

PHENOMENA AND IMPLICATIONS OF FINANCIAL TECHNOLOGY (FINTECH) ADOPTION IN THE FINANCIAL & BANKING INDUSTRY SECTOR IN GLOBAL, REGIONAL AND INDONESIAN CONTEXT

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Abstract

This paper explores the phenomena and implications of Financial Technology (FinTech) adoption in the financial and banking industry globally, regionally, and in Indonesia. It investigates the impact of artificial intelligence (AI) and open banking on market size, security, customer service, and regulatory challenges. The study examines the use of AI in fraud detection, personalization, and cybersecurity, as well as the ethical considerations and risks associated with FinTech adoption. Additionally, the paper analyzes the implications of FinTech from the perspective of Maslahah Mursalah and Maqashid Syariah, providing insights into its compliance with Islamic values. The research underscores the importance of transparent and ethical AI integration, enhanced cybersecurity frameworks, and robust AI models to maximize the benefits of FinTech while mitigating potential risks.

Keywords: *FinTech, Artificial Intelligence, AI, Open Banking, Financial Technology, Digital Transformation, Cybersecurity, Indonesia, Maslahah Mursalah, Maqashid Syariah, Regulation, Financial Institutions*

A. INTRODUCTION

Technology and innovation are driving a major shift in the financial world—from rigid, institution-centric systems to flexible, user-centric ecosystems.¹Despite the great benefits (efficiency, inclusion, personalization)²There are regulatory, ethical, and systemic risk challenges that require a coordinated response. Technology and innovation, particularly AI and open banking, have significantly transformed the financial sector landscape.³Institutions that wisely adopt this technology can improve efficiency, security, and customer experience. However, they must also be aware of emerging risks, such as cyber threats and regulatory challenges.⁴Danielsson, J., & Uthemann, A⁵has shown that the “phenomenon” of AI adoption by global financial institutions can increase efficiency, but also creates new systemic risks, such as hidden crises due to rapid capital flows and automated decisions that are not anticipated by regulators. Saha, B.,

¹Thumar, R., & Vaghiasiya, R. (2024), “The Impact of Artificial Intelligence on the Financial Sector.” International Journal for Research in Applied Science and Engineering Technology, 12(5), 62751. <https://doi.org/10.22212/ijraset.2024.62751>. ijraset.com.

²Kanaparthi, V. (2024). “AI-based Personalization and Trust in Digital Finance.” ArXiv.<https://arxiv.org/abs/2401.15700>

³McKinsey & Company, (2022), “The Future of Finance: How Technology is Reshaping the Financial Sector.” (Report). <https://www.mckinsey.com>

⁴Kovacevic, A., Radenkovic, S. D., & Nikolic, D. (2024). “Artificial Intelligence and Cybersecurity in the Banking Sector: Opportunities and Risks.”arXiv. <https://arxiv.org/abs/2412.04495>.

⁵Danielsson, J., & Uthemann, A. (2023), “How Artificial Intelligence Could Upend Global Financial Stability,” Axios. <https://www.axios.com/2023/11/07/artificial-intelligence-financial-risk>

Rani., & Shukla, S. K⁶ have reviewed the adoption of generative AI in global financial institutions, highlighting opportunities in service automation and personalization, as well as risks such as cyberattacks and regulatory challenges. Maple, C., et al⁷ This paper explores how AI is revolutionizing the financial sector, encompassing improved customer service, fraud detection, and risk management, as well as emerging ethical and regulatory challenges. The primary data collection method was library research. The author conducted keyword searches related to concepts, theories, variables, and indicators of the main topic to be explored. Furthermore, based on the concepts and variables of the main topic, the author analyzed them specifically and categorized them into subtopics or indicators. The author structured these subtopics systematically, analytically, and exploratively, as follows:

1. Data on Market Size Increase and Global & Regional Open Banking Development
2. The phenomenon of AI adoption in the global and Indonesian financial and banking sectors
3. Examples of the implementation of AI Open Banking Globally and Indonesia.
4. Implications of FinTech adoption from the perspective of Maslahah Murlah and Maqashid Syariah

The presentation of these four sub-topics is expected to represent an in-depth description and analysis of the main topic, namely: "the phenomenon and implications of AI and financial technology (fintech) adoption in the financial and banking sectors in the global, regional, and Indonesian contexts." Based on the literature review of the 4 sub-discussions, they are as follows; In aspects of the growth of the Global Financial Market and the Development of Open Banking, there are 10 similar patterns of issues and facts. Examples of AI adoption by global, regional and local financial institutions in Indonesia can show the same pattern of issues and facts with as many as 8 similar issues. To show the AI phenomenon in the financial and banking sector, there is the same pattern of issues and facts, as many as 9 issues. For the implications of the adoption of Sharia Fintech, which is viewed from the perspective of maslahah murlahah and maqashid sharia, the same pattern of issues and facts is shown with the same 7 issues.

B. DATA ANALYSIS AND DISCUSSION

1. Global Market Size Increase Data

Emergent Research. (2023, October 31). Global open banking market size to reach USD 106.15 billion in 2032. GlobeNewswire.⁸ Grand View Research. (2023). Open banking market size, share & trends analysis report by services, by deployment, by distribution channel, by application, by region, and segment forecast, 2024-2030.⁹ GlobeNewswire. (2023, December 13). Global open banking market size to exceed USD 164.8 billion by 2032/ CAGR of 23.11%.¹⁰

Virtue Market Research. (2023). Open banking market by financial services, deployment, distribution channels, and by region-forecast to 2030.¹¹ Global Islamic financial assets are estimated to reach USD 3,384.1 billion in 2024 and are projected to grow to USD 7,441.43 billion by 2033, at a compound annual growth rate (CAGR) of 9.15%. Of these total assets, approximately 70% is held by the Islamic banking sector, making it a key driver of growth in the overall Islamic financial industry.

The estimate that the global open banking market size will exceed USD 164.8 billion by 2032 indicates several important things;

a. Rapid Growth and Widespread Adoption

This demonstrates that open banking is experiencing rapid growth globally, with widespread adoption by banks, fintechs, businesses, and consumers. This means more financial institutions are opening up access to their data to drive innovation in transparent and inclusive financial services.

b. Digitalization of the Financial Sector

⁶Saha, B., Rani., & Shukla, S. K (2025), "Generative AI in Financial Institutions: A Global Survey of Opportunities, Threats and Regulation." arXiv. <https://arxiv.org/abs/2504.21574>

⁷Maple, C., et al (2023), "The AI Revolution: Opportunities and Challenges for the Financial Sector." ArXiv. <https://arxiv.org/abs/2308.16538>.

⁸<https://www.globenewswire.com/news-release/2023/10/31/2770236/0/en/Global-Open-Banking-Market-Size-to-Reach-USD-106-15-Billion-in-2032-Emergen-Research.html>.

⁹<https://www.grandviewresearch.com/industry-analysis/open-banking-market>.

¹⁰<https://www.globenewswire.com/news-release/2023/12/13/2795384/0/en/Global-Open-Banking-Market-Size-to-Exceed-USD-164-8-billion-by-2032-CAGR-of-23-11.html>.

¹¹<https://virtuemarketresearch.com/report/open-banking-market>.

These figures reflect the acceleration of digital transformation in the financial sector, including the use of APIs (Application Programming Interfaces) to integrate services across platforms.

c. Demand for more Personal and Transparent Financial Services

Consumers increasingly want greater control over their financial data and faster, more personalized service experiences. Open banking enables this through secure data sharing.

d. Growing Collaboration between Banks and Fintech

This massive market demonstrates that traditional banks can no longer operate alone. They must collaborate with fintech companies to remain relevant and competitive.

e. Supportive Regulations

This development also indicates that many countries are developing regulatory frameworks that support open banking practices such as PSD2 in Europe, which encourages data transparency while maintaining security.

2. Global and Regional Open Banking Developments

a. Open Banking and FinOps

In 2022, the global open banking market was valued at approximately \$20.6 billion. By 2023, the market value is expected to increase to \$25.14 billion, reflecting a significant growth trend in the adoption of open banking services.¹²The global open banking market is estimated to reach \$43.15 billion in 2024, a 25% increase from 2022. 56% of consumers are projected to use open banking-based services in 2025. In 2030, it is expected to continue to increase to \$135.17 billion with a compound annual growth rate (GAGR) of 27.2% from 2024 to 2030. It is projected that the global open banking market will increase sharply to reach \$164.8 billion in 2032.¹³Meanwhile, global spending on FinOps tools is expected to reach \$8 billion in 2025, up from \$5.1 billion in 2023.

Specifically, these global market trends, when analyzed in the context of regional financial market trends, are as follows;

1) Europe

It once led the global market in 2023, driven by regulations such as PSD2 that encouraged banks to open their APIs to third parties.

2) Asia Pacific

The fastest-growing region, with CARG of 28.7% from 2024 to 2030. Countries such as China, India, and Australia are showing rapid adoption of open banking services.¹⁴

3) North America

Contribute approximately 27.1% of global market revenue by 2030, with strong adoption in the US and Canada.

In addition, additional global transaction statistics show that the transaction volume through open banking platforms is expected to exceed \$1.5 trillion in 2030, up from \$500 billion in 2023. Meanwhile, consumer adoption in 2023 is around 50% of global consumers using at least one open banking service, and is projected to increase to 80% by 2027.¹⁵

Regarding the trends and models of payment service technology based on AI and IoT integration that are most dominant in controlling the global financial industry market, among others;

i. Payment Services

The fastest growing segment, driven by demand for fast and secure digital payment solutions

ii. AI and IoT Integration

The use of artificial intelligence and the Internet of Things in open banking helps in fraud detection and better financial data analysis.

iii. Hybrid Deployment Model

Many banks are adopting a hybrid approach to ensure data security while remaining flexible in service provision.

b. RegTech and Automated Compliance

¹²<https://www.grandviewresearch.com/industry-analysis/open-banking-market>.

¹³<https://www.globenewswire.com/news-release/2023/12/13/2795384/0/en/Global-Open-Banking-Market-Size-to-Exceed-USD-164-8-billion-by-2032-CAGR-of-23-11.html>.

¹⁴<https://www.grandviewresearch.com/industry-analysis/open-banking-market>.

¹⁵<https://virtuemarketresearch.com/report/open-banking-market..>

The global RegTech market is expected to grow from \$12.82 billion in 2023 to \$60.77 billion in 2030, at a CAGR of 24.9%. This technology enables faster and more efficient identity verification and electronic know-your-customer (KYC) processes.¹⁶

c. Generative AI and Cyber Risk

Generative AI is used to improve customer engagement, automate processes, and analyze financial data. However, this technology also carries risks such as AI-based phishing, deepfake scams, and attacks on AI systems.¹⁷

3. The AI Phenomenon in the Global Financial and Banking Sector

Here, we first outline various AI phenomena in the global financial and banking sectors, based on patterns and trends from surveys and literature reviews that can serve as primary data sources. These surveys and literature reviews are expected to demonstrate AI phenomena while strengthening the analysis of the subtopics to be developed. Thumar, R., & Vaghasiya, R. (2024), *The Impact of Artificial Intelligence on the Financial Sector*. *International Journal for Research in Applied Science and Engineering Technology*.¹⁸ Thumar has presented an in-depth study of how AI is transforming the financial industry. Among their findings are improvements in customer service, fraud detection and prevention, credit scoring and lending processes, investment management and algorithmic trading, and risk management and compliance. While AI offers various benefits and conveniences, as found in these findings, there are significant challenges that need to be addressed, including the following:

- a. Data privacy and security; The use of AI requires the collection and analysis of large amounts of data, which raises concerns about the privacy and security of customers' personal information.
- b. Bias and fairness; AI models can inherit bias from training data, potentially resulting in unfair or discriminatory decisions.
- c. Regulatory compliance; The rapid adoption of AI demands an update to the regulatory framework to ensure that innovation does not compromise financial system stability and consumer protection.
- d. Notes for future prospects: The study also highlights the potential for integrating AI with other technologies such as blockchain and quantum computing, which could open up new opportunities for operational efficiency and financial transaction security. Furthermore, AI-based personalized financial services are expected to be a key trend in increasing customer engagement and satisfaction.

Kanaparthi, V. (2024). *AI-based Personalization and Trust in Digital Finance*.¹⁹ Vijaya Kanaparthi explores how artificial intelligence (AI) can enhance service personalization and build trust in the digital financial sector. Among his key findings are:

- a. The role of AI in personalizing financial services; AI enables financial institutions to tailor products and services to individual customer needs. By leveraging technologies such as chatbots and facial recognition systems, AI can improve credit risk management, compliance, and fraud detection. This personalization is based on customer trust; the higher the trust, the more likely customers are to share personal information for more personalized services.
- b. Research gap identification; Through a systematic literature review of 16 papers using the PRISMA model, this study identified five major research gaps in AI-based digital finance as reflected in the following points:
 - i. Explainability; lack of transparency in AI decisions
 - ii. Trustworthiness: Challenges in building trust in AI systems
 - iii. Privacy; concerns about the protection of personal data
 - iv. Ethical considerations; ethical issues in the use of AI
 - v. Detection and mitigation of credit risk; the need for more effective models for assessing credit risk.

¹⁶World Bank (2022), *The Impact of Digital Financial Services*, (Online Report). <https://www.worldbank.org/en/topic/financialinclusion/brief/digital-financial-services>.

¹⁷Saha, B., Rani., & Shukla, S. K (2025), *Generative AI in Financial Institutions: A Global Survey of Opportunities, Threats and Regulation*

¹⁸Thumar, R., & Vaghasiya, R. (2024), "The Impact of Artificial Intelligence on the Financial Sector." *International Journal for Research in Applied Science and Engineering Technology*, 12(5), 62751. <https://doi.org/10.22212/ijraset.2024.62751>. [ijraset.com](https://www.ijraset.com).

¹⁹Kanaparthi, V. (2024). "AI-based Personalization and Trust in Digital Finance." *ArXiv*.<https://arxiv.org/abs/2401.15700>

- c. Development of an AI-based credit risk detection model; To address the gap in credit risk detection, this study developed an AI-based model using four machine learning algorithms;
 - i. Support Vector Machine (SVM)
 - ii. Random Forest
 - iii. Decision Tree
 - iv. Logistic Regression

Of the four models, Random Forest showed the best performance with the following metrics;

- ✓ Accuracy: ~89%
- ✓ Precision: ~88%
- ✓ Recall: ~ 89%
- ✓ Specificity: ~ 89%
- ✓ F1 Score: ~ 88%
- ✓ AUC: ~ 0.77

This model is considered the most effective in predicting customer characteristics for personalized credit risk mitigation strategies.

The study's findings underscore the importance of transparent and ethical AI integration in digital financial services. By addressing the identified research gaps, financial institutions can develop services that are safer, more reliable, and more tailored to individual customer needs. This not only improves operational efficiency but also strengthens the relationship between financial institutions and their customers. McKinsey & Company, (2022), *The Future of Finance: How Technology is Reshaping the Financial Sector*.²⁰McKinsey has identified seven key technologies that will shape the future of the financial sector in the coming decade. These technologies are not only driving innovation but also redefining business models and the competitive landscape in the financial industry. Here's a summary of these seven technologies:

- a. Artificial Intelligence (AI); AI is estimated to create up to \$1 trillion in added value annually for the global banking industry. Its applications include process automation, personalized customer service, fraud detection, and big data analysis for better decision-making.
- b. Blockchain and Distributed Ledger Technology (DLT); These technologies increase the transparency and security of financial transactions. Applications include smart contracts, cross-border transactions, and digital identity verification, all of which contribute to efficiency and trust in the financial system.
- c. Cloud Computing and Edge Computing: By distributing workloads across multiple locations, these technologies improve latency, reduce data transfer costs, and ensure compliance with local data regulations. This enables financial institutions to be more flexible and responsive to market needs.
- d. Internet of Things (IoT); IoT enables the collection of real-time data from various devices, which can be used for more accurate risk assessments, personalized product offerings, and improving the overall customer experience.
- e. Serverless Architecture and No-Code Platforms: These technologies enable faster and more efficient application development without the need for traditional server infrastructure or in-depth programming skills. This accelerates innovation and adaptation to changing business needs.
- f. Robotic Process Automation (RPA); RPA uses software to automate repetitive, rule-based tasks, such as data entry and transaction processing. This improves operational efficiency and allows staff to focus on more strategic tasks.
- g. Digital Trust and Identity Architecture: With the rise of digital transactions, it is crucial to securely and efficiently verify user identity. These technologies include biometric authentication and blockchain-based identity systems to prevent fraud and increase customer trust.

McKinsey emphasized that financial institutions must adopt an “AI-first” approach and build a flexible and secure technology foundation to remain competitive in the digital age. This includes modernizing core platforms, improving technology productivity, and developing platform-focused operating models.

²⁰McKinsey & Company, (2022), “The Future of Finance: How Technology is Reshaping the Financial Sector.” (Report). <https://www.mckinsey.com>

Moreover, this transformation is not only about technology, but also about building organizational capabilities that can adapt quickly to change and capitalize on new opportunities in the ever-evolving financial ecosystem. Kovacevic, A., Radenkovic, S. D., & Nikolic, D. (2024). Artificial Intelligence and Cybersecurity in Banking Sector: Opportunities and Risks.²¹Anna Kovacevic et al. have explored how artificial intelligence (AI) is revolutionizing the banking sector, while highlighting the cybersecurity challenges that arise from the adoption of this technology. This paper also highlights that AI, particularly machine learning, offers various benefits to the banking industry, including:

- a. Increased operational efficiency; AI enables the automation of business processes, such as customer service through chatbots and data analysis for faster and more accurate decision-making.
- b. Better fraud detection; By analyzing transaction patterns, AI can identify suspicious activity and prevent fraud in real-time.
- c. Personalized services; AI enables banks to offer products and services tailored to individual customer needs, increasing customer satisfaction and loyalty.

However, the adoption of AI also brings significant challenges in cybersecurity;

- a. Adversarial attacks; AI models are vulnerable to attacks such as data poisoning and evasion attacks, where attackers manipulate data to mislead the AI system.
- b. Dual-use AI technology; AI tools can be abused by malicious actors to develop more sophisticated and difficult-to-detect attacks.
- c. Lack of transparency; Complex AI models often operate as “black boxes,” making it difficult to understand how decisions are made, which can hamper the detection and response to security threats.

To address these risks, the authors recommend implementing safe AI with the following steps;

- a. Developing robust AI models; Building models with security, trustworthiness, resilience, and robustness characteristics to withstand various threats.
- b. Enhanced cybersecurity framework; Adopting a more robust and adaptive framework to protect banking systems from evolving attacks.
- c. Increased transparency and accountability; Developing more explainable AI models to increase trust and enable effective audits.

This study emphasizes the importance of a balanced approach to integrating AI into the banking sector, considering both the benefits and associated risks. This way, banks can maximize AI's potential while ensuring customer security and trust. Danielsson, J., & Uthemann, A. (2023), How Artificial Intelligence Could Upend Global Financial Stability.²²Danielsson, J et al. discuss how the adoption of AI by global financial institutions can increase efficiency but also create new systemic risks, such as hidden crises due to rapid capital flows and automated decisions that are not anticipated by regulators. Saha, B., Rani., & Shukla, S. K (2025), Generative AI in Financial Institutions: A Global Survey of Opportunities, Threats and Regulation.²³This study reviews the adoption of generative AI in global financial institutions, highlighting opportunities in automation and personalization of services, as well as risks such as cyberattacks and regulatory challenges. Maple, C., et al (2023), The AI Revolution: Opportunities and Challenges for the Financial Sector.²⁴This report explores how AI is revolutionizing the financial sector, covering improvements in customer service, fraud detection, and risk management as well as emerging ethical and regulatory challenges. Based on the literature data, the author found several interesting conclusion variables to be classified as main and new issues as follows; The adoption of AI by global financial institutions can increase efficiency, opportunities in automation and increased personalization of customer service, risk management and fraud detection but also raises new systemic risks such as cyber attacks and ethical and regulatory challenges.

²¹Kovacevic, A., Radenkovic, S. D., & Nikolic, D. (2024). “Artificial Intelligence and Cybersecurity in the Banking Sector: Opportunities and Risks.”arXiv. <https://arxiv.org/abs/2412.04495>.

²²Danielsson, J., & Uthemann, A. (2023), How Artificial Intelligence Could Upend Global Financial Stability, Axios. <https://www.axios.co/2023/11/07/artificial-intelligence-financial-risk>

²³Saha, B., Rani., & Shukla, S. K (2025), Generative AI in Financial Institutions: A Global Survey of Opportunities, Threats and Regulation. arXiv. <https://arxiv.org/abs/2504.21574>.

²⁴Maple, C., et al (2023), The AI Revolution: Opportunities and Challenges for the Financial Sector. arXiv. <https://arxiv.org/abs/2308.16538>

4. The Phenomenon of FinTech Adoption in the Indonesian Financial and Banking Sector

The author has mapped the issues and sub-topic patterns related to the phenomenon of Fintech adoption in the financial and banking industry in Indonesia during the era of disruption. For example, in the article, Rahayu, SK, & Astuti, W. A (2022), "Disruption of Financial Technology (Fintech) in Indonesia."²⁵This study examines the FinTech ecosystem in Indonesia, highlighting the rapid growth in eight product categories with Lending as the most prominent, as well as the presence of disruptive innovations that are impacting traditional business models. Siwi, AN, Triandhari, R., & Parianom, R (2023), "Digital Transformation in Banking Sector: The Effect of Covid-19 Pandemic in Indonesia."²⁶This study analyzes the impact of digital transformation on the financial performance of Islamic and conventional banks in Indonesia before and during the Covid-19 pandemic, finding that digitalization has a significant impact on operational efficiency. Putri, FA (2023), "The Impact of Monetary Policy on the Fintech Industry in Indonesia: Growth, Consumer Behavior, and Financial Inclusion."²⁷This study explores how monetary policy affects the growth of the Fintech industry in Indonesia, consumer behavior, and financial inclusion, finding that low interest rates encourage the adoption of digital financial services. Amal, MA, et al (2024). "Impact of Financial Technology Firms on Banking Performance: Insights from Indonesia."²⁸This article examines the impact of FinTech companies on bank performance in Indonesia, showing that collaboration between banks and FinTech can improve efficiency and customer service. Khaliq, A. (2025), "The Impact of Covid-19 on FinTech Lending in Indonesia: Evidence From Interrupted Time Series Analysis."²⁹This study uses time series analysis to evaluate the impact of the Covid-19 pandemic on FinTech lending in Indonesia, finding that despite an initial decline, lending trends show positive recovery and growth.

5. Examples of AI Open Banking implementation in Global and Indonesia

Various impacts and real phenomena of technological progress and innovation in the financial technology sector, especially the use of Artificial Intelligence (AI) computing in the global financial and banking sector can be shown as follows;

a. Mastercard: AI for fraud detection and personalization

Mastercard has integrated artificial intelligence (AI) to protect more than 159 billion transactions per year.³⁰, increasing fraud detection by 300% and reducing incorrect transaction declines by 22%. They also use AI to provide personalized product recommendations through tools like Shopping Muse and Agency Pay.

b. Baiont (China): AI-Based Quant Fund

Baiont, a quantitative fund in China, relies on a comprehensive AI model for the entire trading process, from factor identification to strategy development.³¹With just 30 staff, two-thirds of whom focus on algorithmic research, Baiont manages nearly \$970 million. Baiont founder Feng Ji stated that quantitative managers who don't adopt AI will be eliminated from the market within three years. In the full interview, Feng Ji emphasized that quantitative trading is fundamentally a matter of computer science and AI, not simply finance. He predicted that quantitative managers who fail

²⁵Rahayu, SK, & Astuti, W. A (2022). "Disruption of Financial Technology (Fintech) in Indonesia." *Scientific Journal of Information Systems Engineering and Management*, 8 (2), 124-130. <https://ojs.unikom.ac.id/index.php/jira/article/view/6708>.

²⁶Siwi, AN, Triandhari, R., & Parianom, R (2023), "Digital Transformation in Banking Sector: The Effect of Covid-19 Pandemic in Indonesia. *Laa Maisyir: Journal of Islamic Banking and Finance*, 10 (1), 45-56. <https://journal.uin-alauddin.ac.id/index.php/lamaisyir/article/view/52940>

²⁷Putri, FA (2023), *The Impact of Monetary Policy on the Fintech Industry in Indonesia: Growth, Consumer Behavior, and Financial Inclusion*. *Leading Economics Journal*, 3(2), 25-37. <https://journals.ristek.or.id/index.php/LE/article/view/104>.

²⁸Amal, MA, et al (2024). *Impact of Financial Technology Firms on Banking Performance: Insights from Indonesia*. *Indonesian Journal of Muslim Economics and Business*, 4 (1), 18-30. <https://economics.pubmedia.id/index.php/jebmi/article/view/168>.

²⁹Khaliq, A. (2025), *The Impact of Covid-19 on FinTech Lending in Indonesia: Evidence From Interrupted Time Series Analysis*. arXiv. <https://arxiv.org/abs/2505.06655>.

³⁰Stefanelli, V., Manta, F., & Toma, P. (2022). *Digital Financial Services and Open Banking Innovation: Are Banks Becoming Invisible?* arXiv. <https://arxiv.org/abs/2210.01109>.

³¹Yang, H., Liu, X.-Y., & Wang, C.D. (2023), *FinGPT: Open-Source Financial Large language Models*. arXiv. <https://arxiv.org/abs/2306.06031>.

to adopt AI within three years will be eliminated from the market due to increasing competition and the significant role of machine learning in the industry.³²

c. Royal Bank of Canada (RBC): AI team for capital markets

RBC has established an AI and digital innovation team within its capital markets division, hoping to generate up to \$1 billion from AI investments. The team focuses on electronic trading and automation, with headquarters in New York, Toronto, and London.³³

d. Wall Street Banks: Adopting Generative AI

Major banks like JP Morgan, Goldman Sachs, and Morgan Stanley have integrated generative AI into various functions, including trading, payments, marketing, and internal operations. They also face challenges such as AI-driven cyberattacks and uncertainty about investment returns.

Specifically, the chronology is as follows: “In May 2025, JP Morgan released an open letter to its third-party suppliers, expressing serious concerns about the security of AI applications in the financial sector.³⁴

The key findings of their internal security assessment found;

- i. 78% of AI implementations in companies lack adequate security protocols.
- ii. Most companies can't explain how their AI makes decisions.³⁵
- iii. Security vulnerabilities have tripled since the mass adoption of AI.

Meanwhile, the use of AI and open banking in Indonesia has shown significant progress in improving operational efficiency, security, and customer service in the financial sector. Banking and fintech institutions that adopt these technologies can provide more personalized, secure, and efficient services to customers.³⁶ However, challenges such as the need for skilled human resources and technology risk management still need to be addressed to ensure successful implementation.³⁷

Examples of the application of AI in the banking industry in Indonesia can be shown, among others;

1. Livin' by Mandiri

This digital application from Bank Mandiri integrates AI for;

- a. Financial services automation; automatically manage transactions, customer service, and bill reminders.
- b. Digital security; detecting and preventing cyber threats such as fraud and customer data theft.
- c. Customer data analytics; analyzing spending patterns and providing appropriate product recommendations. (jurnal nusantara.id)³⁸

2. Bank Central Asia (BCA)

BCA has developed a virtual assistant called VIRA to help customers conduct financial transactions more easily. Furthermore, BCA is implementing facial recognition and biometric technology to enhance the security of banking transactions. (Binus University)

3. State Bank of Indonesia (BNI)

BNI has implemented AI in its loan management system, accelerating previously time-consuming business processes. BNI's AI implementation strategy involves a five-pronged approach: defining needs, identifying opportunities, implementing, adapting, and reevaluating AI use (the use of AI technology in the banking business as a key pillar of digital transformation. csirt.or.id)

³²Financial Times, “Baiont's Feng Ji: Quant managers who don't adopt AI will be eliminated by the market,” May 20, 2025.

³³Canadian Lender RBC sets up new AI team for capital markets unit. Reuters May 21, 2025.

³⁴BankInfoSecurity.

³⁵Brim Labs

³⁶Frost, J. (2020). “The Economic Forces Driving Fintech Adoption Across Countries.” BIS Working Papers No. 838. Bank for International Settlements. <https://www.bis.org/publ/work838.html>.

³⁷Thakor, A. V. (2020). Fintech and Banking: What Do We Know? *Journal of Financial Intermediation*, 41, 100833. <https://doi.org/10.1016/j.jfi.2019.100833>.

³⁸Nia Maryana, et al., Utilization of Artificial Intelligence (AI) in the Financial Technology (Fintech) sector: Case Study of the Livin' by Mandiri Application in the *Journal of Scientific Cendekia*, Paramadina University.

4. Jago Bank

As a digital bank, Bank Jago uses AI to improve customer service and transaction security. Its AI applications include chatbots for 24/7 customer service, AI-based credit risk analysis, and automated fraud detection. (Case Study: How are Indonesian companies using AI for innovation?)

5. Bank Sumut Syariah

Bank Sumut Syariah is implementing AI to improve operational efficiency, including accelerating transaction processes, reducing management risks, and lowering operational costs.

Examples of banks that have implemented Open Banking in Indonesia include;

1. BRIAPI (Bank Rakyat Indonesia API)

BRIAPI provides API access for various banking services, enabling integration with partners;

- a. Bank Raya; Developing efficient and integrated Financial Institution Pension Fund (DPLK) services.
- b. Samsung Indonesia: Launches Samsung BRI Credit Card to Expand Financial Services
- c. Gajah Mada University (UGM): using BRIVA Online for easy student transactions
- d. Indomaret: adopts the BRIAPI QRIS system to simplify customer payment methods.³⁹

2. Bank Indonesia (BI)

As a central bank, BI uses AI to process big data to support policy formulation. AI helps BI analyze highly granular quantitative and qualitative data and enhances supervisory technology as part of its regulatory role.

6. Implications of FinTech Adoption from the Perspective of Maslahah Mursaya and Maqshid Syariah

If we want to examine it from the perspective of masalah mursalah specifically and the principles of maqasid sharia in general, what are the implications and real impacts of AI adoption in the context of FinTech development in Indonesia? The author makes an important note here that there is not much published literature that discusses AI adoption from a masalah mursalah perspective in the financial and banking sector in Indonesia, especially in the context of Aceh. This indicates that there is still a gap in the literature that can be filled by other authors. New authors can refer to and show 7 authors such as in the articles Muhammad Saleh, Andiny Utari and Abdul Wahab. (2020). Analysis of the Use of Sharia FinTech from Maslahah Mursalah's Perspective (Study on Dana Syariah.id).⁴⁰The results of this study indicate that Dana Syariah.id meets the requirements for sharia fintech, as stipulated in DSN-MUI fatwa No. 117/DSN-MUI/II/2018 and OJK regulations. Its efficient, fast, and secure transaction process is considered to provide benefits (masalah) and prevent losses (mafsadat) for users.

Arizal Hamizar.(2020).“Fintech Peer-to-Peer Lending in the Perspective of Maqashid al-Syariah (Study at PT. Amarta Mikro Fintek).”⁴¹Arizal analyzed the application of the maqasid al-syariah principles in the operations of PT. Amarta Mikro Fintek. His research found that fintech P2P lending can contribute to the achievement of maqasid al-syariah, particularly in meeting the economic needs of the community. Muhlis.(2020).“Utilization of Sharia Peer-to-Peer Fintech: A Fiqh Muamalah Perspective.”⁴²This research from UIN Alauddin Makassar examines the application of Islamic jurisprudence (fiqh) principles in Islamic P2P lending. The results indicate that Islamic fintech companies comply with Sharia principles, including avoiding usury (riba), gharar (gharar), and maysir (risk of illegality). Rohmatun Nafiah et al. (2021). “Analysis of Sharia Financial Technology (Fintech) Transactions from the Perspective of Maqashid Sharia.”⁴³Rohmatun Nafiah assessed the compliance of fintech transactions with the maqasid sharia. The results showed that sharia fintech meets sharia objectives and enjoys clear legal protection.

³⁹developers. Bri.co.id

⁴⁰Muhammad Saleh, Andiny Utari, and Abdul Wahab. (2020). Analysis of the Use of Sharia FinTech from the Masalah Mursalah Perspective (Study on Dana Syariah.id). e-Journal: Al-Buhuts Vol. 16. No. 1, 1-12. UIN Alauddin Makassar. <https://journal.iaingorontalo.ac.id/index/ab/article/view/1766> and garuda.kemdikbud.go.id.

⁴¹Arizal Hamizar. (2020). Fintech Peer-to-Peer Lending from the Perspective of Maqashid al-Syariah (Study at PT. Amarta Mikro Fintek). <https://www.academia.edu/108556095>.

⁴²Muhlis (2020). “Utilization of Sharia Peer-to-Peer Fintech: A Fiqh Muamalah Perspective.” *MALIA: Journal of Islamic Banking and Finance* 4 (2), 179-195. <https://jurnal.yudharta.ac.id/v2/index.php/malia/article/view/3265>

⁴³Rohmatun Nafiah, et al. (2021). Analysis of Sharia Financial Technology (Fintech) Transactions from the Perspective of Maqashid Sharia. *Iqtishadia: Journal of Islamic Economics and Banking*, 8 (2), 199-212. Doi: 10.19105/iqtishadia.v8i2.2479.

Ryan Yusuf Pradana. (2023). "Maslahah Mursalah Perspective on the Use of Sharia Fintech in Investment."⁴⁴This study examines the use of Islamic fintech in investment from a maslahat mursalah perspective, focusing on the Shafiq platform. The research found that Shafiq has implemented Sharia principles, including the prohibition of usury (riba), gharar (gharar), and dzalim (unjust) and is under the supervision of the Sharia Supervisory Board and the Financial Services Authority (OJK). This demonstrates that the use of Islamic fintech can provide security and convenience in investing in accordance with Sharia principles. Fajar Juniarto.(2023).“Analysis of the Forms of Maslahat and Mafasdat in Financial Technology: A Maqashid Syariah Perspective.”⁴⁵This study analyzes the benefits (maslahat) and losses (mafsadat) in the peer-to-peer lending fintech industry in Indonesia. This thesis uses a sociological legal approach and maqasid sharia principles, while also examining relevant regulations to ensure that fintech can meet societal needs without violating sharia principles. Aulia Rasyidah. (2023). "Legal Construction of Agreements in Sharia Financial Technology Peer-to-Peer Lending Based on Maslahah Mursalah."⁴⁶This thesis from Brawijaya University examines the legal construction of agreements in Sharia-compliant fintech P2P lending, which prioritizes maslahah mursalah (benefit-based benefit). This research highlights the inconsistencies between PJOK No. 10/PJOK.05/2022 and Sharia principles, particularly regarding interest rates and profit-sharing mechanisms. These studies provide in-depth insights into how fintech can be integrated into the Indonesian financial and banking sector, taking into account the principles of maslahah mursalah and maqasid sharia. This is crucial to ensure that technology adoption is not only economically efficient but also compliant with sharia values and provides maximum benefits to society.

C. CONCLUSION AND RECOMMENDATIONS

The development and growth of the global financial market shows an increasing trend from 2023 to 2032. The adoption of AI by global financial institutions can increase efficiency, opportunities in automation and increased personalization of customer service, risk management and fraud detection but also gives rise to new systemic risks such as cyber attacks and ethical and regulatory challenges. Examples of AI applications in the financial sector demonstrate how technology, particularly financial technology, is being adopted and utilized in financial and banking systems, both globally, regionally, and locally, such as in Indonesia. Examples of AI implementation in the Indonesian banking industry include Bank Mandiri, Bank Central Asia (BCA), Bank Negara Indonesia (BNI), Bank Jago, and Bank Sumut Syariah. Meanwhile, only two banks have implemented Open Banking in Indonesia: Bank Indonesia (BI) and Bank BRI. The AI phenomenon has had a significant impact on change, whether viewed in the context of opening up opportunities to utilize new technologies that support increasingly easier, faster, and better operational efficiency and effectiveness. Or it can also be seen as a new challenge that must be addressed wisely, or even open up new implications and threats that must be anticipated as a logical consequence of technological speed without careful and cautious consideration. Therefore, it is necessary to continue developing technology capable of rapid and accurate detection to create high levels of trust in the future.

Citing the recommendations from Anna Kovacevic et al., for safe AI implementation, it is necessary to follow the following steps;

1. Developing robust AI models; Building models with security, trustworthiness, resilience, and robustness characteristics to withstand various threats.
2. Enhanced cybersecurity framework; Adopting a more robust and adaptive framework to protect banking systems from evolving attacks.
3. Increased transparency and accountability; Developing more explainable AI models to increase trust and enable effective audits.

⁴⁴Ryan Yusuf Pradana. (2023). “The Maslahah Mursalah Perspective of Using Sharia Fintech in Investment. Journal: Qawanin Journal of Economic Syaria Law, 7 (2), 173-186. <https://jurnalfasya.iain.ac.id/index.php/qawanin/article/view/367>.

⁴⁵Fajar Juniarto. (2023). Analysis of the Forms of Maslahat and Mafasdat in Financial Technology: A Maqashid Sharia Perspective. Thesis, Faculty of Sharia and Law, UIN Syarif Hidayatullah Jakarta. <https://repository.uinjkt.ac.id/dspace/handle/123456789/73630>.

⁴⁶Aulia Rasyidah. (2023). "Legal Construction of Agreements in Sharia Financial Technology Peer-to-Peer Lending Based on Maslahah Mursalah." <https://repository.ub.ac.id/id/eprint/209948>.

REFERENCES

- Amal, M. A., et al (2024). Impact of Financial Technology Firms on Banking Performance: Insights from Indonesia. *Jurnal Ekonomi dan Bisnis Muslim Indonesia*, 4 (1), 18-30. <https://economics.pubmedia.id/index.php/jebmi/article/view/168>.
- Arizal Hamizar. (2020). Fintech Peer-to-Peer Lending dalam Perspektif Maqashid al-Syariah (Studi pada PT. Amarta Mikro Fintek). <https://www.academia.edu/108556095>.
- Aulia Rasyidah. (2023). “Konstruksi Hukum Perjanjian dalam Financial Technology Peer-to-Peer Lending Syariah Berdasarkan Masalah Mursalah.” <https://repository.ub.ac.id/id/eprint/209948>.
- Danielsson, J., & Uthemann, A. (2023), *How Artificial Intelligence Could Upend Global Financial Stability*, Axios. <https://www.axios.co/2023/11/07/artificial-intelligence-financial-risk>
- Fajar Juniarto. (2023). Analisis Bentuk Masalah dan Mafsadat pada Financial Technology: Perspektif Maqashid Syariah. *Skripsi Fakultas Syariah dan Hukum UIN Syarif Hidayatullah Jakarta*. <https://repository.uinjkt.ac.id/dspace/handle/123456789/73630>.
- Financial Times, “Baiont’s Feng Ji: Quant managers who don’t adopt AI will be eliminated by the market,” 20 Mei 2025.
- Frost, J. (2020). The Economic Forces Driving Fintech Adoption Across Countries. BIS Working Papers No.838. Bank for International Settlements. <https://www.bis.org/publ/work838.html>.
- Kanaparthi, V. (2024). “AI-based Personalization and Trust in Digital Finance.” *ArXiv*. <https://arxiv.org/abs/2401.15700>
- Khalik, A. (2025), The Impact of Covid-19 on FinTech Lending in Indonesia: Evidence From Interrupted Time Series Analysis. *arXiv*. <https://arxiv.org/abs/2505.06655>.
- Kovacevic, A., Radenkovic, S. D., & Nikolic, D. (2024). “Artificial Intelligence and Cybersecurity in Banking Sector: Opportunities and Risks.” *arXiv*. <https://arxiv.org/abs/2412.04495>.
- Maple, C., et al (2023), *The AI Revolution: Opportunities and Challenges for the Financial Sector*. *arXiv*. <https://arxiv.org/abs/2308.16538>
- McKinsey & Company, (2022), “The Future of Finance: How Technology is Reshaping the Financial Sector. “(Report). <https://www.mckinsey.com>
- Muhammad Saleh, Andiny Utari dan Abdul Wahab. (2020). Analisis Penggunaan FinTech Syariah Perspektif Masalah Mursalah (Studi pada Dana Syariah.id). *e-Jurnal: Al-Buhuts Vol.16. No.1*, 1-12. UIN Alauddin Makassar. <https://journal.iaingorontalo.ac.id/index/ab/article/view/1766>
- Muhlis (2020). “Pemanfaatan Fintech Peer-to-Peer Syariah: Perspektif Fiqih Muamalah.” *MALIA: Journal of Islamic Banking and Finance* 4 (2), 179-195. <https://jurnal.yudharta.ac.id/v2/index.php/malia/article/view/3265>
- Nia Maryana, dkk, Pemanfaatan Artificial Inteligence (AI) dalam sektor Financial Technology (Fintech): Studi Kasus Aplikasi Livin’ by Mandiri dalam *Jurnal Cendekia Ilmiah Universitas Paramadina*.
- Putri, F. A. (2023), The Impact of Monetary Policy on the Fintech Industry in Indonesia: Growth, Consumer Behavior, and Financial Inclusion. *Leading Economics Journal*, 3 (2), 25-37. <https://journals.ristek.or.id/index.php/LE/article/view/104>.
- Rahayu, S. K., & Astuti, W. A (2022). “Disruption of Financial Technology (Fintech) in Indonesia.” *Jurnal Ilmiah Rekayasa dan Manajemen Sistem Informasi*, 8 (2), 124-130. <https://ojs.unikom.ac.id/index.php/jira/article/view/6708>.
- Rohmatun Nafiah, dkk. (2021). Analisis Transaksi Financial Technology (Fintech) Syariah dalam Perspektif Maqashid Syariah. *Iqtishadia: Jurnal Ekonomi dan Perbankan Syariah*, 8 (2), 199-212. Doi: 10.19105/iqtishadia.v8i2.2479.
- Ryan Yusuf Pradana. (2023). “Perspektif Masalah Mursalah Penggunaan Fintech Syariah dalam Investasi. *Jurnal: Qawanin Journal of Economic Syaria Law*, 7 (2), 173-186. <https://jurnalfasya.iain.ac.id/index.php/qawanin/article/view/367>.
- Saha, B., Rani.,& Shukla, S. K (2025), “Generative AI in Financial Institution: A Global Survey of Opportunities, Threats and Regulation.” *arXiv*. <https://arxiv.org/abs/2504.21574>
- Siwi, A. N., Triandhari, R., & Parianom, R (2023), “Digital Tranformation in Banking Sector: The Effect of Covid-19 Pandemic in Indonesia. *Laa Maisyir: Journal of Islamic Banking and Finance*, 10 (1), 45-56. <https://journal.uin-alauddin.ac.id/index.php/lamaisyir/article/view/52940>
- Stefanelli, V., Manta, F., & Toma, P. (2022). Digital Financial Services and Open Banking Innovation: Are Banks Becoming Invisible? *arXiv*. <https://arxiv.org/abs/2210.01109>.

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Fuadi et al

- Thakor, A. V. (2020). Fintech and Banking: What Do We Know? *Journal of Financial Intermediation*, 41, 100833. <https://doi.org/10.1016/j.jfi.2019.100833>.
- Thumar, R., & Vaghasiya, R. (2024), "The Impact of Artificial Intelligence on Financial Sector." *International Journal for Research in Applied Science and Engineering Technology*, 12 (5), 62751. <https://doi.org/10.22212/ijraset.2024.62751>. ijraset.com.
- World Bank (2022), *The Impact of Digital Financial Services*, (Online Report). <https://www.worldbank.org/en/topic/financialinclusion/brief/digital-financial-services>.
- Yang, H., Liu, X.-Y., & Wang, C. D. (2023), FinGPT: Open-Source Financial Large language Models.arXiv. <https://arxiv.org/abs/2306.06031>

Sumber lain:

BankInfoSecurity.
Brim Labs
developers.bri.co.id
Financial Times 20 Mei 2025.
Reuters 21 Mei 2025.

Website:

<https://virtuemarketresearch.com/report/open-banking-market>.
<https://www.globenewswire.com/news-release/2023/10/31/2770236/0/en/Global-Open-Banking-Market-Size-to-Reach-USD-106-15-Billion-in-2032-Emergen-Research.html>.
<https://www.globenewswire.com/news-release/2023/12/13/2795384/0/en/Global-Open-Banking-Market-Size-to-Exceed-USD-164-8-billion-by-2032-CAGR-of-23-11.html>.
<https://www.grandviewresearch.com/industry-analysis/open-banking-market>.