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# Global Finance Transformation Driven By AI: Reshaping the Future with Fintech and Emerging Technologies

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**A B S T R A C T**

The acceleration of AI, FinTech, and decentralized finance (DeFi) based on AI and blockchain is transforming the international financial landscape, rewriting the rules of value, trust, and risk management. This work presents a critical, literature-informed review that integrates conceptual, experiential, econometric, simulation, and regulatory aspects of AI for financial transformation. While the literature on the topic yields consistent results, three key opportunities emerge: increased efficiency, broader financial access, and customer engagement. However, the review also highlights ongoing challenges, including regulatory uncertainty, cybersecurity risks, algorithmic bias, and the digital divide. By comparing the approaches across (as summarized in Table 1 below), the analysis finds that no single approach is adequate to capture the multi-dimensional potential of emerging technologies within finance. The conversation reflects the paradox of disruption, where innovation democratizes access while potentially, in the absence of strong governance and ethical frameworks, entrenching systemic frailties. The report suggests that the future of finance extends beyond adopting technology to also opening up avenues for institutions to be innovative while maintaining accountability, transparency, and inclusion. The limitations of the extant literature are recognized, and suggestions are provided for multi-method, cross-country, and longitudinal research to mitigate methodological fragmentation and advance knowledge on AI and finance.

***الكلمات الدالة:***
*التكنولوجيا المالية، البلوك تشين، التمويل اللامركزي، الابتكار المالي، الحوكمة الأخلاقية، التمويل العالمي.*

**الملخص**

يشهد النظام المالي العالمي تحولاً جوهريًا بفعل الاندماج السريع لكل من الذكاء الاصطناعي (AI)، والتكنولوجيا المالية(FinTech) ، والتمويل اللامركزي القائم على تقنية البلوك تشين (DeFi)، حيث تعيد هذه التقنيات صياغة أسس القيمة والثقة وإدارة المخاطر. تقدم هذه الدراسة مراجعة نقدية قائمة على الأدبيات السابقة، تجمع بين المنظورات المفاهيمية، والتجريبية، والاقتصاد القياسي، والمحاكاة، والأطر التنظيمية لفهم التحول المالي المدفوع بالذكاء الاصطناعي. وتتقاطع نتائج الأدبيات عند ثلاث فرص رئيسة: تحسين الكفاءة، توسيع نطاق الشمول المالي، وتعزيز تفاعل العملاء. ومع ذلك، تكشف المراجعة عن تحديات مستمرة، تشمل غموض الأطر التنظيمية، ومخاطر الأمن السيبراني، والتحيزات الخوارزمية، والفجوة الرقمية. ومن خلال المقارنة بين التقاليد المنهجية المختلفة (كما هو موضح

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في الجدول 1)، يتضح أن أي منهج منفرد لا يكفي لاستيعاب الأثر متعدد الأبعاد للتقنيات الناشئة في القطاع المالي. كما تؤكد المناقشة على مفارقة "التحول المزدوج"، إذ يساهم الابتكار في ديمقراطية الوصول إلى الخدمات المالية، لكنه في الوقت ذاته قد يعزز الهشاشة النظامية ما لم يُدعَم بحوكمة رشيدة وضمانات أخلاقية. وتخلص الدراسة إلى أن مستقبل المالية العالمية لا يكمن فقط في تبني التكنولوجيا، بل في قدرة المؤسسات على دمج الابتكار مع مبادئ المساءلة والشفافية والشمول. كما تعترف الدراسة بحدود الأدبيات الحالية، وتقترح بحوثًا مستقبلية تعتمد مناهج متعددة، ودراسات مقارنة عبر الدول، وأبحاثًا طولية لمعالجة التشرذم المنهجي وتعميق الفهم للتحول المالي المدفوع بالذكاء الاصطناعي.

***JEL Classification:*** *G21, G23, G28, O33, & O16.*

## 1. Introduction

Over the past decade, Artificial Intelligence (AI) and Financial Technology (FinTech) have catalyzed a structural shift in global finance, challenging incumbent logics of intermediation, risk pricing, and customer engagement. Agile entrants and digitally transformed incumbents increasingly rely on machine learning, big-data analytics, and blockchain to deliver faster, cheaper, and more personalized services, thereby reconfiguring the production of financial value and the governance of uncertainty (Arner, Barberis, & Buckley, 2017; Chen, Chen, & Lin, 2020; Iansiti & Lakhani, 2020). Yet transformation is neither uniform nor unproblematic. Empirical and conceptual work shows that efficiency gains and product innovation often arrive entangled with fresh vulnerabilities—from opaque algorithmic decision-making and cybersecurity exposure to uneven consumer access—inviting a critical interrogation of both promises and trade-offs (Gai, Qiu, & Sun, 2018; Truby, Brown, & Dahdal, 2020; Weber, Carl, & Hinz, 2023). In short, the field is moving from digitizing existing processes to redefining financial architectures, even as governance, ethics, and inclusivity lag behind (Zetzsche, Buckley, Arner, & Barberis, 2020).

Historically, centralized institutions mediated trust, cleared payments, and allocated credit through hierarchical processes and legacy infrastructure. Globalization and digitization exposed frictions—high costs, slow cross-border payments, limited reach that FinTech innovations directly target via open banking, platform lending, and embedded finance (Ramdani, Rothwell, & Boukrami, 2020; Suryono, Budi, & Purwandari, 2020; Wang, Zheng, Xu, & Hung, 2022). AI augments this disruption by enabling granular risk models and real-time personalization, while blockchain and DeFi experiment with disintermediation through smart contracts and programmable assets (John, Kogan, & Saleh, 2023; Schär, 2021; Schueffel, 2021). Critically, the same technologies that extend access can also reproduce exclusion if data coverage is uneven or incentives misaligned (Bhagat & Roderick, 2020; Tan, 2022). Evidence from banking markets underscores that digital service quality and data-driven CRM materially shape loyalty and performance, pushing incumbents toward customer-centric redesigns; but outcomes hinge on capability building and context-sensitive implementation (Kaur, Ali, Hassan, & Al-Emran, 2021; Kumar, Mokha, & Pattnaik, 2021; Arora & Banerji, 2024; Lohano, Jariko, & Memon, 2024; Giebe, Zwerenz, & Hammerström, 2023).

Two forces motivate the acceleration of AI-driven transformation. Systemic resilience and efficiency: Post-crisis reforms and the pandemic-era digitization wave exposed the limits of paper-based, batch-processed finance, elevating the case for real-time, data-centric infrastructure and RegTech supervision (Feyen, Frost, Gambacorta, Natarajan, & Saal, 2021; Zetzsche et al., 2020). Shifting user expectations: Consumers and firms increasingly demand instant, hyper-personalized, omnichannel services; AI-assisted interfaces and automation promise to meet these expectations while freeing human capacity for complex tasks (Mogaji, Farquhar, Esch, Durodié, & Perez-Vega, 2022; Oyeniyi, Ugochukwu, & Mhlongo, 2024; Ramesh, 2023). Strategically, organizations that align internal resources with adoption drivers—perceived usefulness, ease of use, social influence—gain durable advantage, suggesting value in integrating the Resource-Based View with TAM/UTAUT to explain heterogeneous performance outcomes (Bendera, 2024; Shekaoneka & Arthur, 2024; Nakamura, 2024; Kumar, Rani, Rani, & Rani, 2025; Tolici & Niculescu, 2025). At the public-finance frontier, complementarities between AI and blockchain signal gains in tax compliance

and revenue assurance, further broadening the scope of transformation beyond private markets (Olabanji, Olaniyi, & Olagbaju, 2024; Zhao, 2024). Despite significant potential, four interlocking challenges complicate responsible scaling. Regulatory and legal uncertainty: Jurisdictions struggle to keep pace with algorithmic credit, XAI mandates, and cross-border DeFi risks, producing fragmented rules and compliance ambiguity (Giraudo, Fosch-Villaronga, & Malgieri, 2024; Huda, Awaludin, & Siregar, 2024; Vijayagopal et al., 2024; Xudaybergenov, 2023). Ethical risk and trust: Bias, privacy, and explainability concerns threaten legitimacy; human-in-the-loop controls and governance scaffolds are necessary but not yet standard practice (Subagio & Sitepu, 2023; Thakur & Sharma, 2024; Adeyelu, Ugochukwu, & Shonibare, 2024; Weber et al., 2023). Market structure and inclusion: FinTech can widen access via mobile and AI scoring, yet digital divides, socio-spatial inequalities, and political-ideology effects on adoption complicate equitable diffusion (Das, 2024; Okeke et al., 2024; Riedel et al., 2022; Tan, 2022). Technical and operational fragility: Smart-contract exploits, oracle risks, and interoperability gaps in DeFi and AI pipelines create non-trivial systemic exposure (Jensen et al., 2021; Bodó & Filippi, 2024; Schär, 2021). Addressing this paradox—innovation that democratizes while potentially amplifying fragility—requires coordinated policy, ethically aligned design, capability investment, and transparent measurement frameworks connecting customer experience, operational resilience, and societal outcomes (He, 2024; Vicario, Salas-Compás, Valcarce-Ruiz, Serrano, & Ramón, 2024; Ranković, Gurgu, Martins, & Vukasović, 2023; Lee, 2020).

## 2. Literature Review

The integration of AI into the global finance sector represents a paradigm shift that is fundamentally reshaping financial services, driven by advancements in fintech and emerging technologies. AI is enhancing decision-making processes, increasing efficiency, and fostering new business models across various financial institutions. This transformation is evidenced by improvements in tax compliance, fraud detection, and risk management, as well as personalized customer service offerings that were inconceivable in previous financial frameworks. AI is poised to revolutionize the financial industry by facilitating the development of innovative business models that enhance accessibility and inclusion in financial markets. According to Vicario et al., AI not only complements existing systems but has the potential to radically transform global finance into a more intelligent ecosystem tailored to the needs of a dynamic economy (Vicario et al., 2024). The ability of AI technologies to manage and analyze vast amounts of data leads to significant improvements in operational efficiency and decision-making accuracy, which are critical as financial institutions navigate the complexities of modern markets (Nahar et al., 2024; He, 2024; Riani, 2024). Moreover, AI's role is further accentuated by its synergy with other technologies, particularly blockchain. Olabanji et al. highlight how the combined application of AI and blockchain can enhance tax compliance and improve revenue management in public finance systems (Olabanji et al., 2024). Blockchain adds a layer of security and transparency that is essential for building trust in automated systems, thus supporting the broader adoption of fintech solutions in commerce and banking (Olabanji et al., 2024).

The implications of AI in finance extend beyond efficiency; they also encompass the ethical and regulatory dimensions of technology adoption. As financial institutions incorporate AI tools, ethical considerations such as data privacy and algorithmic bias come to the forefront (Zhang, 2024). Ranković et al., 2023). These challenges necessitate comprehensive governance frameworks to ensure that the implementation of AI remains responsible and equitable. Researchers like Riedel et al. and Pandey and Sergeeva have noted the importance of preparing for regulatory changes and addressing the potential impact of AI on employment and competitive dynamics within the financial sector (Riedel et al., 2022; Pandey & Sergeeva, 2022). In addition, the human factor remains crucial in this transformation. While AI can automate routine tasks, human oversight and interaction are key to maintaining customer trust and satisfaction. As highlighted by Zhang, the responsible integration of AI technology must consider consumer perceptions and the qualitative factors that influence financial service delivery (Zhang, 2024). Integrating AI effectively requires financial professionals to develop new skills that complement emerging technologies, ensuring that the workforce is equipped to leverage AI capabilities while mitigating associated risks (Jarunde, 2024; Pandey & Sergeeva, 2022). Emerging financial landscapes driven by AI and fintech innovations not only promise enhanced financial performance but also present significant challenges. Industries must engage in

proactive learning and adaptation to harness the benefits of AI fully while addressing its implications for security, privacy, and job displacement. Ensuring that financial institutions are prepared for these changes will be critical in shaping the future of global finance.

### *2.1 Artificial Intelligence and Its Role in Financial Innovation*

AI plays an increasingly pivotal role in driving financial innovation across the sector, enhancing efficiency, service delivery, and overall customer experience. This transformation is evidenced by numerous applications of AI technologies such as automated trading systems, predictive analytics, and personalized banking services. The efficacy of AI in the financial realm stems not just from technological advancements but also from its capability to tailor services to individual customer needs, thereby fostering greater engagement and satisfaction (Hajj & Hammoud, 2023; Mogaji et al., 2022). One of the significant contributions of AI in financial services is its ability to automate routine tasks, which significantly streamlines banking operations. Tools like chatbots and virtual assistants are reshaping customer interactions by providing immediate assistance for inquiries and transaction processing (Mogaji et al., 2022; Oyeniyi et al., 2024). This automation not only enhances operational efficiency but also reduces costs and improves the availability of services, thereby making financial inclusion more attainable for underserved populations. For instance, AI-driven applications such as digital wallets and mobile banking platforms facilitate access to services in remote areas, overcoming geographical and literacy barriers (Das, 2024; Okeke et al., 2024). Moreover, AI empowers financial institutions to enhance risk management and decision-making processes. Historical data analysis supplemented by machine learning algorithms allows for more accurate risk assessments and fraud detection mechanisms, ultimately leading to safer transactions for consumers (Hajj & Hammoud, 2023; Sharma, 2023). The nuances of AI's predictive capabilities permit institutions to forecast market trends and consumer behaviors, ensuring better strategic planning and operational responses. This aspect of AI application is crucial as it mitigates potential losses and strengthens compliance with regulatory standards through improved monitoring systems (Truby et al., 2020, Pandey & Sergeeva, 2022). The ethical implications of AI usage within the financial sector cannot be overlooked. While AI has the potential to drive innovation, it also raises concerns regarding data privacy, algorithmic biases, and regulatory needs. Institutions must navigate these issues carefully to cultivate trust among consumers and ensure fair access to financial services (Duan, 2024; Lee, 2020). Proactive regulatory measures are essential to engender an environment that maximizes the benefits of AI while minimizing potential harms (Truby et al., 2020). AI is profoundly reshaping the financial services landscape by enhancing operational efficiencies, personalizing customer experiences, and ensuring robust risk management strategies. As this technology continues to evolve, its integration into financial services remains paramount for future innovations, requiring thoughtful consideration of ethical standards and regulatory frameworks to guide its development and implementation.

### *2.2 FinTech Disruption and Emerging Business Models*

The rise of financial technology (FinTech) has significantly reshaped the conventional banking landscape, leading to a paradigm shift characterized by new business models and disruptive innovations. FinTech encompasses a broad range of technologies that enhance or automate financial services, integrating capabilities such as artificial intelligence, blockchain, and cloud computing (Wang et al., 2022; Faour & Al-Sowaidi, 2023). This transformation is largely driven by FinTech's ability to deliver efficient, lower-cost alternatives to traditional banking services, thus attracting a diverse customer base seeking convenience and accessibility (Faour & Al-Sowaidi, 2023; Litimi et al., 2023). FinTech's disruptive nature aligns with concepts from consumer theory and disruptive innovation theory, suggesting that consumers gravitate towards more efficient and cost-effective solutions offered by FinTech, subsequently challenging the longstanding dominance of traditional banks (Litimi et al., 2023; Kalai & Toukabri, 2024). Historical precedence shows that disruptive innovations often flourish in niche markets before scaling to redefine larger sectors, a concept articulated by Christensen (Kando & Trinugroho, 2022).

A significant business model evolution is evidenced by the emergence of digital payment systems, peer-to-peer lending, and crowdfunding platforms, which provide direct competition to traditional banks (Kurniawati, 2023; Suryono et al., 2020). The necessity for banks to adapt has prompted collaboration initiatives, such as open banking, enabling established financial institutions to innovate by integrating FinTech solutions into their service offerings (Faour & Al-Sowaidi, 2023; Ramdani et al., 2020). This

collaboration fosters innovation and enhances competition, ultimately benefiting consumers through improved service delivery and reduced costs (Faour & Al-Sowaidi, 2023; Ramdani et al., 2020; Kapoor & Soni, 2024). Moreover, regulatory frameworks are evolving to adapt to this new business landscape, ensuring consumer protection while also fostering innovation. Regulatory bodies are acknowledging the need for oversight in a rapidly changing environment where FinTechs pose both challenges and opportunities to existing financial institutions (Vijayagopal et al., 2024; Kapoor & Soni, 2024). This regulatory evolution is crucial in balancing the agility of FinTechs with the stability requirements of traditional banking systems.

Despite the disruptive potential of FinTech, challenges remain. Disparities in technology adoption among different demographics reveal that while some groups benefit significantly from FinTech services, others are hesitant to fully embrace these new offerings (Tan, 2022 Bhagat & Roderick, 2020). This highlights socio-spatial inequalities that can accompany FinTech advancements, suggesting that financial inclusion must be critically examined within various contexts (Tan, 2022). Thus, the intersection of FinTech and traditional banking is not merely a threat to the latter but a transformative opportunity. The synthesis of innovation-driven services within FinTech compels banks to revaluate their strategies, leading to a competitive yet collaborative environment that promises a more inclusive financial future (Kapoor & Soni, 2024; Meyer & Okoli, 2023; Ramdani et al., 2020).

### *2.3 Blockchain and Decentralized Finance (DeFi)*

Decentralized Finance (DeFi) represents a significant transformation in the global financial landscape, utilizing blockchain technology to create an open, permissionless financial ecosystem that enhances traditional financial services. According to John et al., the emergence of DeFi is closely associated with the development of smart contracts that facilitate automated transactions under predefined conditions, leading to economic value generation in areas traditionally dominated by financial intermediaries (John et al., 2023). This transition illustrates DeFi's potential to disintermediate the financial sector, providing services accessible to individuals regardless of geographical location, race, or socio-economic status, as noted by Muhammad et al. (Muhammad et al., 2024). Central to DeFi are smart contracts, which ensure transparency, security, and efficiency. Zhao indicates that blockchain technology significantly enhances transaction integrity and reliability, fostering a trust-based environment where users can verify transaction histories (Zhao, 2024). DeFi platforms built on blockchain infrastructures like Ethereum leverage these smart contracts to replicate and innovate existing financial products and services, enabling a decentralized approach without central authority oversight (Schär, 2021). Furthermore, Schueffel highlights that the permissionless nature of DeFi allows for an influx of new participants, challenging traditional financial industry incumbents and prompting a reassessment of competitive dynamics in financial markets (Schueffel, 2021).

The foundational architecture of DeFi supports lending and borrowing through decentralized protocols—such as those exemplified by the Compound lending platform—while also creating opportunities for complete financial inclusivity (Tang, 2023). This shift to a decentralized model reflects growing skepticism towards traditional banking systems, as users increasingly seek alternatives that provide greater autonomy over their financial assets (Muhammad et al., 2024). Moreover, decentralized applications (DApps) characterized by secure and transparent transactions are reshaping user interactions within financial markets, fostering a holistic reconsideration of financial processes and goals (Singh, 2024). Despite the numerous advantages presented by DeFi, challenges remain concerning regulatory frameworks, risk management, and the integration of traditional financial norms (Bodó & Filippi, 2024). As Jensen et al. suggest, users must navigate complex risk environments, requiring a clear understanding of both decentralized and traditional financial systems to make informed decisions in this new paradigm (Jensen et al., 2021). This complexity is heightened by the evolving role of regulatory technology (RegTech), the pressure for compliance, and the necessity of maintaining user trust within decentralized frameworks that often lack direct regulatory oversight (Mustafa, 2024). Thus, DeFi embodies a transformative approach to finance, characterized by a shift toward decentralized, transparent, and automated financial solutions. This evolution, highlighted across multiple studies, emphasizes the critical role of smart contracts and blockchain technology in reshaping the finance ecosystem while also revealing the systemic challenges that must be addressed to fully harness its potential.

### *2.4 Customer-Centric Transformation: From Traditional Banking to Smart Finance*

The evolution of banking toward a more customer-centric model primarily hinges on the adoption of digital technologies that enhance user experience, operational efficiency, and customer satisfaction. As traditional banking models become less favorable, financial institutions are increasingly integrating advanced technologies such as Artificial Intelligence (AI) to improve customer interactions and customize their services. Kumar and Kohli (2024) emphasizes the role of augmented reality in transforming client interactions, enabling banks to create immersive customer experiences that could lead to improved satisfaction and engagement levels. This aligns with findings from Tian, which indicate that AI plays a critical function in the digital transformation of commercial banks by enhancing customer service, driving efficiency, and effectively managing risk (Tian, 2024). The incorporation of AI not only streamlines banking processes but also allows for the customization of offerings that align with customer preferences—a shift noted by Tambunan and Nasution (2022) argued that understanding digital customer behavior is vital for transitioning from product-centric to customer-centric models. Furthermore, a review of digital transformation strategies in banks within Ho Chi Minh City reveals a structured approach that begins with assessing digital readiness to identify improvement areas required for achieving a seamless, unified customer experience across various touchpoints. Banks that successfully implement these strategies are better equipped to meet the demands of an increasingly tech-savvy clientele, as evidenced by an empirical analysis conducted by Giebe et al., (2023) which highlights how customer loyalty can be significantly influenced by effective use of big data analytics (Giebe et al., 2023).

In emerging economies like India, customer experience expectations are rapidly evolving, necessitating banks to enhance their digital service offerings. Kaur et al. have shown that effective in-branch communication combined with digital strategies plays a vital role in easing customers' transitions to these new banking channels (Kaur et al., 2021). This sentiment is echoed by studies emphasizing that customers increasingly value both digital and physical interactions, necessitating continuous innovation by banks to maintain competitiveness (Houndjo, 2023). The successful adoption of technology is supported by studies on digital banking service quality, which reveal a direct correlation between customer experience and customer loyalty, ultimately affecting financial performance (Lohano et al., 2024; Kumar et al., 2021). For banks to thrive in the digital age, they must prioritize enhancing customers' online experiences, as research indicates that improved digital service quality fulfills consumer demands while strengthening relationships with existing clients (Mitrović & Raičević, 2020; Arora & Banerji, 2024). Moreover, banks that effectively leverage AI can offer tailored solutions, improving overall satisfaction by aligning services with individual customer needs while managing operational costs effectively (Stegy, 2025; Ramesh, 2023). The transition from traditional banking to a more customer-centric model requires banks to strategically adopt and integrate digital technologies. By harnessing tools like AI and augmented reality, and by focusing on comprehensive customer experience strategies, financial institutions can exceed customer expectations, ensuring longevity and success in a highly competitive landscape.

### *2.5 Regulatory and Ethical Perspectives in AI-Driven Finance*

The integration of Artificial Intelligence (AI) into the financial sector presents multifaceted regulatory and ethical challenges that necessitate a comprehensive examination. As AI systems increasingly influence financial decision-making, including underwriting, risk management, and customer service, the need for robust regulatory frameworks and ethical guidelines has become paramount. This discourse revolves around the 'human-in-the-loop' concept, which holds that human oversight is essential in mitigating the risks associated with the "black box" nature of AI systems, wherein decisions made by these systems are not easily interpretable by humans (Subagio & Sitepu, 2023). This is particularly relevant in finance, where the stakes involve not just financial losses, but also ethical considerations relating to fairness, accountability, and transparency. Studies highlight that the proliferation of AI in finance has led to significant ethical dilemmas, such as algorithmic bias and data privacy concerns. Thakur and Sharma argue that while AI can enhance efficiency and accuracy, it also introduces complex ethical challenges that require careful scrutiny (Thakur & Sharma, 2024). Adeyelu et al. further emphasize the dual nature of AI's impact in finance, explaining that it can improve operational efficiency yet simultaneously heighten systemic risks and exacerbate existing biases, necessitating the establishment of strong ethical frameworks (Adeyelu et al., 2024). This perspective

underscores the importance of developing a regulatory landscape that can keep pace with technological advancements while prioritizing ethical considerations in financial practices. Moreover, collaborative efforts between fintech companies and regulatory authorities are critical to shaping a sustainable environment for AI deployment in finance. Oriji et al. recommend proactive stakeholder engagement to establish legal frameworks that can adapt to the rapid evolution of financial technologies, thereby ensuring that AI is integrated responsibly across the African financial ecosystem (Oriji et al., 2023). This is echoed in discussions surrounding the establishment of dedicated regulatory bodies that would oversee ethical practices and ensure accountability in AI applications within financial institutions (Xudaybergenov, 2023).

The significance of transparency in AI decisions is another crucial area of focus. The need for Explainable Artificial Intelligence (XAI) is paramount in finance, as decision-makers require the ability to understand and audit AI-driven choices to maintain public trust and regulatory compliance (Weber et al., 2023). Without adequate transparency, financial institutions may face legal challenges as regulatory frameworks struggle to evolve in the wake of AI technologies. the legal uncertainties surrounding AI further complicate the regulatory environment, as businesses often confront contradictory regulations amid a rapidly changing technological landscape (Giraudo et al., 2024). International cooperation is also essential in addressing the global ramifications of AI in finance. The transnational nature of AI technologies necessitates a unified approach to regulation, ensuring that ethical guidelines are not only comprehensive but also adaptable to different jurisdictions (Jing-jing et al., 2023). Legal challenges, particularly concerning privacy and data protection, represent significant hurdles that remain unresolved across various territories (Huda et al., 2024). This complexity calls for a synergistic framework that balances the benefits of innovation with stringent protective measures for consumer data.

In terms of practical implications, finance professionals must adapt to the evolving landscape dominated by AI technologies. This shift necessitates an emphasis on critical thinking and problem-solving skills to navigate issues like bias and ethical considerations effectively (Jarunde, 2024). Such skills will be crucial in ensuring that the use of AI not only aligns with financial objectives but also upholds ethical standards and fosters trust among stakeholders. Thus, as AI becomes increasingly embedded in financial practices, it is imperative to adopt a holistic approach that integrates ethical governance, proactive regulatory measures, and a commitment to transparency. Such an approach will mitigate risks while leveraging the transformative potential of AI technologies in finance.

### *2.6 Theoretical Integration: Resource-Based View (RBV) and Technology Adoption Models (TAM/UTAUT)*

The integration of the Resource-Based View (RBV) and Technology Adoption Models (specifically, the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT)) offers significant insights into how organizations can enhance their competitive advantage through innovative technologies. The RBV posits that a firm's unique resources and capabilities are crucial for achieving sustained competitive advantages (Shekaoneka & Arthur, 2024). Complementarily, TAM and UTAUT highlight the determinants that influence technology adoption, emphasizing factors such as perceived usefulness, ease of use, and social influence (Bendera, 2024). One empirical study outlines how the RBV can underpin technology implementation strategies in various sectors, including education, by showcasing how adequately trained human resources serve as vital assets in the adoption process of Information and Communication Technologies (ICT). This aligns well with TAM, which stresses the importance of these attributes for successful technology integration (Shekaoneka & Arthur, 2024). Moreover, the integration of the RBV with TAM showcases the imperatives of addressing skill gaps and enhancing perceptions of usefulness for effective technology implementation in organizational contexts (Bendera, 2024).

Additionally, the resource-based perspective is instrumental in evaluating the dynamics of technological change through various frameworks. For instance, the combined application of RBV and UTAUT has been shown to impact small and medium-sized enterprises (SMEs) decisively, facilitating the adoption of innovative technologies that lead to improved market performance (Kumar et al., 2025). The synergy between the RBV and TAM can also tackle challenges posed by technological innovations in sectors such as human resource management, where AI and big data analytics alter operational paradigms, necessitating a strategic resource-driven approach to leverage these technologies effectively (Tolici & Niculescu, 2025).

Furthermore, studies have indicated that frameworks encompassing RBV, TAM, and UTAUT are increasingly pertinent in the context of digital transformation. For example, organizations that craft comprehensive digital transformation roadmaps are empowered to align their technological capabilities with strategic objectives, thus enhancing performance outcomes (Nakamura, 2024). The emphasis on the compatibility of organizational resources with new technologies further underscores the integral roles of both RBV and TAM in nurturing a conducive environment for technology adoptions. Thus, the theoretical integration of RBV and Technology Adoption Models provides a structured approach that facilitates understanding technology acceptance in organizations while highlighting the pivotal role of internal resources in leveraging new technologies for competitive advantage. This interaction supports organizations in making informed decisions about technology investments and process improvements, ultimately leading to sustainable operational success.

## 3. Methodology

The methodological approaches employed in prior research on AI-driven transformation of finance reveal both diversity and evolution. Early studies on financial innovation primarily adopted conceptual and qualitative frameworks, often relying on case studies of emerging FinTech firms or blockchain applications to illustrate disruptive potential. Schueffel (2016), for instance, used a descriptive approach to outline how FinTech alters the logic of financial intermediation, while Yermack (2017) employed qualitative analysis to highlight blockchain's implications for corporate governance and monetary systems. Such studies provided foundational insights but lacked empirical rigor in testing causal relationships. As the field matured, researchers increasingly turned to quantitative survey-based methods to capture perceptions of adoption and its organizational consequences. For example, Mogaji et al. (2022) and Hajj and Hammoud (2023) used structured questionnaires targeting financial institutions to measure attitudes toward AI integration, focusing on dimensions such as operational efficiency, customer satisfaction, and risk management. These survey studies typically applied statistical techniques such as regression or structural equation modeling (SEM) to test hypotheses about technology adoption, drawing on models like TAM and UTAUT. The strength of this stream lies in its ability to capture behavioral and organizational factors, although it remains vulnerable to self-report bias and common-method variance.

Parallel to survey research, another stream has emphasized secondary quantitative data and econometric modeling at the macro level. Feyen et al. (2021), for example, used cross-country data to assess the resilience of digital financial infrastructures during the COVID-19 crisis, while Gai, Qiu, and Sun (2018) employed econometric models to analyze cybersecurity risks in digital finance ecosystems. Such macro-level approaches enable the study of systemic trends (such as financial inclusion, market efficiency, and regulatory effectiveness) but often struggle with data comparability across jurisdictions and endogeneity challenges. A growing body of literature has also highlighted experimental and simulation-based methods, particularly in the domains of AI and blockchain. Iansiti and Lakhani (2020) developed scenario analyses to model blockchain's effects on intermediation, while more recent studies have applied machine learning simulations to test algorithmic credit scoring or fraud detection tools (Olabanji et al., 2024; Riani, 2024). These methods offer precision in modeling technological outcomes but can lack external validity if divorced from real-world institutional contexts. Finally, the literature increasingly emphasizes the integration of ethical and regulatory considerations into methodological designs. Scholars such as Truby, Brown, and Dahdal (2020) and Weber, Carl, and Hinz (2023) argue that empirical studies must address issues of algorithmic transparency and explainability, leading to calls for incorporating "human-in-the-loop" oversight into both research and practice. Similarly, Adeyelu, Ugochukwu, and Shonibare (2024) propose frameworks for measuring algorithmic bias and privacy risks alongside efficiency metrics. This reflects a methodological shift from purely technical assessments toward multi-dimensional approaches that integrate efficiency, inclusion, ethics, and governance.

To systematize the diverse methodological traditions observed in prior research, a comparative table was developed to highlight how different scholars approached the study of AI, FinTech, and blockchain in finance. Table 1 summarizes these approaches by mapping key authors, methods employed, study focus, and the respective strengths and limitations of each design.

Table 1. Comparative Overview of Methodologies in the Literature on AI-Driven Finance

| Author(s) & Year | Methodological Approach | Focus of Study | Strengths | Limitations |
|---|---|---|---|---|
| Schueffel (2016) | Qualitative, conceptual analysis | Definition and scope of FinTech innovation | Provides foundational conceptual clarity | Lacks empirical validation, descriptive only |
| Yermack (2017) | Qualitative, case-based | Blockchain implications for corporate governance | Highlights institutional impacts of DeFi | Limited generalizability |
| Mogaji et al. (2022); Hajj & Hammoud (2023) | Survey-based, SEM/regression | AI adoption in banking (efficiency, CX, risk) | Captures organizational perceptions; theory-driven | Self-report bias; common-method variance |
| Feyen et al. (2021) | Cross-country econometric analysis | Digital resilience during COVID-19 | System-level insight, comparative | Data comparability, endogeneity issues |
| Gai, Qiu, & Sun (2018) | Econometric modeling | Cybersecurity risks in digital finance | Links digital adoption with systemic risks | Limited micro-level insights |
| Iansiti & Lakhani (2020) | Scenario analysis, simulation | Blockchain's effect on intermediation | Forward-looking, strategic foresight | Lack of empirical validation |
| Olabanji et al. (2024); Riani (2024) | Machine learning simulation | AI/blockchain in tax compliance & fraud detection | High technical precision | May lack contextual or institutional grounding |
| Truby, Brown, & Dahdal (2020); Weber et al. (2023) | Normative & regulatory frameworks | Ethical governance, AI transparency (XAI) | Integrates ethics and law into design | Conceptual, limited empirical testing |
| Adeyelu et al. (2024) | Framework development | Algorithmic bias and privacy risks in AI finance | Expands metrics beyond efficiency | Early-stage, needs application in empirical settings |

The methodologies employed in prior literature span a spectrum from qualitative case studies and conceptual analyses, through survey-based organizational studies, to macro-level econometric analyses and simulation models. Each approach offers distinct advantages but also limitations: qualitative studies provide depth but limited generalizability, surveys capture perceptions but risk bias, econometric analyses provide breadth but face data constraints, and simulations test technical outcomes but lack contextual grounding. The convergence of these approaches in recent years underscores the necessity of multi-method perspectives to fully understand the transformative potential and risks of AI, FinTech, and emerging technologies in global finance.

## 4. Results

The review of prior studies demonstrates both convergences and divergences in how scholars have assessed the role of AI, FinTech, and blockchain in transforming global finance. As shown in Table 1, methodologies range from conceptual analyses and qualitative case studies to survey-based organizational research, macro-level econometric modeling, simulation experiments, and regulatory frameworks. Each approach generates specific insights but also reflects clear limitations, which collectively shape the evidence base for understanding financial innovation. Conceptual and qualitative contributions, such as Schueffel (2016) and Yermack (2017), establish the foundational view that FinTech and blockchain hold disruptive potential by redefining financial intermediation and governance. These works provide valuable theoretical framing, but—as summarized in Table 1—they remain limited by their lack of empirical grounding and generalizability. Survey-based research offers stronger empirical evidence by linking AI adoption to operational efficiency, customer satisfaction, and improved risk management. Mogaji et al. (2022) and Hajj and Hammoud (2023) find that firms report tangible benefits from AI-driven services, particularly in

enhancing personalization and fraud detection. Nevertheless, these studies also suffer from common-method bias and self-report limitations, a weakness noted in Table 1. Macro-level econometric analyses, including Feyen et al. (2021) and Gai, Qiu, and Sun (2018), extend the scope to systemic outcomes. Their results show that digital financial infrastructures improve resilience during crises and expand financial inclusion, especially in emerging markets. Yet, as indicated in Table 1, these models face data comparability challenges and endogeneity issues, complicating causal inference across countries. Simulation-based approaches provide precise technical modeling. Iansiti and Lakhani (2020) illustrate blockchain's restructuring of intermediation, while Olabanji et al. (2024) as well as Riani (2024) demonstrate through simulations that AI and blockchain integration can improve tax compliance and fraud detection. The strength of these studies lies in technical precision, but as Table 1 highlights, their external validity remains limited when compared to real-world institutional dynamics.

The regulatory and ethical literature underscores that efficiency alone cannot determine the success of technological adoption. Studies such as Truby, Brown, and Dahdal (2020) and Adeyelu, Ugochukwu, and Shonibare (2024) emphasize explainable AI, accountability, and algorithmic fairness. As noted in Table 1, this stream expands the scope of assessment beyond operational gains, but it is still dominated by conceptual and normative contributions rather than empirical testing. The findings indicate broad agreement that AI and FinTech create significant opportunities for efficiency, inclusion, and personalization, while also raising concerns about cybersecurity, regulatory uncertainty, and ethical risks. Table 1 illustrates that no single methodological approach fully captures these complexities: qualitative studies provide conceptual depth, surveys highlight adoption patterns, econometrics capture systemic shifts, simulations demonstrate feasibility, and regulatory frameworks raise governance issues. The convergence of these strands' points to the necessity of multi-method research designs that integrate organizational, systemic, technical, and ethical perspectives.

## 5. Discussion

The synthesis of results from prior studies indicates that the transformation of global finance through AI, FinTech, and blockchain is simultaneously evolutionary and disruptive. The evidence reviewed demonstrates that while technology adoption has brought about significant gains in efficiency, personalization, and inclusion, it also introduces profound challenges concerning ethics, governance, and systemic stability. A critical reading of the literature shows that the direction and magnitude of these effects are deeply contingent on methodological lenses, institutional settings, and regulatory environments. One central theme emerging from the reviewed evidence is the dual nature of AI adoption. On the one hand, survey-based studies show clear organizational benefits: efficiency improvements, enhanced fraud detection, and greater customer engagement (Mogaji et al., 2022; Hajj & Hammoud, 2023). On the other hand, qualitative and regulatory perspectives highlight risks of algorithmic bias, opaque decision-making, and data privacy violations (Thakur & Sharma, 2024; Weber, Carl, & Hinz, 2023). This tension underscores that AI in finance cannot be evaluated solely by technical performance metrics but must also be examined through ethical and institutional frameworks. The literature suggests that sustainable adoption requires balancing innovation with trust-building, echoing calls for explainable AI (XAI) and human-in-the-loop oversight (Truby, Brown, & Dahdal, 2020; Subagio & Sitepu, 2023). Another important theme relates to FinTech disruption and its implications for financial inclusion. Macro-level econometric studies (Feyen et al., 2021; Wang et al., 2022) consistently show that digital financial infrastructures improve resilience and expand access, particularly in emerging markets. Yet, survey and qualitative studies reveal persistent socio-spatial inequalities in adoption (Tan, 2022; Bhagat & Roderick, 2020). This contradiction highlights a critical paradox: while FinTech is often celebrated as a democratizing force, without adequate digital infrastructure and supportive regulation it risks reproducing, or even exacerbating, exclusion. The literature thus points to a conditional inclusion effect, where benefits materialize only under enabling governance and resource contexts.

Blockchain and Decentralized Finance (DeFi) further complicate the picture. Simulation studies (Iansiti & Lakhani, 2020; Olabanji et al., 2024) confirm blockchain's potential to enhance security, automate compliance, and reduce intermediation costs. However, conceptual and regulatory analyses highlight the

fragility of DeFi ecosystems, where vulnerabilities in smart contracts, lack of oversight, and speculative behaviors may undermine financial stability (Jensen, Wachter, & Ross, 2021; Bodó & Filippi, 2024). This divergence of findings illustrates the methodological gap: technical simulations validate feasibility, but real-world regulatory studies caution against systemic risks. Thus, DeFi exemplifies the broader tension between technological possibility and institutional reality. A recurring theme across all methodological traditions is the importance of regulatory and ethical clarity. Studies consistently argue that without clear governance frameworks, the benefits of AI and FinTech may be offset by risks of bias, exclusion, and instability (Adeyelu, Ugochukwu, & Shonibare, 2024; Oriji et al., 2023). Yet, as shown in Table 1, much of this research remains conceptual or normative, with limited empirical testing of how regulatory quality or ethical safeguards concretely shape outcomes. This suggests a pressing need for empirical integration of governance variables into both firm-level and macro-level models. The comparative analysis also highlights methodological fragmentation. Conceptual studies provide depth but lack empirical testing; surveys capture organizational adoption but are prone to self-report biases; econometric studies provide cross-country breadth but face data comparability and endogeneity issues; and simulations validate feasibility but lack contextual realism. The literature increasingly calls for multi-method designs that can triangulate these approaches to provide a fuller picture. For example, survey evidence on adoption drivers could be complemented by econometric tests of systemic outcomes, while simulation models of AI or blockchain could be validated through field experiments or case studies.

The discussion reveals that the transformation of global finance is best understood as a contingent process shaped by technology, institutions, and governance. AI and FinTech can drive efficiency, inclusion, and trust, but these outcomes are neither automatic nor universal. They depend on regulatory quality, ethical safeguards, consumer expectations, and resource-based capabilities at the firm and country levels. The existing literature highlights the promise of technological disruption but also cautions against technological determinism, reminding us that innovation in finance is always embedded within broader political, ethical, and institutional frameworks. The implications for future research are clear. First, studies should move beyond siloed methodological traditions toward integrated designs that combine micro-level organizational evidence with macro-level systemic analyses. Second, greater attention must be paid to the mediating role of customer expectations and the moderating role of regulatory quality and ethical risks, themes that are acknowledged but underexplored empirically. Third, researchers should prioritize comparative and cross-country analyses to capture variation in institutional readiness and regulatory approaches. Finally, future work must embed ethics and transparency into empirical designs, ensuring that questions of inclusion, accountability, and fairness are assessed alongside efficiency and profitability.

## 6. Conclusion and Recommendations

This study critically reviewed the literature on the AI-driven transformation of global finance, with a particular focus on the roles of artificial intelligence, FinTech innovations, and blockchain-enabled decentralized finance. The analysis revealed that these technologies are reshaping the global financial landscape by improving efficiency, enabling personalized services, and broadening financial inclusion. At the same time, they introduce profound ethical, regulatory, and systemic challenges that require careful navigation. The evidence across methodological traditions underscores that technology adoption in finance is not a uniform or automatic process but rather a contingent phenomenon shaped by institutional capacity, governance structures, and societal expectations. A key conclusion from the literature is the paradox of disruption: while AI and FinTech democratize access and enhance resilience, they also risk reinforcing inequalities, deepening systemic vulnerabilities, and creating new ethical dilemmas. The findings point to the need for robust regulatory frameworks, transparent AI systems, and consumer-centric approaches that balance innovation with accountability. The analysis also highlighted methodological fragmentation in prior studies, with conceptual analyses providing theoretical depth but little empirical grounding, surveys capturing adoption dynamics but facing bias risks, econometric studies offering breadth but limited causal clarity, and simulations validating feasibility without contextual realism. Future research must therefore adopt multi-method approaches that integrate these strengths to capture both micro-level mechanisms and macro-level outcomes. From a practical perspective, financial institutions, regulators, and policymakers must recognize that the successful integration of AI and FinTech requires more than technological

adoption—it demands institutional readiness, regulatory clarity, and ethical safeguards. Without these, the transformative potential of emerging technologies could generate instability rather than progress. At the same time, the literature suggests that with appropriate oversight and strategic investment in digital infrastructure and human capital, AI-driven finance can deliver more inclusive, efficient, and trustworthy systems capable of meeting the demands of a rapidly evolving global economy. While this study provides a comprehensive critical review of the literature on AI-driven financial transformation, it is subject to several limitations. First, the analysis relies on published academic studies and may underrepresent insights from industry reports, policy briefs, and emerging case studies that capture rapidly evolving developments in FinTech and DeFi ecosystems. Second, the diversity of methodologies in prior research, as summarized in Table 1, complicates direct comparisons of findings, particularly when studies use different operationalizations of efficiency, inclusion, or ethical risks. Third, the global scope of the literature often masks significant regional differences in regulatory capacity, consumer readiness, and technological infrastructure, which are crucial in shaping adoption outcomes. Future research should therefore pursue more integrated, multi-method designs that combine survey evidence, econometric modeling, experimental simulations, and qualitative case studies to triangulate findings. Cross-country comparative studies are particularly needed to explore how variations in institutional readiness and regulatory quality condition the effects of AI and FinTech adoption. Moreover, scholars should move beyond efficiency metrics to incorporate ethical and social dimensions such as algorithmic fairness, data privacy, and consumer trust, ensuring that financial innovation contributes to inclusive and equitable outcomes. Finally, longitudinal studies tracking adoption trajectories over time would provide deeper insights into how firms, regulators, and consumers adapt to ongoing technological disruption in global finance. By addressing these gaps, future research can provide more robust, nuanced, and actionable insights, supporting both academic theory-building and practical policymaking in shaping the future of AI-driven finance.

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