

AI, RISK, AND REGULATION: STRATEGIC RESPONSES OF PAYMENT INSTITUTIONS IN THE AGE OF GENAI AND REAL-TIME COMPLIANCE

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Abstract: *The global payments industry is undergoing a structural transformation characterized by the rapid decline of cash usage and the concurrent rise of digital transaction instruments. This study explores the multifaceted transition from traditional payment methods to digitally enabled infrastructures, emphasizing the evolving role of financial institutions in this process. Drawing on comparative analysis of international cases and recent industry data, the research identifies key drivers of this shift, including government-led digital public infrastructure initiatives, the proliferation of instant payments, and the competitive emergence of fintech intermediaries. Particular attention is given to regional disparities in adoption rates and institutional capacity to adapt to these changes. The findings suggest that while banks retain a central position in the financial ecosystem, their ability to capture future value will increasingly depend on technology modernization, strategic partnerships, and proactive regulatory engagement. This article contributes to the scholarly discourse by offering a comprehensive examination of how banks can navigate the complexities of the decoupled payments era and remain relevant in a rapidly digitizing economy.*

Keywords: *digital payments, instant payments, financial institutions, fintech, cash displacement, public infrastructure, payment innovation, regulatory transformation*

Introduction.

The rapid expansion of digital payment systems has not only fostered financial inclusion and innovation but also introduced new vectors of operational and regulatory risk. As real-time payments, embedded finance, and AI-driven platforms become foundational to the global transaction infrastructure, payment institutions must navigate an increasingly complex environment shaped by rising compliance burdens, cyber threats, and data governance challenges [1].

Artificial intelligence (AI), and more recently generative AI (GenAI), has emerged as a transformative tool in the domain of payments risk and compliance. While initially deployed

for fraud detection and anomaly monitoring, AI is now being embedded into broader compliance workflows, including know-your-customer (KYC), anti-money laundering (AML), and regulatory reporting processes [2]. According to the U.S. Department of the Treasury, AI tools are already reshaping credit underwriting, identity verification, and financial crime risk management across various financial subsectors [1].

The strategic value of GenAI is especially evident in high-volume environments, where the velocity of transactions outpaces human oversight. A 2024 risk management survey by PwC found that 73% of U.S. executives report their organizations use or plan to use both traditional AI and GenAI, with many focusing on operational systems used by employees [3]. Moreover, leading payment providers are beginning to integrate large language models to assist with regulatory interpretation, policy mapping, and continuous control testing [4].

Simultaneously, regulatory authorities are adapting their frameworks to address both the opportunities and risks posed by AI. In Europe, the proposed Artificial Intelligence Act aims to impose risk-based obligations on AI systems, with specific requirements for those used in financial decision-making [5]. The Financial Stability Board (FSB) has also emphasized the importance of AI model transparency, accountability, and resilience, urging supervisors to adopt proactive oversight strategies [5]. In the United States, the Office of the Comptroller of the Currency (OCC) and several state attorneys general have issued interpretive guidance to ensure that AI usage aligns with consumer protection, fair lending, and data privacy standards [6].

Nevertheless, the deployment of AI in compliance is not without concern. Key risks include algorithmic opacity, bias amplification, adversarial manipulation, and the challenge of regulatory lag [7]. These risks are magnified in payment systems, where transaction approval, fraud detection, and alert adjudication are increasingly automated and time-sensitive. As financial institutions delegate critical compliance decisions to AI systems, questions arise regarding explainability, liability, and the enforceability of governance protocols [8].

This article examines how payment institutions are integrating AI—particularly GenAI—into their compliance and risk management frameworks, and how regulators are responding to these shifts. By synthesizing recent academic studies, regulatory publications, and empirical surveys, the study aims to contribute to a more grounded understanding of how AI is not merely a technical innovation, but a strategic and governance-critical element in the future of financial infrastructure.

Methods. This study employs a qualitative analytical approach, supported by secondary data from regulatory reports, academic literature, and industry white papers published between 2022 and 2025. The research is structured around three core objectives: (1) identifying strategic applications of AI and GenAI in compliance and risk functions within payment institutions; (2) analyzing institutional responses to emerging regulatory frameworks; and (3) evaluating key governance and operational risks associated with AI deployment in real-time financial environments.

To achieve these objectives, the methodology integrates three key components:

1. Document analysis: A structured review was conducted of regulatory publications issued by the U.S. Department of the Treasury, the Financial Stability Board, the European Commission, and selected state-level financial authorities. These documents were used to map evolving regulatory expectations around AI transparency, accountability, model governance, and cybersecurity. Particular attention was given to the proposed EU Artificial Intelligence Act and guidance from the New York Department of Financial Services on AI-specific risk management [1][5][6].

2. Industry survey synthesis: Findings from recent industry surveys and reports—such as the 2024 PwC Responsible AI Survey [3] and the Thomson Reuters GenAI Professional Services Report [4]—were evaluated to understand the practical implementation of AI tools across financial compliance functions. These sources were used to extract data on adoption rates, perceived challenges, and anticipated benefits of AI-based automation in payments risk environments.

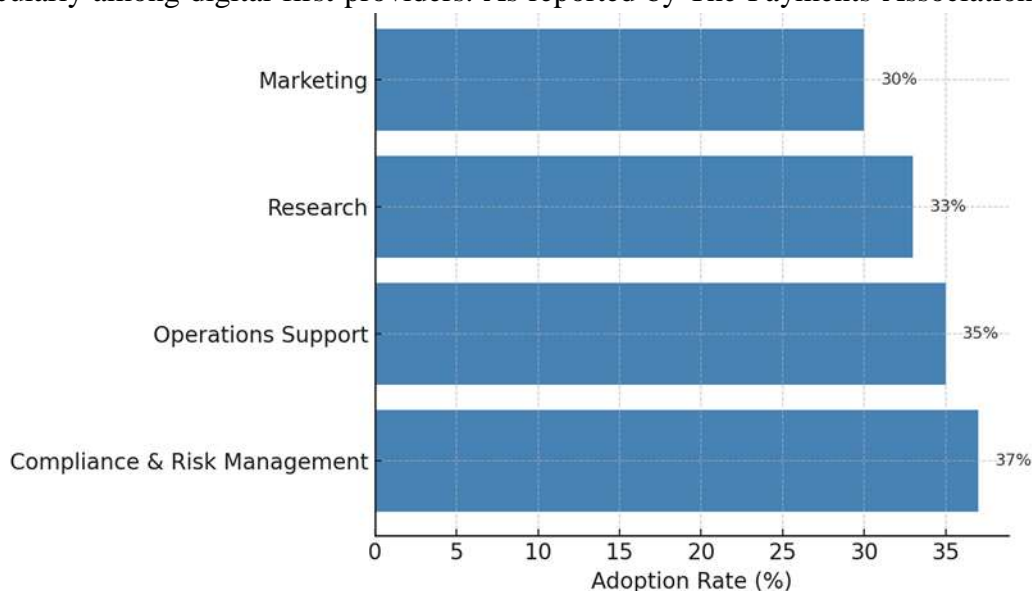
3. Case-based comparison: Selected use cases from global and regional payment service providers (PSPs) were examined to assess the integration of AI into real-time fraud detection, transaction monitoring, and regulatory reporting. Descriptive comparison of AI strategies across high-volume PSPs was conducted based on public disclosures, interviews, and media sources aggregated through Pymnts.com and regulatory filings [2].

Data triangulation was applied to ensure consistency and reliability across the three data sources. Regulatory insights were cross-referenced with industry practices, while academic analyses were used to evaluate the broader implications of AI governance in compliance-critical settings. No primary interviews or proprietary data were used, ensuring the study remains replicable and based entirely on publicly accessible materials.

Results. The integration of artificial intelligence (AI) into compliance and risk management processes is gaining measurable traction across financial services. According to a

2024 survey conducted by ACA Group, 75% of financial firms are exploring or using AI, with 37% actively applying it in compliance and risk functions. The distribution of AI adoption by function is shown in Figure 1.

In the context of payment institutions, the adoption of AI is even more prominent, particularly among digital-first providers. As reported by The Payments Association, 85% of



such firms are using AI for fraud analytics, while 80% apply it to real-time risk scoring and 70% for regulatory reporting [2]. These applications reflect the increasing need to respond to real-time threats and dynamic compliance demands. Figure 2 summarizes these trends.

Figure 1. AI Adoption Across Financial Services Functions (2024)¹

Despite the momentum, effectiveness remains inconsistent. While 67% of compliance leaders surveyed by ACA aim to use AI to enhance efficiency, 68% report that AI has so far had no significant impact on their compliance outcomes. This discrepancy may be attributed to the early stage of implementation, lack of skilled personnel, or the immaturity of governance frameworks.

¹ Source: ACA Group, 2024

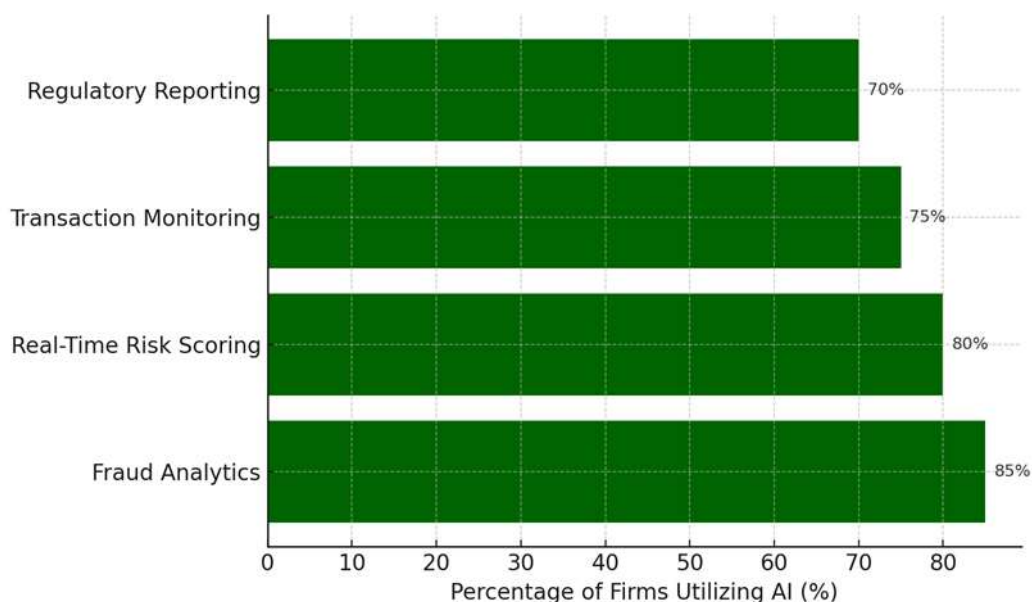


Figure 2. AI Applications in Digital-First Payment Firms (2024)²

Furthermore, Wolters Kluwer's 2024 survey reveals that while 80% of risk professionals anticipate AI to become integral by 2029, only 9% currently use such systems regularly, albeit with observed gains in fraud detection and alert triage [9].

Discussion. The data presented in this study underscore both the accelerating adoption of AI across financial services and the uneven nature of its effectiveness, particularly in the context of compliance and risk management. While survey results show that over 75% of financial institutions are exploring or have deployed AI tools [10], only a fraction report measurable improvements in regulatory performance. This gap suggests a growing divergence between technological enthusiasm and operational maturity.

The analysis of payment firms, specifically digital-first institutions, reveals more advanced use of AI compared to the general financial sector. High levels of AI deployment for fraud analytics (85%) and real-time risk scoring (80%) indicate that transaction-heavy environments prioritize automation where human oversight would otherwise be infeasible [11]. These findings align with broader industry trends in payments, where instant settlement systems and large transaction volumes create the need for continuous monitoring and adaptive detection.

However, the observed effectiveness of AI remains mixed. As reported by ACA Group, 68% of compliance professionals indicate that AI has had no significant impact on their existing programs [10]. This paradox may be attributed to several factors:

² Source: The Payments Association, 2024

- First, many organizations lack clear governance frameworks for AI, resulting in fragmented or experimental implementations.
- Second, regulatory ambiguity—especially around explainability and model accountability—discourages full deployment of AI in high-stakes compliance functions.
- Third, skill shortages and limited internal expertise in AI model management further constrain the ability to integrate these tools strategically.

In addition, the discrepancy between anticipated and actual use, as evidenced in the Wolters Kluwer findings (only 9% current users vs. 80% future expectations), illustrates a typical lag in technology maturity cycles in regulated sectors [9]. This gap highlights the importance of aligning AI initiatives with broader compliance architecture and regulatory readiness.

Finally, the dominant use of AI in fraud analytics and transaction monitoring confirms its role as a defensive, rather than proactive, technology. Although some firms report success with GenAI for internal reporting and document summarization, the lack of standardized benchmarks and supervisory acceptance continues to limit AI's penetration into core regulatory reporting systems.

In sum, while AI—and particularly GenAI—offers substantial promise for transforming compliance operations in payment institutions, its current role remains largely supportive and operational. Future effectiveness will depend not only on technological advancement but also on institutional readiness, regulatory clarity, and the evolution of governance frameworks tailored to algorithmic systems.

Conclusion. The integration of artificial intelligence (AI) into compliance and risk management functions within the financial and payments sectors reflects a broader transformation of institutional governance in the digital era. This study has shown that while AI—particularly in the form of fraud analytics and real-time risk scoring—is already widely adopted among digital-first payment providers, its overall impact on compliance maturity remains limited and uneven.

The analysis reveals a clear dichotomy: on the one hand, firms recognize the strategic potential of AI in improving efficiency and mitigating regulatory risk; on the other, a lack of internal governance, regulatory clarity, and human expertise often hinders full-scale, effective implementation. Although many institutions are actively experimenting with generative AI (GenAI) tools for reporting and automation tasks, these applications remain largely in exploratory stages.

Furthermore, expectations around AI's future role significantly outpace current operational realities. While surveys point to near-universal adoption intentions by 2029, actual integration is constrained by regulatory hesitation and the inherent complexity of algorithmic systems. This gap emphasizes the urgent need for robust frameworks that combine technological innovation with ethical, transparent, and accountable deployment strategies.

In sum, AI in the payments compliance domain is not merely a tool, but a test of institutional agility, regulatory foresight, and operational discipline. Its success will depend not only on technological capacity but also on how effectively financial institutions align AI deployment with risk culture, regulatory expectations, and sustainable governance models.

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