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The Impact of Financial Technology on Enhancing Investment Management Efficiency in Capital Markets: A Qualitative Review of Global and Regional Literature (2015–2025)

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Abstract:

The purpose of this research is to study how financial technology (FinTech) has changed the way capital markets operate and how this has increased the efficiency of investment management around the world and regionally. The methodology for this study consists of conducting a systematic qualitative review of all peer-reviewed articles and institutional reports published between 2015-2025 that are related to FinTech's ability to support the integration of Artificial Intelligence (AI), Blockchain technology, and Robo-advisors to improve existing investment management systems. From this review, the findings indicate that AI has improved risk-adjusted return on investments (Sharpe ratio) by 2-3% per year for investments assessed under AI solutions as compared to traditional fundamental analysis solutions. Furthermore, the widely used transition to T+1 settlement cycles globally made it possible to use Distributed Ledger Technology (DLT) has not only improved credit risk but has also provided enhanced liquidity for capital market participants.

Regionally, the Gulf Cooperation Council (GCC) has distinguished itself from other global competitors by creating an innovative and dynamic financial services marketplace, with the UAE anticipating that AI will generate a 14% increase in its GDP by 2030. Overall, while FinTech improves access to capital markets and reduces transaction costs for all investors, the establishment of long-term sustainable capital markets will necessitate developing Adaptive Regulations (SupTech) and employing Explainable AI (XAI) to effectively manage systemic risks.

Keywords: FinTech, Investment Management, Capital Markets, Artificial Intelligence, Blockchain, GCC Markets, Market Efficiency, APA Style.

1. Introduction

Presently, the global economy is experiencing a change in its base framework due to advances in digital technology, which are at the heart of changing markets and new ways to provide financial support (Schueffel, 2016). Financial Technology (FinTech), which refers to using innovative technologies to improve financial services by making them more effective, transparent, and inclusive, is also a driving force in changing how investors manage investments.

The investment management industry has entered a new era of development with the move from decentralized standalone automated processes to Protocolized Intermediation as of 2025. This new model is based on algorithmic platforms completing the same type of services that traditional banks and other institutions had provided previously (Georgiev, 2024; Mertzanis,

2025). A primary consideration within global markets has been centered around reducing fees and encouraging higher frequency liquidity; whereas many regions (primarily in the Middle East) have leveraged FinTech as part of their economic diversification strategy per the Saudi Vision 2030 and UAE National Strategy for AI 2031 (Central Bank of The United Arab Emirates [UAE], 2024; Sohail, 2026). This report attempts to provide a comprehensive dual perspective on these developments by combining an academic review of the global theoretical underpinnings of FinTech and empirical examples of regional implementation.

2. Theoretical Framework and Conceptual Evolution

To understand the efficiency gains of FinTech, it is necessary to re-evaluate classical financial theories through the lens of digital transformation.

2.1. Redefining the Efficient Market Hypothesis (EMH)

According to Fama (1970), the efficient market hypothesis (EMH) says prices of financial assets reflect all information that investors have about the asset's future earnings potential. Technologies like artificial intelligence (AI) and LLMs are driving improvements in financial market "informational efficiency" using unstructured data—e.g., central bank minutes and satellite photos—at a speed of less than 45 seconds for gauging the actual impact on financial markets (IMF 2024). If information-processing delays associated with market transactions are reduced due to advances in technology and service levels increase due to reduced transaction costs associated with technology, then financial markets will be closer to the "strong form" of efficiency.

2.2. Transaction Cost Economics (TCE)

Market frictions can result from costs incurred to search for and monitor economic exchanges, according to Williamson (1985) in his work on TCE theory. Blockchain technology helps to eliminate these market frictions using smart contracts and "programmable trust." Smart contracts automatically verify transactions, reducing the need for costly intermediaries such as banks, payment processors, etc. (Agarwal, et al., 2023; Williamson 1985). In recent years, certain studies have suggested that blockchain technology could reduce cross-border remittance fees by 60% (MarketsandMarkets, 2025).

2.3. Resource-Based View (RBV) in Digital Banking

In the RBV view, the efficiency with which institutions transform technology and human resources into final productive outputs is a determining factor in the institution's overall performance (Akinyemi, 2025). The process of digitalization aids in alleviating the "trade-off between diversification and efficiency" by lowering operational (Manta et al., 2024).

3. Global and Regional Analysis of AI in Investment Management

Artificial Intelligence is the primary engine of alpha generation and risk management in the modern era.

3.1. Performance Benchmarks and Algorithmic Alpha

Global empirical evidence demonstrates that AI-augmented portfolios consistently outperform traditional benchmarks:

- **Alpha Generation:** Machine learning models have generated 2–3% higher annual alpha compared to traditional statistical methods (Mertzanis, 2025).
- **Portfolio Fitness:** The application of genetic algorithms (GA) has resulted in a 30% average improvement in portfolio fitness scores, aligning profitability with investor preferences (Falsetti, 2025).
- **Noise Reduction:** Advanced loss functions, such as the Huber Loss function, are used to stabilize return estimates by minimizing the impact of outliers.

$$Loss_{Huber}(y, f(x)) = \begin{cases} \frac{1}{2}(y - f(x))^2 & \text{for } |y - f(x)| \leq \delta \\ \delta(|y - f(x)| - \frac{1}{2}\delta) & \text{otherwise} \end{cases}$$

3.2. Regional AI Adoption: The GCC Heavyweights

The Middle East has transitioned from an early adopter to a global hub for AI infrastructure.

- **The UAE Market:** By 2024, 28% of financial firms in the UAE utilized AI for trading, a figure expected to reach 45% by 2026 (Central Bank of the UAE, 2024).
- **Saudi Arabia:** The Kingdom's "HUMAIN" initiative has secured over $20 billion in partnerships to build a sovereign AI ecosystem, aiming to avoid dependency on third-party hosted models (Sohail, 2026).
- **Economic Impact:** Saudi Arabia is expected to see absolute gains of $135.2 billion from AI by 2030, while the UAE will see the largest relative impact at 14% of its GDP (PwC, 2025).

4. Robo-Advisory: Democratization and Personalization

Robo-advisors have disrupted wealth management by offering automated, objective advice at a fraction of traditional costs.

4.1. Fee Compression and Inclusion

Traditional human advisors typically charge 1–2% of assets under management (AUM), whereas robo-platforms have compressed fees to 0.25–0.50% (Abraham et al., 2019). making these services available to everyone as well as significantly improving returns among lower wealthy clients. On average, lower-income clients using robo-advisors received a median

increase in return of 4.13% compared to clients using a human advisor (Falsetti, 2025).

4.2. Behavioral Bias Mitigation

According to Niszczota & Kaszás (2020) and Falsetti (2025), robo-advisors use “thinking AI” to help investors cope with cognitive biases (i.e., overconfidence & loss aversion) that may affect their investment decisions. Systematic rebalancing keeps robo-advisors within their portfolio discipline regardless of extreme market conditions (D’Acunto et al., 2025).

AI Level	Function in Investment	Performance Outcome
Mechanical AI	Task automation (Reporting/KYC)	Cost reduction and fee compression
Thinking AI	Data learning (Asset Allocation)	Alpha generation and risk prediction
Feeling AI	Social/Emotional Analysis	Enhanced client trust and loyalty

(Falsetti, 2025).

5. Blockchain and the Transformation of Post-Trade Infrastructure

Blockchain is revolutionizing the "plumbing" of financial markets, shifting the industry toward real-time capital mobility.

5.1. The Shift to T+1 Settlement

According to Citi in 2025, North America has successfully moved to a T+1 settlement cycle in its global markets. Improvements to infrastructure and adoption of DLT have allowed for "precision settlement," thus reducing the time it takes to go from trade execution to settlement from an average of T+5 in 1985 to nearly instantaneously today. (BNY, 2025).

5.2. Regional Tokenization: UAE and Saudi Arabia

The GCC region is at the forefront of asset tokenization:

- **Digital Bonds:** Dubai has successfully piloted "Digital Bonds" to reduce transaction time and increase transparency (Central Bank of the UAE, 2024).
- **CBDCs:** The UAE’s "Digital Dirham" and India’s UPI (Unified Payments Interface) are setting global benchmarks for cross-border settlement efficiency (Central Bank of the UAE, 2024; BCG, 2025).
- **Tokenized Turnover:** Global digital asset turnover is projected to reach 10% of total assets by 2030 (Citi, 2025).

6. Governance, Ethics, and Regulatory Responses

The rapid integration of technology necessitates a balance between innovation and systemic

stability.

6.1. The "Black Box" Challenge and XAI

Compliance with regulations is severely impacted by the lack of explainability in deep learning algorithms. To combat this issue, XAI encompasses methods to improve understanding of automated decisions. Human supervisors' ability to make informed decisions about automated systems will be increased through transparency of the systems (Mertzanis & SHS, 2025).

6.2. RegTech and SupTech Evolution

Supervisory Technology (SupTech) lets regulators leverage tech to oversee other tech, making it possible for central banks to identify fraud in real time. As a result, investment products can be approved in as little as 2 weeks instead of several months as in the past (Central Bank of the UAE, 2024).

6.3. Regulatory Sandboxes

Pioneered globally, regulatory sandboxes have become essential in the GCC for testing innovations like stablecoins and P2P lending platforms in controlled environments before full-scale deployment (IMF, 2023; Sohail, 2026).

7. Conclusion and Strategic Recommendations

By decreasing costs, speeding up the integration of data, and making it possible for everyone to use the same type of tools that professional investors use, Fintech has helped to greatly increase the efficiency of managing investment funds throughout history. Furthermore, as we move toward 2030, the connection between global standards for technology and strategic sovereign (country's) investments from the GCC have combined to form a new, very high-growth opportunity for the finance industry.

Strategic Recommendations:

1: Institutional Integration Through API-Based Ecosystems

- Establishing secure connections between traditional banks and fintech through API-enabled systems is essential to moving from a disruption-centric focus to a collaborative approach with financial technology companies by using API-based systems.
- All banks must collaborate with fintech companies using collaboration-based strategic partnership models, including minority investments, joint ventures, or an ecosystem approach - not simply relying on the acquisition approach alone.
- Simultaneously, banks that do create an enterprise-wide API governance framework will be

able to provide a safe and efficient method for integrating all their banks with the integrated methods and creating their traditional systems.

- Finally, banks must also establish internal methods of supporting employee adoption, such as creating cross-functional teams that will integrate and manage FinTech solutions that have been validated by outside parties into the bank and implementing a methodology for managing change within the bank's organization. Banks must work to develop secure means for sharing data to support privacy-compliant data sharing with outside sources - which will ultimately provide the banks with better customer insights, personalized service, and create opportunities for innovation.

2: Human-in-the-Loop Governance for Responsible AI

- The use of Artificial Intelligence (AI) in the finance sector must be regulated with a blend of human and AI supervision to use the benefits of both algorithmic efficiencies, together with that of human judgement, and moral accountability.
- Companies must have multilayered governance structures which include, but are not limited to, pre-deployment bias testing, Realtime human involvement where needed to mitigate risk, and post-deployment audits of the AI whether it was done at the completion of work or through periodic audits.
- By adding Explainable AI (XAI) systems to improve transparency and permit regulatory compliance as well as giving supervisors a better method for understanding and evaluating algorithmic decision-making.
- Companies must also create clear guidance on how humans will collaborate with AI systems while defining the need for escalation and the rights of each during high-risk situations, including the creation of user interfaces that visibly highlight human oversight will help to build trust with customers.
- There should be continued oversight and monitoring by humans who will continually add value through retraining of the AI models while also creating clear lines of accountability and audit trails for AI-assisted decisions.

3: Regional Regulatory Harmonization for FinTech Scalability

- To support the growth of cross-border FinTech innovations, regional regulators should develop a gradual regulatory harmonization framework across different financial hubs. For example, a good starting point could be establishing bilateral recognition agreements between the key financial centers. These agreements could help to facilitate mutual licensing, thus reducing the amount of regulatory duplication that now exists between these regions.

- Regulatory coordination could also begin with sector-specific harmonization efforts in areas where there is already some level of natural convergence, such as Islamic finance, digital payments and remittances. Creating a regional regulatory sandbox would allow FinTech firms that possess innovative solutions the ability to test their products and services in multiple markets under a single supervisory body.
- Another important focus for regulators should be the establishment of harmonized frameworks for digital assets and cross-border data governance that includes consistent classifications and robust data-sharing protocols. Continued collaborative efforts will also strengthen the regulatory alignment by supporting sustainable development of FinTech ecosystems through regional platforms for dialogue and capacity building initiatives.

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