Integration of Al-Kindi's Rationalism and Ar-Razi's Empiricism: The Relevance of Islamic Epistemology for Contemporary Science

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Abstract: The decline of scientific knowledge in the Islamic world today is usually linked to an epistemological split from the classical scientific legacy that suffers from imitative modern practices. Based on this, I will provide an epistemological perspective whereby Al-Kindi's rationalism and Ar-Razi's empiricism, though different, construct a plausible foundational position for the scientific method in Islamic rationalism and empiricism. The research method used for this study is qualitative where the writer undertakes library research with primary classical texts and writings of both, and secondary texts on Islamic intellectual history, philosophy of science, and related articles. Findings reveal that Al-Kindi's rationalism is stronger in providing the necessary theoretical and metaphysical scaffolding of science, while Ar-Razi's empiricism is instrumental in providing the verification processes through observation and experimentation. However, each of these approaches suffers from the consequences of being in an isolated application. The author argues that the integration of rationalism and empiricism in Islamic epistemology is meant to be more of a dialectical and argumentative process as opposed to a simplistic integration, and this is more of a contribution to the fragmentation in the contemporary philosophy of science and scientific methodology.

Keywords: Al-Kindi, Ar-Razi, Rationalism, Empiricism, Islamic Epistemology.

Abstrak: Kemunduran tradisi keilmuan di dunia Islam kontemporer sering dikaitkan dengan keterputusan epistemologis antara warisan ilmiah klasik dan praktik ilmu modern yang cenderung bersifat imitasi. Artikel ini bertujuan mengajukan argumen epistemologis bahwa rasionalisme Al-Kindi dan empirisme Ar-Razi merupakan dua pendekatan yang berbeda namun saling melengkapi dalam membentuk fondasi metode ilmiah dalam tradisi Islam. Pendekatan yang digunakan adalah kualitatif dengan metode studi pustaka menggunakan data primer berupa buku dan artikel yang diadopsi dari karya-karya kedua tokoh serta data sekunder pendukung berupa buku sejarah intelektual Islam, kajian filsafat ilmu, dan artikel ilmiah. Temuan penelitian menunjukkan bahwa rasionalisme Al-Kindi unggul dalam membangun kerangka teoretis dan metafisis ilmu, sementara empirisme Ar-Razi memberikan mekanisme verifikasi melalui observasi dan eksperimen, namun masing-masing memiliki keterbatasan jika berdiri sendiri. Artikel ini berargumen bahwa

sintesis rasionalisme dan empirisme dalam epistemologi Islam bersifat argumentatif dan dialektis, bukan normatif, serta berkontribusi secara teoretis dengan menawarkan model integrasi epistemologis yang relevan bagi pengembangan filsafat ilmu dan metode ilmiah kontemporer.

Kata Kunci: Al-Kindi, Ar-Razi, Rasionalisme, Empirisme, Epistemologi Islam.

Introduction

The advancement of science during the history of humankind has always been the result of an intersection of various dimensions of culture and social experience of religions, and philosophy of the time[1]. In terms of its historical significance, Islamic civilization was instrumental in connecting the continuum of Greek philosophy and the science tradition that was just emerging in Europe. Rationality and spirituality, in a unique balance, characterized the intellectual efflorescence of the Islamic civilization of the medieval period, particularly between the 8 th and 13 th centuries. An everlasting emblem of this most creative period of Baghdad, for instance, was the establishment of the Bayt al- Ḥikmah, which was a center of translation, research, and scientific development. It was one of the most dynamic intellectual institutions of this period that greatly contributed to the scientific heritage of the world, and is justifiably credited with being one of the most important Islamic libraries of this period[2]. It was also during this period that the rational scientific tradition of ʿulūm al-ʿaqliyyah, which facilitated communication with the local and global scientific intellectual heritage, came to be established. The translation of Greek works by Muslim scholars was not a simple reproduction of the text; it was a restatement of the text from a rational, practical, and spiritually integrated perspective.

Islamic civilizations were able to create their own theories, which focused on the pursuit of the universal truth rather than just constructing theories. Presently, on the other hand, the modern Islamic world is suffering from a noticeable drop in the world of science and in scientific productivity in general. Throughout the years, many studies and analyses have proven that the scientific output of the Muslim world is insufficient, and is less than 3% of the world's total scientific papers[3]. When the scientific output is compared to the intellectual capacity of the Muslim community, it is apparent that there is an 'Epistemological Crisis' where each member of the community acts as a consumer of knowledge, rather than a contributor[4]. There are many reasons that can be listed as to why a community obtains an 'Epistemological Crisis'. In this instance, a community's scientific legacy and the modern educational systems available to them are disconnected. Because of this, there is a need to re-visit the intellectual legacy of the Islamic scholars,

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[1] Seyyed Hossein Nasr, *Islamic science: An illustrated study* (1976), pp. 33–41.

[2] Adel Abdul-Aziz Algeriani and Mawloud Mohadi, "The house of wisdom (Bayt al-Hikmah) and its civilizational impact on islamic libraries: a historical perspective", *Mediterranean Journal of Social Sciences*, vol. 8, no. 5 (2017), pp. 1–4.

[3] Yusuf Ikbal Oldac, "Global science and the muslim world: overview of muslim-majority country contributions to global science", *Scientometrics*, vol. 127, no. 11 (2022), pp. 6231–55.

[4] Moch Iqbal and Adisel, "Epistemology of Islamic Science: A searching for Ideal Form and Format of Scientific Design for Islamic Higher Education in Indonesia", *Tadrib*, vol. 5, no. 1 (2021), pp. 122–37.

as this will restore a lost scientific paradigm that is based on the integrative value of reason.

Al-Kindi (801–873 CE) is recognized as the first philosopher among the Arabs and the first scholar to systematically fuse Greek thought and Islamic theology[5]. He pointed out the philosophical and theologically based true (al-Ḥaqq)[6], and placed revelation above reason, while defending philosophy as a worthy instrument that could aid and deepen the understanding of religion[7]. In contrast, Abu Bakr Muhammad ibn Zakariyya Ar-Razi (865–925 CE), a physician and scientist, introduced a rigorously experimental approach to medicine and chemistry long before the formulation of the modern scientific method in Europe[8]. These two figures represent the twin pillars of Islamic epistemology: rationalism and empiricism. An epistemological framework that harmonizes reason, experience, and revelation thus becomes essential for overcoming the dichotomy of knowledge in the modern Islamic world[9]. Both rejected dogmatism and maintained that authentic knowledge must be grounded in logical reasoning and empirical evidence, ultimately serving human well-being and spiritual proximity to God[10].

Islamic epistemology, as a branch of philosophy, examines the nature, sources, structure, processes, and criteria of truth in relation to faith-based values. Etymologically, the term epistemology derives from the Greek epistēmē (true knowledge) and logos (reasoned discourse)[11], which means the study of how to acquire, construct, and validate knowledge through rational, empirical, or a combination of both approaches[12]. The article "Islamic Epistemology: An Investigation of the Foundations of Knowledge" explains that humans acquire knowledge through the senses, reason, and revelation[13]. In the Islamic tradition, rationalism and empiricism are seen as complementary within a framework that unites reason, experience, and revelation. Islamic thinkers developed a rationalism that takes into account experience and cultural context[14].

In modern science, epistemology includes various approaches such as rationalism, empiricism, intuition, language, and tradition, so that it is not only descriptive but also

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[5] Majid Fakhry, *A history of Islamic philosophy* (Columbia University Press, 2004), pp. 68-75.

[6] Jefri Rieski Triyanto, *Al-Kindi Thinking: Harmonization of Islam and Philosophy*, vol. 11, no. 1 (2025), pp. 174–176.

[7] Wisam Kh. Abdul-Jabbar, "Al-Kindi on education: Curriculum theorizing and the intercultural *Minhaj*", *Curriculum Inquiry*, vol. 50, no. 3 (2020), pp. 262–80.

[8] Samir S. Amr and Abdulghani Tbakhi, "Abu Bakr Muhammad Ibn Zakariya Al Razi (Rhazes): Philosopher, Physician and Alchemist", *Annals of Saudi medicine*, vol. 27, no. 4 (King Faisal Specialist Hospital & Research Centre, 2007), pp. 305–7.

[9] Mohamad Nur Wahyudi, "Epistemologi Islam di Era Modern: Studi Analisis Pemikiran Feyerabend tentang Anarkisme Epistemologi", *Alhamra Jurnal Studi Islam*, vol. 2, no. 2 (2021), p. 134.

[10] Nasr, *Islamic science: An illustrated study*.

[11] Robert Audi, *Epistemology: A contemporary introduction to the theory of knowledge*, ke-3 edition (New York: Routledge, 2010), https://doi.org/10.4324/9780203846469.

[12] Rina Fatiya Rosida et al., "The process of forming knowledge: In the study of ontology, epistemology, and axiology", *International Journal for Educational and Vocational Studies*, vol. 5, no. 1 (2023), pp. 13–8.

[13] Mahayudin Hj Yahaya, *Islamic Epistemology: An Inquiry Into The Foundation Of Knowledge In Metaphysics And Physic* (2018), pp. 19–27.

[14] Supriyanto Supriyanto, "Periodisation of the philosophy of Islamic rationalism in the perspective of Zaki Naguib Mahmud", *HTS Teologiese Studies / Theological Studies*, vol. 79, no. 1 (2023), pp. 4–9.

normative in determining standards of truth in knowledge[15]. Consequently, Islamic epistemology seeks to maintain harmony between intellectual reasoning and empirical investigation, ensuring that scientific activity remains grounded in ethical responsibility and theological awareness[16]. Islamic epistemology has drawn more attention in recent years as academics work to reconcile classical philosophy with contemporary scientific ideas[17]. Islamic educations epistemological paradigm is fundamentally based on a theocentric worldview that regards revelation experience and knowledge as interconnected aspects of learning and comprehension[18].

This article situates itself within existing scholarship by contributing in three primary aspects. First, in terms of epistemological framework, it emphasizes the integration of Al-Kindi's deductive rationalism and Ar-Razi's inductive empiricism as complementary approaches in the formation of the Islamic scientific method. This focus differs from studies such as Kusuma's, which examine rationalism and empiricism from an Islamic perspective without articulating their dialectical relationship within the context of scientific methodology[19]. Second, in terms of the focal intellectuals, this article almost evenly distributes the advocacy of Al-Kindi and Ar-Razi as two opposing epistemological pillars, unlike Masykur's comparative study of Al-Farabi and Al-Kindi, where Ar-Razi is left out and therefore, the empirical element is left disproportionate[20]. Third, with respect to the implications of analysis, this study goes beyond mere descriptive comparison to the extent of formulating an epistemological synthesis that is constructive towards the revitalization of the Islamic scientific tradition. Such an approach clearly sets this study apart from Satyaningrum and Ramadhan, whose focus on the ethical and moral lenses bear no methodological construct towards the renewal of science[21].

Given this comparative positioning, the principal novelty of this article is the attempt to construct a dialectical and argumentative relationship between Al-Kindi's deductive rationalism and Ar-Razi's inductive empiricism, situated within the Islamic scientific method. Instead of generalizing the discussion to broad epistemological spheres or ethical assessments, this study addresses a theoretical void by portraying both figures as equally and symmetrically important to Islamic epistemology. Consequently, the article provides

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[15] Gagah Daruhadi, "Epistemology As A Way Of Knowing.", *Journal of Social Science (2720-9938)*, vol. 5, no. 5 (2024), pp. 112–8.

[16] Zanzabil Adwa Fitrian, Ahmad Nasrulloh, and Sigit Nugroho, "Perspektif IslamTentang Signifikansi Antara Filsafat dan Ilmu", *Aqlania*, vol. 13, no. 2 (2023), pp. 247–62.

[17] Muhammad Zakiyullah Romdlony et al., "Tawḥīdī Epistemology: Uniting Rationality, Empiricism, and Transcendence within the Framework of Islamic Science", *International Journal of Nusantara Islam*, vol. 13, no. 2 (2025), pp. 397–412.

[18] Firmansah Kobandaha et al., "The Basis Of The Epistemological Paradigm In A Review Of The Philosophy Of Islamic Education", *Journal of International Multidisciplinary Research*, vol. 3, no. 1 (2025), pp. 43–9.

[19] Kumara Adji Kusuma, "Empiricism and Rationalism in Islamic View", *Indonesian Journal of Cultural and Community Development*, vol. 16, no. 1 (2024), pp. 1–6.

[20] Zein Muchamad Masykur, "Comparative Epistemology of Al-Farabi and Al-Kindi in the Contextualization of Modern Knowledge", *Pascasarjana IAIN Palopo*, vol. 4, no. 2 (2025), pp. 211–8.

[21] Retnowati Satyaningrum and Muhammad Fadli Ramadhan, "Muslim Scientists From The East: A Comparison Thought Of Al-Kindi And Ar-Razi", *International Journal of Indonesian Philosophy & Theology*, vol. 5, no. 1 (2024), pp. 38–44.

both a reinterpretation of their intellectual legacies and a methodologically pertinent model to renew the Islamic scientific tradition within contemporary settings.

The main argument underlying this study is that the decline of the scientific tradition in the modern Islamic world is not caused by a lack of intellectual resources, but rather by a disconnection between Muslim societies and their classical epistemological roots. Al-Attas describes this condition as the loss of adab, namely the loss of the proper order of knowledge, which has led science to lose its moral orientation and spiritual purpose[22]. As a consequence, contemporary educational and research practices tend to be imitative rather than creative and innovative. On the other hand, Pamba Shatson is also of the view that the Islamic epistemological framework needs to be re-established by the reintegration of revelation, reason, and empirical observation. The unique strength of Islamic knowledge is in its combination of the rational and the spiritual, which, in turn, offers the needed philosophical basis for the reconstruction of a scientific culture that is holistic and dynamic[23].

This article focuses on a particular theoretical problem: how to construct a critical mapping of epistemological differences between Al-Kindi's rationalism and Ar-Razi's empiricism, and how their mapping, when synthesized, could result in a cohesive epistemological model for integrating rationality and empiricism in the framework of the science of the Islamic intellectual tradition. Therefore, this article is not a descriptive-historical document of Al-Kindi and Ar-Razi's thoughts, but a study on the epistemological structures and implications of their theories. The originality of this study is in its attempt to reconstruct the epistemological connections between Al-Kindi and Ar-Razi, through three analytically distinct processes: (1) the conceptual elucidation of the theoretical framework of each individual; (2) a critical assessment of the rationalism and empiricism of the classical Islamic period, to identify their advantages and disadvantages; and (3) the construction of an epistemological synthesis that is of value to the scientific method and contemporary Islamic philosophy. The suggested method contributes to the expression of thought on Islamic epistemology, emphasizing the impact of the classical Islamic intellectual tradition on contemporary scientific applications.

Method

In this study, I take a qualitative approach and employ a library research method, which is a systematic exploration of relevant written materials and their subsequent formation. The translated books and scholarly articles from Al-Kindi's books, which include *On First Philosophy* and *Risālah fī al-ʿAql*, together with Ar-Razi's writings, such as *Kitab al-Ḥawi* and *Akhlaq al-Ṭabib*, make up the primary data. From these primary data sources, I have tried to answer the questions of rationalism and empiricism in the Islamic scientific tradition from these primary sources. Secondary sources have been used

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[22] Syed Muhammad Naquib Al-Attas, *Islam and Secularism* (International Institute of Islamic Thought and Civilization (ISTAC)., 2019), https://traditionalhikma.com/wp-content/uploads/2020/09/Al-Attas-Islam-and-Secularism.pdf.

[23] Pamba Shatson Fasco et al., "Epistemology unveiled: Exploring the foundations of knowledge in philosophy", *World Journal of Advanced Research and Reviews* (2024), pp. 3–10.

to develop the historical background, the philosophy, and the construction of the Islamic scientific method and the method of Islam. This study analyzes the primary and secondary sources to locate the two figures within classical Islamic thought and methodology, identify the relevance of their ideas to contemporary scientific methods, and analyze the circumstances in which the scientific spirit is utilized today. This study encompasses the textual criticism of Al-Kindi and Ar-Razi's principal works.

The techniques used in this study include content analysis and analysis through a hermeneutical lens, the particulars of which can be described in three parts. The first stage involved the analysis of primary texts of al-Kindī and al-Rāzī, which sought to inform the structures of deductive rationalism and inductive empiricism as articulated by each of these thinkers. The second stage involved the comparison of the texts in order to identify the fundamental differences in the two approaches, predominantly as it pertained to each thinker's identification of the sources of knowledge, the mechanisms by which they validated truth, and the scientific disposition of their frameworks. Third, the synthesis and reconstruction of the dialectical relationship between rationalism and empiricism in the context of Islamic epistemology involved the formulation of rational empiricism as descriptive and integrative of the epistemic positions of al-Kindī and al-Rāzī, and as such, this synthesis served to identify the primary dialectical thrust of the relationship between rationalism and empiricism. The stages of analysis involved data reduction, thematic classification, and formulation of conceptual conclusions[24]. Critically, the model described in this study functions to cross-evaluate the epistemological positions of the two thinkers and empirically test the relevant scientific methodologies and frameworks.

Results

This study finds that the intellectual contributions of Al-Kindi and Ar-Razi can be interpreted as epistemological analogues relevant to the foundations of the modern scientific method, with Al-Kindi representing deductive rationalism and Ar-Razi representing inductive empiricism. It should be emphasized that the terms *rationalism* and *empiricism* employed in this article are not the original conceptual categories used by Al-Kindi or Ar-Razi themselves. Rather, these terms originate from the modern Western epistemological tradition, as noted by Robert Audi, "*epistemology encompasses approaches such as rationalism, empiricism, intuition, language, and tradition.*"[25]. Nevertheless, within contemporary Islamic philosophical scholarship, these terms are legitimately employed as analytical categories for interpreting the epistemological characteristics of classical thinkers. Al-Kindi emphasized deductive reasoning in conjunction with revelation, which allows his epistemological orientation to be analogically described as Islamic rationalism. Peter Adamson observes that, for Al-Kindi, "*reason is a divine gift that allows humans to grasp universal truths.*"[26].

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[24] Matthew B. Miles, *"Qualitative data analysis: An expanded sourcebook"*, *Thousand Oaks* (1994), pp. 10–5.

[25] Audi, *Epistemology: A contemporary introduction to the theory of knowledge,* pp. 1-3.

[26] Peter Adamson, *al-Kindi* (Oxford University Press, 2006), pp. 16-18.

In contrast, Ar-Razi emphasized observation, experimentation, and repeated verification as the foundations of scientific inquiry, thereby justifying his classification as a representative of Islamic empiricism. Samir Amr and Abdulghani Tbakhi highlight that Ar-Razi "*insisted on repeated clinical observation and experimentation as the basis of medical knowledge.*"[27]. Thus, the use of the terms rationalism and empiricism in this study is heuristic and comparative in nature, intended to place Islamic intellectual thought in dialogue with global epistemological traditions rather than to equate it directly with Western philosophical paradigms.

Al-Kindi

Al-Kindi is a representative of deductive rationalism in the classical Islamic epistemological tradition which views reason as the main tool for comprehending reality while keeping it within the context of revelation. Al-Kindi's rationalism is not a form of secular rationalism, rather, it constitutes an intellectual approach that regards reason as a divine gift serving to disclose universal truth (al-ḥaqq)[28]. Accordingly Al-Kindi believes that knowledge is produced by a methodical metaphysically focused process of logical reasoning rather than just through sensory experience. According to this framework revelation serves as a normative horizon that directs and controls the functioning of reason while philosophy is seen as a logical attempt to understand the First Cause (*al-sabab al-awwal*) and the order of the universe. Al-Kindis rationalism is based on this epistemological stance which also sets it apart from the purely secular rationalism of the Greek philosophical tradition.

Abu Yusuf Ya'qub ibn Ishaq al-Kindi was born around 801 AD in Kufa, Iraq, to a noble family of the Kindah tribe[29]. He is known in the West as Alkindus and is called the First Arab Philosopher (Faylasūf al-'Arab). He is a central figure of rationalism in the Islamic intellectual tradition. This thought is expressed in his most famous work, al-Falsafah al-Ulâ (On the First Philosophy), in which he defines metaphysics as the noblest of sciences, because its subject of study is the Cause of all that exists[30]. During the reigns of the Abbasid caliphs al-Maʾmūn and al-Muʿtaṣim when he was tasked with spearheading the translation of scientific and philosophical works from Greek into Arabic Al-Kindis intellectual influence became especially noticeable. Al-Kindi integrated Greek philosophical traditions, particularly Aristotelianism and Neoplatonism, into an Islamic conceptual framework during this time by methodically reformulating foreign texts arguments to align with Islamic rationality[31]. To Al-Kindi, philosophy and religion are both viewed as paths to truth, and logic and sense experience are viewed as tools for

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[27] Amr and Tbakhi, "Abu Bakr Muhammad Ibn Zakariya Al Razi (Rhazes): Philosopher, Physician and Alchemist", pp. 305-306.

[28] Triyanto, *Al-Kindi Thinking: Harmonization of Islam and Philosophy,* pp. 177-180.

[29] Fakhry, *A history of Islamic philosophy,* pp. 62-67.

[30] Alfred L. Ivry, *Al-Kindi's Metaphysics: A Translation of Ya'qub ibn Ishaq al-Kindi's Treatise" On First Philosophy"* (State University of New York Press, 1974), pp. 55-58.

[31] Jarman Arroisi, Nur Hadi Ihsan, and M. Najib Abdussalam, "The Notion of the Soul in al-Kindi: Building the Epistemological Foundation of Early Islamic Psychology", *Jaqfi: Jurnal Aqidah dan Filsafat Islam*, vol. 8, no. 2 (2023), pp. 172–91.

higher intellectual activity. Through this synthesis, Al-Kindi formulated an epistemological model that placed reason and revelation in a reinforcing relationship. This model became a primary epistemological framework for the progression of knowledge in the later periods of Islamic civilization.

When it comes to Al-Kindi's rationalism, one of the most distinct strengths of rationalism when viewed from an epistemological standpoint, is it's ability to build an intricate and orderly framework for knowledge. Using the theory of deduction, Al-Kindi was able to organize scientific pursuits around mega laws, and these laws were rational and beyond the physical world. This protected science from the shackles of relativist empiricism, and provided a solid philosophical basis for the development of the theoretical sciences, especially, metaphysics and cosmology. However, the rationalism of Al-Kindi has its own problems. His rigid reliance on the theory of deduction and universal laws, led him to a tendency to overlook the heterogeneity of empirical disaggregation and the fluidity of the social fabric. In relation to the applied sciences, this disposition of Al-Kindi provided little room for correction through experience and experimentation. Hence, because of the absence of empirical corroboration, Al-Kindi's rationalism was likely to produce a philosophical conjecture that would become a source of verifiable practical problems; and rationalism of Al-Kindi, was likely to produce conjectures of a practical problem source. Such gaps and shortcomings needed to be filled, and an experience and observation based epistemology such as that of Ar-Razi, was a direct result of this need.

Ar-Razi

With reference to the articulation of the tradition of rationalism by Al-Kindi, the development of empiricism in the Islamic intellectual tradition was furthered by Abu Bakr Muhammad ibn Zakariyya al-Razī (Rhazes). Empiricism is the epistemological view that knowledge is gained through the senses, particularly through the processes of observation and experiment, coupled with inductive reasoning[32]. Within the classical Islamic epistemological framework, Ar-Razi represents a particular form of inductive empiricism, where an experienced-based, systematic, and observational approach in the acquisition of scientific knowledge is taken. His form of empiricism is based on the premise that the truth as a basis of knowledge cannot be ascertained through reasoning and in the absence of experience, coupled with an authority of the text, and this knowledge must be corroborated through experience and the processes of verification; thus, knowledge is seen as a product of an inductive reasoning process that moves from the particulars to the universal.

Unlike the deductive rationalism which derives knowledge from universal laws, Ar-Razi's description of empiricism emphasizes the need for the empirical alteration of scientific theories. In this case, reason is still important, but it mainly serves the purpose of organizing, interpreting, and evaluating empirical evidence[33]. This means that Archimedes's description of empiricism offers remarkable epistemological construction

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[32] Audi, *Epistemology: A contemporary introduction to the theory of knowledge,* pp. 6-9.
[33] Romdlony et al., "Tawḥīdī Epistemology", pp. 402-404.

because of the provision of scientific knowledge and the basis of observation, experimentation, and constant revision. This direction effectively limits the excessive rational speculation and greatly contributed to the development of medicine and chemistry in the Islamic world. In other words, Archimedes's description of empiricism also poses epistemological confinement, in the absence of adequate metaphysical and rational foundations. Overdependence of the rational and metaphysical fundamentals results in a risk where knowledge becomes solely restricted to that which is empirically observable, which in science, results in the absence of the universal description and the normative aspects of science. This most particularly describes the critical interdependence of rationalism and empiricism where Archimedes describes rationalism as Al-Kindi needing empirical proof to avoid the abstraction of metaphysical thought and Al-Kindi's rationalism lost the direction of thought.

An important physician, philosopher, and alchemist, Ar-Razi was born in Rayy in 865 CE and died in 925 CE. He was initially interested in the arts and music, but after spending time in the lab and suffering lab-related eye damage, alchemy turned into medicine as Ar-Razi's new focus. He captured the experience in the *Kitab al-Ḥāwī[34]*, where he documented the medical findings he observed[35], rigidly following the medical empiricism that framed the Islamic scientific tradition. He had the honor of studying medicine in Baghdad under renowned physician Ibn Rabban al-ʿabarī. Ar-Razi succeeded in becoming a medical expert but he didnt stop there. He also studied and mastered logic, philosophy, ethics, and alchemy, making him a dominant figure and polymath in the Islamic world.

In order to further the assimilation of theory and practice, Ar-Razi used control groups in medical experimentation, illustrating his challenges to authority ungrounded in the facts[36]. He worked as the chief medical officer of a hospital in Rayy and was later promoted to Baghdad's hospital director, where he pioneered a clinical teaching model that was built around direct patient contact, efficient hospital sanitation, systematic hospital order, and managerial control. Ar-Razi was the first physician to clinically differentiate small pox from measles in , al-Jadarī wa al-Ḥaṣbah, a distinction that greatly advanced medical practice and theory[37]. Through his emphasis on observation, experimentation, and verification, Ar-Razi emerged as one of the earliest pioneers of evidence-based scientific practice[38].

To comprehend the range of the tools available to modern science, one must study the two great pioneers of science, Al-Kindi and Ar-Razi. Both are considered the founding

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[34] Amr and Tbakhi, "Abu Bakr Muhammad Ibn Zakariya Al Razi (Rhazes): Philosopher, Physician and Alchemist".

[35] Charles Burnett, *Arabic into Latin: the reception of Arabic philosophy into Western Europe* (2004), pp. 23–31.

[36] Peter E. Pormann, *Epistemologi medis dalam tradisi Islam abad pertengahan*, vol. Volume 4- Edisi 3 (Journal Aspetar Sports Medicine, 2016), pp. 506.

[37] Mohsen Naseri et al., "Rhazes, a pioneer in contribution to trials in medical practice", *Acta medico-historica Adriatica*, vol. 15, no. 2 (2017), pp. 261–70.

[38] Mohd Farid Mohd Shahran, "THE PRIORITY OF RATIONAL PROOF IN ISLAM: THE VIEW OF FAKHR AL-DĪN AL-RĀZĪ", *TAFHIM : IKIM Journal of Islam and the Contemporary World*, vol. 8, no. 1 (2015), pp. 1–18.

fathers of modern science. Al-Kindi was the first to introduce deductive reasoning, whereby one arrives at the truths via rational analysis. His emphasis was on the First Truth which, to him, was God[39]. On the other hand, Ar-Razi introduced the concept of inductive reasoning. He stated that for one to arrive at scientific truths, one must test scientific theories based on four elements: experience, observation, analysis, and proof. Although Al-Kindi and Ar-Razi focused on different disciplines, Al-Kindi on philosophy and Ar-Razi on medicine and chemistry, they both laid the first strike of the fundamental principles of modern science. These first principles combine rational reasoning and experiential proof. Rationalism combined with empiricism is what modern science is built on.

Internalization of Al-Kindi's and Ar-Razi's Epistemological Frameworks

This study aims to look at the theoretical implications of analyzing the rationalism of Al Kindi and the empiricism of Al Razi from an epistemological perspective. These implications show the potential of the internalization of these epistemological perspectives as functioning conceptual frameworks for the advancement of modern science. The internalization of these perspectives requires the individual to systematically combine both types of reasoning structures. Al Kindi's epistemological orientation is internalized with a focus on reasoning as described in the deductive manner, where use of the rational and reasonable mind (Giddens, 1987) is for the purpose of discovering universal principles, and formulating coherent theoretical frameworks or paradigms. An example of this in contemporary society is in theoretical physics. Theoretical physicists use mathematics to create models and employ abstract reasoning to make assumptions about unobservable things such as dark matter before any empirical evidence ascertains the existence of such things[40].

Unlike others, Ar-Razi's epistemology requires solid, inductive empirical practice, meaning that the focus centers around systematic observation, followed by verification, and ultimately, testing. This kind of orientation can be exemplified through empirical and iterative methodologies, especially in the medicine and the application of *randomized controlled trials* (RCT) field, to confirm the safety and efficacy of the drugs and/or vaccines[41]. This kind of internalization also requires the scholar to internalize the value of untested doctrines, the value of intellectual courage, and the value of the ability to challenge the prevailing paradigm. In this sense, Al-Kindi's moral and ethical philosophy concerning the man-God relationship invoked the most sense of the value, from the various scholarly traditions of Islam. To be able to restore the scientific traditions of Islam to a balanced state of rationality, empiricism, and a higher state of the spirituality, it is this kind of internalization which is most critical.

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[39] Achmad Khudori Soleh, *Filsafat al-Kindi* (Arruzz Media, 2016), pp. 55–62.
[40] *Ibid.*
[41] Amr and Tbakhi, "Abu Bakr Muhammad Ibn Zakariya Al Razi (Rhazes): Philosopher, Physician and Alchemist".

Current modern science emphasizes the importance of acquiring knowledge through intellectual reasoning, factual evidence, and ethics[42]. As an example, modern science also notes that theorizing and hypothesizing as a result of reasoning, followed by observation and experimentation, describes the research process[43]. It shows that rationalism and empiricism need not be antagonistic, and instead, may be viewed as dual pillars of a unified epistemological system. Rationalism provides the framework and direction of the inquiry, while empiricism provides the system of proof and adjustment. There would be no rationalism without some degree of empiricism, and without rationalism, any degree of empiricism would be a futile exercise. From this, one may view the synthesis as a complete one, rather than just a simple normative one.

In today's digital world, the principles of rationalism and empiricism become particularly important in the context of the innovation of science and technology. One of the prominent manifestations of rationalism in today's world is the development of *artificial intelligence* (AI) and other algorithm-based systems, which use deductive reasoning and mathematical modeling to provide solutions to problems in an analytical and constructive manner. The other principal manifestation of empiricism is the development of data-based (or big data) research and machine learning, which rely on the collection, observation, and verification of numerous data sets. The combination of both rationalism and empiricism demonstrates that the scientific achievements of the digital era rely, in addition to the reasoning capabilities of a scientist, on the ethical and responsible usage of available data. Therefore, applying the rationalism and empiricism of Al-Kindi and Ar-Razi is essential in maintaining the digital transformation for the benefit of humanity, the integrity of science, and the responsible ethics of every innovation.

Discussion

This Al-Kindi and Ar-Razi example shows the two approaches to epistemology as not mutually exclusive but rather in a dynamic dialectical relationship. With Al-Kindi's rationalism, the strength lies in the conceptual and metaphysical realms of knowledge, especially in creation a coherent theoretical framework. However, this approach, as mentioned, does have its limits when faced with the sophistication of the empirical realm, which requires an unending and empirical adjustment. In the contrary, Ar-Razi's empiricism, knowledge which is accumulated is outstanding, tested in practice and gained through methodical observation and experimentation. In this respect, the empirical scope is dominant and unbounded, leading to abstract and unverifiable speculation. However, when empiricism is not governed by rational, ethical, and normative frameworks, it risks losing its metaphysical orientation altogether.

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[42] Riza Mulfi Hari Aji, Fatimah Azuhra, and Nur Hanifiyah, *EPISTEMOLOGI DALAM PERSPEKTIF ISLAM DAN BARAT: OBSERVASI, EKSPERIMEN, DAN RASIONALITAS*, vol. 23 (2025), pp. 41–52.

[43] Fazlur Rahman, *Islam & modernity: Transformation of an intellectual tradition*, vol. 15 (15-23: University of Chicago Press, 2024).

Within this context, representation of the fusion of Al-Kindi's rationalism and Ar-Razi's empiricism serves its purpose here as a synthesised and critical definitional epistemology as opposed to an epistemological-methodological fusion. Rationalism would allow the construction of a definitional framework and set the theoretical parameters of what would constitute boundaries of the scientific investigation, and empiricism would assist in questioning and reformulating the definitional constructs in practical, tangible terms. The Islamic epistemology community shows the absence of the split between the use of reason and experience. Demonstrating in this instance, an all-embracing construct, integration, and use of both as essential in the quest to acquire knowledge.

The interpretations of this study hinge on a triad of arguments. The first argument delineates the notion of the existence of dual and distinct yet integrative epistemological constructs which would dictate the flow of the scientific rational system to be iterative and dialogical, whereby rational assertions would need to empirically be tested, thus confirming the iterative flow of the system, a phenomenon which typified the Islamic scientific tradition - the self-correcting system. The second argument framed the references to the Al-Kindi philosophical rational and the Ar-Razi empirical clinical paradigms which appear to be the fusion of the two traditions, in terms of the articulation of the ultimate rational truths and the experience of the ultimate rational truths as the Islamic scientific Archimedean point of the articulation of the rationalism as the essence and the ultimate empiricism as the application. The Islamic scientific methodology had a dialectical methodology and this fusion represents that in Ar-Razi's empirical clinical prism. The final argument references the knowledge.

This study proposes three clear directions for future development based on these findings. First is Recognition, which proposes incorporating the Islamic origins of the modern scientific method into the curricula of the teaching of science. Second is Repositioning, which attempts to advocate for the Islamic scientific tradition as an integrative paradigm for the construction of "*scientifically*" and "*morally*" reasonable frameworks of knowledge. Third is Reactualization, which involves the restoration of the experimental and rational attributes of Al-Kindi and Ar-Razi through interdisciplinary scholarship and collaboration. The described initiatives should allow for the synthesis of the various components of the study, resulting in a contribution to contemporary scientific discourse.

Conclusion

This study finalizes that Al-Kindi's rationalism and Ar-Razi's empiricism formed two pillars of classical Islamic rationalism that are still dialectically relevant to the contemporary scientific method. Al-Kindi's rationalism offers a deductive and metaphysical structure that places reason at the forefront in capturing absolute truths. In contrast, Ar-Razi's empiricism secures that scientific knowledge is always open to verification through the observational and experimental frameworks. The integration of these two epistemological approaches is dialectical and not simply normative,

constituting an integration of epistemology that is theoretically rational and empirically authoritative.

This study aims to reconceptualize the epistemological connection between rationalism and empiricism within an Islamic context, beyond simply providing a descriptive comparison of the two figures. In this way, the article seeks to revitalize the Islamic epistemic scientific tradition by developing an epistemological model applicable to the field of secondary and tertiary education, scholarly research, and modern scientific advancement. Furthermore, this fusion deems fit a constructive discourse between the modern philosophy of science and classical Islamic philosophy, thus reiterating the importance of the Islamic intellectual tradition in confronting contemporary issues of epistemology.

The study's academic implications indicate the necessity of reinforcing the critique of the internalization of the rational spirit, the critical epistemic autonomy, and the morally oriented istiqamah within Islamic education and modern Muslim scholarly research. Such critical components of Muslim scholarly research and education may assist in the strengthening of the philosophy of science curriculum, the improvement of research methodologies, and the meaningful synergetic of the religious and the rational (or empirical) sciences. This being said, the study did have its limitations. The analysis has been restricted to only two prominent scholars and has not dealt with the later periods of Islamic epistemology and its rational–empirical intersections in particular fields of science. Thus, subsequent studies may focus on the comparative study of post-classical Islamic scholars and the rational empirical framework in current systems of education, science, and technology.

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