active source of research inspiration.

By limiting the text to merely elucidating, verifying, bounding, or teleologically reframing existing knowledge, the interpretation reinforces what Ismaʿil Raji al-Faruqi diagnoses as a "malaise of thought and methodology". Under this predominantly confirmatory paradigm, the intellectual heritage is treated as "fossils of a bygone age" awaiting retrospective validation rather than a dynamic catalyst for generating new discoveries (al-Faruqi, 1997). Furthermore, as Seyyed Hossein Nasr emphasizes, this defensive posture deviates fundamentally from the classical Islamic scientific ethos, which viewed nature not as a tool to verify verses, but as an active cosmological vision (*āyāt*) that oriented new inquiry (Nasr, 2001). Consequently, the Ministry's framework fails to transform the Qur'an into what Ziauddin Sardar calls an "operational and productive form", leaving its true potential as an "invitation to appreciate, develop, and practice science" entirely unactivated (Sardar, 1985). It is precisely this epistemological stagnation, manifested as the failure to utilize the text as a generative catalyst, that necessitates a fundamental reorientation of the entire project toward an inspirational paradigm.

Reorienting *Tafsir Ilmi* as a Source of Research Inspiration

The need for such a reorientation finds strong legitimacy in Islamic intellectual history. During the classical period of Islamic civilization, the relationship between the Qur'an and science was not constructed within a framework of empirically proving

Qur'anic verses, but rather through a Qur'anic worldview that perceived nature as *āyāt Allāh*. This consciousness motivated Muslim scholars to investigate natural phenomena systematically, resulting in original contributions to astronomy, medicine, optics, and other natural sciences. In this context, the Qur'an functioned as a horizon of meaning and an epistemic orientation that animated scientific activity, rather than as a text awaiting legitimation from science (Falagas et al., 2006). This relational pattern corresponds with Daneshgar's mapping, which shows that in the pre-modern Islamic phase, revelation functioned as a source of epistemic orientation in reading nature (Daneshgar, 2023a). Nevertheless, Daneshgar also notes that in subsequent phases the Qur'an-science relationship underwent significant shifts: during the modern-colonial phase it tended to assume a defensive and legitimative posture toward Western science (Daneshgar, 2023b), while in the contemporary phase it has developed strongly in the form of *iʿjāzʿilmī* and narratives of harmony with modern science, with relatively limited contribution to the generation of new scientific research agendas (Daneshgar, 2023c).

Beyond historical legitimacy, an inspirative orientation in the relationship between the Qur'an and science also finds direct normative grounding in the Qur'an itself. The Qur'an repeatedly links faith with acts of reasoning and reflection through expressions such as *afalā ta'qilūn* and *afalā tatafakkarūn*, emphasizing that intellectual reflection constitutes an integral dimension of the human response to revelation. This is evident, for example, in QS. al-Baqarah (2): 164, which associates natural phenomena such as the alternation of night and day, the movement of winds, and the order of the cosmos with *āyāt* for people who reason (*li qawmin ya'qilūn*). Similarly, QS. Ali 'Imrān (3): 190-191 characterizes reflection upon the creation of the heavens and the earth as a defining trait of *ulū al-albāb*, those who not only remember God but also contemplate His creation deeply. These verses indicate that intellectual inquiry and the examination of cosmic reality are expressions of reflective faith, rather than purely rational activities detached from religiosity. Furthermore, QS. al-Jāthiyah (45): 13 affirms that the universe has been subjected to humanity so that it may become an object of reflection and learning, rather than merely a means for fulfilling practical needs. Accordingly, reading *āyāt kauniyyah* as sources of inspiration for scientific research does not constitute a deviation from the Qur'anic message, but rather represents a logical consequence of the Qur'anic ethos that explicitly encourages thinking, inquiry, and the understanding of reality as integral to faith.

What distinguishes this inspirative reading from the verificatory mode lies in the level at which the verse is brought into relation with science. The verificatory mode engages the verse at the level of empirical content. It treats the text as an encoding of a determinate datum that science must either anticipate or confirm. Consequently, this approach binds the meaning of revelation to the fluctuating fortunes of revisable scientific theories. Conversely, the inspirative mode engages the verse at the level of orientation. Here, the verse furnishes a question, a horizon of meaning, or an ethical framing from which inquiry proceeds, while empirical work is carried out through the autonomous methods of science. The verse thus stands at the origin of inquiry rather than at its point of validation. In Sardar's formulation, it provides a motivation for the pursuit of knowledge that begins with the text but does not end in it (Bigliardi, 2017).

Once inquiry is set in motion, the verse is no longer consulted for confirmation because its primary work in framing the problem and its significance is already done.

So understood, this orientational approach inherently safeguards against the verificatory drift. Because it advances no empirical claims on behalf of the text, it neither exposes revelation to the contingency of changing theories nor grants science the authority to adjudicate scriptural truth. Chauvet draws precisely this limit, observing that while the Qur'an may guide and inspire scientific work, its plurality of readings prevents it from underwriting any specific theory (Chauvet, 2023). This proposal is by no means isolated. It converges with the work of a new generation of Muslim scholars, including Golshani, Guiderdoni, and Altaie, who engage modern science on its own terms. They decline to locate "scientific content" in the Qur'an, choosing instead to interpret scientific findings within a broader, theistic understanding of nature (Guessoum, 2015).

This orientation is not merely theoretical, for it has begun to take shape in research practice. Ismil et al. take QS. al-Baqarah (2): 61 as the point of departure for a study of garlic (*Allium sativum L.*) and onion (*Allium cepa L.*). The verse is read not as a medical text but as a reflective entry point, from which the inquiry moves into dialogue with modern biomedical findings on the anti-inflammatory, antibacterial, and anticancer properties of these plants (Ismil et al., 2024). The verse raises the question, while the empirical work of answering it belongs to science. Kitota reads Qur'anic and prophetic teachings on eating and drinking alongside contemporary medical literature, drawing from the text not a datum but an ethical frame of lawful consumption, wholesomeness (*ṭayyib*), moderation, and purposive living, which the study brings to bear on modern health problems such as obesity and non-communicable disease (Kitota, 2024). In both cases the Qur'an operates as a catalyst and a frame for inquiry rather than as an object of confirmation or a source of symbolic legitimation.

On these historical, normative, and practical grounds, the reorientation of Tafsīr Ilmī may be articulated as a two-directional dialogical framework. In one direction, science continues to serve as a dialogical partner that enriches the understanding of āyāt kauniyyah through empirical data and contemporary discovery. In the other, the Qur'an is positioned as a source of epistemic inspiration, giving rise to research questions, ethical frameworks, and horizons of meaning for the development of scientific knowledge. The two directions are not of the same kind, since each contributes in a manner proper to itself, yet together they form the reciprocal relation that distinguishes an inspirative tafsīr 'ilmī from an apologetic one.

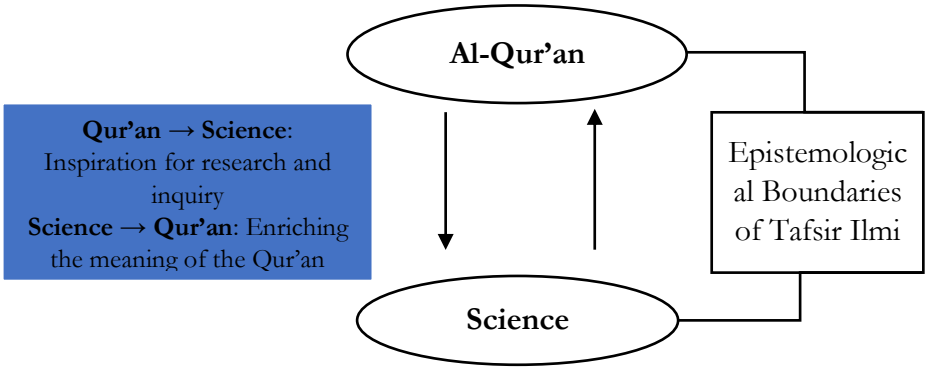


Figure 1. Dialogical Relationship between the Qur'an and Science

Understood in this way, Tafsīr Ilmī is no longer a static and finished product but a living work that moves with the development of scientific knowledge while remaining anchored in the Qur'an's primary role as guidance for humanity. The reorientation does not displace its foundational principles but brings them to completion, preserving their protective function while drawing out the generative capacity that has long been latent within them.

Conclusion

The "*Tafsir Ilmi*" books issued by the Indonesian Ministry of Religious Affairs proves largely consistent with its own foundational principles, though not uniformly so. Across the elucidative, bounded, and teleological patterns, science is allowed to illustrate a settled meaning, to halt before the metaphysical, or to be reframed toward divine purpose without ever determining what a verse means; only in the verificatory pattern, most visibly in the reading of embryological sequences, does the principle forbidding science from adjudicating meaning go unenforced, so that interpretation drifts toward the apologetic posture those principles were meant to prevent. The relationship this produces is therefore predominantly explanatory and justificatory, and the Qur'an's capacity to generate new scientific questions remains unactivated.

Reading this structure through Lakatos's distinction between a hard core and a protective belt is what makes the diagnosis possible, and it demonstrates that his account of research programmes can be applied to a work of scientific exegesis to test the coherence between stated principle and interpretive practice. On this basis the study proposes reorienting *tafsīr 'ilmī*, not by revising its principles but by enriching the function they serve. The principles stay in place, but they are directed beyond the defense of settled meaning toward the generation of inquiry, so that the Qur'an becomes a source of research questions, ethical frameworks, and horizons of meaning, while science continues to deepen the understanding of *āyāt kauniyyah*. The result is a tafsīr ʿilmī that no longer confines itself to confirming what is already known, but reads the verse as a starting point for questions that science is left free to pursue on its own terms.

The study is limited in scope. It examines a single work, and within it three thematic volumes on the creation of humankind, the creation of the Earth, and the extinction of living beings, so the four patterns it identifies may not cover every tendency in *tafsīr ilmī*. Its method is also textual, concerned with what the interpretation does on the page rather than how readers receive it or how it is used in teaching and religious life. Future work might extend the framework to the remaining volumes and to other works of scientific exegesis, study how an inspirative reading is taken up in practice, and develop interpretive models in which particular verses are shown to generate specific, researchable questions.

CRediT Authorship Contribution Statement

Kiki Adnan Muzaki: Conceptualization, data collection, data analysis, and writing of the original draft of the research. **Waki Ats Tsaqofi:** Development of methodological framework and language refinement.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this research.

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Declaration of Generative AI Use

In preparing this manuscript, the authors employed three AI-assisted research tools (Elicit, ResearchRabbit, and Scite) exclusively to support the identification, exploration, and mapping of relevant scholarly literature. Elicit was used to facilitate literature discovery, ResearchRabbit to examine citation networks and relationships among scholarly publications, and Scite to evaluate citation contexts and identify supporting or contrasting scholarly evidence. All AI-assisted outputs, including bibliographic information, citation relationships, and research findings, were critically examined and independently verified against the original published sources to ensure their accuracy, relevance, and reliability. No AI-generated text was incorporated into the manuscript, and no generative AI tools were used to draft, rewrite, or produce any part of its scholarly content. The conceptual framework, Lakatosian analysis, interpretation of findings, scholarly arguments, and conclusions were independently developed and written by the authors, who retain full responsibility for the originality, accuracy, and academic integrity of the research.

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