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AI-Driven Digital Payment Ecosystems for Financial Inclusion Under Saudi Vision 2030

HUMAYUN AHMED HASHMI

Abstract- ***This review paper develops an integrated framework for understanding how artificial intelligence is reshaping digital payment ecosystems and widening financial inclusion in Saudi Arabia under Vision 2030. The study shifts the analytical focus from isolated payment instruments to the ecosystem logic that links regulation, interoperable payment rails, digital identity, open banking, merchant acceptance, consumer trust, and AI-enabled decision systems. Unlike studies that discuss payments, fintech, or inclusion separately, this paper examines how machine learning, intelligent fraud controls, automated onboarding, personalized interfaces, and data-driven governance can jointly move the Saudi payment market from transactional digitization to inclusive financial architecture. A structured narrative review was adopted, drawing mainly on literature and policy sources published between 2020 and 2025, alongside the attached model article used as a structural guide for review design and framework presentation. The findings show that Saudi Arabia has built strong enabling conditions through policy coordination, faster payment infrastructure, fintech promotion, and open banking reforms, yet inclusion gains still depend on digital capability, trust, affordability, merchant readiness, and accountable AI governance. The paper proposes a five-layer ecosystem model linking regulatory foundations, intelligent payment rails, AI service orchestration, inclusive user interfaces, and continuous governance learning. The review concludes that AI can deepen inclusion only when it is embedded in interoperable, transparent, and citizen-centered payment ecosystems rather than deployed as a stand-alone technology.***

Keywords: Artificial Intelligence, Digital Payments, Financial Inclusion, Saudi Vision 2030, Fintech, Open Banking, Payment Ecosystems, Financial Innovation

I. INTRODUCTION

Digital payments have moved from being a narrow banking convenience to becoming a foundational layer of contemporary economic participation. In many emerging and middle-income markets, access to digital payment tools is increasingly tied to access to wages, social transfers, e-commerce, savings products, formal credit, and public services. This shift has elevated payment systems from background infrastructure to a strategic policy domain in which financial inclusion, data governance, cybersecurity, competition, and innovation converge (Demirgüç-Kunt et al., 2022; World Bank, 2024).

Saudi Arabia provides an especially relevant case for examining this transition because the Kingdom is pursuing payment modernization as part of a broader national transformation agenda under Vision 2030 and the Financial Sector Development Program. Policy attention has moved beyond simple card acceptance toward a less-cash economy supported by fintech growth, open banking, instant payments, supervisory modernization, and a digitally capable population (Vision 2030, 2021; SAMA, 2024a).

Within this transition, artificial intelligence has emerged as an enabling layer rather than a stand-alone product. Payment institutions now use AI to score fraud risk, monitor transaction anomalies, personalize user journeys, automate merchant support, optimize liquidity, and segment excluded users whose payment behaviors may otherwise remain invisible. The rise of AI in payments matters for inclusion because exclusion is rarely produced by one barrier alone.

A customer may face friction at onboarding, low trust in digital channels, weak access to nearby cash-in and cash-out options, language mismatch in interfaces, low merchant acceptance, or repeated false fraud alerts that interrupt usage. AI can either reduce these frictions through prediction and personalization or amplify them if models are opaque, biased, or weakly governed. The policy question is therefore not whether AI belongs in payments, but how AI should be governed within a payment ecosystem so that innovation improves access and usage rather than

merely increasing system sophistication (Abi Litty, 2024; Uddin et al., 2025).

Saudi Arabia's experience is significant for three reasons. First, the Kingdom has pursued payment digitization through formal state programs rather than through fragmented market diffusion alone. This has helped align supervision, fintech support, and infrastructure investment. Second, Saudi Arabia combines high smartphone usage and strong digital ambitions with social and geographic diversity, meaning that inclusion cannot be assumed simply because infrastructure exists.

Third, the Kingdom's shift toward open banking, fintech licensing, and non-cash retail targets creates a useful setting for studying how ecosystem design influences inclusive outcomes.

Official policy documents explicitly frame digital payments as part of a less-cash and innovation-oriented economy, while SAMA's open banking policy links data sharing and competition to innovation and financial inclusion (SAMA, 2022). At the same time, empirical studies on Saudi inclusion continue to show that income, education, gendered barriers, trust, and capability affect actual use of formal finance.

Although recent work has examined fintech, open banking, and digital financial inclusion, three analytical gaps remain. The first is fragmentation: many studies assess wallets, payments, or AI applications in isolation rather than as interdependent parts of a payment ecosystem.

The second is governance under-specification: AI is often praised for fraud detection or service personalization without adequate discussion of accountability, explainability, and inclusion trade-offs. The third is contextual thinness: Saudi Arabia is frequently referenced in policy reports, yet academic analysis often relies on broad fintech narratives without linking payment architecture to inclusion pathways specific to Vision 2030.

This review addresses these gaps by treating digital payments as an ecosystem composed of technical, regulatory, institutional, and behavioral layers.

The aim of the study is to develop a Vision 2030-aligned review framework explaining how AI-driven digital payment ecosystems can deepen financial inclusion in Saudi Arabia.

To achieve this aim, the review pursues four objectives. First, it synthesizes recent literature on digital payments, fintech-enabled inclusion, and AI adoption in financial services. Second, it maps the institutional and infrastructural conditions that shape Saudi Arabia's payment transition, including policy programs, open banking, and payment usage trends.

Third, it identifies the principal mechanisms through which AI may enhance or weaken inclusion across onboarding, payments security, merchant enablement, service personalization, and risk management. Fourth, it proposes a practical ecosystem framework that can support researchers, regulators, and financial institutions seeking to move from product-level innovation to inclusion-centered payment governance.

The paper is organized as follows. Section 2 reviews the literature on digital payment technologies, financial inclusion, and AI in financial services, then situates these themes in the Saudi context. Section 3 explains the review methodology and thematic coding logic. Section 4 presents the core findings on ecosystem design, AI use cases, inclusion mechanisms, and implementation constraints.

Section 5 develops an applied framework and practical implications for Saudi policymakers and market participants. Section 6 concludes by outlining future research priorities and governance directions for inclusive payment ecosystems under Vision 2030.

II. LITERATURE REVIEW

2.1 Digital payment ecosystems and the architecture of inclusion

Recent scholarship increasingly treats digital payments as ecosystems composed of rails, interfaces, institutions, standards, trust mechanisms, and data flows. This view matters because inclusion depends less on the existence of any single product than on the ability of users to move across services without severe friction.

A card, wallet, QR code, account-to-account transfer, merchant app, or buy-now-pay-later journey becomes inclusion-enhancing only when the surrounding ecosystem supports identity verification, interoperability, affordability, and predictable user experience. Reviews of fintech and financial inclusion show that digital infrastructures can reduce geographic and cost barriers, yet persistent disparities remain by income, education, gender, and digital capability. Infrastructure expansion is therefore necessary but insufficient (Vasishta et al., 2024; Shahen et al., 2025).

The literature identifies four recurring ecosystem pillars. The first is interoperability across payment rails, APIs, and merchant networks. The second is institutional coordination among regulators, banks, fintech firms, merchants, and public-service platforms.

The third is trust architecture, including fraud controls, consumer protection, privacy safeguards, and dispute resolution. Studies that emphasize only supply-side innovation often miss the way these pillars interact. Faster onboarding may increase adoption but also elevate fraud risk; stronger fraud controls may protect the system yet unintentionally block first-time users.

2.2 Fintech, financial inclusion, and the Saudi context
The fintech–inclusion literature generally finds that technology expands access by lowering transaction costs, reducing dependence on physical branches, and enabling scalable service delivery (Allen et al., 2021; Al-Mudimigh & Anshari, 2020).

However, the benefits are uneven. Review studies show that fintech can widen access to payments, savings, and credit, but may also reproduce exclusion when products are designed for already-digital populations or when regulatory capacity lags. For Saudi Arabia, the inclusion literature has stressed the relevance of demographic and socioeconomic variables.

Khan and Alhadi show that women, lower-income groups, and less educated users face greater barriers to formal financial participation, while documentation requirements, distance, cost, and information asymmetry remain important obstacles (Khan & Alhadi, 2022). Later Saudi-focused work on digital financial inclusion also indicates that digital progress does not automatically eliminate disparities; instead, exclusion shifts toward capability, connectivity, and confidence.

Saudi policy developments are therefore important because they create enabling conditions for ecosystem expansion. The Financial Sector Development Program frames digital payments as part of a less-cash and more competitive economy.

SAMA's open banking policy explicitly links secure data sharing, third-party innovation, and customer-consented services to competition and financial inclusion.

Payment's usage studies likewise show a growing policy focus on how consumers, businesses, and government actually transact. This signals a more mature stage of payment policy in which inclusion must be evaluated through usage, not only through infrastructure (SAMA, 2023; SAMA, 2024a).

2.3 AI in payments: fraud control, prediction, and personalization
AI has become central to payment system operations. The most visible use case is fraud detection, where machine-learning models identify anomalous transaction patterns more quickly than static rules.

Beyond fraud, AI is used for customer segmentation, service recommendations, intelligent routing, chatbot support, merchant scoring, demand prediction, and liquidity optimization. In a payment ecosystem these functions are tightly linked. Better anomaly detection sustains trust; better merchant scoring expands acceptance; better service personalization reduces abandonment; and better demand prediction improves resilience.

Yet the inclusion consequences of AI are mixed. A well-designed model may help identify underserved user groups, adapt interfaces to language or behavior, and reduce manual compliance costs that otherwise discourage low-balance accounts. Poorly governed AI may over-flag non-standard payment behavior,

exclude users with limited digital history, or make adverse decisions that are difficult to contest.

The broader literature on AI and inclusion therefore stresses explainability, bias mitigation, human oversight, and proportionate governance. What matters is not merely the use of AI but the governance context in which AI is embedded (Yaseen et al., 2025; Uddin et al., 2025).

2.4 Open banking, data sharing, and modularity

Open banking has become a critical bridge between digital payments and inclusion because it allows customer-consented data sharing across providers. In principle, this creates modular payment ecosystems in which new entrants can build budgeting tools, account aggregation services, payment initiation services, merchant dashboards, and alternative credit products on top of regulated banking infrastructure.

Literature on open finance suggests that open data can support inclusion by improving portability, reducing switching costs, and allowing more tailored product design.

For Saudi Arabia, open banking is strategically important because it can connect the Kingdom's trusted banking sector with a growing fintech layer that is often faster at service design and interface innovation (SAMA, 2022; Fintech Saudi, 2024).

The inclusion relevance is especially visible in budgeting tools, merchant analytics, and alternative suitability signals. At the same time, the literature warns that open banking does not guarantee inclusion on its own. Without accessible consent journeys, inclusive APIs, transparent business models, and strong security governance, the benefits may remain concentrated among already affluent and digitally confident users.

2.5 Merchant acceptance, trust, and the last-mile problem

Inclusion depends as much on where digital payments are accepted as on who owns a formal account.

Many studies focus on consumer-side adoption but underplay merchant-side constraints. Small merchants often face cost concerns, technology complexity, settlement delays, or uncertainty about disputes and fraud. Public-service integrations matter as well, because recurring interactions with government, utilities, education, and transport can normalize digital payment habits. This last-mile dimension is especially important in national transitions away from cash.

The literature also returns repeatedly to trust and literacy. Users may have smartphones, accounts, and payment apps yet still prefer cash if digital channels appear risky, confusing, or impersonal. Policy bodies increasingly argue that digital financial inclusion requires informed and safe use, not just access. This makes the human layer central to ecosystem design. Interfaces must be understandable, multilingual where necessary, and responsive to different levels of capability.

Complaint systems must be legible. Fraud messaging must build confidence without shifting disproportionate responsibility onto users. The most promising direction is therefore ecosystem intelligence: digital payments built on interoperable infrastructure, AI-enabled service logic, inclusive design, and accountable governance (AFI, 2025; OECD, 2025).

III. METHODOLOGY

This study adopts a structured narrative review methodology. A narrative review was selected because the topic spans regulation, payments infrastructure, AI applications, consumer behavior, fintech strategy, and financial inclusion outcomes, which are not consistently measured through a single empirical design.

A strict meta-analysis would exclude many policy and systems-level sources that are essential for understanding ecosystem development in Saudi Arabia. The goal of the methodology is therefore synthesis rather than effect-size estimation, consistent with recent review approaches used in fintech and financial inclusion research (Vasishta et al., 2024; Lye et al., 2025).

The review was guided by three principles. First, it prioritized recency and relevance. Sources published mainly between 2020 and 2025 were targeted in order to capture post-pandemic acceleration in digital payments, open banking developments, and the rapid rise of AI use cases in finance. Second, the review combined academic and institutional evidence.

Third, the review used thematic integration rather than chronological description. Evidence was coded according to payment ecosystem components and inclusion mechanisms.

The search process focused on combinations of the following terms: “Saudi Arabia,” “digital payments,” “financial inclusion,” “fintech,” “open banking,” “artificial intelligence,” “payment fraud,” “digital wallets,” “instant payments,” and “Vision 2030.” Databases and institutional repositories searched included Google Scholar, publisher webpages, official policy portals, and public reports from SAMA, Vision 2030, the World Bank, OECD, and related bodies.

Initial screening emphasized title and abstract relevance. Full-text reading was then used to retain sources that directly addressed at least one of four analytical domains: payment ecosystem infrastructure, AI-enabled payment functions, financial inclusion mechanisms, or Saudi policy and market development.

Sources were included if they met three conditions. They had to be published in 2020–2025, be directly relevant to digital payments, AI in financial services, or financial inclusion, and provide either empirical findings, policy analysis, or conceptual insight applicable to Saudi Arabia.

Sources were excluded if they focused solely on unrelated financial technologies, contained no identifiable methodological or policy substance, or discussed digitalization without clear relation to payments or inclusion. Because this is a review paper, the study did not undertake primary data collection.

After screening, the retained literature was coded into five themes: regulatory and institutional foundations; intelligent payment rails and interoperability; AI applications in fraud, compliance, and personalization; user capability and trust; and ecosystem governance for inclusion. These themes were then mapped into the framework presented in the discussion. The thematic approach made it possible to compare official strategy documents with academic literature without forcing artificial equivalence between them.

The methodology has limitations. First, the review depends on the quality and availability of published sources, and Saudi-specific peer-reviewed literature remains narrower than global fintech literature. Second, because many official documents are policy oriented, they tend to emphasize progress and aspirations more than implementation frictions.

Third, the review synthesizes a fast-moving area in which some technologies and regulations evolve faster than academic publication cycles. Despite these limitations, the method is appropriate for a review paper seeking to build an integrative framework and generate practical implications for future empirical work.

IV. FINDINGS AND DISCUSSION

4.1 Saudi Arabia’s transition is ecosystem building rather than simple digitization

The reviewed evidence shows that Saudi Arabia’s payment transformation is not simply a story of rising digital transactions; it is a case of ecosystem building in which policy, infrastructure, and market design evolve together.

Vision 2030 and the Financial Sector Development Program provide strategic direction, while SAMA shapes execution through payments modernization, fintech licensing, and open banking design. This layered architecture matters because financial inclusion is rarely achieved by adding one more payment method (Vision 2030, 2021; SAMA, 2024a). Inclusion improves when users can enter the formal system easily, transact safely, interact with merchants and government smoothly, and benefit from data-enabled services that remain understandable and affordable.

The Saudi case also illustrates the importance of sequencing. Stronger payment rails and regulatory clarity create the conditions in which AI becomes useful. If data are fragmented, consent processes unclear, or merchant systems poorly integrated, AI mostly optimizes fragments. But if rails are interoperable and governance is stable, AI can act as a system enhancer. The literature therefore supports a progression from policy foundations and interoperability to intelligent service orchestration and portfolio-scale learning.

4.2 AI improves inclusion when it reduces friction

Across the literature, the most inclusion-relevant AI applications are not necessarily the most visible ones. Fraud detection receives major attention because it is operationally critical, yet the inclusion gains from AI often arise from ordinary reductions in friction.

Examples include more accurate identity checks, fewer false declines, multilingual and adaptive interfaces, merchant support automation, personalized reminders, and analytics that detect dormant or vulnerable user segments. These functions matter because excluded users are especially sensitive to failed or confusing interactions.

This finding has direct relevance for Saudi Arabia. The Kingdom has the capacity to deploy sophisticated AI tools, but inclusion outcomes will depend on how these tools are targeted. A payment ecosystem that uses AI only for backend surveillance may become safer but not necessarily more inclusive.

By contrast, one that uses AI to simplify onboarding, adapt to user capability, identify underserved merchants, and improve complaint handling can convert security gains into inclusion gains. The review therefore suggests that AI should be assessed through a friction-reduction lens (Abi Litty, 2024; Shahen et al., 2025).

4.3 Open banking makes payment data economically productive

A recurring theme in the literature is that open banking changes the value of payments data. In a closed system, payment histories are mostly internal records. In an open, consent-based system, they become building blocks for competition, product design, and inclusion. Customers can aggregate accounts, authorize third-party tools, and use transaction histories to access more tailored services.

Banks can collaborate with fintech firms instead of building every feature internally. Smaller providers can serve customer segments that large institutions overlook.

For Saudi Arabia, this modularity is strategically important. Open banking can connect the Kingdom's strong banking system with a younger fintech layer that is often quicker at service design and interface innovation. The inclusion relevance is visible in budgeting tools, merchant analytics, and alternative signals for product suitability.

However, the review also shows that open banking is not automatically inclusive. If consent frameworks are complex, data-sharing costs high, or public awareness week, the benefits may remain concentrated among digitally advanced users. Open banking should therefore be governed as inclusion infrastructure rather than merely as innovation policy (SAMA, 2022; AFI, 2025).

4.4 Merchant-side readiness is decisive

The literature makes clear that user-side adoption cannot be sustained without merchant-side readiness. Digital payment ecosystems fail inclusively when consumers are encouraged to transact digitally but local merchants remain partially integrated, receive weak support, or face cost and settlement concerns. Small retailers, neighborhood services, and microenterprises are often the last-mile nodes through which formal inclusion becomes routine.

AI offers practical value at this layer. It can help acquirers and platforms identify merchant clusters with high potential but low activation, prioritize support interventions, predict churn, and tailor pricing or training pathways. It can also improve acceptance quality by spotting settlement anomalies, device downtime, and abnormal dispute patterns early.

In the Saudi context, where digital transformation is increasingly tied to entrepreneurship and SME

development, merchant inclusion deserves more analytical attention. A citizen is more likely to remain digitally active when digital payments work consistently in ordinary transactions rather than only in premium retail settings.

4.5 Inclusion under AI requires accountable design

One of the strongest findings across the review is that accuracy alone is a weak basis for inclusive governance. Fraud models can be statistically strong and still exclusionary in practice if they penalize non-standard behavior associated with new users, low-income spending patterns, irregular merchant cash flows, or cross-border transfers.

Onboarding models can accelerate approvals while failing to explain rejections in ways users can contest or understand. Inclusion therefore depends on accountable design. The literature repeatedly points to explainability, proportionality, appeal mechanisms, model monitoring, and human oversight as essential safeguards.

For Saudi Arabia, this is especially important because the payment ecosystem is expanding within a high-trust but strongly regulated environment. Users are more likely to remain within formal channels when they believe the system is secure and fair.

AI governance should therefore include not only cyber and compliance metrics but also inclusion-sensitive indicators such as false decline rates for new users, complaint resolution times, language accessibility, merchant activation quality, and differential outcomes across customer segments (BIS, 2025; OECD, 2025).

4.6 Financial inclusion is a usage problem as much as an access problem

A significant theme in both the Saudi and wider literature is the distinction between access and meaningful use. Formal account ownership is vital, but inclusion deepens only when users conduct regular, beneficial, and trusted transactions. Digital payments are uniquely placed to convert nominal access into habitual usage because they sit at the center of daily economic activity. Wage receipt, bill payment, transfers, merchant purchases, transport, public fees, and e-commerce all reinforce the value of remaining in the formal system.

The Saudi payments usage perspective is therefore important. By studying how consumers, businesses, and government actually transact, authorities can move beyond account statistics toward behavioral inclusion. AI strengthens this approach by identifying dormant patterns, forecasting drop-off points, and allowing segmented interventions (Sharaf, 2025; World Bank, 2024).

Some users need interface simplification, while others need merchant density or trust messaging. The practical implication is that inclusion strategy should be built around payment journeys rather than only around account opening.

4.7 Toward an ecosystem logic for Vision 2030

Taken together, the findings suggest that Saudi Arabia is well positioned to move from payment digitization to intelligent payment inclusion, but only if AI is embedded in a broader ecosystem logic. That logic has five requirements. First, regulatory and institutional foundations must remain clear, trusted, and innovation-enabling.

Second, payment rails and data architectures must be interoperable so that customers and providers are not trapped in silos. Third, AI should be deployed to reduce friction across fraud control, onboarding, merchant support, and service personalization.

Fourth, user and merchant interfaces must be inclusive, understandable, and aligned with real transaction behaviors. Fifth, governance must create a feedback loop through which data on usage, complaints, segmentation, and inclusion outcomes are continuously reviewed.

This synthesis shifts the debate away from whether Saudi Arabia should digitize payments—it already is—and toward how the next stage should be governed. Under Vision 2030, the decisive challenge is no longer basic modernization. It is ecosystem intelligence with inclusion discipline.

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V. FRAMEWORK AND PRACTICAL IMPLICATIONS

Building on the review, this paper proposes a five-layer framework for AI-driven digital payment ecosystems in Saudi Arabia. Layer one is regulatory foundations, covering licensing, consumer protection, data rights, open banking standards, and payment-system governance.

Layer two is interoperable rails, including wallets, cards, account-to-account transfers, merchant acceptance, and government payment interfaces. Layer three is AI orchestration, where machine learning supports fraud detection, intelligent onboarding, merchant analytics, customer support, and predictive service management.

Layer four is inclusive interaction, which concerns multilingual interfaces, user education, accessibility, affordability, merchant enablement, and complaint resolution. Layer five is governance learning, in which ecosystem actors continuously review performance data, security incidents, complaint patterns, and inclusion outcomes to refine rules and models.

The framework has practical implications for policymakers, banks, fintech firms, and merchants. Policymakers should treat inclusion indicators as system-performance variables alongside stability and security metrics. Banks should use AI not only to protect transactions but also to simplify journeys for underserved users (Khan & Alhadi, 2022; Yaseen et al., 2025).

Fintech firms should design modular products that translate open banking and payment data into understandable and low-friction value. Merchant acquirers should combine digital acceptance expansion with analytics, training, and service support tailored to smaller businesses.

Public agencies should increase the routine embedding of digital payments in citizen-facing services, because repeated use strengthens inclusion more effectively than marketing campaigns alone.

A key managerial implication is that payment ecosystems should be governed through a “trust-to-usage” pathway. Security builds trust, but trust must convert into repeat usage through convenience and acceptance. AI is most valuable where it supports that conversion. Another implication is that inclusion should be measured longitudinally.

Institutions should monitor not only adoption but also repeat usage, complaint recovery, dormancy, merchant persistence, and outcome disparities across user segments. This would allow Saudi Arabia to align payment innovation with the broader Vision 2030 agenda of competitiveness, digital transformation, and socially grounded economic participation.

VI. CONCLUSION

This review has argued that AI-driven digital payment ecosystems can play a strategic role in advancing financial inclusion under Saudi Vision 2030, but only when payments are understood as ecosystems rather than isolated technologies. The evidence shows that Saudi Arabia has developed strong enabling conditions through institutional coordination, digital payment targets, fintech support, and open banking reform.

These foundations create space for AI to improve fraud resilience, service personalization, operational efficiency, and market intelligence. Yet the review also shows that inclusion is not the automatic by-product of technical sophistication. It depends on whether systems reduce friction for ordinary users and merchants, remain accountable in their use of data, and convert access into meaningful and trusted usage.

The main contribution of the paper is the five-layer framework linking regulatory foundations, interoperable rails, AI orchestration, inclusive interaction, and governance learning. This framework helps explain why some payment ecosystems expand transaction volumes without equally deepening inclusion (SAMA, 2023; Shahen et al., 2025). It also clarifies the conditions under which AI can support inclusion: transparent governance, interoperable data

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environments, merchant-side readiness, user-centered design, and measurable feedback loops.

For Saudi Arabia, the policy opportunity is to use AI not merely to optimize payments, but to shape a broader financial architecture in which more citizens and businesses can participate safely and productively.

Future research should move from broad fintech narratives toward finer-grained empirical work on the Saudi payment journey. Particular priorities include merchant adoption quality, false-positive fraud effects on new users, the inclusion impact of open banking services, and the role of digital capability in sustaining payment usage. The next phase of digital payments in the Kingdom will be defined not by whether systems are intelligent, but by whether that intelligence is disciplined by inclusion. Supporting inclusion, resilience, trust, competition, and sustainable growth nationally.

Figure 1. AI-enabled digital payment ecosystem for financial inclusion in Saudi Arabia.

Table 1. Core ecosystem layers, primary inclusion value, and principal implementation risks.

Layer	Core function	Inclusion value	Main risk if poorly governed
Regulatory foundations	Licensing, consumer protection, identity, consent	Builds trust and lowers entry uncertainty	Fragmented rules and unclear accountability
Interoperable rails	Wallets, cards, A2A, instant payments, merchant acceptance	Makes formal finance useful in daily life	Siloed systems and uneven acceptance
AI orchestration	Fraud scoring, onboarding, segmentation, support automation	Reduces friction and improves service fit	Bias, false declines, and opaque decisions
Inclusive interaction	Accessible interfaces, literacy nudges, merchant support	Converts access into sustained usage	Low trust, poor usability, and abandonment
Governance learning	Feedback loops using usage, disputes, and risk data	Improves resilience and inclusion quality over time	Optimization without inclusion metrics

Figure 2. Capability pathway for AI-driven inclusive payments under Saudi Vision 2030.

Table 2. Representative AI use cases and their relevance for payment inclusion.

AI use case	Operational role	Inclusion benefit	Governance requirement
Fraud detection	Flags anomalous transactions in real time	Protects trust and reduces losses for new users and merchants	Explainability, appeal channels, false-positive monitoring
Intelligent onboarding	Automates checks and adapts document journeys	Reduces account-opening friction and wait	Proportional KYC, inclusion testing, human

		time	override
Merchant analytics	Identifies weak acceptance areas and likely churn	Expands last-mile payment usability	Fair pricing logic and transparent support rules
Personalized interfaces	Adapts language, prompts, and education content	Supports lower-literacy and first-time digital users	Consent, accessibility testing, non-manipulative design
Portfolio learning	Uses ecosystem data to refine rules and strategy	Turns payment usage into inclusion intelligence	Privacy safeguards and inclusion-sensitive KPIs

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