

Secure and Scalable Cloud-Native Financial Operations for Saudi Institutions under Vision 2030: Integrating Oracle Fusion ERP, SADAD, Mada, Open Banking APIs and Automated Reconciliation

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Abstract- Saudi institutions are scaling digital financial operations while facing higher expectations for payment reliability, data protection, auditability, and rapid financial close. This review develops a cloud-native framework connecting Oracle Fusion ERP with national payment rails, open banking interfaces, and automated reconciliation. Evidence from 2020–2025 is synthesised through a structured integrative review, thematic coding, and architecture-oriented comparison across five capabilities: enterprise financial processing, payment connectivity, API governance, reconciliation automation, and operational control. The review finds that cloud ERP creates most value when it acts as a governed accounting hub rather than an isolated transaction system; SADAD and mada require disciplined reference and settlement handling; open banking expands connectivity while increasing consent, authentication, and API-lifecycle obligations; and reconciliation automation improves close speed only when matching rules, exception ownership, and audit evidence are designed together. The proposed closed-loop model moves transactions through controlled integration, payment rails, open APIs, cash management, and accounting, while settlement responses and exceptions continuously refine controls. For Saudi institutions, the framework supports Vision 2030 priorities for digital infrastructure, operational efficiency, resilience, and innovation without weakening financial integrity.

Keywords: cloud-native finance; Oracle Fusion ERP; SADAD; mada; open banking; automated reconciliation; financial operations; Saudi Arabia; Vision 2030

I. INTRODUCTION

Saudi Arabia's financial infrastructure has moved decisively toward digital execution. The Financial Sector Development Program links national diversification to advanced financial infrastructure, digitised processes, fintech growth, and lower cash dependence (Financial Sector Development Program

2021). By 2024, electronic payments represented 79% of retail-payment volume and non-cash transactions reached 12.6 billion, showing that institutional finance increasingly depends on electronic rails rather than periodic manual settlement routines (Saudi Central Bank 2025). Finance architecture must therefore connect transaction capture, payment initiation, settlement evidence, bank data, reconciliation, and reporting as one controlled information chain.

The domestic payments environment reinforces this requirement. SAMA's 2023 payments-usage study reported that SADAD supports more than 100 major billers and processed 322 million bill payments, while card infrastructure expanded across merchant and online channels (Saudi Central Bank 2024a). The Financial Stability Report likewise records the strong contribution of point-of-sale, e-commerce, instant-payment, and SADAD flows to the national non-cash mix (Saudi Central Bank 2024b). These networks generate high volumes, settlement cycles, refunds, reversals, fees, and reference identifiers that must ultimately reconcile with accounting records.

At enterprise level, cloud ERP can consolidate financial data, standardise processes, and improve access to integrated records. Research shows that benefits depend on governance, management support, process redesign, security, and service-model choices rather than migration alone (Alsharari 2022; Jayeola et al. 2022; Jiang and Wang 2022). Oracle Fusion ERP is relevant because its financial suite combines general ledger, payables, receivables, cash management, subledger accounting, reporting, and integration services. Current documentation supports REST-based access, bank statement processing, cash management, and reconciliation analysis (Oracle

2025a; Oracle 2025b). Accounting Hub also enables diverse transactional sources to retain accounting context while feeding a governed model (Oracle 2023).

The research problem is architectural. Saudi institutions need to determine how cloud ERP, domestic payment rails, open banking APIs, and reconciliation should interact so that greater connectivity does not create fragmented control. SAMA's first Open Banking Framework established regulated account-information services, and the 2024 release extended the framework to payment initiation (Saudi Central Bank 2022; Saudi Central Bank 2024c). This review develops an integrated operating framework in which digital payments, APIs, accounting, and reconciliation remain traceable, scalable, secure, and auditable. Finance systems also operate on different clocks. An application may confirm a customer action immediately, while payment settlement, bank reporting, and ledger recognition occur later. Architecture must preserve these distinctions through common references and controlled state changes. Collapsing status too early can cause premature cash recognition, missed reversals, or duplicate accounting events.

II. AIM, OBJECTIVES AND REVIEW QUESTIONS

The aim of this study is to develop a review-based framework for secure and scalable cloud-native financial operations in Saudi institutions by integrating Oracle Fusion ERP, SADAD, mada, open banking interfaces, and automated reconciliation. The study identifies the design relationships that determine whether these components produce reliable financial outcomes as transaction volume, external connectivity, and regulatory expectations increase.

Four objectives guide the review: evaluate cloud ERP as a controlled financial backbone for payment and settlement data; examine Saudi payment rails and open banking requirements affecting references, consent, security, settlement status, and API governance; analyse automation approaches for matching, exception management, close, and audit evidence; and convert the evidence into an implementation model

aligned with Vision 2030 priorities for digital infrastructure and financial resilience.

The review asks how payment and API data should become governed accounting events, which controls preserve completeness and traceability across cloud-native interfaces, and how reconciliation can evolve from periodic clerical work into a continuous control process. The questions connect technology architecture with finance ownership because cloud ERP, accounting automation, and open banking evidence shows that performance gains depend on process and governance evolving with technology (Harrast 2020; Xie and Hu 2024; Rabhan and Almezeini 2025).

III. REVIEW METHODOLOGY

The study adopts a structured integrative review and thematic synthesis suitable for evidence spanning enterprise systems, payment infrastructure, banking interfaces, accounting automation, and Saudi financial policy. This design accommodates peer-reviewed studies explaining adoption and automation together with authoritative sources defining national payment systems, open banking requirements, and Vision 2030 priorities. A purely technical review would miss institutional rules, while a policy-only review would underrepresent system and process design.

The review followed five stages. First, the analytical boundary was defined from transaction creation to final ledger and reporting outcomes. Searches combined terms relating to cloud ERP, Oracle Fusion Financials, financial close, reconciliation automation, robotic process automation, process mining, SADAD, mada, Saudi digital payments, open banking, payment initiation, account information, API security, and Vision 2030. Evidence was restricted to 2020–2025 and retained when it contributed to enterprise financial processing, domestic payment connectivity, API-enabled banking, automated reconciliation, or security and governance.

Second, sources were screened for direct relevance and evidential quality. Peer-reviewed work was prioritised where it offered explicit methods, empirical evidence, architecture analysis, or validated review

findings. Official SAMA, Vision 2030, Ministry of Finance, IMF, and Oracle materials were included when they defined payment capabilities, regulatory requirements, national indicators, or product behaviour. Sources focused only on consumer marketing, cryptocurrency speculation, or generic cloud adoption without a financial-operations connection were excluded.

Third, comparable design information was extracted from each source: operational problem, technology or process mechanism, principal benefit, implementation constraint, and financial-control implication. Cloud ERP evidence was coded for integration, standardisation, scalability, and performance; payments for settlement characteristics and channel diversity; open banking for consent, data exchange, payment initiation, and API risk; and automation for matching, exception handling, process analytics, and auditability.

Fourth, thematic synthesis identified recurring tensions between speed and control, connectivity and security, and automation and exception judgement. Accounting automation studies show that repetitive procedures are strong candidates for RPA, but access rights, deployment controls, and governance must accompany scale (Harrast 2020; Perdana et al. 2023). Process-mining research demonstrates that transaction pathways can be reconciled to financial accounts, strengthening completeness analysis when data semantics are coherent (Werner et al. 2021). Open banking evidence likewise shows that connectivity depends on secure APIs, consent, and trustworthy system behaviour (Xie and Hu 2024).

Finally, the synthesis was translated into an architecture and maturity roadmap and assessed against accounting integrity, operational scalability, security and traceability, and fit with Saudi payment context. The output is conceptual rather than an empirically validated implementation blueprint, so benefits are framed as evidence-supported design expectations. This caution is consistent with the IMF's emphasis on preserving financial stability while Saudi digital finance expands (IMF 2024). Evidence was triangulated across technical, accounting, regulatory, and Saudi-specific sources before a design proposition was retained. Product documentation alone did not

establish a control, and policy text alone did not establish an implementation mechanism. This comparison was especially important for open banking and reconciliation, where regulatory rules, API behaviour, and accounting outcomes describe different parts of one process.

IV. CLOUD-NATIVE FINANCIAL OPERATIONS AS AN OPERATING MODEL

Cloud-native financial operations are an operating model in which transaction services, integration, accounting, cash management, reconciliation, controls, and analytics are designed for continuous digital interaction. The term does not require every component to use one public cloud. It assumes API-based connectivity, automated monitoring, standardised data contracts, and explicit service ownership. Cloud ERP research indicates that organisational value depends on assimilation into processes rather than software delivery mode alone (Alsharari 2022; Jiang and Wang 2022).

For finance, the key shift is from interface-centric integration to event accountability. A payment is not complete because a file or API request reached its destination. Finance must know which obligation generated it, whether the external rail accepted it, when settlement occurred, which fees or adjustments applied, and how cash maps to subledger and general-ledger accounts. Oracle can provide the accounting anchor, while upstream and downstream services preserve identifiers and state changes across the lifecycle (Oracle 2025a).

Scalability therefore requires semantic consistency as well as throughput. Reference fields, customer or supplier identifiers, bank accounts, invoice numbers, payment-channel codes, dates, currencies, and reason codes need governed definitions. Without this discipline, higher volume creates larger manual queues. Cloud ERP investment research similarly shows that strategic value depends on flexibility and implementation choices, not on platform replacement alone (Lozano-Almansa et al. 2023).

Cloud-native design also moves controls earlier. Duplicate checks, account validation, consent status, amount thresholds, segregation of duties, and reference completeness can be enforced before a transaction becomes a reconciliation exception. This is consistent with Saudi initiatives to digitise disbursement and improve transaction efficiency under the Financial Sector Development Program (Ministry of Finance 2024). The objective is not only faster processing, but earlier evidence that processing is correct.

V. ORACLE FUSION ERP AS THE GOVERNED ACCOUNTING BACKBONE

Oracle Fusion ERP can serve as the governed accounting backbone when business processing, accounting interpretation, and external connectivity remain distinct responsibilities. Payables, receivables, cash management, general ledger, and subledger accounting provide the record-to-report structure, while integration services expose controlled interfaces for payment and bank data (Oracle 2025a; Oracle 2025b). SADAD, mada, banks, and open banking providers have their own states and identifiers; their messages should inform accounting without independently redefining accounting policy.

A robust pattern begins with canonical financial events. A SADAD bill flow can be represented as obligation, payment instruction, rail acceptance, settlement, and reconciliation. A mada transaction can include authorisation, clearing, settlement, fees, refund, reversal, or dispute. Open banking payment initiation adds consent, third-party application, bank response, and final status. Mapping these events to subledgers maintains consistent accounting even when channel mechanics differ. Direct point-to-point posting from each external interface into the general ledger would duplicate mapping logic and weaken traceability.

Accounting Hub strengthens this model by translating non-Oracle transactions into a common accounting environment while preserving supporting references (Oracle 2023). For Saudi institutions with billing, treasury, government, or sector-specific systems, centralised accounting interpretation reduces the need

to replicate rules across each source. Cloud ERP evidence also stresses implementation governance. Jayeola et al. (2022) show that change-management support affects implementation and financial performance, while Bitkowska et al. (2024) identify integration and process coverage as major Cloud ERP development directions. Each interface therefore needs a business owner, technical owner, accounting owner, control owner, and recovery path.

The ERP should be the source of financial truth without becoming the only source of operational truth. Real-time payment platforms may require specialised stores for status, performance, or fraud analytics. A scalable design records external events in an integration layer, validates them, and posts financially relevant state changes to Oracle. Reconciliation then compares the ERP view with independent settlement and bank evidence, preserving performance and accounting independence. Configuration discipline is equally important. Chart-of-accounts segments, accounting rules, bank structures, transaction sources, reconciliation attributes, and approvals should survive channel growth. Rather than creating a new ledger mapping for each payment product, events should be classified by economic meaning while channel identity remains an analytical attribute. This supports cross-channel reporting and keeps accounting treatment driven by consistent business rules.

VI. INTEGRATING SADAD AND MADA PAYMENT FLOWS

SADAD and mada should be treated as distinct payment domains within a common integration-control pattern. SADAD is a national billing environment spanning government, utilities, telecommunications, banking, insurance, e-commerce, and other sectors. Its scale makes bill identifiers, biller references, payment status, and settlement timing critical reconciliation fields. SAMA reported 322 million SADAD bill payments in 2023, illustrating why manual item-level matching is unsustainable for large participants (Saudi Central Bank 2024a).

mada represents card-based flows across point-of-sale, ATM, and e-commerce channels. These transactions

introduce authorisation, clearing, settlement, reversals, refunds, fees, and disputes. Saudi digital-payment growth has made them increasingly important to cash visibility and scalable settlement processing (Saudi Central Bank 2024b; Saudi Central Bank 2025). Consumer research also shows that usefulness, service quality, trust, and ease influence digital-payment adoption, linking operational reliability with wider acceptance (Alnemer 2022; Chen et al. 2022).

For both rails, the integration model should preserve original payment references and enrich rather than replace them. A transaction should retain the enterprise document number, external identifier, payer or merchant context, amount, currency, processing date, settlement date, and status. Fees, partial payments, aggregations, and reversals require explicit linkage to the originating transaction. These fields create deterministic matching opportunities and reduce manual resolution.

The design must also distinguish transaction confirmation from cash settlement. External

acceptance may validate an instruction, but cash accounting should depend on settlement evidence. Payables or receivables can update when operational conditions are met, while cash management and reconciliation confirm bank movement independently. This enables faster visibility without collapsing operational and accounting controls. As national strategy continues to promote advanced financial infrastructure and digital services, the institutional challenge is to absorb payment growth without turning it into reconciliation backlog (Financial Sector Development Program 2021; Financial Sector Development Program 2025). Settlement aggregation deserves specific attention. One bank credit may represent many customer or merchant transactions, while a card settlement may be net of fees or adjustments. Reconciliation should support one-to-many and many-to-one relationships without losing original-item traceability. Batch identifiers, settlement summaries, and fee components should be structured data so settlement efficiency does not sacrifice customer-level evidence.

Table 1. Evidence synthesis for secure, scalable cloud-native financial operations.

Evidence domain	Selected evidence	Main finding	Design implication
Cloud ERP adoption	Alsharari (2022); Jayeola et al. (2022); Jiang and Wang (2022); Bitkowska et al. (2024)	Value depends on process assimilation, governance, service model and integration rather than migration alone.	Use ERP as governed finance backbone with explicit ownership and stable integration boundaries.
ERP accounting and integration	Oracle (2023; 2025a; 2025b)	Accounting Hub, REST interfaces, cash management and reconciliation functions support integrated transaction-to-ledger processing.	Centralise accounting interpretation; preserve source references; post financially relevant state changes.
Saudi payment infrastructure	Saudi Central Bank (2024a; 2024b; 2025)	High and rising digital-payment volumes create settlement, reference and exception-management demands.	Model SADAD and mada as distinct payment domains using common traceability and settlement controls.
Open banking	Saudi Central Bank (2022; 2023; 2024c); Xie and Hu (2024)	Account information and payment initiation improve connectivity but depend on standards, consent, identity and API governance.	Place gateway, consent, security, versioning and status management outside the core ledger.

Evidence domain	Selected evidence	Main finding	Design implication
Automation and reconciliation	Harrast (2020); Werner et al. (2021); Perdana et al. (2023)	Automation can reduce repetitive work; process analytics can strengthen completeness and conformance when governance is explicit.	Prioritise deterministic matching, controlled exceptions, audit evidence and root-cause feedback.
Saudi adoption and institutional context	Alnemer (2022); Chen et al. (2022); Rabhan and Almezeini (2025)	Usefulness, regulation, organisational readiness and trust shape adoption of digital finance.	Measure operational reliability and governance as adoption enablers, not only back-office controls.

VII. OPEN BANKING APIS AND CONTROLLED CONNECTIVITY

Open banking makes bank data and payment initiation programmatically available through governed interfaces. SAMA's 2022 framework focused initially on Account Information Service, while the Open Banking Lab created a controlled testing and certification environment (Saudi Central Bank 2022; Saudi Central Bank 2023). The 2024 Payment Initiation Service release then enabled authorised services to initiate payments under standardised responsibilities and technical requirements (Saudi Central Bank 2024c). These capabilities create new routes for cash visibility, collections, payments, and financial-service innovation.

For enterprise finance, the main benefit is reduced information latency. Account-information interfaces can improve cash-position visibility without waiting for traditional end-of-day files, while payment initiation can reduce rekeying between enterprise workflows and bank channels. Benefits nevertheless depend on identity, consent, authentication, authorisation, API versions, retries, idempotency, and response-state design. Open banking reviews consistently treat standardisation and trust as necessary conditions for sustainable adoption (Xie and Hu 2024).

Saudi user evidence supports this control emphasis. Studies of fintech payments find that system quality, service quality, perceived value, risk, and satisfaction influence continued use (Abed and Alkadi 2024; Albarq 2024; Salameh et al. 2023). Although these studies focus on users rather than architecture,

unstable or insecure APIs can damage both transaction efficiency and confidence.

API security must therefore operate as a financial control. Financial interfaces expose balances, identities, payment instructions, and transaction history. Industry evidence documents increasing API attacks and recommends stronger lifecycle security, monitoring, authentication, and anomaly detection (Pompon 2021; Akamai 2024). Controls should include strong client identity, scoped permissions, short-lived credentials, encryption, consent validation, schema validation, rate controls, threat monitoring, and central logging. Security events must also correlate with financial events so that blocked requests cannot create valid accounting states and initiated payments retain evidence of consent and identity.

An API gateway and orchestration layer should isolate external API volatility from ERP accounting by handling translation, retries, throttling, schema changes, and provider-specific logic. Oracle receives validated business events rather than unmanaged external calls. This supports new open banking services without rewriting core accounting rules. Rabhan and Almezeini (2025) show that regulation and government engagement affect fintech adoption among Saudi MSMEs, reinforcing that technical scalability and governance must develop together. Financial operations also require explicit API version management. Banks, open banking participants, and enterprise platforms change on different schedules, so the integration layer should maintain tested versions, compatibility rules, certification evidence, and rollback procedures. Contract tests should verify mandatory fields, consent

attributes, status codes, and errors before release. A small interface change can otherwise alter whether transactions are posted, duplicated, delayed, or left unreconciled.

VIII. AUTOMATED RECONCILIATION AND EXCEPTION MANAGEMENT

Reconciliation proves whether the architecture's transaction story is complete. In fragmented environments, teams compare ERP entries, bank statements, payment-processor files, and operational reports manually. This becomes slow and control-intensive as channels, settlement cycles, currencies, and exception types increase. RPA research identifies reconciliation and other stable procedures as strong automation candidates, provided access, change control, and governance are managed explicitly (Harrast 2020; Perdana et al. 2023).

The first principle is deterministic matching before intelligent matching. Exact payment identifiers, reference keys, bank accounts, dates, amounts, and settlement batches should be used wherever possible. Rules can then handle predictable differences such as date windows, fees, split settlements, aggregated deposits, or partial payments. Only residual items should move to fuzzy or analyst-assisted matching. This sequence protects explainability because reviewers can understand why a match was authorised. The second principle is to treat an exception as an operational object, not an unmatched line. Each exception needs a reason code, severity, owner, ageing measure, evidence, and resolution action. Categories may include missing reference, amount difference, duplicate, settlement delay, reversal, fee, rejection, or mapping failure. Workflow should route technical issues to integration support, commercial differences to business operations, accounting differences to finance, and suspicious items to risk functions.

Process-mining evidence shows that transaction pathways can be compared with financial accounts to assess completeness and conformance (Werner et al. 2021). In a Saudi environment, process analytics could trace a payment from invoice creation through SADAD, mada, bank, or open banking events into settlement and ledger posting, revealing missing steps

and repeated exception patterns. Oracle Financials supports bank statement processing, cash management, and reconciliation-oriented analysis, making it a suitable accounting endpoint (Oracle 2025b).

Automated reconciliation should compare independently derived views: what the enterprise believes occurred and what the bank or payment network confirms occurred. Agreement within approved rules allows straight-through clearing; disagreement should accelerate investigation rather than hide it. Exception statistics can then identify weak references, mappings, APIs, or operating procedures. Matching rules that affect accounting must remain versioned, approved, testable, and auditable. Automation removes repetitive work, but financial authority remains explicit. Reconciliation priorities should also be value-sensitive. A high automated match rate can mislead if remaining items contain the largest exposures. Dashboards should track both item count and monetary value, with escalation based on age, counterparty, and control significance. Root-cause analysis should separate genuine financial differences from data-quality and timing issues, shifting effort from line-by-line matching toward economically meaningful exceptions.

IX. SECURITY, DATA GOVERNANCE AND OPERATIONAL RESILIENCE

Secure scaling requires a control plane spanning ERP, integration services, payment rails, open banking, and reconciliation. The IMF's 2024 assessment emphasises preserving financial stability as Saudi digital capabilities expand, while SAMA's open banking model combines technical standards with participant responsibilities (IMF 2024; Saudi Central Bank 2022). Every financial interface therefore needs defined ownership, authorised identities, approved data use, and recoverable evidence.

Identity is the first control. Human users, service accounts, API clients, integration workloads, and automation components require distinct identities and least-privilege permissions. Privileged access to payment configuration, supplier bank details, reconciliation rules, or journal posting should receive

stronger approval and monitoring than inquiry. Automation credentials should be managed as production identities with controlled secrets and activity logs. Harrast (2020) notes that automation introduces governance concerns around access to sensitive financial records.

Data governance is the second control. Integrations carry personal data, bank details, references, and commercially sensitive information. Data contracts should specify required fields, storage locations, retention, masking, and access. Open banking adds consent context, while payment data introduces channel-specific obligations. The architecture should therefore minimise unnecessary replication and separate analytical data from credentials or operational secrets.

Operational resilience is the third control. Cloud availability does not remove dependencies on APIs, bank connectivity, payment rails, identity providers, and integration services. Institutions need retry logic, idempotency, queueing, duplicate prevention, health monitoring, and tested fallback procedures. A lost payment response should not trigger duplicate initiation, and a delayed bank statement should not force an incorrect cash position.

Observability ties the controls together. Logs should correlate transaction identifiers across Oracle, integration services, payment interfaces, open banking APIs, and reconciliation. Dashboards should monitor successful-payment rate, settlement latency, unreconciled value, exception ageing, duplicate prevention, API error rate, and manual-touch percentage. Cloud ERP assimilation research indicates that institutional alignment shapes successful adoption, so this visibility must serve finance, treasury, technology, risk, and audit rather than IT alone (Alsharari 2022). Control evidence should support reconstruction after an incident. For a material payment, reviewers should establish the initiating identity, approval or consent, interface version, external response, accounting event, and reconciliation outcome. This evidence supports audit, disputes, fraud investigation, and recovery while reducing dependence on staff memory. Resilience requires reconstructing financial state from durable evidence, not merely restarting applications.

X. PROPOSED INTEGRATED FRAMEWORK

The proposed framework combines six connected layers. Oracle Fusion ERP forms the governed accounting core for payables, receivables, cash management, subledger accounting, general ledger, and reporting. An integration plane manages mapping, API mediation, file exchange, events, retries, and idempotency. The Saudi payments layer preserves SADAD and mada references and settlement states. The open banking layer governs account data and payment initiation through consent, identity, standards, and participant responsibilities. A reconciliation layer applies deterministic rules, tolerances, exception workflows, and evidence retention. A cross-cutting control plane provides identity, security, observability, data governance, and audit.

The architecture operates as a closed loop. A transaction receives an enterprise reference and moves through the appropriate payment or banking channel. Responses are captured and translated into controlled status changes. Settlement evidence then enters cash management and reconciliation. Matched items clear under authorised rules; exceptions are classified and assigned; resolved outcomes update accounting where necessary. Trends and incidents are analysed to improve reference design, mappings, controls, and procedures rather than repeatedly fixing the same symptom.

Figure 1 presents this transaction-to-ledger model, and Table 1 summarises the supporting evidence. The design avoids uncontrolled direct connections between external services and the general ledger and positions reconciliation as independent validation between operational transaction claims and external financial evidence. This reflects the broader value proposition of cloud ERP: integrated information and process visibility rather than disconnected automation (Bitkowska et al. 2024). The framework separates control decisions from transport technology. The same accounting and reconciliation principles should apply whether an event arrives through an API, secure file, message queue, or another approved mechanism. This reduces lock-in and creates a clearer assurance boundary: transport services deliver reliably,

orchestration validates state, and finance interprets
accounting and reconciliation.

Closed-loop cloud-native financial operations architecture

A governed transaction-to-ledger model for Saudi institutional finance

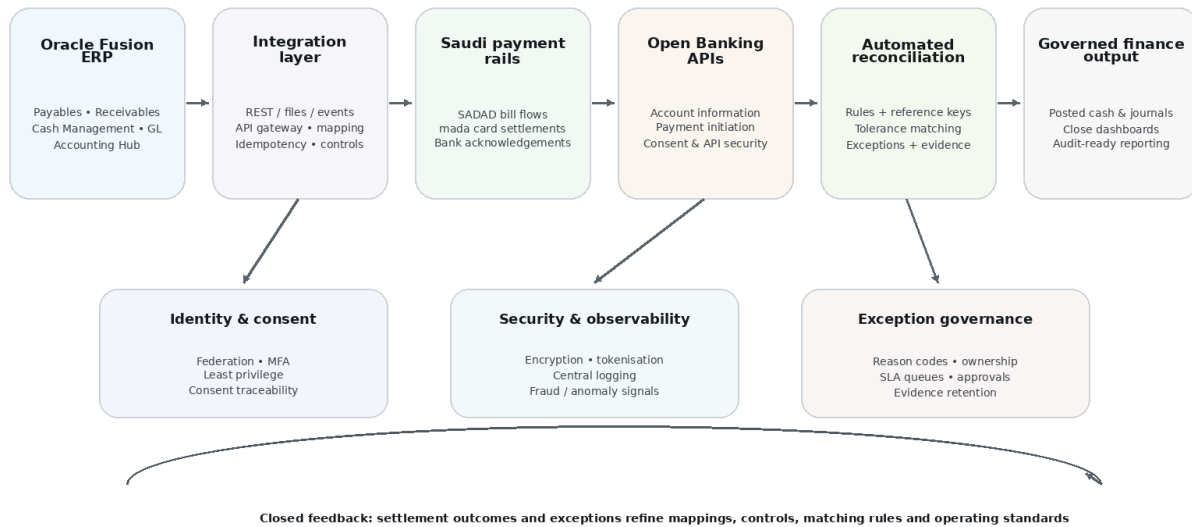


Figure 1. Closed-loop cloud-native financial operations architecture.

Table 2. Control-layer mapping for the proposed financial operations framework.

Framework layer	Core data / control	Principal risk	Operational KPI	Saudi relevance
Oracle finance core	Ledgers, subledgers, bank accounts, accounting rules, approvals	Incorrect or inconsistent accounting	Posting accuracy; close duration	Creates governed record-to-report foundation
Integration plane	Canonical events, mapping, idempotency, retries, version control	Duplicate, lost or misinterpreted events	Interface success; duplicate prevention	Connects national rails and APIs without direct ledger coupling
SADAD / mada layer	External references, settlement batches, fees, reversals	Unmatched cash and settlement ambiguity	Settlement latency; match rate	Supports high-volume domestic digital payments
Open banking layer	Consent, client identity, account data, payment status	Unauthorised access or inconsistent API state	API availability; consent failures	Supports AIS/PIS expansion under national framework
Reconciliation layer	Match rules, tolerances, exceptions, evidence	Hidden financial differences or backlog	Unreconciled value; exception ageing	Turns digital scale into controlled cash and close outcomes

Framework layer	Core data / control	Principal risk	Operational KPI	Saudi relevance
Control plane	Identity, encryption, logs, data rules, recovery evidence	Fraud, data exposure, weak audit trail	Control exceptions; evidence completeness	Supports resilience, trust and financial stability

XI. VISION 2030 ALIGNMENT AND IMPLEMENTATION ROADMAP

The framework aligns with Vision 2030 by connecting operational efficiency with financial infrastructure rather than treating digitisation as a front-end experience. The Financial Sector Development Program calls for advanced infrastructure, fintech participation, digitised processes, and resilience (Financial Sector Development Program 2021). By the end of 2024, the Kingdom had 261 licensed fintech companies and a 79% electronic share of retail payments, increasing integration demands on institutional finance (Financial Sector Development Program 2025).

Implementation should proceed in four stages. First, establish governed master data, chart-of-accounts mappings, bank and payment identifiers, access roles,

and reconciliation ownership. Second, connect Oracle with SADAD, mada, banks, and approved open banking interfaces through a controlled integration layer. Third, automate deterministic reconciliation and exception workflow, beginning with high-volume, low-ambiguity classes. Fourth, introduce adaptive operations using continuous cash visibility, anomaly signals, process analytics, and cross-channel performance monitoring. Figure 2 presents this maturity path.

Success should be measured through straight-through processing, automated match rate, unreconciled value, exception ageing, settlement latency, duplicate-payment prevention, manual touches, close-cycle duration, API availability, and completeness of end-to-end evidence. These metrics translate digital transformation into finance outcomes and support the Ministry of Finance's wider push toward efficient digital disbursement (Ministry of Finance 2024).

Financial operations maturity roadmap

A phased path from fragmented payment processing to governed, near-real-time finance operations

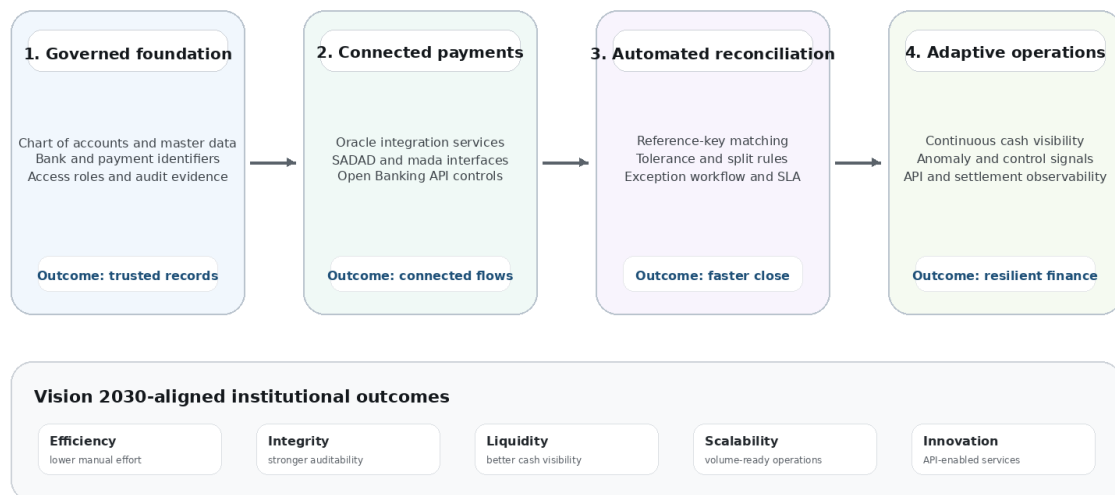


Figure 2. Financial operations maturity roadmap for Saudi institutions.

XII. DISCUSSION, LIMITATIONS AND FUTURE RESEARCH

The synthesis suggests that Saudi institutions do not lack digital components. The Kingdom already has extensive payment infrastructure, regulated open banking, rapidly growing electronic payments, and strong fintech policy support (Saudi Central Bank 2025; Financial Sector Development Program 2025). The challenge is coordination: payment channels, APIs, ERP accounting, bank evidence, and reconciliation can each be modern yet collectively fragmented. The framework addresses this by treating financial integrity as an end-to-end property.

Three implications follow. Cloud ERP should be governed as an accounting platform with integration boundaries rather than a universal operational database. Payment modernisation should preserve references and settlement evidence so speed does not reduce auditability. Reconciliation should also be designed upstream: weak identifiers, status models, and exception ownership cannot be repaired simply by adding more sophisticated matching. This is consistent with automation studies showing that stable processes and explicit governance are prerequisites for reliable outcomes (Harrast 2020; Perdana et al. 2023).

The review does not test a live Oracle-SADAD-mada-open-banking implementation, and academic literature rarely evaluates all components in one Saudi institution. Some operational evidence therefore comes from official documentation and sector reports. Product capabilities also change through cloud releases. Future research should use Saudi transaction datasets, compare rule-based and learning-assisted matching, quantify control effort before and after open banking integration, and test whether architecture maturity predicts close speed, cash visibility, and exception rates.

A further implication concerns accountability across organisational boundaries. National payment rails, banks, cloud services, API providers, and enterprise finance teams may each satisfy service obligations while an end-to-end transaction still fails. Institutions should therefore define business service objectives spanning the complete financial journey, including

maximum settlement delay, reconciliation ageing, evidence completeness, and recovery responsibilities. These measures create a common language between finance and technology and prevent local service metrics from masking unresolved financial exposure. They also provide a practical basis for governance committees to prioritise remediation according to business impact rather than technical severity.

XIII. CONCLUSION

Saudi financial operations are reaching a stage in which scalability depends on integration discipline as much as processing capacity. Oracle Fusion ERP can provide a governed accounting backbone when external payment and banking events are translated through controlled interfaces, preserved with complete references, and independently validated through reconciliation. SADAD and mada provide domestic scale; open banking adds programmable connectivity; automation reduces repetitive work; and observability links operations with control evidence.

The proposed framework places accounting integrity, API governance, settlement validation, and exception ownership inside one closed-loop design. It supports faster processing without equating speed with completion and automation without transferring financial authority to opaque rules. For institutions pursuing Vision 2030, the priority is financial operations that can absorb higher digital volume while remaining explainable, secure, recoverable, and auditable.

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