



The Legacy of Abu Raihan Al-Biruni's Thoughts: A Systematic Literature Review of Scientific Journals in Indonesia

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Abstract

This study examines the intellectual accomplishments of Abu Rayhan Al-Biruni, a distinguished Muslim polymath, using a thorough literature assessment of scholarly publications published in Indonesian academic journals. The study used a qualitative methodology and library research strategy to investigate 53 articles sourced from the Garuda (Garba Rujukan Digital) database. Merely nine of these articles significantly address Al-Biruni's intellectual legacy. The research demonstrates Al-Biruni's extensive influence in disciplines including astronomy, trigonometry, economics, calendrical science (hisab rukyah), and early metallurgy. He is consistently depicted as a discerning, probing, and interdisciplinary scholar whose concepts remain pertinent within modern scientific frameworks. Nonetheless, a substantial void persists in the literature about his contributions to epistemology, comparative religion, geography, geodesy, and philosophy. These domains remain little examined, despite their significance in his studies, particularly in seminal works such as *Tahqiq ma li-l-Hind* and *Tahdīd Nihāyāt al-Amākin*. This study advocates for a more thorough examination of Al-Biruni's works to rejuvenate the Islamic scientific tradition and reestablish a connection with the intellectual heritage of classical Muslim academics. The results indicate that expanding the academic investigation of Al-Biruni's contributions beyond the natural sciences may greatly enhance contemporary interdisciplinary and intercultural discussions.

Abstrak

Penelitian ini mengkaji pencapaian intelektual Abu Rayhan Al-Biruni, seorang polimatik Muslim terkemuka, melalui telaah pustaka yang mendalam terhadap publikasi-publikasi ilmiah yang diterbitkan dalam jurnal akademik di Indonesia. Penelitian ini menggunakan metodologi kualitatif dengan pendekatan studi kepustakaan terhadap 53 artikel yang diperoleh dari basis data Garuda (Garba Rujukan Digital). Dari jumlah tersebut, hanya sembilan artikel yang secara signifikan membahas warisan intelektual Al-Biruni. Hasil penelitian menunjukkan bahwa Al-Biruni memiliki pengaruh luas dalam berbagai disiplin ilmu, termasuk astronomi, trigonometri, ekonomi, ilmu penanggalan (hisab rukyah), dan metalurgi awal. Ia secara konsisten digambarkan sebagai ilmuwan yang tajam, kritis, dan lintas disiplin, dengan pemikiran yang tetap relevan dalam kerangka keilmuan modern. Namun demikian, masih terdapat kekosongan besar dalam literatur yang membahas kontribusi Al-Biruni di bidang epistemologi, perbandingan agama, geografi, geodesi, dan filsafat. Bidang-bidang ini masih jarang diteliti, meskipun memiliki peran penting dalam karya-karyanya, khususnya dalam karya monumental seperti *Tahqīq mā li-l-Hind* dan *Tahdīd Nihāyat al-Amākin*. Studi ini mendorong dilakukannya kajian yang lebih mendalam terhadap karya-karya Al-Biruni guna merevitalisasi tradisi keilmuan Islam dan membangun kembali hubungan dengan warisan intelektual ulama Muslim klasik. Temuan penelitian ini mengindikasikan bahwa perluasan kajian akademik atas kontribusi Al-Biruni, terutama di luar ranah ilmu alam, berpotensi memperkaya wacana interdisipliner dan antarbudaya pada masa kini.

Kata Kunci: Al-Biruni; Ilmu; Ilmuwan Muslim; Kontribusi; Pemikiran.

Introduction

Abu Rayhan Muhammad ibn Ahmad Al-Biruni (973–1048 CE) was one of the most illustrious scholars of the Islamic Golden Age. His intellectual pursuits traversed an impressive array of disciplines, including astronomy, mathematics, medicine, geography, geology, history, comparative religion, and philosophy. Born in Kath, present-day Uzbekistan, Al-Biruni lived during a period of unprecedented scholarly and scientific flourishing in the Islamic world (Carolina Sparavigna, 2013). He is widely recognized for his pioneering methods of empirical observation, mathematical precision, and rigorous comparative analysis. Through his works, he not only contributed substantially to the development of science and humanities but also laid the foundations for a universal epistemology grounded in observation, reason, and cultural relativism (Huringiin & Azfathir, 2018).

The Islamic world from the 8th to 14th centuries CE was a crucible of knowledge, wherein scholars actively translated, critiqued, and expanded upon the classical traditions of Greece, India, Persia, and China (Syah, 2023). Within this intellectual milieu, Al-Biruni emerged as an iconic figure whose legacy exemplified the synthesis of diverse knowledge systems (Putri et. al, 2025). His works, such as *al-Qanun al-Mas'udi*, *Kitab al-Tafhim*, and *Tahqiq ma li-l-Hind*, demonstrate an intricate

blending of rigorous scientific method with a deep respect for cultural and religious pluralism. Al-Biruni's investigations into Indian philosophy and religions reveal an unparalleled commitment to objective scholarship and epistemological humility.

Despite the wealth of his contributions, contemporary discourse around Al-Biruni remains largely confined to historical and Islamic studies departments. In recent decades, efforts to recover and reinterpret the contributions of classical Muslim scholars have increased in light of ongoing debates surrounding decolonization of knowledge and the revitalization of indigenous epistemologies. However, these efforts often emphasize figures like Ibn Sina, Al-Ghazali, or Al-Farabi, with Al-Biruni receiving relatively limited attention. Particularly in the Indonesian academic landscape, scholarly engagement with Al-Biruni has been sporadic and mostly limited to his scientific achievements, with little focus on his philosophical and comparative religious insights.

Indonesia, as the world's largest Muslim-majority country, possesses a rich intellectual tradition informed by both classical Islamic thought and indigenous cultural systems. Its academic and religious institutions are uniquely positioned to advance studies that integrate the Islamic scholarly legacy with modern educational and scientific paradigms. However, the disconnect between historical Islamic scholarship and contemporary curricula has led to a diminished awareness of figures like Al-Biruni, especially regarding the interdisciplinary nature of their contributions. This gap underscores the need for systematic efforts to reevaluate and reintegrate the thoughts of polymaths like Al-Biruni into both academic scholarship and public intellectual discourse.

This paper seeks to address this gap by conducting a systematic literature review of Indonesian academic journals to identify how Al-Biruni's thought has been represented and analyzed. Specifically, the study aims to understand the scope and depth of scholarly engagement with Al-Biruni's intellectual legacy in Indonesia, assess the thematic trends and research focuses within these studies, and highlight areas of neglect or underrepresentation.

By mapping the current landscape of research on Al-Biruni in Indonesia, this paper aims to underscore the multidimensionality of his thought and advocate for a broader, more inclusive framework in Islamic intellectual history. The study draws attention not only to Al-Biruni's achievements in the natural sciences but also to his profound contributions to epistemology, comparative religion, cultural anthropology, and philosophical inquiry. Such a reorientation is essential for fostering a holistic appreciation of Islamic intellectual heritage and for inspiring a new generation of Muslim scholars to pursue interdisciplinary research grounded in both tradition and innovation (Elihami & Melbourne, 2022).

The structure of this paper is organized as follows. Following this introduction, the second section provides a comprehensive literature review, synthesizing existing research on Al-Biruni from Indonesian academic journals and identifying recurring themes and methodological approaches. The third section outlines the methodological framework employed in conducting the systematic literature review. The fourth

section presents the findings and offers an in-depth discussion on the patterns and gaps identified. The final section concludes the paper by summarizing key insights and offering recommendations for future research directions.

In undertaking this study, we hope to contribute to the growing body of work aimed at revitalizing Islamic intellectual traditions and demonstrating their relevance to contemporary scholarly and social challenges. Al-Biruni's life and work offer a powerful example of how rigorous scholarship, cultural openness, and epistemic humility can serve as a foundation for meaningful intellectual engagement across time, space, and tradition (Nikmatullah et al., 2023).

Literature Review

This section provides a thorough literature evaluation of scholarly works published in Indonesia that examine the intellectual legacy of Abu Rayhan Al-Biruni. The framework for this literature evaluation is structured around three primary dimensions: thematic analysis, methodological orientation, and identification of epistemic gaps. The aim is to rigorously assess the current academic discourse surrounding Al-Biruni's concepts and to identify patterns, trends, and shortcomings in the extant literature (Puspita et al., 2023).

A preliminary search for the term "Al-Biruni" in the Garuda (Garba Rujukan Digital) database produced 53 items. Each of them was assessed for its pertinence and substantive analysis of Al-Biruni's contributions. Among them, only nine articles were identified as engaging substantively with his intellectual achievements. The selected articles underwent meticulous examination and were studied according to the disciplinary issues they encompassed, including astronomy, mathematics, trigonometry, economics, calendrical science, metallurgy, and Islamic philosophy (Ardi et al., 2016).

The examined material predominantly demonstrates a scientific approach in investigating Al-Biruni's ideas. Publications centered on astronomy and cosmology, including those by Sakirman (2017) and Jannah (2023), detail Al-Biruni's sophisticated comprehension of celestial mechanics, Earth's rotation, and his calculations of planetary distances. These contributions are often praised for their conformity to contemporary astronomical accuracy. Similarly, Latief's (2023) analysis of Al-Biruni's contributions to trigonometry highlights the mathematical precision with which he formulated sine, cosine, and tangent tables utilized in determining Earth's radius and geographic coordinates (Sakirman, 2017).

In the field of economics, Sirajulhuda and Syamsuri (2019) examine Al-Biruni's ideas through the lens of contemporary economic theory (Sirajulhuda et.al, 2019). They see his findings regarding the significance of human capital, collaborative

entrepreneurship, artisanal production, and monetary circulation as especially pertinent to the issues faced by modern economic systems. This method demonstrates how Al-Biruni's traditional economic insights might be adapted to tackle contemporary fiscal challenges. Kohar (2018) offers a comprehensive examination of Al-Biruni's calendrical sciences in his discourse on hisab rukyah. His empirical computations of lunar visibility, solar declination, and the mechanics of ascertaining the qibla orientation are recognized for their scientific ingenuity (Kohar, 2018).

Additionally, Pramono's (2022) research on metallurgy examines Al-Biruni's book on *Fi Makrifat al-Jawahir*, highlighting its significance for contemporary materials science. Al-Biruni's record of processes similar to carbonization in metalworking is seen as a precursor to metallurgical engineering. These findings demonstrate the breadth of Al-Biruni's contributions, transcending theoretical frameworks to encompass technological applications that were millennia in advance of their era (Agus, 2022).

The examined publications predominantly utilize historical-descriptive and textual-analytical methodologies. Most articles rely on primary classical texts and interpretive commentary instead of utilizing comparative, empirical, or multidisciplinary approaches. The historical-descriptive approach contextualizes Al-Biruni within his time yet frequently lacks critical analysis of his overarching epistemological foundations. Works like Sparavigna's (2013) typically depict Al-Biruni's biography and significant contributions as straightforward narratives, lacking a thorough examination of their philosophical significance or pertinence to modern discussions (Carolina Sparavigna, 2013).

Textual-analytical methodologies, as evidenced in the research of Kohar (2018) and Pramono (2022), yield more concentrated interpretations of certain texts. However, these assessments frequently remain confined to departmental silos, seldom exploring the transdisciplinary realms that Al-Biruni himself navigated. For example, there is limited cross-referencing with texts in Islamic philosophy or comparative religion, which could enhance the understanding of Al-Biruni's scientific ideas.

The literature indicates multiple epistemic deficiencies that imply a fragmented and inconsistent engagement with Al-Biruni's body of work. Significant domains that continue to be underrepresented encompass his contributions to philosophy, especially his analyses of the essence of knowledge, scientific investigation, and rationality. Al-Biruni's critiques of Greek philosophical traditions and his dialogues with Hindu and Buddhist intellectuals in India are rarely examined thoroughly. Likewise, *Tahqiq ma li-l-Hind*, his principal work on Indian religions and philosophy,

is referenced just briefly, lacking a thorough examination of its significance for interfaith dialogue or comparative religious studies.

Geography and geodesy, domains to which Al-Biruni made seminal contributions, are conspicuously lacking in the literature. His achievements in quantifying Earth's radius and determining time zones from longitudinal data are recognized, yet their historical significance and methodological originality remain uncritically assessed. The ramifications of his geospatial discoveries for the advancement of early Islamic mapping remain predominantly unexamined.

A significant remark is the absence of contextualization within the wider Islamic intellectual tradition. Al-Biruni's concepts are infrequently juxtaposed with those of his contemporaries, such as Ibn Sina or Al-Farabi, nor are they examined in the context of Islamic theological or legal debates. The absence of comparison analysis constrains our comprehension of the distinctiveness and originality of Al-Biruni's ideas and their potential influence or divergence from the dominant paradigms of his era (Arifin Azis & Harahap Jaipuri, 2021; Ibn Sīnā, 1975).

Notwithstanding these constraints, numerous encouraging patterns are surfacing. There is an increasing interest in reinterpreting Al-Biruni's concepts for contemporary economic and scientific concerns. His methodological rigor and dedication to empirical observation are increasingly acknowledged as fundamental values aligned with contemporary scientific investigation. Moreover, the enhanced digitization of classical texts and expanded access to global research present new prospects for more thorough and interdisciplinary interactions with his work.

In Short, the analyzed material reveals a selective and predominantly scientific engagement with Al-Biruni's legacy within Indonesian academia. This highlights the strengths of his empirical contributions but inadequately captures the philosophical, religious, and cultural aspects of his work. Future study should pursue a more integrative methodology that incorporates Al-Biruni's multidisciplinary perspective, rigorously reassesses his contributions across several domains, and establishes him as a pivotal figure in both Islamic intellectual history and the broader global history of knowledge.

Methods

This study employs a qualitative research methodology based on library research techniques (Antwi & Hamza, 2015). The primary aim of this methodological approach is to identify, review, and assess the degree to which Abu Rayhan Al-Biruni's intellectual contributions have been examined in Indonesian academic publications. The selection of a qualitative technique arises from the research

question's nature, necessitating interpretive analysis and critical assessment of textual sources instead of empirical or statistical data. This study uses systematic literature review methodologies to assess the depth, topic focus, and methodological quality of published publications on Al-Biruni's work.

The principal data source for this study is the Garuda (Garba Rujukan Digital) database, a national academic repository administered by the Ministry of Education, Culture, Research, and Technology of Indonesia. This platform was selected for its extensive indexing of Indonesian academic publications, encompassing journals from religious, scientific, technological, and humanities fields. The search method employed "Al-Biruni" as the primary keyword across all domains to guarantee relevancy and comprehensiveness. The preliminary search produced 53 publications covering the timeframe from 1945 to 2025, offering a comprehensive temporal framework for discerning the development of academic trends.

A two-stage filtration process was implemented after the articles were obtained. The initial phase entailed scrutinizing titles and abstracts to exclude works that merely made cursory references to Al-Biruni, such as instances where his name appeared in institutional or educational names without addressing his substantive achievements. At this juncture, 48 pieces were omitted for missing substantial information pertinent to Al-Biruni's philosophy. The second stage entailed a meticulous examination and analysis of the complete texts of the remaining nine pieces to evaluate their interaction with Al-Biruni's intellectual legacy. Articles exhibiting comprehensive analysis, thematic consistency, and academic rigor were chosen for final inclusion.

The analytical approach utilized for the chosen articles integrates descriptive content analysis with thematic coding. Each article was meticulously analyzed for the following criteria: disciplinary focus (e.g., astronomy, mathematics, economics, metallurgy), methodological approach (e.g., historical-descriptive, textual analysis), and epistemological framework (e.g., Islamic worldview, scientific rationalism). The elements were subsequently encoded into a matrix to enable comparative analysis across the sample. The study utilized a critical discourse analysis framework to examine the framing of Al-Biruni's legacy across various scholarly contexts, specifically investigating whether his contributions are viewed as integral to a greater Islamic intellectual heritage or regarded as mere historical curiosities (Haryono Hadi Kuswanto & Mahmud, 2023).

The findings' reliability and validity were augmented by triangulating with secondary sources and worldwide literature on Al-Biruni. These references established a standard for assessing the precision and comprehensiveness of

Indonesian intellectual discourse. Research conducted by international scholars, including Edward Sachau, who translated numerous works of Al-Biruni into English, together with contemporary peer-reviewed journal publications from global platforms, was utilized to create a comparison framework and identify potential gaps or biases within the Indonesian context.

This methodological framework also incorporates an ethical dimension. Considering the cultural and religious importance of Al-Biruni's oeuvre, particularly his examinations of comparative religion and Indian customs, the scholars upheld a respectful and impartial tone throughout the analysis. Interpretations were corroborated to prevent distortion or ethnocentric prejudice, and proper credit was attributed to all primary and secondary sources utilized.

This methodological technique, albeit thorough, has its limitations. A significant limitation is the restricted focus of Indonesian journals that meaningfully address Al-Biruni, hence constraining the generalizability of the results. Moreover, the prominence of some discipline, particularly astronomy and mathematics, within the dataset may distort the thematic equilibrium of the review. A further constraint is the possible omission of pertinent publications published outside the Garuda database or in grey literature formats, like theses, conference papers, or institutional reports. Nevertheless, the results obtained from this systematic and rigorous methodology provide significant insights into the status of Al-Biruni scholarship in Indonesia and establish a basis for future research (Krippendorff, 2019).

This study employs a structured, transparent, and interpretive technique, consistent with best practices in qualitative research. It not only aids in the discovery and assessment of pertinent literature but also offers a critical perspective for understanding the reception and depiction of Al-Biruni's intellectual legacy within the Indonesian academic context. This strategy aids in the greater endeavor of restoring and rejuvenating Islamic intellectual traditions in the modern age (Muharningsih et al., 2024).

Results and Discussion

The thorough analysis of Indonesian academic literature regarding Abu Rayhan Al-Biruni indicates a significant focus on his scientific and mathematical achievements, although his writings in philosophy, comparative religion, epistemology, and geography are predominantly underexamined. This discovery highlights a notable thematic disparity and indicates a necessity to expand the range of scholarly investigation to include the entirety of Al-Biruni's intellectual heritage.

The analyzed articles frequently depict Al-Biruni as a polymath whose approaches were far advanced for his era. Numerous publications in astronomy, including those by Sakirman (2017) and Jannah (2023), offer comprehensive analyses of Al-Biruni's celestial observations and astronomical computations (Sakirman, 2017). These investigations underscore his comprehension of the Earth's rotation, the computation of time zones, and the quantification of planetary distances. Jannah's study highlights the remarkable precision of Al-Biruni's measurements of the Earth's diameter, which deviate only slightly from contemporary estimates. His utilization of trigonometry and empirical measurements exemplifies his application of what is now regarded as the scientific method, centuries prior to its formalization in the West.

Latief's (2023) paper in trigonometry recognizes Al-Biruni as a trailblazer who created one of the oldest and most precise sine and tangent tables. These mathematical tools were essential for his endeavors in astronomy and geography. Latief asserts that Al-Biruni's methodology is a distinctive amalgamation of theoretical abstraction and practical application, demonstrating how mathematics may function as a fundamental instrument for scientific investigation. This integration of mathematical precision and empirical analysis establishes Al-Biruni as a pivotal figure in the pre-modern evolution of scientific technique (Latief et al., 2023).

Economic issues are present in literature, albeit to a diminished degree. Sirajulhuda and Syamsuri (2019) characterize Al-Biruni as an economic theorist whose discourse on labor, value, and the function of money anticipates modern economic theories. His focus on human capital, labor ethics, and the societal role of currency offers foundational insights into developmental economics. The authors contend that Al-Biruni's comprehensive perspective on the economy—incorporating scientific understanding, technological advancement, and ethical considerations—provides a significant alternative to contemporary neoliberal frameworks depicts him as a critical thinker who employed skepticism, rational inquiry, and a rejection of dogma without substantiation (Sirajulhuda et.al, 2019).. The authors examine Al-Biruni's intellectual autonomy, highlighting his propensity for posing penetrating inquiries, pursuing empirical validation, and upholding intellectual modesty. This article mostly emphasizes cognitive style rather than philosophical content, however it initiates a significant exploration of the philosophical aspects of Al-Biruni's work.

Nonetheless, substantial gaps persist. Although Al-Biruni demonstrates a pronounced interest in epistemology, as illustrated by his critical examination of Greek philosophy and his contemplations on the essence of knowing in *Kitab al-Tafhim*, none of the Indonesian scholarly publications in the sample explicitly address these dimensions. Similarly, his significant work *Tahqiq ma li-l-Hind*, which chronicles and critically examines the beliefs, practices, and philosophies of Indian

religions, is merely referenced in one or two paragraphs, lacking considerable analytical discourse (Ardi et al., 2016).

The oversight of Al-Biruni's contributions to comparative religion and interfaith communication is notably significant considering the current importance of these domains. In *Tahqiq ma li-l-Hind*, Al-Biruni exemplifies a methodologically rigorous and ethically respectful approach to the study of other religions. He translates Sanskrit texts, engages with Hindu experts, and avoids polemics, opting instead for a tone of inquiry and appreciation. His book demonstrates an early iteration of religious plurality and may serve as a fundamental text for contemporary interreligious studies. This aspect of his legacy remains inadequately examined by Indonesian scholars.

Likewise, Al-Biruni's advancements in geography and geodesy—especially his triangulation techniques for determining Earth's radius and his organization of geographic information—are rarely addressed. This is unexpected considering the significance of geographic knowledge in both historical and modern Islamic studies. His contributions to Islamic cartography and environmental perception provide a rich foundation for study that synthesizes history, geography, and environmental ethics (Carolina Sparavigna, 2013).

The investigation additionally uncovers methodological trends in the manner Indonesian scholars engage with Al-Biruni's legacy. The majority of the examined studies utilize descriptive-historical methodologies, concentrating on the presentation of Al-Biruni's works rather than engaging in critical analysis within wider intellectual or theoretical contexts. Limited articles establish comparative links between Al-Biruni and other classical Muslim intellectuals or examine the pertinence of his concepts to modern challenges in science, education, or religious pluralism.

This methodological conservatism may reflect broader trends in Islamic studies in Indonesia, where historical respect for ancient thinkers is frequently prized over critical engagement. This method may render Al-Biruni's legacy immobile and disconnected from contemporary intellectual conversation. A reinvigoration of his work through interdisciplinary techniques that link his ideas to contemporary global concerns is necessary (Gaskin-Reyes, 2019).

The increasing digitization of classical manuscripts and enhanced access to worldwide academic resources may provide Indonesian scholars with the means to further their interaction with Al-Biruni. Collaborating with international scholars, particularly in the domains of the history of science, comparative philosophy, and religious studies, may cultivate more dynamic readings of Al-Biruni's contributions (Kurniasih & Raya, 2022).

The ramifications of this study transcend the particular instance of Al-Biruni. They emphasize the imperative of decolonizing knowledge methods and reclaiming intellectual traditions in Muslim societies (El-Bizri, 2016). Reexamining and critically analyzing figures such as Al-Biruni enhances Islamic intellectual history and advances

the worldwide initiative of knowledge diversity. His work interrogates the conflict between science and religion, East and West, as well as tradition and modernity.

This review's findings affirm that although Al-Biruni's scientific contributions are recognized in Indonesian academia, his interdisciplinary brilliance is mostly undervalued. His philosophical inquiries, epistemological reflections, geographical insights, and comparative religious studies have not yet garnered the academic recognition they merit. Addressing these deficiencies necessitates methodological innovation, multidisciplinary collaboration, and a fresh dedication to examining the depth of Islamic intellectual tradition. These endeavors would not only honor Al-Biruni's heritage but also establish it as an essential resource for confronting the intricate intellectual and ethical dilemmas of contemporary society.

Conclusion

This study conducted a systematic literature assessment of Indonesian academic publications to examine the scope, depth, and focus of scholarly engagement with the intellectual legacy of Abu Rayhan Al-Biruni. The research indicates that although Al-Biruni's scientific and mathematical contributions—particularly in astronomy, trigonometry, and calendrical science—are well documented and valued in Indonesian academia, other equally important aspects of his work are insufficiently examined. Specifically, there is a significant oversight of his contributions to epistemology, comparative religion, geography, geodesy, and Islamic philosophy. These deficiencies not only constrain our comprehension of Al-Biruni's intellectual breadth but also diminish the potential influence of his ideas on modern discussions.

The findings highlight a dominant inclination in Indonesian academia to examine Al-Biruni predominantly from a descriptive-historical perspective, frequently lacking substantial critical or comparative research. This demonstrates admirable reverence for historical personalities, although it also jeopardizes their significance in contemporary discourse. Al-Biruni's life and contributions, however, defy simplistic classification. He was an innovative thinker whose methodology for knowledge prioritized critical inquiry, empirical observation, and intercultural dialogue—principles that continue to hold significant relevance today.

This study posits that a more thorough and multidisciplinary examination of Al-Biruni's works could substantially enhance Islamic intellectual history and provide novel insights for tackling modern challenges. His writings on Indian religions exemplify an early ethnographic and ecumenical methodology that could significantly enhance contemporary religious studies and intercultural communication. Similarly, his geographical methodologies and contemplations on the essence of scientific knowledge are pertinent to contemporary discussions in environmental ethics, science education, and epistemology.

The review emphasizes the transformative potential of incorporating classical Islamic learning into contemporary academic processes. This action will not only safeguard the profound intellectual heritage of the Muslim world but also contest the

supremacy of Western-centric epistemologies in global academia. Al-Biruni's legacy, when thoroughly acknowledged, presents a paradigm of knowledge creation that is simultaneously grounded in religion and receptive to the world—empirical yet reverent, rational yet spiritual.

Consequently, the study presents multiple recommendations. Scholars should diligently explore underrepresented aspects of Al-Biruni's work, especially within the humanities and social sciences. Secondly, academic institutions ought to promote interdisciplinary research efforts that connect Islamic studies with contemporary sciences and global challenges (Barile & Saviano, 2021). Third, improved collaboration between Indonesian researchers and the worldwide academic community is necessary to enable deeper and more diverse interpretations of Al-Biruni's work. Educators and curriculum developers ought to incorporate Al-Biruni's ideas into educational materials, not merely as historical content but as a dynamic intellectual resource.

This research confirms that Abu Rayhan Al-Biruni is a significant figure in the history of knowledge, whose many contributions are still underappreciated in Indonesian academic discourse. Broadening the examination of his works is both an intellectual obligation and a cultural requirement. By reexamining his legacy through new lenses, scholars can both pay tribute to a remarkable intellect of the past and derive inspiration for contemporary and future intellectual and ethical dilemmas.

References

- Agus, P. (2022). Fi Makrifat Al Jawahir Karya Reyhan Al Biruni: Kitab Rujukan Teknologi Manufaktur Logam Dunia. *Journal of Islamic History*, 2(1), 48–62. <https://doi.org/10.53088/jih.v2i1.211>
- Antwi, S. K., & Hamza, K. (2015). Qualitative and quantitative research paradigms in business research: A philosophical reflection. *European Journal of Business and Management*, 7(3), 217–225.
- Ardi, M. N., Abdullah, F., Al-tamimi, S., Islam, U., Ushuluddin, D., Wahyu, I., Humaniora, S., Wahyu, I., & Perbandingan, A. (2016). *Machine Translated by Google Al-Biruni : Seorang Pemikir Kritis Muslim Machine Translated by Google*. 04, 1–12.
- Arifin Azis, & Harahap Jaipuri. (2021). Kritik Imam Al-Ghazali terhadap Para Filsuf. *Aqlania: Jurnal Filsafat Dan Teologi Islam*, 12(1), 75–94.
- Barile, S., & Saviano, M. (2021). *Interdisciplinary Systems Thinking for a New Scientific Paradigm: Toward a Re-founding of Human Values* (pp. 17–39). https://doi.org/10.1007/978-3-030-71877-0_3
- Carolina Sparavigna, A. (2013). The Science of Al-Biruni. *International Journal of Sciences*, 1(12), 52–60. <https://doi.org/10.18483/ijsci.364>
- El-Bizri, N. (2016). Falsafa: A labyrinth of theory and method. *Synthesis Philosophica*,

62(2), 295–311. <https://doi.org/10.21464/sp31205>

- Elihami, E., & Melbourne, M. (2022). The Trend of “Independent Learning Independent Campus”: Teaching Model of Islamic Education through bibliometrics mapping in 2021-2022. *Journal of Innovation in Educational and Cultural Research*, 3(2), 86–96. <https://doi.org/10.46843/jiecr.v3i2.70>
- Gaskin-Reyes, C. (2019). Monitoring and Evaluation. In *International Encyclopedia of Geography* (Issue 195, pp. 1–4). Wiley.
<https://doi.org/10.1002/9781118786352.wbieg0085.pub2>
- Haryono Hadi Kuswanto, H., & Mahmud, H. (2023). Etika Perencanaan Dalam Perspektif Al-Qur’an. *Al Furqan: Jurnal Ilmu Al Quran Dan Tafsir*, 6(2), 208–221. <https://doi.org/10.58518/alfurqon.v6i2.2085>
- Huringiin, N., & Azfathir, H. N. (2018). The Concept of Syed Muhammad Naquib al-Attas on De-Westernization and its Relevancy toward Islamization of Knowledge. *Kalimah*, 16(2). <https://doi.org/10.21111/klm.v16i2.2867>
- Ibn Sinā, al-H. bin ‘Alī. (1975). *Asy-Syifa’; ath-Thabi’iyyat, an-Nafs*. Haiah Mishriyah al-‘Ammah lil Kitabah.
- Kohar, A. (2018). Pemikiran Hisab Rukyah Abu Raihan Al-Biruni. *Almizan*, 14(1), 63–79.
- Krippendorff, K. (2019). *Content Analysis: An Introduction to Its Methodology*. SAGE Publications, Inc. <https://doi.org/10.4135/9781071878781>
- Kurniasih, A., & Raya, M. K. F. (2022). Digitalizing Da’wah and Religious Authorities in Contemporary Indonesia: After the Fall of Religious Leader. *Journal of Contemporary Islam and Muslim Societies*, 6(1). <https://doi.org/10.30821/jcims.v6i1.9660>
- Latief, K. A., Islam, U., & Banda, N. A. (2023). *Al Biruni and His Contribution to Trigonometry*. February 2002.
- Muhriningsih, V. T., Shofa, Ida Kurnia, & Gifari, M. (2024). Integrating Islamic Teachings: Enhancing Environmental Awareness in the Digital Era Through Qur’anic Interpretations. *TAFSE: Journal of Qur’anic Studies*, 9(1), 84. <https://doi.org/10.22373/tafse.v9i1.22789>
- Nikmatullah, C., Wahyudin, W., Tarihoran, N., & Fauzi, A. (2023). Digital Pesantren: Revitalization of the Islamic Education System in the Disruptive Era. *Al-Izzah: Jurnal Hasil-Hasil Penelitian*, 18(1), 1. <https://doi.org/10.31332/ai.v0i0.5880>
- Puspita, I., Indarti, N., & Nurhayati, D. (2023). Pendekatan, Metode, Strategi Dan Model Pembejaraan: Literature Review. *Jurnal Euilibrium Nusantara*, 2(1), 93–96. <https://doi.org/10.56854/jeqn.v2i1.150>
- Putri, A. A., Sabilla, I. A., Fadhilah, S. A., & Aridansyah, V. (2025). *Ilmu Pengetahuan Alam dan Bidang 4 Ilmu Pengetahuan Alam*. 3.

- Sakirman, S. (2017). Memahami Konsep Dasar Gerak, Bentuk Dan Ukuran Bumi Studi Analisis Kitab Al-Qânûn Al-Mas'ûdî Karya Al-Biruni Dalm Konteks Hukum Islam. *Al-Istinbath : Jurnal Hukum Islam*, 2(1), 17.
<https://doi.org/10.29240/jhi.v2i1.147>
- Sirajulhuda, M. H., & Syamsuri. (2019). Analisa Kontribusi Al-Biruni dan Relevansinya dalam Pembangunan Ekonomi Komtemporer. *Menara Tebuireng : Jurnal Ilmu-Ilmu Keislaman*, 14(02), 212–226.
<https://doi.org/10.33752/menaratebuireng.v14i02.976>
- Syah, F. (2023). Problematika Ilmu Pengetahuan dalam Islam. *Az-Zarnuji: Journal of Islamic Education*, 1(1), 49–65.