



**Unveiling the Intellectual Landscape of Artificial Intelligence in Islamic  
Capital Markets: A PRISMA-Based Systematic Literature Review**  
*Eksplorasi Lanskap Keilmuan Kecerdasan Buatan dalam Pasar Modal Syariah: Studi  
Tinjauan Literatur Sistematis Berbasis PRISMA*

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**ABSTRACT**

This study aims to systematically map the evolution, intellectual structure, and future research agenda of artificial intelligence (AI) in Islamic capital markets. Employing a Systematic Literature Review (SLR) guided by the PRISMA framework, the study analyzes 34 Scopus-indexed publications to identify temporal trends, dominant themes, methodological developments, and patterns of scholarly collaboration within this emerging field. The findings reveal a transition from a fragmented and pre-paradigmatic stage into a rapidly growing and interdisciplinary research field. The literature has evolved from focusing mainly on predictive analytics and efficiency toward broader themes such as risk management, Shariah compliance, sustainability, and behavioral finance. Methodologically, the field has progressed from conventional machine learning to more advanced and hybrid approaches. The study also identifies increasingly global and interdisciplinary collaboration networks involving academia, industry, and regulators. However, several gaps remain, including limited theoretical integration, insufficient explainable and Shariah-compliant AI models, fragmented governance frameworks, weak empirical validation, and limited exploration of social and sustainable finance applications. These findings indicate the need for more integrative, theory-driven, and impact-oriented research. This study contributes by providing a comprehensive synthesis of the field and proposing a future research agenda emphasizing the integration of AI with maqāsid al-syarī'ah, ethical governance, and practical applicability in Islamic capital markets.

**Keywords:**

*Artificial Intelligence; Islamic  
Capital Markets; Systematic  
Literature Review; PRISMA*

**ABSTRAK**

Penelitian ini bertujuan untuk memetakan secara sistematis evolusi, struktur intelektual, dan agenda penelitian masa depan terkait artificial intelligence (AI) dalam pasar modal syariah. Dengan menggunakan pendekatan Systematic Literature Review (SLR) berbasis kerangka PRISMA, penelitian ini menganalisis 34 publikasi terindeks Scopus untuk mengidentifikasi tren temporal, tema-tema dominan, perkembangan metodologis, serta pola kolaborasi ilmiah dalam bidang yang sedang berkembang ini. Temuan penelitian menunjukkan adanya transisi dari tahap yang terfragmentasi dan pra-paradigmatik menuju bidang penelitian yang berkembang pesat dan bersifat multidisipliner. Literatur berkembang dari fokus utama pada analitik prediktif dan efisiensi menuju tema yang lebih luas, seperti manajemen risiko, kepatuhan syariah, keberlanjutan, dan behavioral finance. Dari sisi metodologis, bidang ini mengalami perkembangan dari penggunaan machine learning konvensional menuju pendekatan yang lebih maju dan hibrida. Penelitian ini juga mengidentifikasi jaringan kolaborasi

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yang semakin global dan interdisipliner yang melibatkan akademisi, industri, dan regulator. Namun demikian, masih terdapat sejumlah kesenjangan, seperti keterbatasan integrasi teoretis, belum optimalnya model AI yang explainable dan sesuai syariah, kerangka tata kelola yang terfragmentasi, lemahnya validasi empiris, serta masih terbatasnya eksplorasi pada aspek keuangan sosial dan berkelanjutan. Temuan ini menunjukkan perlunya penelitian yang lebih integratif, berbasis teori, dan berorientasi pada dampak. Studi ini berkontribusi dengan menyediakan sintesis komprehensif mengenai bidang kajian tersebut sekaligus menawarkan agenda penelitian masa depan yang menekankan integrasi AI dengan maqāṣid al-syarī'ah, tata kelola etis, dan penerapan praktis dalam pasar modal syariah.

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## INTRODUCTION

The rapid advancement of digital technologies over the past two decades has fundamentally transformed the structure and architecture of the global financial system<sup>1</sup>. The convergence of artificial intelligence (AI), big data analytics, blockchain, and cloud computing has given rise to a more adaptive, automated, and data-driven financial ecosystem commonly referred to as financial technology (fintech)<sup>2</sup>. This transformation has not only enhanced the efficiency and accessibility of financial services but has also reshaped the paradigm of financial intermediation—from centralized, institution-based systems toward decentralized, predictive, and algorithm-driven infrastructures<sup>3</sup>.

Within global capital markets, artificial intelligence has emerged as a pivotal force in improving market efficiency, risk management, and investment decision-making<sup>4</sup>. AI-driven applications—such as algorithmic trading, sentiment analysis, anomaly detection, and asset price prediction using machine learning and deep learning—have significantly altered how financial markets operate<sup>5</sup>. These developments signal a transition toward data-intensive capital markets, where investment decisions increasingly rely on

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<sup>1</sup> M M Billah, *Islamic FinTech: Insights and Solutions, Islamic FinTech: Insights and Solutions* (Islamic Economics Institute, King Abdulaziz University, Jeddah, South Africa: Springer International Publishing, 2021), <https://doi.org/10.1007/978-3-030-45827-0>.

<sup>2</sup> Dawood Ashraf, "Digital Finance and Artificial Intelligence: Islamic Finance Challenges and Prospects BT - Islamic Finance, FinTech, and the Road to Sustainability: Reframing the Approach in the Post-Pandemic Era," ed. Zul Hakim Jumat, Saqib Hafiz Khateeb, and Syed Nazim Ali (Cham: Springer International Publishing, 2023), 241–58, [https://doi.org/10.1007/978-3-031-13302-2\\_11](https://doi.org/10.1007/978-3-031-13302-2_11).

<sup>3</sup> A M Habib, "Fintech Evolution, Opportunities, and Challenges: Perspectives from Emerging Markets," *Trends and Challenges of Electronic Finance: Perspectives from Emerging Markets* (Department of Accounting and Finance, Independent Research, Zagazig, Egypt: Springer Science+Business Media, 2025), [https://doi.org/10.1007/978-981-96-3304-3\\_13](https://doi.org/10.1007/978-981-96-3304-3_13).

<sup>4</sup> Nurhadhinah Nadiyah Ridzuan et al., "AI in the Financial Sector: The Line between Innovation, Regulation and Ethical Responsibility," *Information* 15, no. 8 (July 25, 2024): 432, <https://doi.org/10.3390/info15080432>; M Irfan et al., *Fintech Applications in Islamic Finance: AI, Machine Learning, and Blockchain Techniques* (Business School, NSB Academy, Bangalore, India: IGI Global, 2023), <https://doi.org/10.4018/9798369310380>.

<sup>5</sup> T Bareith, T Tatay, and L Vancsura, "Navigating Inflation Challenges: AI-Based Portfolio Management Insights," *Risks* 12, no. 3 (2024), <https://doi.org/10.3390/risks12030046>.

computational intelligence rather than solely on human judgment and traditional analytical techniques.

In the context of Islamic finance, the integration of AI into capital markets introduces a more complex yet strategically significant dimension. Islamic capital markets, grounded in Shariah principles, extend beyond profit maximization to emphasize justice, transparency, ethical conduct, and alignment with the objectives of *maqāṣid al-syarī'ah*<sup>6</sup>. Accordingly, the adoption of AI in this domain is not merely a technological enhancement but also a potential mechanism for strengthening market integrity, ensuring Shariah compliance, and promoting value-based financial inclusion.

The application of artificial intelligence in Islamic capital markets has begun to materialize through various innovations, including AI-based Shariah stock screening systems, robo-advisory platforms for Islamic investments, machine learning–driven portfolio risk analysis, and the automation of Shariah compliance processes using natural language processing (NLP)<sup>7</sup>. These advancements not only improve operational efficiency but also enhance the accuracy, consistency, and transparency of investment decisions in accordance with Islamic principles. Several countries—such as Malaysia, Saudi Arabia, the United Arab Emirates, and Indonesia—have taken proactive steps in developing Islamic fintech ecosystems that integrate AI into capital market operations.

Despite these promising developments, the existing body of literature on artificial intelligence in Islamic capital markets remains fragmented and insufficiently integrated. Most prior studies tend to focus on specific technical aspects, such as stock price prediction, trading algorithm efficiency, or broader applications of AI in Islamic banking and fintech<sup>8</sup>. As a result, there is a lack of comprehensive scholarly synthesis that systematically maps the intellectual structure, thematic evolution, and research trajectories of AI within the context of Islamic capital markets. This fragmentation highlights a critical gap in the literature and underscores the need for a more systematic and integrative scholarly approach. Three key research gaps can be identified. First, there is an absence of a comprehensive intellectual mapping that examines the intersection of artificial intelligence and Islamic capital markets from a multidisciplinary perspective. Second, the application of rigorous methodologies such as Systematic Literature Review (SLR), particularly those guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), remains limited in this field. Third, there is a lack of longitudinal analyses that trace the thematic and epistemological evolution of research, which is essential for understanding how this domain has developed over time.

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<sup>6</sup> N Alam, L Gupta, and B Shanmugam, *Islamic Finance: A Practical Perspective, Islamic Finance: A Practical Perspective* (University of Reading Malaysia, Johor Bahru, Malaysia: Springer International Publishing, 2017), <https://doi.org/10.1007/978-3-319-66559-7>.

<sup>7</sup> Tripti Pal et al., “Harnessing the Power of Artificial Intelligence and Machine Learning in the Islamic Capital Market,” 2023, 93–102, <https://doi.org/10.4018/979-8-3693-1038-0.ch006>.

<sup>8</sup> K Abbas and M Hafeez, “Will Artificial Intelligence Rejuvenate Islamic Finance? A Version of World Academia,” *Hitit Theology Journal* 20, no. 3 (2021): 311–24, <https://doi.org/10.14395/hid.931401>; N R M Zain, R Hassan, and A Ismail, “Enhancing Islamic Banking and Finance in Southeast Asia through the Application of Artificial Intelligence: An Exploration of Banking’s Best Practices,” in *Impact of Financial Technology (FinTech) on Islamic Finance and Financial Stability* (IIUM Institute of Islamic Banking and Finance, International Islamic University Malaysia, Malaysia: IGI Global, 2019), 36–53, <https://doi.org/10.4018/978-1-7998-0039-2.ch003>.

In response to these gaps, a PRISMA-based Systematic Literature Review offers a robust and transparent methodological framework for synthesizing existing knowledge<sup>9</sup>. PRISMA provides a standardized approach for identifying, screening, evaluating, and synthesizing scholarly literature, thereby ensuring methodological rigor, reproducibility, and accountability<sup>10</sup>. By adopting this approach, the present study seeks not only to identify research trends but also to uncover the intellectual structure, collaboration patterns, and conceptual evolution of artificial intelligence research within Islamic capital markets.

Previous studies show that the application of artificial intelligence (AI) in Islamic finance has expanded rapidly through technologies such as AI, machine learning, and blockchain. Irfan et al.<sup>11</sup> highlight their integration within the Islamic fintech ecosystem to improve efficiency, transparency, and innovation, while Hamadou et al.<sup>12</sup> demonstrate that AI implementation at Bank Syariah Indonesia enhances service quality and decision-making. Similarly, Sarea et al.<sup>13</sup> emphasize AI's potential in improving operational efficiency and Shariah compliance within Islamic banking and finance.

Despite these contributions, existing studies remain largely sector-specific and have not comprehensively captured the broader intellectual dynamics of AI integration in Islamic capital markets. Globally, AI adoption in capital markets has expanded into areas such as algorithmic trading, sentiment analysis, fraud detection, and portfolio optimization<sup>14</sup>, transforming market efficiency and financial ecosystems. At the same time, Islamic capital markets continue to grow as value-based alternatives to conventional systems<sup>15</sup>, operating under Shariah principles that prohibit *riba*, *garār*, and *maysir* while emphasizing ethical and asset-backed transactions<sup>16</sup>.

In this context, AI integration in Islamic capital markets presents both opportunities and challenges. AI can enhance automated Shariah screening, risk assessment, and compliance monitoring systems. However, it also raises concerns

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<sup>9</sup> David Moher et al., "Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement," *International Journal of Surgery* 8, no. 5 (2010): 336–41, <https://doi.org/10.1016/j.ijisu.2010.02.007>.

<sup>10</sup> Dinah V. Parums, "Editorial: Review Articles, Systematic Reviews, Meta-Analysis, and the Updated Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 Guidelines," *Medical Science Monitor* 27 (August 20, 2021), <https://doi.org/10.12659/MSM.934475>.

<sup>11</sup> Mohammad Irfan et al., *Fintech Applications in Islamic Finance: AI, Machine Learning, and Blockchain Techniques: AI, Machine Learning, and Blockchain Techniques* (IGI Global, 2023).

<sup>12</sup> Issa Hamadou et al., "Unleashing the Power of Artificial Intelligence in Islamic Banking: A Case Study of Bank Syariah Indonesia (BSI)," *Modern Finance* 2, no. 1 (2024): 131–44.

<sup>13</sup> Adel Sarea et al., "Artificial Intelligence (AI) Applications in Islamic Finance and Banking Sector," in *Artificial Intelligence and Islamic Finance* (Routledge, 2021), 108–21, <https://www.taylorfrancis.com/chapters/edit/10.4324/9781003171638-8/artificial-intelligence-ai-applications-islamic-finance-banking-sector-adel-sarea-mustafa-raza-rabbani-md-shabbir-alam-mohammad-atif>.

<sup>14</sup> M Tajudin et al., "Financing with Heart and Intelligence: Augmenting Intimacy and Sustainability through Islamic Fintech," *International Journal of Advanced Science and Technology* 29, no. 9 Special Issue (2020): 1638–64, <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85084368157&partnerID=40&md5=c195213f22e8b1fa570194ac7037a627>.

<sup>15</sup> Rizaldi Yusfiarto et al., "Examining Islamic Capital Market Adoption from a Socio-Psychological Perspective and Islamic Financial Literacy," *Journal of Islamic Accounting and Business Research* 14, no. 4 (2023): 574–94.

<sup>16</sup> Dini Selasi, Cory Vidiati, and Tardjono Tardjono, "Sharia Capital Market: Securities Fatwa, Derivative Securities and Mechanisms," *IJOBBA: International Journal of Bunga Bangsa Cirebon* 1, no. 1 (2022): 1–24.

regarding the alignment of algorithmic decision-making with Islamic ethical and legal principles<sup>17</sup>. Nevertheless, current studies have yet to provide a comprehensive intellectual mapping of this field. Most remain limited to technical or institutional perspectives without addressing broader conceptual and evolutionary dimensions. Therefore, this study seeks to fill this gap by systematically unveiling the intellectual landscape of AI in Islamic capital markets through a PRISMA-based Systematic Literature Review, focusing on research trends, intellectual structures, scholarly collaboration, and future research directions.

To achieve these objectives, this study is guided by several research questions (RQ). RQ1 examines how research on artificial intelligence in Islamic capital markets has evolved in terms of themes, methodologies, and publication trends. RQ2 investigates the intellectual structures and scholarly collaboration patterns that characterize this field. Furthermore, RQ3 identifies the existing research gaps and explores potential future research directions emerging from the current body of literature.

In line with these research questions, this study pursues three interrelated and complementary objectives. First, it aims to systematically identify and map the evolution of scholarly publications on artificial intelligence in Islamic capital markets, including temporal trends, dominant themes, and methodological approaches adopted across the literature. Through a PRISMA-guided Systematic Literature Review, this objective enables a structured and evidence-based tracing of how academic discourse in this field has developed over time, particularly in response to the rapid digitalization of global financial systems. Second, the study seeks to uncover and analyze the intellectual structure and scholarly collaboration patterns that underpin this domain. This includes identifying key thematic clusters, influential research streams, and the interconnections among authors, institutions, and geographical contexts, thereby providing a comprehensive understanding of how knowledge is produced, disseminated, and interconnected within the field. Third, the study endeavors to identify critical research gaps, emerging themes, and future directions, ultimately formulating a forward-looking research agenda that can strengthen the integration of artificial intelligence within value-based Islamic capital market systems, particularly in alignment with Shariah principles and the objectives of *maqāṣid al-sharīʿah*.

The novelty of this study lies in its comprehensive effort to map the intellectual structure and thematic evolution of AI in Islamic capital markets on a global scale—an area that remains underexplored in existing research. Unlike prior studies that are predominantly technical or sector-specific, this research provides an integrative, evidence-based synthesis that bridges technological innovation with Shariah-based financial principles.

In terms of contributions, this study is expected to offer meaningful theoretical and practical insights. Theoretically, it advances the discourse on Islamic finance by elucidating how artificial intelligence reshapes knowledge structures, research trajectories, and conceptual frameworks within Islamic capital markets. Practically, it offers valuable insights for policymakers, regulators, and industry practitioners in designing more adaptive, transparent, and Shariah-compliant financial systems. By providing a comprehensive intellectual foundation, this study is expected to support the

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<sup>17</sup> M Awais et al., *The Islamic Economic System: Cultural Context in a Global Economy*, *The Islamic Economic System: Cultural Context in a Global Economy* (Economics & Finance Department, Foundation University, School of Science and Technology, Pakistan: Taylor and Francis, 2024), <https://doi.org/10.4324/9781003484349>.

development of a more inclusive, ethical, and technologically advanced Islamic capital market ecosystem in the era of artificial intelligence.

## RESEARCH METHODS

This study employs a Systematic Literature Review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, as developed by Moher et al.<sup>18</sup>. PRISMA is widely recognized as a rigorous and standardized protocol that ensures transparency, reproducibility, and methodological accountability in the process of identifying, screening, and synthesizing scientific literature<sup>19</sup>. By adopting this framework, the present study follows a structured and sequential procedure encompassing literature identification, screening based on predefined criteria, eligibility assessment, and final inclusion for analysis.

Beyond descriptive synthesis, this study is designed to unveil the intellectual landscape of artificial intelligence in Islamic capital markets. Accordingly, the methodological orientation extends to mapping research trends, conceptual structures, and thematic evolution within this multidisciplinary domain. The SLR–PRISMA approach is therefore considered particularly suitable, as it facilitates both systematic filtering of relevant studies and the development of a comprehensive, academically grounded synthesis of knowledge<sup>20</sup>.

### Data Source and Search Strategy

The data were exclusively retrieved from the Scopus database, one of the most reputable and comprehensive sources of peer-reviewed scholarly publications. Scopus was selected due to its extensive coverage, high-quality indexing standards, and global recognition across disciplines. A systematic keyword-based search strategy was employed using Boolean operators to capture the intersection between artificial intelligence and Islamic capital markets. The search query was constructed as follows:

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((TITLE-ABS-KEY("artificial intelligence")  
OR TITLE-ABS-KEY("machine learning")  
OR TITLE-ABS-KEY("deep learning")  
OR TITLE-ABS-KEY("neural network"))  
AND  
(TITLE-ABS-KEY("Islamic capital market")  
OR TITLE-ABS-KEY("Islamic stock market")  
OR TITLE-ABS-KEY("Shariah capital market")  
OR TITLE-ABS-KEY("Islamic finance")  
OR TITLE-ABS-KEY("Shariah-compliant investment"))  
AND  
PUBYEAR > 2013 AND PUBYEAR < 2026)
```

The query was applied to the title, abstract, and keyword fields to ensure comprehensive coverage while maintaining thematic relevance. The publication period

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<sup>18</sup> David Moher et al., "Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 Statement," *Systematic Reviews* 4 (2015): 1–9.

<sup>19</sup> Parums, "Editorial: Review Articles, Systematic Reviews, Meta-Analysis, and the Updated Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 Guidelines."

<sup>20</sup> Moher et al., "Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement"; Moher et al., "Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 Statement."

was limited to 2013–2025, reflecting the accelerated phase of digital transformation and the growing integration of AI within global financial and capital market systems.

### Inclusion and Exclusion Criteria

To ensure methodological rigor, explicit inclusion and exclusion criteria were applied, as summarized in Table 1.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Topic	Studies addressing the application, impact, or integration of AI in Islamic capital markets or Shariah-based investments	Studies unrelated to AI and/or Islamic capital markets
Type of Publication	Peer-reviewed journal articles and conference proceedings	Editorials, opinion papers, news articles, books, and non-systematic reviews
Language	English	Non-English publications
Publication Period	2013–2025	Publications prior to 2013
Accessibility	Full-text available	Abstract-only or inaccessible articles

Source: Author's Analysis (2026)

### SLR–PRISMA Procedure

This study employed a Systematic Literature Review (SLR) using the PRISMA framework to ensure a transparent and systematic article selection process. Data were collected exclusively from the Scopus database using predefined search keywords related to artificial intelligence and Islamic capital markets. The selection process consisted of four stages. First, during the identification stage, all relevant records retrieved from Scopus were compiled, and duplicate documents were removed. Second, in the screening stage, titles and abstracts were reviewed to assess their relevance to the study focus. Articles unrelated to AI, Islamic finance, or capital markets were excluded. Third, in the eligibility stage, the remaining full-text articles were evaluated based on inclusion criteria, including relevance to the research objectives, availability of full text, and academic quality. Non-research documents such as editorials, notes, and non-peer-reviewed publications were excluded. Finally, studies meeting all criteria were included in the final dataset for analysis. The overall selection process was documented using a PRISMA flow diagram.

### Data Extraction and Analysis

Data from the selected articles were extracted and organized using Microsoft Excel. The extracted information included author names, publication year, journal source, research objectives, methods, analytical approaches, and key findings. The analysis applied an inductive thematic analysis approach to identify patterns and thematic developments within the literature<sup>21</sup>. The coding process consisted of three stages: open coding to identify initial concepts, axial coding to group related categories, and selective coding to develop broader themes representing the intellectual development of AI in Islamic capital markets. In addition, descriptive analysis was used to examine publication

<sup>21</sup> Virginia Braun and Victoria Clarke, "Using Thematic Analysis in Psychology," *Qualitative Research in Psychology* 3, no. 2 (2006): 77–101.

trends, methodological developments, and patterns of scholarly collaboration. Through this approach, the study provides a systematic mapping of the evolution, intellectual structure, and future research directions of AI in Islamic capital markets.

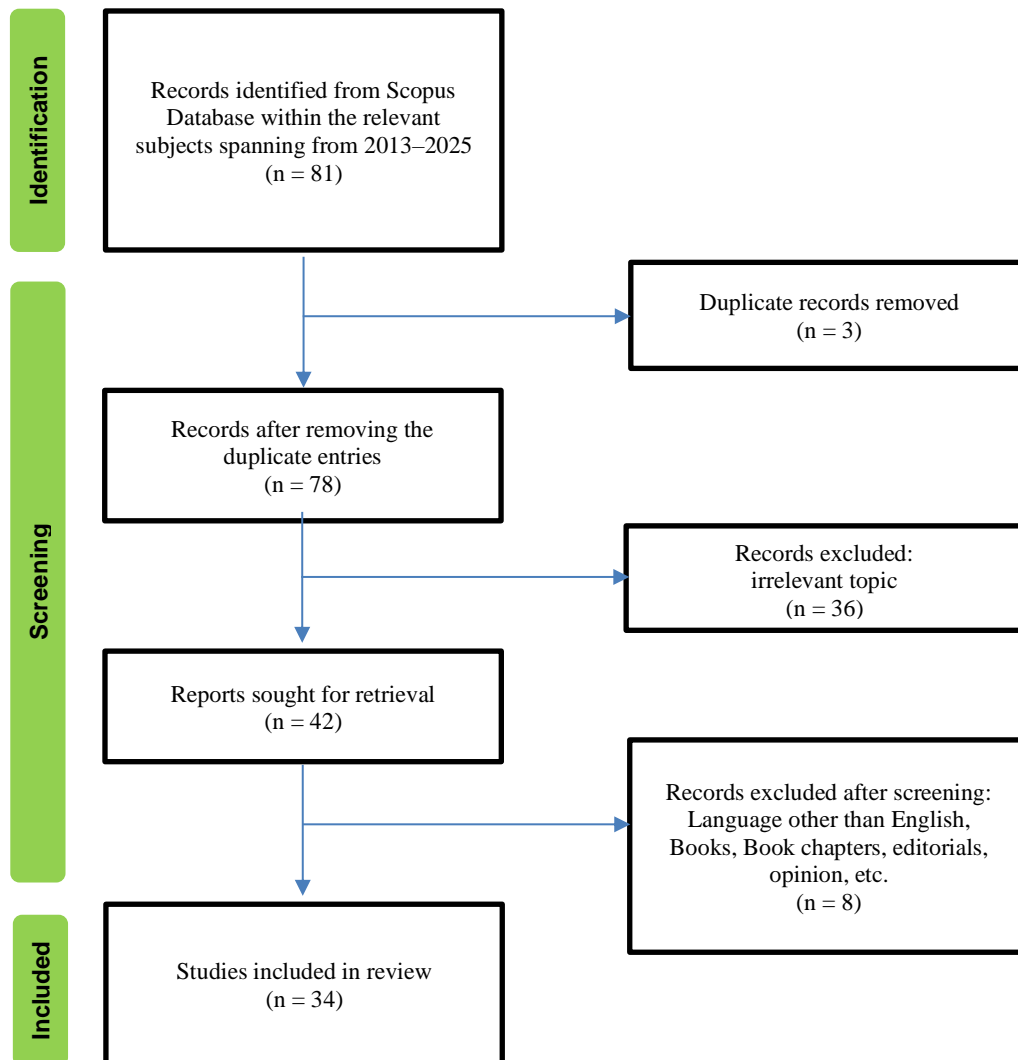


Figure 1. Flow of Literature Selection (PRISMA Framework  
Source: Author's Analysis (2026)

The initial search in the Scopus database yielded a total of 81 documents identified as potentially relevant to the research topic, namely the application of artificial intelligence in Islamic capital markets. Following the identification stage, duplicate and incomplete records were carefully examined, resulting in the exclusion of 3 documents. Consequently, 78 unique articles remained for further analysis. The subsequent stage involved a title and abstract screening, during which each document was systematically reviewed to assess its alignment with the research scope, objectives, and thematic focus. This process revealed that a substantial number of articles were not directly relevant, either because they discussed artificial intelligence without reference to Islamic capital markets, or addressed Islamic finance without explicitly incorporating AI-related applications or analysis. As a result, 36 articles were excluded, leaving 42 articles eligible

for the next stage. A full-text review was then conducted on these 42 articles to evaluate their methodological rigor, conceptual relevance, and compliance with the predefined inclusion criteria. This stage considered factors such as publication in English, full-text accessibility, empirical or conceptual robustness, and explicit relevance to the intersection of artificial intelligence and Islamic capital markets. Following this evaluation, 8 articles were excluded due to reasons such as limited accessibility (abstract-only), lack of methodological clarity, classification as non-academic outputs (e.g., editorials, opinion pieces, or news articles), or insufficient relevance to the research focus. Ultimately, 34 articles met all inclusion criteria and were retained for the final analysis. These selected studies constitute the empirical foundation for mapping the intellectual landscape, identifying thematic developments, and analyzing the evolution of research on artificial intelligence in Islamic capital markets.

## RESULTS AND DISCUSSION

### The Evolution of Research on Artificial Intelligence in Islamic Capital Markets: Themes, Methodologies, and Publication Trends

This study aims to identify and analyze the strategies applied or developed in the literature on the application of Artificial Intelligence (AI) within the Islamic Capital Market through a Systematic Literature Review (SLR). The article selection process, conducted via the Scopus database, yielded 34 key documents considered relevant and up to date, published between 2013 and March 2025. These articles reflect a wide range of approaches, models, and challenges associated with AI adoption in the halal industry across different regions.

Table 2. List of Articles, Year, and Document Type

No.	Authors	Title	Year	Document Type
1	Gayem A.	Implications of changing trends of commercial and strategic oil reserves on international oil prices; a study between 2002 and 2007	2012	Article
2	Aslam F.; Mughal K.S.; Ali A.; Mohmand Y.T.	Forecasting Islamic securities index using artificial neural networks: performance evaluation of technical indicators	2021	Article
3	Metlek S.	Forecasting Of Dow Jones Sukuk Index Prices Using Artificial Intelligence Systems	2022	Article
4	Faturohman T.; Nugraha T.	Islamic Stock Portfolio Optimization Using Deep Reinforcement Learning	2022	Article
5	Abakah E.J.A.; Tiwari A.K.; Ghosh S.; Doğan B.	Dynamic effect of Bitcoin, fintech and artificial intelligence stocks on eco-friendly assets, Islamic stocks and conventional financial markets: Another look using quantile-based approaches	2023	Article
6	Shahzad U.; Ghaemi Asl M.; Panait M.; Sarker T.; Apostu S.A.	Emerging interaction of artificial intelligence with basic materials and oil & gas companies: A comparative look at the Islamic vs. conventional markets	2023	Article

7	Veerasingam N.; Teoh A.P.	Modeling cryptocurrency investment decision: evidence from Islamic emerging market	2023	Article
8	Ridzuan N.N.; Masri M.; Anshari M.; Fitriyani N.L.; Syafrudin M.	AI in the Financial Sector: The Line between Innovation, Regulation and Ethical Responsibility	2024	Review
9	Benmamoun M.; Sobh R.	An Islamic Perspective on AI Ethics: A Case Study of Wahed Invest Robo Advisory	2024	Article
10	Shafi R.M.; Shaharuddin N.; Bakar N.A.; Muhamat A.A.; Tabash M.I.	Bibliometric and ai analysis of environmental risks of sukuk and bond yields	2024	Article
11	Shilbayeh S.; Grassa R.	Creditworthiness pattern prediction and detection for GCC Islamic banks using machine learning techniques	2024	Article
12	Rahman M.N.B.A.	Exploring the Experimental Analysis of Deep Learning Based Risk Management and Corporate Governance in Islamic Finance	2024	Conference paper
13	Boulanouar Z.; Benrhmach G.; Grassa R.; Abdennadher S.; Aldhaheri M.	Exploring the predictive power of artificial neural networks in linking global Islamic indices with a local Islamic index	2024	Article
14	Amri M.C.E.L.; Mohammed M.O.; AlKhalili M.M.S.	Fintech adoption and its investment impact in islamic social finance: the case of zakat	2024	Article
15	Touri O.; Ahroum R.; Achchab B.	Management and monitoring of the displaced commercial risk: a prescriptive approach	2024	Article
16	Ghaemi Asl M.; Ben Jabeur S.; Goodell J.W.; Omri A.	Mitigating digital market risk with conventional, green, and Islamic bonds: Fresh insights from new hybrid deep learning models	2024	Article
17	Aysan A.F.; Ciftler B.S.; Unal I.M.	Predictive Power of Random Forests in Analyzing Risk Management in Islamic Banking	2024	Article
18	Manzilati A.; Rizaldi M.; Prestianawati S.A.; Rasli A.; Ghofar A.; Prabandari S.P.; Wildana M.D.A.	Resilience under the tapering shadow: A study on the dynamics of shariah stock markets in Indonesia and Malaysia	2024	Article
19	Billah M.	An analysis of extreme risk spillover effects and their determinants between AI-related assets and Islamic banking indices	2025	Article
20	Arsyad I.; Kharisma D.B.; Wiwoho J.	Artificial intelligence and Islamic finance industry: problems and oversight	2025	Article
21	ul Mustafa A.	Exploring the safe haven properties of sukuk: a machine learning and K-cluster perspective	2025	Article
22	Mulyono E.; Edris M.M.A.M.	From Jurisprudence to Algorithms: The Role of Artificial Intelligence in Contemporary Sharia Financial Decision-Making	2025	Article

23	Al-Ababneh H.A.; Alnsour I.R.	Implementation Of Artificial Intelligence: Can It Optimize The Marketing Of Islamic Financial Services?	2025	Article
24	Ahmed A.	Integrating Society 5.0 with Sustainable Finance: A Human-Centered Model to Address Global Challenges and Unlock Opportunities	2025	Conference paper
25	Ooi K.L.; Candra S.	Machine Learning vs. Human Investors: Analyzing Adaptive Herding Behavior in U.S. Stocks vs. Shariah-Compliant Stocks in Malaysia and Indonesia	2025	Article
26	Nurtiyasari D.; Rosadi D.; Abdurakhman; Sumardi	Performance Evaluation for Indonesia Sharia Stocks Price Prediction Integrating Wavelet and Hybrid Approaches	2025	Article
27	Hassan Mohmmmed K.A.; Hussin H.A.A.A.; Ali N.B.M.; Tayfor A.E.	Practical Applications of Neutrosophic Logic in Enhancing the Accuracy of Economic Forecasting Models and Supporting Decision-Making in Banks	2025	Article
28	Akinde M.; Olapeju O.; Olaiju O.; Ogunseye T.; Emmanuel A.; Olagoke-Salami S.; Oduwole F.; Olapeju I.; Ibikunle D.; Aladelusi K.	Prediction of Green Sukuk Investment Interest Drivers in Nigeria Using Machine Learning Models	2025	Article
29	Kamarudin N.S.; Hadi N.A.; Ahmad A.; Hashim A.J.C.M.; Rasedee A.F.N.; Hishamudin M.Z.; Dzolkarnaini N.	Robo-Advisor Can Play a Role in Promoting Financial Knowledge Within Society	2025	Article
30	Shi J.; Firmansyah E.A.; Wang Y.; Xu W.	Technological innovation and regulatory harmonization in Islamic finance: a systematic review and machine learning analysis (2000–2023)	2025	Article
31	Setyaningsih F.A.; Andayani S.; Subekti R.	The Prediction Of Sharia Stock Price By Using Supervised Machine Learning	2025	Article
32	Kharisma D.B.; Wiwoho J.; Arsyad I.	AI meets Shariah: ensuring robo-advisors for compliance in Islamic mutual funds	2026	Article
33	Ghaemi Asl M.	An AI-optimized strategy for intelligent risk mapping of Islamic and conventional sustainable markets: Assessing the enduring dynamics of technological risk spillovers	2026	Article
34	Kumar R.; Kishor K.; Gulati A.; Vaibhav; Kumar R.	Sustainable finance research frontiers: A hybrid bibliometric–TCCM review	2026	Review

Source: Author's Analysis (2026)

### 1. Thematic Evolution

As shown in Table 2 above, the thematic development of research on artificial intelligence (AI) in Islamic capital markets demonstrates a clear transition from narrow, technically oriented inquiries toward multidimensional and integrative research domains.

This evolution reflects not only the maturation of AI technologies but also the increasing complexity of Islamic financial systems within the broader digital economy.

In the early exploratory stage (pre-2020), thematic engagement was largely absent or indirect. Studies during this period did not explicitly examine AI within Islamic capital markets, but rather addressed general financial or macroeconomic issues<sup>22</sup>. This indicates that the intersection between AI and Shariah-compliant capital markets had not yet been conceptualized as a distinct research domain. Thematically, this phase can be understood as pre-paradigmatic, lacking a coherent focus or unifying research agenda.

The emerging stage (2021–2022) marks the initial crystallization of core themes, primarily centered on predictive analytics and financial forecasting. Research during this phase focused on the application of machine learning techniques—such as artificial neural networks and deep reinforcement learning—to forecast Islamic stock indices and optimize portfolio allocation<sup>23</sup>. The dominant concern was improving prediction accuracy, investment efficiency, and decision-making performance. However, these studies remained largely technocentric, emphasizing computational performance without deeply engaging with the institutional or normative dimensions of Islamic finance.

A significant thematic expansion occurs in the post-2023 period, where the literature evolves into a more diversified and interdisciplinary landscape. Several major thematic clusters emerge:

- a. Risk management and financial stability become increasingly prominent, with studies exploring AI-driven models for credit risk prediction, volatility analysis, and spillover effects between Islamic and conventional financial markets<sup>24</sup>. This reflects a growing awareness of systemic risk and financial resilience.
- b. Shariah compliance and ethical AI introduces a normative dimension into the discourse. Research examines how AI applications—such as robo-advisory systems—can align with Islamic ethical principles, including transparency and accountability<sup>25</sup>.

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<sup>22</sup> A Gayem, “Implications of Changing Trends of Commercial and Strategic Oil Reserves on International Oil Prices; a Study between 2002 and 2007,” *World Applied Sciences Journal* 18, no. 10 (2012): 1359–69, <https://doi.org/10.5829/idosi.wasj.2012.18.10.1335>.

<sup>23</sup> F Aslam et al., “Forecasting Islamic Securities Index Using Artificial Neural Networks: Performance Evaluation of Technical Indicators,” *Journal of Economic and Administrative Sciences* 37, no. 2 (2021): 253–71, <https://doi.org/10.1108/JEAS-04-2020-0038>; S Metlek, “Forecasting of Dow Jones Sukuk Index Prices Using Artificial Intelligence Systems,” *Economic Computation and Economic Cybernetics Studies and Research* 56, no. 1 (2022): 107–24, <https://doi.org/10.24818/18423264/56.1.22.07>; T Faturohman and T Nugraha, “Islamic Stock Portfolio Optimization Using Deep Reinforcement Learning,” *Journal of Islamic Monetary Economics and Finance* 8, no. 2 (2022): 181–200, <https://doi.org/10.21098/jimf.v8i2.1430>.

<sup>24</sup> S Shilbayeh and R Grassa, “Creditworthiness Pattern Prediction and Detection for GCC Islamic Banks Using Machine Learning Techniques,” *International Journal of Islamic and Middle Eastern Finance and Management* 17, no. 2 (2024): 345–65, <https://doi.org/10.1108/IMEFM-02-2023-0057>; M Ghaemi Asl et al., “Mitigating Digital Market Risk with Conventional, Green, and Islamic Bonds: Fresh Insights from New Hybrid Deep Learning Models,” *Finance Research Letters* 68 (2024), <https://doi.org/10.1016/j.frl.2024.105962>; M Billah, “An Analysis of Extreme Risk Spillover Effects and Their Determinants between AI-Related Assets and Islamic Banking Indices,” *International Journal of Islamic and Middle Eastern Finance and Management* 18, no. 3 (2025): 598–627, <https://doi.org/10.1108/IMEFM-09-2024-0453>.

<sup>25</sup> M Benmamoun and R Sobh, “An Islamic Perspective on AI Ethics: A Case Study of Wahed Invest Robo Advisory,” *Journal of Business Ethics Education* 21 (2024): 231–44, <https://doi.org/10.5840/jbee20242114>; E Mulyono and M.M.A.M. Edris, “From Jurisprudence to Algorithms: The Role of Artificial Intelligence in Contemporary Sharia Financial Decision-Making,”

- c. Advanced predictive modeling continues to evolve, incorporating hybrid deep learning, ensemble models, and non-linear techniques to enhance forecasting performance<sup>26</sup>.
- d. Sustainability and green Islamic finance emerges as a new frontier, integrating AI into green sukuk analysis and sustainable finance frameworks<sup>27</sup>.
- e. Behavioral finance and market microstructure introduces a novel perspective by examining investor behavior, herding dynamics, and AI-human interaction in Shariah-compliant markets<sup>28</sup>.

In general, the thematic evolution reveals a transition from isolated, efficiency-driven applications toward a holistic and interdisciplinary research paradigm integrating technical, ethical, behavioral, and sustainability dimensions.

## 2. Methodological Evolution

The methodological trajectory of research on AI in Islamic capital markets reflects a shift from basic computational techniques to advanced, hybrid, and integrative analytical frameworks. This progression mirrors broader developments in data science and financial analytics<sup>29</sup>. In the early and emerging stages, studies predominantly employed conventional machine learning models, such as artificial neural networks and regression-based approaches. These methods were primarily used for forecasting stock

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*Nusantara: Journal of Law Studies* 4, no. 2 (2025): 129–42, <https://doi.org/10.5281/zenodo.17341980>; D B Kharisma, J Wiwoho, and I Arsyad, “AI Meets Shariah: Ensuring Robo-Advisors for Compliance in Islamic Mutual Funds,” *Journal of Islamic Accounting and Business Research*, 2026, 1–14, <https://doi.org/10.1108/JIABR-10-2024-0388>.

<sup>26</sup> D Nurtiyasari and D Rosadi, “Performance Evaluation for Indonesia Sharia Stocks Price Prediction Integrating Wavelet and Hybrid Approaches,” *Industrial Engineering and Management Systems* 24, no. 2 (2025): 211–24, <https://doi.org/10.7232/iems.2025.24.2.211>; K A Hassan Mohammed et al., “Practical Applications of Neutrosophic Logic in Enhancing the Accuracy of Economic Forecasting Models and Supporting Decision-Making in Banks,” *International Journal of Neutrosophic Science* 25, no. 4 (2025): 282–94, <https://doi.org/10.54216/IJNS.250424>; Z Boulanouar et al., “Exploring the Predictive Power of Artificial Neural Networks in Linking Global Islamic Indices with a Local Islamic Index,” *Humanities and Social Sciences Communications* 11, no. 1 (2024), <https://doi.org/10.1057/s41599-024-03885-7>.

<sup>27</sup> M Akinde et al., “Prediction of Green Sukuk Investment Interest Drivers in Nigeria Using Machine Learning Models,” *Journal of Risk and Financial Management* 18, no. 2 (2025), <https://doi.org/10.3390/jrfm18020089>; R Kumar et al., “Sustainable Finance Research Frontiers: A Hybrid Bibliometric-TCCM Review,” *Development and Sustainability in Economics and Finance* 9 (2026), <https://doi.org/10.1016/j.dsef.2026.100122>; R M Shafi et al., “Bibliometric and Ai Analysis of Environmental Risks of Sukuk and Bond Yields,” *Journal of Sustainability Science and Management* 19, no. 11 (2024): 138–52, <https://doi.org/10.46754/jssm.2024.11.009>.

<sup>28</sup> K L Ooi and S Candra, “Machine Learning vs. Human Investors: Analyzing Adaptive Herding Behavior in U.S. Stocks vs. Shariah-Compliant Stocks in Malaysia and Indonesia,” *Gadjah Mada International Journal of Business* 27, no. 3 (2025): 297–319, <https://doi.org/10.22146/gamaijb.110602>; N Veerasingam and A P Teoh, “Modeling Cryptocurrency Investment Decision: Evidence from Islamic Emerging Market,” *Journal of Islamic Marketing* 14, no. 7 (2023): 1817–35, <https://doi.org/10.1108/JIMA-07-2021-0234>.

<sup>29</sup> Huidan Liu, Lihua Liu, and Huadong Li, “Multimodal Discourse Studies in the International Academic Community (1997–2023): A Bibliometric Analysis,” *SAGE Open* 14, no. 4 (September 9, 2024): 25, <https://doi.org/10.1177/21582440241305454>; J Soodoo and P Hosein, “Predicting Foreign Exchange Rates for an Oil-Rich Country Using Energy-Based Indicators,” in *2025 IEEE International Conference on Technology Management, Operations and Decisions, ICTMOD 2025* (The University of the West Indies, Department of Computing and Information Technology, St. Augustine, Trinidad and Tobago: Institute of Electrical and Electronics Engineers Inc., 2025), <https://doi.org/10.1109/ICTMOD66732.2025.11371900>.

prices and sukuk performance<sup>30</sup>. The analytical focus was largely on model accuracy and predictive performance.

As the field progresses into the post-2023 phase, there is a noticeable shift toward methodological sophistication. Researchers increasingly adopt advanced techniques, including deep learning, reinforcement learning, hybrid models, and clustering algorithms<sup>31</sup>. These approaches enable the modeling of complex and nonlinear financial relationships. Recent studies also demonstrate a growing use of hybrid and ensemble models, combining multiple algorithms to improve robustness and predictive power<sup>32</sup>. This reflects a transition from single-model reliance to integrative modeling strategies.

Another significant development is the emergence of systematic reviews and bibliometric analyses, indicating increasing epistemological maturity within the field<sup>33</sup>. These approaches contribute to theory-building and structured knowledge synthesis. Moreover, methodological evolution is evident in the expansion of analytical scope—from individual asset prediction to system-level analysis, including cross-market interactions and financial networks<sup>34</sup>. This signals a shift toward multi-level, interdisciplinary methodologies. Overall, the methodological evolution demonstrates a progression from simplistic, performance-oriented models to complex, hybrid, and theoretically informed analytical frameworks.

### 3. Publication Trends

The publication trends in AI research within Islamic capital markets reveal a pattern of late emergence followed by rapid acceleration. During the pre-2020 period, the number of publications was extremely limited, reflecting the absence of a well-defined research agenda<sup>35</sup>. The 2021–2022 period marks the beginning of academic recognition,

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<sup>30</sup> Aslam et al., “Forecasting Islamic Securities Index Using Artificial Neural Networks: Performance Evaluation of Technical Indicators”; Metlek, “Forecasting of Dow Jones Sukuk Index Prices Using Artificial Intelligence Systems.”

<sup>31</sup> Ghaemi Asl et al., “Mitigating Digital Market Risk with Conventional, Green, and Islamic Bonds: Fresh Insights from New Hybrid Deep Learning Models”; Nurtiyasari and Rosadi, “Performance Evaluation for Indonesia Sharia Stocks Price Prediction Integrating Wavelet and Hybrid Approaches”; Hassan Mohammed et al., “Practical Applications of Neutrosophic Logic in Enhancing the Accuracy of Economic Forecasting Models and Supporting Decision-Making in Banks.”

<sup>32</sup> Akinde et al., “Prediction of Green Sukuk Investment Interest Drivers in Nigeria Using Machine Learning Models”; Boulanouar et al., “Exploring the Predictive Power of Artificial Neural Networks in Linking Global Islamic Indices with a Local Islamic Index.”

<sup>33</sup> Ridzuan et al., “AI in the Financial Sector: The Line between Innovation, Regulation and Ethical Responsibility”; J Shi et al., “Technological Innovation and Regulatory Harmonization in Islamic Finance: A Systematic Review and Machine Learning Analysis (2000–2023),” *Journal of Islamic Accounting and Business Research*, 2025, <https://doi.org/10.1108/JIABR-01-2025-0026>; M Gowshik et al., “Lightweight Security System for Bank and ATM,” in *Proceedings of 2024 International Conference on Science, Technology, Engineering and Management, ICSTEM 2024* (Centre for Computational Imaging and Machine Vision, Sri Eshwar College of Engineering, Tamil Nadu, Coimbatore, India: Institute of Electrical and Electronics Engineers Inc., 2024), <https://doi.org/10.1109/ICSTEM61137.2024.10561138>.

<sup>34</sup> E J A Abakah et al., “Dynamic Effect of Bitcoin, Fintech and Artificial Intelligence Stocks on Eco-Friendly Assets, Islamic Stocks and Conventional Financial Markets: Another Look Using Quantile-Based Approaches,” *Technological Forecasting and Social Change* 192 (2023), <https://doi.org/10.1016/j.techfore.2023.122566>; U Shahzad et al., “Emerging Interaction of Artificial Intelligence with Basic Materials and Oil & Gas Companies: A Comparative Look at the Islamic vs. Conventional Markets,” *Resources Policy* 80 (2023), <https://doi.org/10.1016/j.resourpol.2022.103197>.

<sup>35</sup> Gayem, “Implications of Changing Trends of Commercial and Strategic Oil Reserves on International Oil Prices; a Study between 2002 and 2007.”

with early studies focusing on forecasting and portfolio optimization using AI<sup>36</sup>. Although still limited, this phase represents the initial formation of the research field.

A dramatic shift occurs in the post-2023 period, where publication output increases significantly. The majority of studies are concentrated between 2024 and 2026, including contributions on risk management, sustainability, AI ethics, and financial behavior<sup>37</sup>.

This surge is driven by several factors, including:

- Rapid advancement of AI technologies in financial markets<sup>38</sup>
- Increasing global relevance of Islamic capital markets
- Growing focus on sustainability and ethical finance
- Expansion of data availability and computational capabilities

In terms of document types, the literature is dominated by peer-reviewed journal articles, with a smaller proportion of conference papers and review studies. The emergence of review and bibliometric studies further indicates a phase of intellectual consolidation. Publication trends reflect a transition from fragmentation to consolidation, signaling that AI research in Islamic capital markets is evolving into a mature and strategically significant field.

Taken together, the evolution across themes, methodologies, and publication trends demonstrates a coherent transformation of the field. Research has progressed from technically isolated and methodologically limited studies toward a comprehensive, interdisciplinary, and conceptually rich body of knowledge. This trajectory underscores the increasing relevance of AI not only as a technological tool but also as a strategic and normative force shaping the future of Islamic capital markets.

## Intellectual Architecture and Collaboration Dynamics of the Field

### 1. Intellectual Structures

The intellectual structure of research on artificial intelligence (AI) in Islamic capital markets reveals an increasingly convergent and interdisciplinary knowledge system. The field has evolved from fragmented and technocentric studies toward a more integrated paradigm that combines technological, systemic, ethical, and sustainability dimensions. Early studies mainly focused on predictive analytics and financial modeling, forming the epistemological core of the field. For instance, Aslam F. et al.<sup>39</sup> applied artificial neural networks to model Islamic stock index behavior, while Metlek S.<sup>40</sup> employed LSTM and hybrid neural architectures to improve sukuk price prediction. Faturrohman T. & Nugraha T.<sup>41</sup> further introduced deep reinforcement learning for

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<sup>36</sup> Aslam et al., "Forecasting Islamic Securities Index Using Artificial Neural Networks: Performance Evaluation of Technical Indicators"; Metlek, "Forecasting of Dow Jones Sukuk Index Prices Using Artificial Intelligence Systems"; Faturrohman and Nugraha, "Islamic Stock Portfolio Optimization Using Deep Reinforcement Learning."

<sup>37</sup> Benmamoun and Sobh, "An Islamic Perspective on AI Ethics: A Case Study of Wahed Invest Robo Advisory"; Ooi and Candra, "Machine Learning vs. Human Investors: Analyzing Adaptive Herding Behavior in U.S. Stocks vs. Shariah-Compliant Stocks in Malaysia and Indonesia."

<sup>38</sup> Bareith, Tatay, and Vancsura, "Navigating Inflation Challenges: AI-Based Portfolio Management Insights."

<sup>39</sup> Aslam et al., "Forecasting Islamic Securities Index Using Artificial Neural Networks: Performance Evaluation of Technical Indicators."

<sup>40</sup> Metlek, "Forecasting of Dow Jones Sukuk Index Prices Using Artificial Intelligence Systems."

<sup>41</sup> Faturrohman and Nugraha, "Islamic Stock Portfolio Optimization Using Deep Reinforcement Learning."

portfolio optimization. Although methodologically rigorous, these studies largely emphasized predictive performance and computational efficiency.

The field later expanded into market integration and financial interconnectedness, shifting from micro-level prediction to macro-level system analysis. Abakah E.J.A. et al.<sup>42</sup> examined the dynamic relationships between AI-related assets, cryptocurrencies, and Islamic financial instruments, while Shahzad U. et al.<sup>43</sup> explored nonlinear connectedness between AI industries and financial sectors. This development introduced a network-based understanding of Islamic capital markets within the global digital financial ecosystem.

At the same time, the literature increasingly emphasizes risk management and financial stability. Shilbayeh S. & Grassa R.<sup>44</sup> applied ensemble learning models for credit risk prediction, while Ghaemi Asl M. et al.<sup>45</sup> developed hybrid deep learning frameworks to capture digital market risks. This reflects a shift toward risk-aware AI systems aimed at strengthening financial resilience. Another major cluster concerns Shariah compliance, governance, and ethical AI. Benmamoun M. & Sobh R.<sup>46</sup> discussed ethical issues in robo-advisory systems, while Mulyono E. & Edris M.M.A.M.<sup>47</sup> linked AI development with *maqāsid al-syarī'ah*. In addition, Arsyad I. et al. and Kharisma D.B. et al.<sup>48</sup> highlighted the importance of regulatory frameworks such as RegTech and SupTech. This cluster demonstrates a paradigmatic shift from technical feasibility toward ethical legitimacy and governance alignment.

The literature also increasingly integrates sustainability and green Islamic finance. Akinde M. et al.<sup>49</sup> used machine learning to identify drivers of green sukuk investment, while Kumar R. et al.<sup>50</sup> emphasized AI's role in ESG measurement and sustainable finance. These studies reinforce the alignment between Islamic finance principles and global sustainability agendas. Finally, the behavioral finance and market microstructure cluster introduces a human-centered dimension into the field. Ooi K.L. & Candra S.<sup>51</sup> showed that machine learning models can better capture adaptive herding behavior by incorporating sentiment and behavioral indicators. This reflects the emergence of a hybrid epistemology integrating computational finance, behavioral economics, and data science.

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<sup>42</sup> Abakah et al., "Dynamic Effect of Bitcoin, Fintech and Artificial Intelligence Stocks on Eco-Friendly Assets, Islamic Stocks and Conventional Financial Markets: Another Look Using Quantile-Based Approaches."

<sup>43</sup> Shahzad et al., "Emerging Interaction of Artificial Intelligence with Basic Materials and Oil & Gas Companies: A Comparative Look at the Islamic vs. Conventional Markets."

<sup>44</sup> Shilbayeh and Grassa, "Creditworthiness Pattern Prediction and Detection for GCC Islamic Banks Using Machine Learning Techniques."

<sup>45</sup> M Ghaemi Asl et al., "Fintech's Impact on Conventional and Islamic Sustainable Equities: Short- and Long-Term Contributions of the Digital Financial Ecosystem," *Global Finance Journal* 62 (2024), <https://doi.org/10.1016/j.gfj.2024.101022>.

<sup>46</sup> Benmamoun and Sobh, "An Islamic Perspective on AI Ethics: A Case Study of Wahed Invest Robo Advisory."

<sup>47</sup> Mulyono and Edris, "From Jurisprudence to Algorithms: The Role of Artificial Intelligence in Contemporary Sharia Financial Decision-Making."

<sup>48</sup> Kharisma, Wiwoho, and Arsyad, "AI Meets Shariah: Ensuring Robo-Advisors for Compliance in Islamic Mutual Funds."

<sup>49</sup> Akinde et al., "Prediction of Green Sukuk Investment Interest Drivers in Nigeria Using Machine Learning Models."

<sup>50</sup> Kumar et al., "Sustainable Finance Research Frontiers: A Hybrid Bibliometric-TCCM Review."

<sup>51</sup> Ooi and Candra, "Machine Learning vs. Human Investors: Analyzing Adaptive Herding Behavior in U.S. Stocks vs. Shariah-Compliant Stocks in Malaysia and Indonesia."

Table 2. Summary of Intellectual Structures in AI Research within Islamic Capital Markets

Cluster	Core Focus	Key Characteristics	Representative Studies	Intellectual Contribution
Predictive Analytics & Financial Modeling	Forecasting Islamic financial assets and portfolio optimization	<ul style="list-style-type: none"> <li>• Dominance of machine learning (ANN, LSTM, RNN, DRL)</li> <li>• Emphasis on prediction accuracy and computational efficiency - Technocentric and method-driven orientation</li> </ul>	Aslam et al. (2021); Metlek (2022); Faturohman & Nugraha (2022)	Establishes the epistemological foundation of the field; provides core analytical tools and modeling frameworks
Market Integration & Financial Interconnectedness	Interactions between Islamic markets, AI assets, and global financial systems	<ul style="list-style-type: none"> <li>• Use of quantile-based and nonlinear causality models</li> <li>• Network-based and systemic perspective</li> <li>• Focus on spillovers and cross-market dynamics</li> </ul>	Abakah et al. (2023); Shahzad et al. (2023)	Shifts the field toward system-level analysis and positions Islamic markets within global financial ecosystems
Risk Management & Financial Stability	Credit risk, volatility, and systemic resilience	<ul style="list-style-type: none"> <li>• Application of ensemble learning and hybrid deep learning</li> <li>• Focus on robustness and uncertainty modeling</li> <li>• Integration of time-varying and nonlinear frameworks</li> </ul>	Shilbayeh & Grassa (2024); Ghaemi Asl et al. (2024; 2026)	Transforms AI from a predictive tool into a risk-aware intelligence system supporting financial stability
Shariah Compliance, Governance & Ethical AI	Alignment of AI with Islamic principles and regulatory frameworks	<ul style="list-style-type: none"> <li>• Emphasis on maqāṣid al-syarī'ah, transparency, accountability</li> <li>• Exploration of legal, ethical, and institutional dimensions</li> <li>• Development of RegTech and SupTech frameworks</li> </ul>	Benmamoun & Sobh (2024); Mulyono & Edris (2025); Arsyad et al. (2025); Kharisma et al. (2026)	Introduces normative and institutional depth, embedding AI within Islamic ethical and legal systems
Sustainability & Green Islamic Finance	AI applications in ESG, green sukuk, and sustainable investment	<ul style="list-style-type: none"> <li>• Integration of AI with sustainability metrics</li> <li>• Focus on ESG alignment and impact evaluation</li> <li>• Convergence of Islamic finance and global sustainability agendas</li> </ul>	Akinde et al. (2025); Kumar et al. (2026)	Positions the field within global sustainability discourse and reinforces ethical finance orientation
Behavioral Finance & Market Microstructure	Investor behavior, sentiment, and human-AI interaction	<ul style="list-style-type: none"> <li>• Use of ML to capture herding and sentiment dynamics</li> <li>• Integration of behavioral and computational approaches</li> <li>• Focus on decision-making processes</li> </ul>	Ooi & Candra (2025)	Introduces human-centric perspective, bridging AI with behavioral economics

Source: Author's Analysis (2026)

Taken together, these clusters form a multi-layered and dynamically interconnected intellectual architecture, characterized by the integration of technical, systemic, normative, and behavioral dimensions. Importantly, the evolution of these clusters is not merely additive but synergistic, as advances in one domain (e.g., predictive modeling) enable and inform developments in others (e.g., risk management, governance, and sustainability). This convergence reflects a broader transformation of the field into an interdisciplinary, reflexive, and strategically oriented research domain, where AI is no longer treated solely as a computational tool but as a central organizing principle shaping the future of Islamic capital markets.

## 2. *Scholarly Collaboration Patterns*

Beyond the internal configuration of thematic clusters, the intellectual evolution of research on artificial intelligence (AI) in Islamic capital markets is profoundly shaped by its patterns of scholarly collaboration. These patterns reveal not only how knowledge is produced, but also how it is distributed, legitimized, and integrated across disciplinary, geographical, and institutional boundaries. In this sense, collaboration networks function as the social infrastructure underpinning the field's epistemic development. The evidence suggests that the field is characterized by a decentralized, interdisciplinary, and globally dispersed collaboration structure, reflecting both its emergent status and its rapid integration into broader academic and policy discourses.

First, the collaboration landscape exhibits a highly international and geographically heterogeneous configuration, indicating that knowledge production is not concentrated within a single dominant region but rather distributed across multiple centers of expertise. Contributions originate from Southeast Asia, the Gulf Cooperation Council (GCC), Europe, and emerging economies, each bringing context-specific priorities and empirical settings. Southeast Asia—particularly Indonesia and Malaysia—emerges as a significant hub for research on Islamic stock markets, portfolio optimization, and behavioral dynamics, as reflected in studies such as Fatur Rahman and Nugraha<sup>52</sup> and Ooi and Candra<sup>53</sup>. In contrast, the GCC region plays a central role in advancing research on Islamic banking stability, credit risk, and regulatory frameworks, as evidenced by works such as Shilbayeh and Grassa<sup>54</sup> and Aysan et al.<sup>55</sup>. Meanwhile, contributions from Europe and other regions often focus on methodological innovation and cross-market analysis, including interconnectedness and spillover effects. This geographical differentiation suggests the presence of regionally embedded knowledge systems, where local institutional contexts, regulatory environments, and market structures shape research priorities, while still being integrated into a broader global network. Consequently, the field reflects a form of glocalised scholarship, where global methodological standards intersect with local empirical realities.

Second, the authorship structure reveals the dominance of small, tightly coordinated, multi-author research teams, typically consisting of two to five scholars.

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<sup>52</sup> Fatur Rahman and Nugraha, "Islamic Stock Portfolio Optimization Using Deep Reinforcement Learning."

<sup>53</sup> Ooi and Candra, "Machine Learning vs. Human Investors: Analyzing Adaptive Herding Behavior in U.S. Stocks vs. Shariah-Compliant Stocks in Malaysia and Indonesia."

<sup>54</sup> Shilbayeh and Grassa, "Creditworthiness Pattern Prediction and Detection for GCC Islamic Banks Using Machine Learning Techniques."

<sup>55</sup> A F F Aysan, A S Lemine, and U Kayani, "Kingdom of Fintech: Crowdfunding Shaping the Future in the Kingdom of Saudi Arabia," *Journal of Science and Technology Policy Management*, 2024, <https://doi.org/10.1108/JSTPM-05-2023-0066>.

This pattern is indicative of a field that relies on intensive collaboration rather than large-scale consortia, likely due to the specialized and technical nature of the research. More importantly, these teams are inherently interdisciplinary, often combining expertise from finance, economics, computer science, statistics, and data science. For instance, Ridzuan et al.<sup>56</sup> integrate technological, regulatory, and ethical perspectives in their review of AI in finance, while Shi et al.<sup>57</sup> combine bibliometric analysis, machine learning, and qualitative validation techniques. Such configurations suggest the emergence of cross-disciplinary epistemic communities, in which knowledge production is no longer confined within traditional disciplinary silos but instead occurs at their intersections. This interdisciplinary convergence is not merely additive but synthetic, enabling the development of novel analytical frameworks that integrate computational intelligence with financial theory and Islamic jurisprudence.

Third, the collaboration patterns indicate a strong and growing interface between academia and practice-oriented domains, including regulators, financial institutions, and policy stakeholders. A significant portion of the literature explicitly engages with practical challenges such as AI governance, regulatory compliance, fintech adoption, and risk management. Studies such as Arsyad et al.<sup>58</sup> and Amri et al.<sup>59</sup> incorporate legal, institutional, and industry perspectives, often drawing on comparative regulatory frameworks or stakeholder interviews. This suggests that the field is characterized by co-production of knowledge, where academic inquiry is informed by real-world problems and, in turn, contributes to policy design and industry practice. Such interaction enhances the field's translational capacity, bridging the gap between theoretical innovation and practical implementation. It also reflects the strategic importance of AI in Islamic finance, where technological adoption must be aligned with regulatory standards and Shariah principles.

Fourth, an important dimension of collaboration emerges in the form of methodological convergence networks, where researchers are connected not primarily by geography or institutional affiliation, but by shared analytical tools and modeling approaches. The widespread adoption of machine learning techniques—such as artificial neural networks (ANN), long short-term memory (LSTM), random forests, and deep reinforcement learning (DRL)—as well as advanced econometric methods like time-varying parameter vector autoregression (TVP-VAR), quantile regression, and clustering algorithms, has created method-centric communities of practice. These communities facilitate the diffusion of techniques across different research contexts, enabling scholars from diverse regions to engage in comparable analytical frameworks. For example, the use of hybrid deep learning architectures in Ghaemi Asl et al.<sup>60</sup> and wavelet-integrated

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<sup>56</sup> Ridzuan et al., "AI in the Financial Sector: The Line between Innovation, Regulation and Ethical Responsibility."

<sup>57</sup> Shi et al., "Technological Innovation and Regulatory Harmonization in Islamic Finance: A Systematic Review and Machine Learning Analysis (2000–2023)."

<sup>58</sup> Ifan Arsyad, Dona Budi Kharisma, and Jamal Wiwoho, "Artificial Intelligence and Islamic Finance Industry: Problems and Oversight," *International Journal of Law and Management*, 2025, <https://doi.org/10.1108/IJLMA-07-2024-0236>.

<sup>59</sup> M.C.E.L. Amri, M O Mohammed, and M M S AlKhalili, "Fintech Adoption and Its Investment Impact in Islamic Social Finance: The Case of Zakat," *Qudus International Journal of Islamic Studies* 12, no. 2 (2024): 213–54, <https://doi.org/10.21043/qijis.v12i2.17069>.

<sup>60</sup> M Ghaemi Asl, M Nasr Isfahani, and M Mohammadi, "How Does the Mineral Resource Exploitation Sector Interact with Islamic and Traditional Ventures? Insights amidst the Impact of Green Reforms and State-of-the-Art Technological Advancements," *Resources Policy* 98 (2024), <https://doi.org/10.1016/j.resourpol.2024.105287>.

models in Nurtiyasari et al.<sup>61</sup> illustrates a convergence toward increasingly sophisticated computational paradigms. This trend reflects a broader shift toward algorithmic standardization and methodological interoperability, which enhances the comparability, replicability, and scalability of research findings.

Fifth, the increasing prevalence of review articles, bibliometric analyses, and meta-analytical studies signals the emergence of higher-order collaboration networks focused on knowledge synthesis and intellectual consolidation. Works such as Ridzuan et al.<sup>62</sup>, Shi et al.<sup>63</sup>, and Kumar et al.<sup>64</sup> do not merely contribute new empirical findings but instead map the structure of the field itself, identifying key themes, influential authors, and collaboration patterns. These studies play a critical role in transforming a fragmented body of literature into a more coherent and self-reflective knowledge system. In doing so, they contribute to the formation of a meta-epistemic layer, where the field begins to systematically evaluate its own development, gaps, and future directions. This is a hallmark of a maturing research domain, indicating a transition from knowledge expansion to knowledge organization and consolidation.

Sixth, despite these advances, the overall collaboration structure remains moderately fragmented and decentralized, with limited evidence of dominant research hubs or highly centralized author networks. Unlike more mature scientific fields characterized by strong institutional clusters or leading research consortia, the AI–Islamic capital markets domain exhibits a distributed and evolving network topology, where multiple small clusters coexist and gradually expand. This fragmentation, however, should not be interpreted as a weakness; rather, it reflects the field’s openness and dynamism, allowing for the continuous entry of new contributors and perspectives. At the same time, it indicates that the field is still in a transitional phase, moving from early-stage diversification toward eventual consolidation and potential centralization.

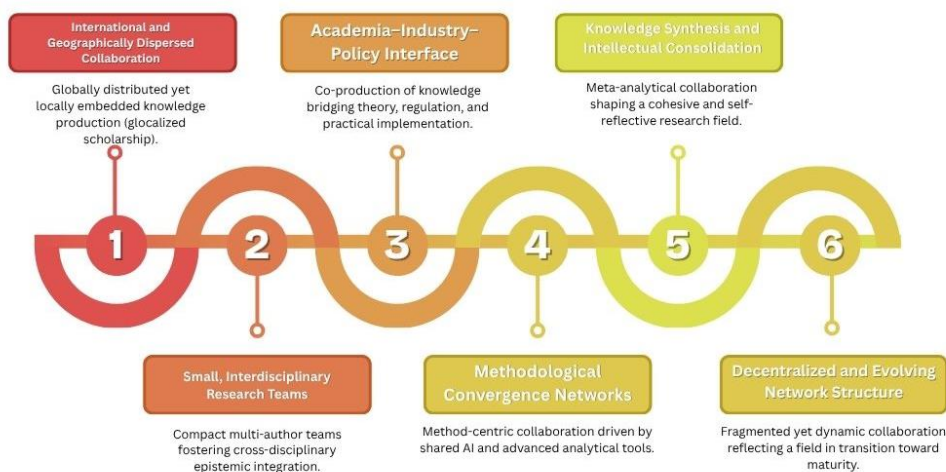


Figure 2. Patterns of Academic Collaboration  
Source: Author’s Analysis (2026)

<sup>61</sup> Nurtiyasari and Rosadi, “Performance Evaluation for Indonesia Sharia Stocks Price Prediction Integrating Wavelet and Hybrid Approaches.”

<sup>62</sup> Ridzuan et al., “AI in the Financial Sector: The Line between Innovation, Regulation and Ethical Responsibility.”

<sup>63</sup> Shi et al., “Technological Innovation and Regulatory Harmonization in Islamic Finance: A Systematic Review and Machine Learning Analysis (2000–2023).”

<sup>64</sup> Kumar et al., “Sustainable Finance Research Frontiers: A Hybrid Bibliometric–TCCM Review.”

Taken together, the evidence demonstrates that the development of scholarly collaboration patterns is deeply intertwined with the evolution of the field's intellectual structure. As thematic domains expand—from predictive analytics to risk management, ethics, sustainability, and behavioral finance—collaboration networks simultaneously become more international, interdisciplinary, and methodologically integrated. This co-evolution reflects a broader transformation in which research on AI in Islamic capital markets is no longer confined to isolated technical inquiries but is increasingly shaped by collective, cross-boundary knowledge production processes. The field thus emerges as a globally connected epistemic ecosystem, where ideas, methods, and empirical insights circulate across regions and disciplines, supported by flexible and adaptive collaboration networks.

Ultimately, these patterns underscore that the advancement of the field is not driven solely by technological innovation, but by the synergistic interaction between intellectual structures and collaborative practices. AI, in this context, functions not only as an analytical tool but also as a unifying axis around which diverse scholarly communities converge, jointly shaping the future trajectory of Islamic capital market research in an increasingly digital, interconnected, and ethically grounded financial landscape.

### **Research Gaps and Charting Future Scholarly Agendas**

The systematic review of the literature indicates that, despite significant scholarly progress, research on artificial intelligence (AI) in Islamic capital markets remains characterized by several structural and epistemological gaps. These gaps not only highlight current limitations but also delineate a forward-looking research agenda toward a more integrative and mature field.

First, the dominance of method-driven predictive modeling and the lack of theoretical integration. Existing studies are heavily concentrated on enhancing forecasting accuracy through advanced machine learning techniques such as ANN, LSTM, and DRL. While methodologically robust, this stream remains largely instrumentalist and insufficiently anchored in financial theory, behavioral insights, or Islamic economic principles. Future research should therefore advance toward theory-driven AI models that integrate financial economics, behavioral finance, and *maqāṣid al-syarī'ah* within computational frameworks.

Second, the limited development of explainable, transparent, and Shariah-compliant AI systems. The widespread reliance on black-box models creates significant challenges in interpretability, accountability, and ethical validation. This is particularly critical in Islamic finance, where decision-making must align with Shariah principles. Future studies should prioritize explainable AI (XAI) and develop Shariah-auditable algorithms that ensure transparency, fairness, and compliance with Islamic ethical standards.

Third, the imbalance between micro-level modeling and macro-systemic analysis. Although emerging studies explore interconnectedness and spillover effects, the literature remains largely focused on isolated instruments or markets. This limits understanding of broader financial system dynamics. Future research should adopt systemic and network-based approaches, incorporating complexity theory, agent-based modeling, and global financial integration perspectives.

Fourth, the underdevelopment of AI applications in Islamic social finance, sustainability, and human-centric dimensions. The integration of AI into areas such as zakat, waqf, financial inclusion, and ESG-oriented finance remains limited and fragmented. Similarly, behavioral and human–AI interaction aspects are insufficiently explored. Future research should emphasize AI for social impact, sustainable Islamic finance, and hybrid human–AI decision frameworks that incorporate ethical, behavioral, and societal considerations.

Fifth, the absence of unified governance, regulatory, and standardization frameworks. Despite growing attention to legal and ethical issues, there is no comprehensive and harmonized framework governing AI implementation in Islamic finance across jurisdictions. Key challenges include regulatory fragmentation, Shariah standardization, and limited integration of RegTech and SupTech. Future studies should focus on developing holistic AI governance architectures that are scalable, transparent, and globally interoperable.

Sixth, the lack of empirical, longitudinal, and globally representative research designs. Most existing studies rely on retrospective datasets and simulation-based approaches, with limited real-world validation. In addition, the geographical concentration of research in Southeast Asia and the GCC highlights a contextual imbalance. Future research should prioritize field-based and longitudinal studies, industry collaboration, and cross-country comparative analyses to enhance external validity and global relevance.



Figure 3. Research Gap dan Future Research  
 Source: Author’s Analysis (2026)

As illustrated in Figure 3, taken together, the identified gaps reveal that the evolution of AI research in Islamic capital markets is not simply a matter of incremental methodological refinement, but rather a paradigmatic transition from fragmented, technique-oriented inquiry toward a deeply integrative, theory-anchored, and societally embedded research domain. What is at stake is not only improving predictive performance, but redefining the epistemological foundations, institutional logic, and ethical orientation of how Islamic financial systems are studied and governed in the age of intelligent technologies.

Accordingly, the next phase of scholarly development should be characterized by several interdependent transformations. First, there is a need for the systematic integration of AI with Islamic economic theory and *maqāsid al-syarī‘ah*, moving beyond superficial compliance toward embedding normative objectives—such as justice, transparency, and welfare maximization—directly into algorithmic design and decision-making architectures. Second, the field must advance toward the development of explainable, ethical, and Shariah-auditable AI systems, where transparency, accountability, and fairness are not *ex-post* considerations but intrinsic design principles of intelligent financial systems.

Third, future research should embrace systemic, network-based, and complexity-oriented analytical frameworks, enabling a holistic understanding of Islamic capital markets as dynamically interconnected ecosystems shaped by technological, financial, and geopolitical forces. This shift is essential to capture contagion effects, cross-market dependencies, and the evolving role of AI-driven assets within global financial architectures. Fourth, there is a strategic imperative to expand AI applications into Islamic social finance and sustainability domains, positioning AI as a catalyst for financial inclusion, equitable distribution, and ESG-aligned investment, thereby reinforcing the ethical and developmental mandate of Islamic finance.

Fifth, the establishment of robust, adaptive, and globally interoperable governance and regulatory architectures is crucial. This includes the integration of RegTech and SupTech, the harmonization of Shariah standards across jurisdictions, and the development of institutional mechanisms capable of overseeing algorithmic decision-making in a transparent and accountable manner. Sixth, the field must strengthen its empirical foundation through longitudinal, field-based, and interdisciplinary research collaborations, bridging academia, industry, and policymakers to ensure that theoretical advancements are grounded in real-world applicability and institutional relevance.

Ultimately, these directions point toward a fundamental reconceptualization of AI within Islamic capital markets. AI should no longer be understood merely as a computational instrument for efficiency gains, but as a transformative epistemic and institutional force—one that reshapes how financial knowledge is produced, how markets are structured, and how ethical principles are operationalized in practice. In this emerging landscape, the convergence of technology, Shariah, and financial innovation has the potential to redefine not only market performance, but also the very purpose and moral architecture of finance itself.

## CONCLUSION

This study systematically maps and synthesizes the evolution, intellectual structure, and future research trajectory of artificial intelligence (AI) in Islamic capital markets through a Systematic Literature Review of 34 Scopus-indexed publications. The findings provide several integrated insights corresponding to the three research questions (RQ1–RQ3) and highlight the transformation of the field into an increasingly strategic and interdisciplinary domain.

First, the evolution of the literature (RQ1) demonstrates a clear transition from a fragmented and pre-paradigmatic stage toward a mature and rapidly expanding research field. Initially dominated by technocentric and efficiency-driven predictive modeling, the field has evolved into a multidimensional domain encompassing risk management, Shariah compliance, sustainability, and behavioral finance. This transformation is accompanied by increasing methodological sophistication—from conventional machine

learning to hybrid, system-level, and interdisciplinary approaches—as well as a sharp rise in publication output, particularly in the post-2023 period. Collectively, these trends indicate that AI has moved beyond a purely technical function to become a central driver shaping the conceptual and institutional development of Islamic capital markets.

Second, the analysis of intellectual structures and collaboration patterns (RQ2) reveals a multi-layered and increasingly convergent knowledge system supported by a decentralized yet globally connected research network. The field is anchored in predictive analytics but has expanded into interconnected clusters, including financial integration, risk management, governance, sustainability, and behavioral finance. At the same time, scholarly collaboration is characterized by interdisciplinary, small-team networks distributed across regions such as Southeast Asia, the GCC, and Europe, with growing engagement between academia, industry, and regulators. This co-evolution of intellectual architecture and collaboration dynamics reflects the emergence of a more integrated, reflexive, and globally embedded research ecosystem.

Third, despite these advances, the study identifies several critical research gaps that define the future scholarly agenda (RQ3). The literature remains constrained by a dominance of method-driven approaches lacking theoretical integration, limited development of explainable and Shariah-compliant AI systems, insufficient macro-systemic analysis, underexplored applications in social finance and sustainability, fragmented governance frameworks, and a lack of empirical, longitudinal, and globally representative studies. Addressing these gaps requires a paradigmatic shift toward integrative, theory-driven, and impact-oriented research. Future studies should prioritize embedding *maqāsid al-syarī'ah* into AI design, developing transparent and ethically auditable systems, adopting systemic and interdisciplinary frameworks, expanding AI applications for social and sustainable finance, strengthening governance and regulatory architectures, and enhancing real-world empirical validation through cross-sector collaboration.

### **Implications, Limitations, and Directions for Future Research**

This study provides important implications for theory, practice, and policy. Theoretically, it advances Islamic finance literature by positioning AI not merely as a technical tool, but as a framework that should be integrated with financial theory, behavioral insights, and *maqāsid al-syarī'ah*. Practically, the findings offer guidance for Islamic financial institutions, fintech developers, and investors to adopt explainable, transparent, and Shariah-compliant AI systems that enhance trust, accountability, and decision-making quality. From a policy perspective, the study highlights the need for harmonized governance and regulatory frameworks, including RegTech and SupTech integration, to ensure that AI adoption aligns with global standards and Islamic ethical principles. More broadly, the study emphasizes AI's strategic role in promoting sustainable and inclusive Islamic finance, particularly in social finance, ESG integration, and financial inclusion.

Despite these contributions, several limitations remain. First, the study is based on only 34 Scopus-indexed publications, which may not fully represent the broader literature. Second, reliance on a single database may limit review inclusiveness. Third, the qualitative-descriptive SLR approach does not incorporate bibliometric or meta-analytical validation. Fourth, the rapid evolution of AI and Islamic finance means that recent developments may not yet be reflected. Finally, the study does not empirically test the proposed frameworks, limiting direct practical validation.

Based on these limitations, several future research directions are proposed. Future studies should incorporate multiple databases and mixed-method approaches, including bibliometric and meta-analysis techniques, to strengthen analytical rigor. More empirical and theory-driven studies integrating maqāsid al-syarī‘ah into AI model development are also needed. In addition, future research should focus on explainable AI (XAI), macro-systemic and network-based analysis, and the application of AI in Islamic social finance, ESG, and sustainability. Longitudinal, comparative, and interdisciplinary studies involving academia, industry, and regulators are also essential to produce more practical, scalable, and policy-relevant solutions.

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