



Integrating Science and Shariah: Scenarios from Higher Education, Islamic Finance and The Halal Industry

Contemporary Issues in Shariah

Integrasi Sains dan Syariah: Senario dalam Pendidikan Tinggi, Kewangan Islam dan Industri Halal

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ABSTRACT

The growing complexity of contemporary challenges requires a more coherent integration of scientific knowledge and shariah principles. However, current approaches remain fragmented and lack a sufficiently systematic framework for practical application. This study critically examines the integration of science and shariah in three selected sectors: higher education, Islamic banking and finance, and the halal industry. Drawing on a critical narrative review of relevant literature, the study analyses existing practices through the concepts of Islamization of Knowledge, revelation-guided science, the integration of Naqli and Aqli knowledge, Tawhid, and Maqasid al-Shariah. The findings demonstrate that integration has progressed beyond theoretical discourse and is increasingly reflected in university curricula, shariah-compliant financial innovation, digital finance, halal governance, and supply-chain traceability. Nevertheless, its implementation remains constrained by epistemological fragmentation, limited multidisciplinary competence, methodological inconsistencies, inadequate technological and shariah literacy, and the absence of standardised shariah governance for emerging technologies such as artificial intelligence and blockchain. In the halal industry, an additional concern is the tendency to prioritise procedural halal compliance without adequately incorporating the broader principles of *halalan tayyiban*, consumer welfare, and sustainability. The study proposes a more systematic and applicable epistemological approach that integrates revelation, reason, and empirical evidence while preserving scientific rigour and alignment with Maqasid al-Shariah. This requires Tawhid-based curricula, cross-disciplinary capacity building, ethical frameworks for emerging technologies,





stronger governance, and sustained collaboration among academia, industry, shariah scholars, and regulators. Such integration can transform science and shariah from parallel domains into a unified foundation for ethical, sustainable, and socially meaningful development.

Keywords: Integration; Science; Shariah; *Maqasid al-Shariah*; Islamization of Knowledge; Naqli and Aqli Epistemology

ABSTRAK

Kerumitan cabaran dalam dunia kontemporari memerlukan integrasi pengetahuan saintifik dan prinsip syariah yang lebih tersusun. Walau bagaimanapun, pendekatan semasa masih bersifat terasing tanpa kerangka kerja yang sistematik untuk aplikasi praktikal. Justeru, kajian ini menilai secara kritis integrasi sains dan syariah dalam tiga sektor terpilih: pendidikan tinggi, perbankan dan kewangan Islam, dan industri halal. Berdasarkan tinjauan naratif kritikal terhadap literatur yang berkaitan, kajian ini menganalisis amalan sedia ada melalui konsep Islamisasi Ilmu, sains berpandukan wahyu, integrasi ilmu Naqli dan Aqli, Tauhid, dan Maqasid al-Syariah. Hasil kajian menunjukkan bahawa integrasi telah berkembang melangkaui wacana teori dan dapat dilihat dalam kurikulum universiti, inovasi kewangan patuh syariah, kewangan digital, tadbir urus halal, dan kebolehesanan rangkaian bekalan. Walau bagaimanapun, pelaksanaannya masih dikekang oleh epistemologi yang terpisah, kurangnya kompetensi dalam menguruskan usaha-usaha multi-disiplin, metodologi yang tidak konsisten, literasi teknologi dan syariah yang tidak mencukupi, dan ketiadaan tadbir urus syariah yang standard untuk teknologi memunculkan seperti kecerdasan buatan dan rangkaian blok. Dalam industri halal, kebimbangan tambahan termasuk kecenderungan untuk mengutamakan pematuhan prosedur halal tanpa menggabungkan prinsip halalan tayyiban, kebajikan pengguna dan kemampuhan. Kajian ini mencadangkan pendekatan epistemologi yang lebih sistematik dan sesuai yang mengintegrasikan wahyu, akal dan bukti empirikal sambil memelihara ketelitian saintifik dan penjajaran dengan Maqasid al-Shariah. Ini memerlukan kurikulum berasaskan Tauhid, pembinaan kapasiti merentas disiplin, rangka kerja etika untuk teknologi baharu, tadbir urus yang lebih kukuh dan kerjasama yang berterusan antara ahli akademik, industri, cendekiawan syariah dan pengawal selia. Integrasi sedemikian boleh mengubah sains dan syariah daripada domain yang hanya bersifat selari kepada domain dasar yang bersepadu untuk pembangunan yang beretika, mampan dan bermakna secara sosial.

Kata kunci: Integrasi; Sains; Syariah; *Maqasid al-Syariah*; Islamisasi Ilmu; Epistemologi Naqli dan Aqli

INTRODUCTION

The integration of shariah and science is crucial for confronting the contemporary challenges of the 21st century, as it aligns with shariah principles while remaining attuned to current advancements (Adawiyah, et al., 2016). The sources of shariah, including the Qur'an, Sunnah, Ijma', Qiyas, and the principles of Usul al-Fiqh, serve as the foundation for addressing contemporary challenges, as the Qur'an and Sunnah are



divinely ordained guides for humanity (Az-Zahra et al., 2023). This integration is not novel, rather it has existed since the Islamic era, during which ancient scholars such as Ibn Rushd, Al-Biruni, and Ibn Sina adeptly merged legal studies with scientific inquiry. However, this tradition has undergone a decline due to various reasons including institutional fragmentation, over specialization and rigid *taqlid* (to follow a *mujtahid* in religious laws and commandment as he has derived them where a *mujtahid* is a person who is an expert of Islamic jurisprudence (*fiqh*) rendering strict adherence to earlier rulings became dominant, reducing openness to new scientific data) colonial disruption and western epistemological dominance, and loss of Arabic as the scientific lingua franca (Thakur et al., 2025).

Synthesis of reason and revelation has been argued to be able to address these challenges. According to Jumarni et al. (2024), the integration of reason and revelation offers viable solutions to the challenges confronting Islamic law, while simultaneously encouraging the development of legal frameworks that are more responsive to advancements in social governance, politics, and related domains.

The discussion elucidates that the integration of scientific inquiry and shariah principles is essential for addressing contemporary issues. Nonetheless, a deficiency exists in a coherent conceptual framework for the integration of science and shariah (Tajuddin et al., 2014; Harahap et al., 2025). Lacking a definitive concept or basis complicates the holistic understanding of integration and hinders its practical application across diverse scopes of implementation. For instance, technological advancements, including artificial intelligence, biotechnology, and big data, are intensifying modern challenges with significant ethical implications (Saifuddeen et al., 2013; Zulkepli et al., 2025). It is argued that modern research and problem-solving endeavours continue to inadequately implement shariah-based mechanisms and guidelines. This can lead to an absence of explicit direction for scientific practitioners and policymakers in evaluating shariah compliance of scientific and technological innovations to solve contemporary issues.

Despite increasing efforts to integrate science and shariah in responding to challenges, significant limitations remain. This shortfall can be attributed to the absence of a robust and universally accepted conceptual framework to guide such integrative efforts. This work aims to study the integration of science and shariah in selected contemporary sectors by analysing them against several key concepts.

Specifically, the study seeks:

- (i) to describe how the integration of science and shariah is implemented in practice across higher education, Islamic finance, and the halal industry;
- (ii) to interpret these implementations through the lens of selected key concepts
- (iii) to identify key practical challenges and gaps in the current approaches to integration, along with suggested directions for improvement.

The significance of this study is reflected in its contribution to both academic understanding and practical discussion of science and shariah integration. For



academics and researchers, the study provides a cross-sectoral description of existing integration practices and interprets these practices through selected concepts, contributing to discussions on the relationship between revealed knowledge and scientific reasoning (Syihabuddin et al., 2023; Jumarni et al., 2024). For practitioners and policymakers, identifying practical challenges and gaps may provide insights into areas requiring further development and more systematic approaches to integration, particularly in addressing contemporary issues involving scientific and Shariah considerations (Thakur et al., 2025).

LITERATURE REVIEW

Previous studies indicate that the integration of science and Shariah has been discussed from the perspectives of epistemology, higher education, Islamic finance, and the halal industry. From an epistemological standpoint, the Islamization of Knowledge emphasizes efforts to link the advancement of knowledge with the Islamic worldview and the concept of Tawhid (Divine Oneness). Syihabuddin et al. (2023) discuss Ismail Raji al-Faruqi's concept of the Islamization of Knowledge as an approach to addressing the influence of secularism and connecting the development of knowledge with the concept of Tawhid. These discussions demonstrate that the epistemological foundation is a crucial aspect in understanding the relationship between modern knowledge and the Islamic perspective.

In the context of higher education, the integration of science and Shariah is also implemented through the integration of Naqli (revealed) and Aqli (rational) knowledge within the teaching and learning process. Abdullah et al. (2019) examined the implementation of Naqli and Aqli elements in the "English for Academic Purposes" course at the Islamic Science University of Malaysia (USIM) and found that these elements were incorporated into instruction, although the level of understanding and implementation remained basic. Meanwhile, Mohamed et al. (2018) studied the integration of Naqli and Aqli in the teaching of Arabic for Specific Purposes and found that lecturers implemented this integration using their own respective approaches, without reference to a specific model. Both studies demonstrate that the integration of knowledge can be applied in educational practice through specific teaching approaches and processes.

In the realm of Islamic finance, technological advancements have broadened the discourse regarding the relationship between technological innovation and Shariah. AlSalih (2025) examined the use of blockchain-based smart contracts in Islamic finance, focusing on aspects such as auditability, Shariah interpretation, and human oversight. These developments indicate that the application of technology in Islamic finance involves not only technical efficiency but also necessitates appropriate governance mechanisms and Shariah oversight.

In the halal industry, the integration of science and Shariah is also linked to the use of technology for supply chain traceability. Nashirudin et al. (2024) analyzed the use of blockchain in halal traceability based on Maqasid al-Shari'ah values, specifically



transparency, accountability, responsibility, and justice. This demonstrates that technology can serve as an instrument to support Shari'ah objectives within the management of the halal industry.

Overall, previous studies have focused on the epistemological foundations, implementation methods, and applications of integrating science and Shari'ah across various contexts. Building on these developments, future research could focus on how this integration is put into practice, the challenges encountered during implementation, and the implications arising when the integration of scientific and Shari'ah perspectives is not comprehensive.

METHODOLOGY AND RESEARCH DESIGN

This study employs a qualitative approach through a critical narrative review design, examining literature related to the integration of science and Shariah within higher education, Islamic finance, and the halal industry. This approach was selected because the study aims to describe and interpret the implementation of integration, compare the approaches used, and identify challenges and gaps in existing research, rather than measuring relationships between variables. Data collection was conducted through literature searches across academic databases such as Scopus, Web of Science, and Google Scholar, using keywords related to the "integration of science and Shariah," "Islamisation of knowledge," "Naqli and Aqli," using keywords related to the "integration of science and Shariah", "Islamisation of knowledge", "Naqli and Aqli", and "Maqasid al-Shariah" within the contexts of higher education, Islamic finance, and the halal industry.

Furthermore, identified sources were screened based on their relevance to the study's objectives, academic content, and contextual suitability. Relevant journal articles, academic books, and scholarly sources served as secondary data. The data were analysed thematically to identify patterns, similarities, differences, challenges, and gaps across the literature. According to Braun and Clarke (2021), thematic analysis provides a systematic and flexible approach for identifying and interpreting patterns within qualitative data. The reliability of the interpretation was strengthened through cross-source and cross-sector comparisons, as well as interpretations grounded in the concepts of the Islamisation of Knowledge, Tawhid, Naqli and Aqli, and Maqasid al-Shariah.

CONCEPTS OF THE INTEGRATION OF SCIENCE AND SHARIAH

To enable meaningful discourse on the integration of science and shariah in solving contemporary issues, this section first describes three relevant concepts. The first concept is based on the Islamization of knowledge, which is grounded in the principle of tawhid (the oneness of Allah). This concept exists because contemporary science, rooted in secularism, results in an incomplete understanding from an Islamic viewpoint (International Institute of Islamic Thought, 1989). The Islamization of Knowledge (IoK) concept was initiated by Ismail Raji al-Faruqi, who asserted that contemporary science



must be restructured according to the Islamic worldview, which is founded on Tawhid. Based on this concept, the distinction between revealed knowledge and rational knowledge is non-existent, and science is regarded as fulfilling the Maqasid of al-Shariah (the higher objectives of shariah), which aims to promote the welfare of humanity. Also, values, aims, and methodologies must align with the tenets of Islamic faith and jurisprudence. Tawhid must be included as the foundational element of this epistemological framework (Lestari et al., 2020).

The second concept, by guided by revelation, posits that science can be employed in a holistic and ethical manner (Muslih et al., 2025). This concept further described that the multitude of scientific discoveries, if not assessed through revelation and shariah, may result in moral or ethical deviations. Based on this concept, science is not dismissed but rather regulated and guided by shariah principles to ensure alignment with Islamic values. Integration will occur when scientific discoveries are assessed through the lens of the Qur'an, Sunnah, and the principles of Usul al-Fiqh. Revelation serves as an authoritative source of knowledge. This idea signifies that revelation, specifically the Qur'an and Sunnah, is regarded as the paramount authoritative source for discerning truth and guiding the progression of knowledge. Additionally, science functions as an instrument rather than a final goal. Scientific discoveries and advancements should be oriented toward furthering shariah objectives, including safeguarding religion, life, intellect, lineage, and property. Evaluation should be conducted using Usul al-Fiqh methodologies, including *qiyas*, *maslahah*, *sadd al-dhara'i*, and the consideration of Maqasid al-Shariah (Alias et al., 2024).

The third concept emerged due to methodological shortcomings that treated science (that produces knowledge through observation, experiments, data, and empirical testing) and shariah (that produces knowledge through revelation (Qur'an & Sunnah), Usul al-Fiqh, *qiyas*, *ijma'*, *maqasid*, to name a few) as separate systems of knowledge production, thereby limiting their effectiveness in addressing contemporary challenges. Based on this concept, Muslim researchers and scientists can integrate sources of knowledge, specifically revelation, reason, and empirical evidence, to evaluate contemporary issues such as bioethics, technology, and the environment (Malkawi et al., 2024).

This concept emphasizes integration from an epistemological standpoint, which entails the unification of sources, methods, and objectives of knowledge. The integration of scientific methodologies, including observation, analysis, and evidence, with Usul al-Fiqh techniques such as *qiyas*, *istislah*, and *istihsan* in legal determination represents a harmonized approach. This methodology facilitates the systematic analysis of intricate modern issues, particularly within the domains of science and technology, while adhering to the tenets of Islamic law (Kamali et al., 2011; Ikhsanuddin et al., 2025).

The fourth concept is the integration of Naqli and Aqli knowledge, which combines revealed knowledge with rational and acquired knowledge in understanding and addressing contemporary issues. Naqli refers to knowledge derived from divine revelation, particularly the Qur'an and Sunnah, whereas Aqli refers to knowledge



acquired through human reasoning, intellectual inquiry, observation, and empirical investigation (Ibrahim et al., 2017; Ali et al., 2024). Rather than treating these two forms of knowledge as separate domains, their integration seeks to establish a complementary relationship in which revealed knowledge provides Islamic values and guidance, while rational and empirical knowledge contributes to the understanding and analysis of worldly phenomena.

This approach enables contemporary issues to be examined by considering both religious guidance and intellectual or empirical evidence. In this regard, the integration of Naqli and Aqli does not reject scientific or rational inquiry but positions it within an Islamic framework, allowing knowledge from both sources to contribute towards a more comprehensive understanding and responsible application of knowledge (Hashim et al., 2019; Zainuddin et al., 2016).

INTEGRATION OF SCIENCE AND SHARIAH IN SOLVING CONTEMPORARY ISSUES IN SELECTED SECTORS

The integration of science and shariah is a holistic approach that harmonizes revealed knowledge and rational knowledge to address contemporary challenges. This approach ensures that the development of knowledge and technology is in line with Islamic values and shariah principles (Fakhrurrazi et al., 2023). This section described the integration of science and shariah in selected contemporary context. In the education sector, such integration aims to produce a knowledgeable and ethical generation who are able to critically evaluate modern issues. Meanwhile, in Islamic banking and finance and the halal industry, the integration serves as a backbone to ensure practices and governance are in line with shariah while effectively addressing the ever-increasing complex system.

Integration of Science and Shariah in Institute of Higher Learning

The integration of science education and Islamic religious education is needed because there is a significant gap between the two, causing students to emphasize modern academic achievement without strengthening faith and morals. This weakness stems from teachers and institutions who lack understanding of integrated education, thus making effective implementation difficult. Focusing solely on academics affects students' intellectual, ethical, and religious development, thus impacting their personal and professional qualities in the future (Embong et al., 2018).

This integration thus allows students to build strong faith, practice noble morals, and understand shariah principles holistically. In Malaysia, the integrated system from preschool to university level aims to address social and moral issues which produce academically excellent individuals with high ethics. Students who practice this integration are expected to demonstrate discipline, responsibility, and respect for others in their professional lives (Lubis et al., 2022).



Knowledge integration in Malaysian education is needed to produce students who are not only intellectually intelligent but also morally upright, capable of making decisions based on scientific principles and Islamic law. Conventional education systems often separate science and religion, causing students to consider Islamic knowledge less important, thus affecting the development of professional values and responsibilities (Az-Zahra et al., 2023). With integration, there is a comprehensive knowledge paradigm where all knowledge comes from Allah, differing only in terms of methodology (Malik et al., 2020). Universities such as the International Islamic University Malaysia (IIUM), Universiti Sains Islam Malaysia (USIM) and Universiti Tun Hussein Onn (UTHM) show that the integration approach strengthens the application of knowledge based on Islamic values, thus producing competitive and ethical graduates.

Western colonialism has introduced a secular education model in many Islamic countries, which separates science from the metaphysical framework and religious values. The discourse on the "Islamization of knowledge" discussed by Syed Muhammad Naquib al-Attas, described by Hasim et al. (2025), emphasizes the need to free knowledge from secular elements that separate the nature of knowledge from manners, morality, and the purpose of life. The challenge of education is not just a matter of curriculum content, but confusion over the concept of knowledge, which affects the formation of moral people. Therefore, this educational crisis demands the reorganization of modern knowledge within the framework of monotheism, so that the development of knowledge runs in parallel with the construction of morality and the Islamic worldview.

In this context, IIUM is an example of knowledge integration, where the modern curriculum is attempted to be integrated with the principles of shariah. A study by Hussien et al. (2018) shows that the effectiveness of integration depends on the understanding and practice of academics themselves, including pedagogical and training challenges. Meanwhile, the studies by Rohim et al. (2025) and Amin et al. (2012) assessed the marketability of graduates and the effectiveness of the integrated curriculum, showing that IIUM succeeded in producing graduates who are professionally competent and remained ethical and aware of moral responsibilities according to an Islamic perspective. This emphasizes that the integration of knowledge is not just a curriculum structure, but a comprehensive effort to form civilized individuals who are able to compete at the professional level without being separated from shariah values.

The integration of Naqli and Aqli knowledge is needed to address the lack of holistic understanding in current education, where modern knowledge is often taught secularly without reference to the sources of revelation. This gap poses a risk of developing materialism and value relativism in society, because the knowledge obtained is only guided by reason without the guidance of the Qur'an and Sunnah (Jailani et al., 2019). Without integration, students have the potential to lose intellectual and moral balance, thus affecting their ability to solve current problems ethically and based on Islamic principles. This integration also addresses the issue of lack of practical applications in the curriculum, including in research and community development, where many



institutions fail to systematically combine the perspectives of revelation and modern science (Zarkasih et al., 2019).

USIM applies the INAQ concept to restore the holistic nature of knowledge, emphasizing the balance between revelation and contemporary science while inspiring innovative solutions to global problems (Hashim et al., 2019). This implementation enables graduates to be proficient in their professional fields and guided by the principles of the Qur'an and Sunnah, emulating previous Islamic figures such as Ibn Sina and Ibn Khaldun. For example, the integration of Naqli and Aqli in English language learning encourages students to dialogue, research articles, and analyze issues based on revelations while also improving language proficiency and appreciating classical knowledge (Izham et al., 2017). Therefore, the integration of knowledge is needed to produce individuals who are intellectually and morally balanced, capable of critical thinking, and play a responsible role in the development of society.

Higher education urgently needs to integrate science and shariah, as the absence of a Tawhid-based perspective leads to unbalanced student development. According to Helmy et al. (2025), focusing solely on academic learning without an appreciation of spiritual values causes students to ignore the dimension of life after death. This emptiness of the Tawhid framework weakens the university's efforts to produce holistic graduates who are able to integrate knowledge, faith, and charity. Without a structured paradigm, graduates tend to judge success based solely on human recognition or material achievements, ignoring relationships with Allah, fellow humans, and the environment. Therefore, integration is needed as a mechanism to instill Tawhid values, enabling students to understand the implications of knowledge in ethical, social, and spiritual contexts, while also building an awareness of responsibility towards society and the environment.

UTHM has taken the initiative to implement the Tawhid Paradigm to ensure that this integration occurs systematically. Author Khalid et al. (2023) emphasize that four core values, namely Amanah, Siddiq, Fatanah, and Tabligh, are the foundation in guiding students to act ethically and balance academics with spirituality. Implementation through 24 teaching methods, including intention, relationship with Allah, integrity, and mastery of knowledge, not only targets Muslim students but also non-Muslim staff to foster a culture of ethics and information sharing. This analysis shows that integration is not just theoretical teaching but a strategic necessity to ensure that universities achieve the goals of holistic education, forming graduates who are competent, moral, and contribute positively to society (Khalid et al., 2021). Table 1 shows the implementation of the integration of science and shariah in institute of higher learnings.



Table 1: Implementation of The Integration of Science and Shariah in Universities

University	Integration Approach	Concept	Implementation	Benefits
International Islamic University Malaysia (IIUM)	Modern curriculum integrated with Islamic epistemology	Combining Naqli and Aqli knowledge in professional fields	Students evaluate current issues, technology, and biomedical sciences from a Shariah perspective.	Graduates are professionally competitive and maintain Islamic identity, with improved employment rates and positive employer feedback.
Universiti Sains Islam Malaysia (USIM)	INAQ concept: Integration of Naqli and Aqli knowledge	Balance between revelation and contemporary science	Courses like English encourage dialogue, research, and analysis based on revelation.	Graduates are intellectually and morally balanced, capable of critical thinking, and contribute responsibly to society.
Universiti Tun Hussein Onn Malaysia (UTHM)	Tawhid Paradigm	Integration based on Tawhid values to achieve ethical, spiritual, and academic balance	24 teaching methods emphasize intention, relationship with Allah, integrity, and mastery of knowledge.	Graduates are competent, ethical, and contribute positively while fostering a culture of ethics and knowledge sharing.

Integration of Science and Shariah in Islamic Banking and Finance

The integration of science and shariah in Islamic banking and finance sector can be seen in at least two main aspects; the Shariah Financial Technology and the innovation of Islamic finance/banking products as alternative to the conventional counterparts. Nurdiana et al (2025), posits that there is a necessity for the development and establishment of Shariah Financial Technology that integrates contemporary financial technology with shariah principles (Nurdiana et al., 2025). The Shariah Financial Technology may include digital payments, investments, peer-to-peer loans, and crowdfunding, all functioning online in accordance with shariah rules. Nonetheless, it is contended that although Shariah Financial Technology drives innovation and inclusion, ongoing improvements in transparency, efficiency, and shariah governance are vital to ensure its global competitiveness and credibility (Nawi et al., 2025).

Blockchain has been described as a tool that is line with Maqasid al-Shariah and can play a role in innovating Islamic finance (Dewayat et al., 2025). Blockchain offers an immutable and transparent record of financial transactions hence, it eliminates gharar (high level of uncertainty and risk in monetary transactions) and enables shariah



compliance audits. Integrating blockchain technology into the administration of zakat, waqf and sukuk can also significantly enhance transparency, streamline operations, and embed robust audit trails, fostering greater public trust (Septianda et al., 2022).

In addition to blockchain, the application of artificial intelligence (AI) is crucial for enhancing the quality of Islamic financial services (Najib et al., 2025). Artificial intelligence technology, including robotic advisers, machine learning, and automated risk assessment systems, enhances customer service, enables precise financial decision-making, and detects illegal activity. In the absence of AI, Islamic banks may fall behind in innovation and efficiency relative to conventional banks. This technology enables the automation of processes including customer service, fraud detection, and loan risk evaluation. Despite advancements in AI, it requires a definitive ethical framework to ensure that the results conform to shariah standards as AI may reach decisions that could potentially conflict with Islamic principles if not adequately governed (Omar et al., 2024).

Islamic finance aims to provide transparent and just financial dealings that avoid usury, *gharar* (excessive uncertainty that makes a contract unfair or unclear), and *maisir* (gambling or any transaction where wealth is acquired by chance, without effort or legitimate exchange). Integration of shariah and science in terms of advancement of financial technology has been shown to be able to achieve this goal. Ishak et al. (2021) described that Maqasid al-Shariah could pragmatically adapt shariah rulings into the real operation of Islamic finance for instance in the case of case of home loans.

Typically, a traditional product like a home loan has interest, which is considered haram in Islam. The charge of interest will impose repayment obligations on the consumer, creating an unfair burden (Abdull Manaf et al., 2017). To avoid usury in home loans, shariah-compliant alternatives such as Bay' Bithaman Ajil (deferred payment sale) or al-Ijarah thumma al-Bay' (hire then buy) where interest is substituted with profit or *ujrah* (rent), are provided to replace conventional banking products rendering the transaction lawful under shariah law. By modifying it to adhere to shariah principles, banking institutions can enhance competitiveness and sustain operations without the necessity of developing an entirely new product.

Islamic banking principles has also been described to complement green finance goals, enabling ethical, socially responsible, and environmentally sustainable investments, though regulatory and implementation challenges exist (Anami et al., 2024). For example, Green Sukuk and ESG (environmental, social governance)-compliant fund have enabled Islamic financial institutions to financially support eco-friendly and socially responsible initiatives. This type of funds allocates investments to environmentally sustainable and climate-resilient projects, including renewable energy, sustainable transportation, and a circular economy (Aldhaheeri et al., 2025).



Integration of Science and Shariah in Halal Industry

Halal industry is a unique industry that showcase the importance of integration of science and shariah. Being an inherently a faith-based system, it however, does not discount the underlying role of scientific body of knowledge that supports the shariah rulings related to halal. As halal industry grows rapidly worldwide and the supply chain becomes more complex, the integration of science and shariah in solving various issues is increasingly warranted.

Several studies have pointed out the missing elements of *toyyib* which encapsulates the scientific attributes including hygiene, safety, quality, wholesomeness and overall well-being. To counter this shortcomings, Maqasid-based approach is recommended where *halalan toyyiban* practices, certification and governance are laid upon the Maqasid al-Shariah to attain the preservation of religion, life, intellect, lineage, and property (Hilme et al., 2024, Zain et al., 2022).

Further, the *halalan toyyiban* status of a product or service must encompass the entire supply chain, spanning preparation, production, processing, storage, transportation, and final delivery. Both the Qur'an and the Sunnah emphasize that halal, wholesomeness (*toyyib*), and cleanliness are integral dimensions of faith. Without grounding halal practices in the framework of Maqasid al-Shariah, a product may technically fulfil halal requirements yet fall short of delivering holistic benefits to individuals, society, and the environment (Ramli et al., 2017). Similarly, another study described that product safety principles are consistent with shariah objectives, as the concept of *toyyib* requires products to be safe, clean, and non-harmful to consumers (Mohd Jalil et al., 2019).

The integration of science and shariah within the halal industry is also essential in addressing rapid advancements in biotechnology, materials science, and synthetic innovations. These developments have led to the emergence of numerous food, pharmaceutical, and cosmetic products whose ingredients and production processes present complex and, at times, ambiguous halal status (Mappiare et al., 2025). These developments further complicate the halal certification process, as products must undergo multiple technical assessments before their status can be properly verified. At the same time, many shariah scholars may not be sufficiently exposed to the scientific and technological dimensions of contemporary research. This knowledge gap can constrain their ability to evaluate complex ingredients, scrutinize production processes, and issue well-informed and accurate halal rulings.

Salam et al. (2023) emphasizes that the active involvement of shariah scholars in the Halal Assurance System (HAS) is indispensable, as the concept of halal is fundamentally rooted in Shariah principles. However, rapid advancements in biotechnology present new challenges that require a sound understanding of scientific knowledge to accurately determine the halal status of certain products.



Therefore, the training and education of shariah scholars must be strengthened to enhance their capacity to evaluate materials, technologies, and production processes more effectively. At the same time, scientific experts should also revisit and upgrade their shariah knowledge to better complement their shariah scholar counterparts, particularly in the areas of auditing and halal governance. Strengthening the competency framework of shariah scholars and auditors is essential to ensure that halal rulings and assurance processes are carried out with professionalism and accountability (Kasim et al., 2015).

The need for integration of science and shariah in halal industry can also be seen in the aspect traceability of products. While the global demand for halal-certified food products is rising due to their assurance of improved hygiene and safety requirements, consumers query about the reliability of halal certification, transparency in the production process, and traceability within the supply chain (Alourani et al., 2024). This issue weakens consumer confidence due to the challenges in verifying that a product truly adheres to halal standards from the raw material source to the final product.

A robust traceability mechanism is essential to strengthen consumer confidence in the halal status of products. In this context, blockchain technology offers significant potential, as it can securely record data on the origin, composition, manufacturing processes, and distribution of certified items. By providing transparent and tamper-resistant information on product development, processing, and storage, blockchain enables consumers to make more informed purchasing decisions (Abd Muin et al., 2025).

However, a key challenge lies in the lack the technical expertise and infrastructure required to develop and manage blockchain systems among the many halals certifying bodies and industry players, particularly small and medium-sized enterprises (SMEs). To address this gap, structured training programmes, technical capacity-building initiatives, and clear industry standards are necessary to ensure the effective and sustainable adoption of blockchain technology within the halal ecosystem (Firmansyah et al., 2025).

CHALLENGES AND WAY FORWARD

The previous section has explained how science and shariah are currently integrated in selected contemporary context. This shows that such integration is no longer something new or unusual. Instead, it is increasingly applied in many areas of development, including academic work, innovation, economic activities, and the halal industry.

This development also shows that shariah principles are not only theoretical or limited to religious rituals. When combined with scientific methods and evidence-based approaches, they remain relevant, practical, and applicable to modern life. Many studies have demonstrated that religion and science can work together in addressing contemporary challenges. However, some challenges remain. There are ongoing perceptions that religion is restrictive or that it slows down progress. These



misunderstandings continue to hinder wider acceptance of a more integrated approach between science and shariah.

In education sector, the epistemological gap between science and Islamic religious education is still a critical issue. Science education is empirical, while religious education is normative where this separation causes students to prioritize science and consider religious knowledge to be less important. The assessment found that this dichotomy has a direct impact on the priority of knowledge and the formation of students' worldviews, not just a curriculum issue but a fundamental issue of understanding (Zaharudin et al., 2025). A possible solution is to use the Tawhidic framework as the basis for unifying knowledge, not just as a philosophical theory, but as the basis for designing learning modules. Educators need to develop integrative course modules that systematically connect the Qur'an and Sunnah with scientific methodology, so that the unification of knowledge is functional, not merely conceptual.

The comparison also shows that educational integration is ineffective and inconsistent due to the lack of bi-disciplinary competence among educators, that is, educators only master one field, not both (Kilau et al., 2024). This creates an implementation gap despite the abundance of integration discourse. Therefore, evaluating solutions such as co-teaching systems and professional training is no longer optional, but a structural necessity. In addition, the implementation of the integration curriculum that has not been systematic and widespread proves that acceptance is still low among academics and the community (Mazlan et al., 2025). Justification for improvement must be through increased conferences, journals, and scientific discussions that evaluate effectiveness, not just introduce concepts, to increase academic acceptance and validity.

In Islamic banking finance, the main challenge of integration is the lack of a clear methodology to combine fintech, AI, and blockchain with shariah principles. The assessment found that without a clear methodology, shariah fintech innovations risk becoming technical adaptations, not shariah-driven transformations (Nawi et al., 2025). Therefore, there is a need for extensive research on blockchain and AI from a shariah perspective, especially for zakat, waqf, and sukuk transactions, not just legal fiqh analysis, but also assessment of digital shariah models, risks, and governance. The lack of understanding in society about blockchain also shows that Islamic financial literacy is still weak and reduces trust in shariah fintech (Hasan et al., 2020). Therefore, the implementation of Islamic financial literacy programs and shariah fintech education need to emphasize understanding of functions, not just legal status, to increase customer trust and participation.

Assessments comparing Islamic finance with conventional financial systems indicate that Islamic finance is often perceived as less efficient and less innovative (Meero et al., 2025). However, in practice, Islamic financial institutions have adopted digital technologies, artificial intelligence, and shariah-compliant financing models such as Bay' Bithaman Ajil and al-Ijarah thumma al-Bay'. This comparison suggests that the issue may not be a lack of innovation per se, but rather a deficit in customer confidence,



particularly regarding contract transparency and the effectiveness of digital shariah governance.

Accordingly, the way forward is not limited to advancing technological capabilities alone. Greater emphasis must also be placed on ensuring contractual clarity, strengthening shariah compliance frameworks, and enhancing governance mechanisms. These measures are essential to build customer trust, reinforce institutional legitimacy, and address perceptions of inefficiency relative to conventional finance. To this end, the integration of technological knowledge with shariah is important to arrive at more effective solutions.

In the halal industry, although halal is well-known and trusted, the integration of science and shariah still faces challenges, namely the industry only focuses on halal compliance and ignores the principles of toyyiban (Ahmad et al., 2021). The assessment shows that halal without toyyiban weakens the justification of maqasid for consumer safety and benefits. Therefore, developing a halal governance framework based on shariah and modern technology is not just a suggestion, but an intervention to ensure halal is holistic, not checklist-based compliance.

Another challenge is the lack of shariah scholars in modern science, causing halal decisions on modern synthetic materials to be at risk of being inaccurate. The comparison assesses that this weakness is not in law, but in assessment competence. Therefore, increasing the education of shariah scholars in contemporary science is a strategic solution for the accuracy of halal decisions and sustainability of assessments.

The final challenge is the lack of supply chain transparency especially by SMEs that lack blockchain technology expertise (Shahrudin et al., 2025). The assessment found that the traceability issue is not just a technological weakness, but also governance integrity and digital shariah controls that have not been standardized. Therefore, setting industry standards and training programs for SMEs is a structural solution to increase transparency, traceability, and prevent misuse of halal labels. This recommendation demonstrates that the integration of science and Shariah requires a simultaneous assessment of worldview, competence, governance, and public acceptance in order to be truly efficient, practical, and in line with shariah principles.

CONCLUSION

This study critically examines the implementation of science and shariah integration across selected contemporary contexts, with the aim of identifying the underlying motivations driving this integration, the methodological approaches adopted, and the extent to which these efforts have effectively addressed the issues at hand. The study also interrogates existing conceptual foundations in order to advance a more coherent and systematic epistemological framework for engaging contemporary challenges.

In conclusion, this study shows that the integration of science and shariah is not just a normal discussion, but a strategic necessity in facing the complexity of contemporary



challenges. Critical analysis across the contexts of higher education, Islamic finance, and the halal industry shows that the main motivation for integration is rooted in the demands of Tawhid and the preservation of Maqasid al-Shariah. It is also accompanied by the practical need to bridge the gap between technological advancement and the guidance of revelation. This drive is reinforced by awareness of the limitations of the secular paradigm, the need for ethical governance, and the demand for public trustworthiness.

However, this study also identifies ongoing challenges, including multidisciplinary competency gaps, methodological inconsistencies, and the need for standardization of Sharia governance in the digital ecosystem. Accordingly, this study proposes the empowerment of Tawhid-based curricula, cross-training of sharia scholars, development of technological ethics frameworks (specifically AI and blockchain), and strengthening collaboration between academic institutions, industry, and regulators.

Finally, this study questions and refines the existing conceptual foundations by proposing a more coherent, systematic, and applicative epistemological framework. This framework demands the systematic integration of Naqli and Aqli, maintaining scientific precision, with strict adherence to the objectives of revelation. Thus, the integration of science and shariah has the potential to evolve from a conceptual ideal to a model of knowledge transformation and development that is sustainable, just, and meaningful to humanity and the ummah.

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