



Scaling Trustworthy Digital Finance in Asia and the Middle East: A Regional Evidence Review and Institutional Readiness Framework

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ABSTRACT

Digital finance has made significant progress in Asia and the Middle East, but it is not one-size-fits-all in terms of performance in inclusion, productivity, or stability. The key limitation is now institutional, not technical: Payment rails, data-sharing structures, regulatory capability, market capacity, and protections need to be built up in lockstep. This article summarizes 34 peer-reviewed papers from 2020 to 2025 and sets up an institutional-readiness framework for trustworthy digital finance for the region. The synthesis brings together elements of structured evidence coding, comparative evidence analysis of East and Southeast Asian evidence, evidence from the Gulf Cooperation Council and broader Middle East, and cross-regional emerging-market evidence analysis. Five interdependent pillars emerge: digital public infrastructure; data governance and interoperability; adaptive regulation; market capability and inclusive adoption; and resilience with consumer protection. The evidence from Asia is more extensive with regard to outcomes at the household- and firm-level, platform-enabled inclusion, and digital infrastructure, whereas evidence from the Middle East is more focused on outcomes related to platform adoption by regulators, bank performance, and governance conditions. In both regions, positive results are undermined by asymmetric data access, weak markets, low consumer capability, and low innovation coupled with the lack of post-deployment supervisions. The article suggests an order of implementation for both national and cross-border initiatives, identifies the research gaps and proposes a research agenda for ASEAN-GCC digital-finance corridors. A core message is that trustworthy scale relies on institutional complementarity – innovation’s developmentally valuable only if it is supported by development of infrastructure, rules, capabilities and safeguards.

Keywords: Digital finance ▪ FinTech ▪ Financial inclusion ▪ Regulatory sandbox ▪ Digital public infrastructure ▪ Asia ▪ Middle East ▪ GCC ▪ Financial stability ▪ Institutional readiness

1. INTRODUCTION

The locus of financial innovation has shifted. Regulatory sandboxes, instant-payment systems, digital banks and open-finance programs are driving structural changes in economies across the Gulf and wider Middle East, meanwhile several of the world’s largest markets for digital payments and platform-

finance are found in Asia. These paths have been referred to as technology adoption stories. That interpretation does not fully convey the meaning. Different technologies produce different results as a result of being introduced to different institutional systems.

If the factors of identity, connectivity, merchant acceptance and redress mechanism are already in place, a payment ap-

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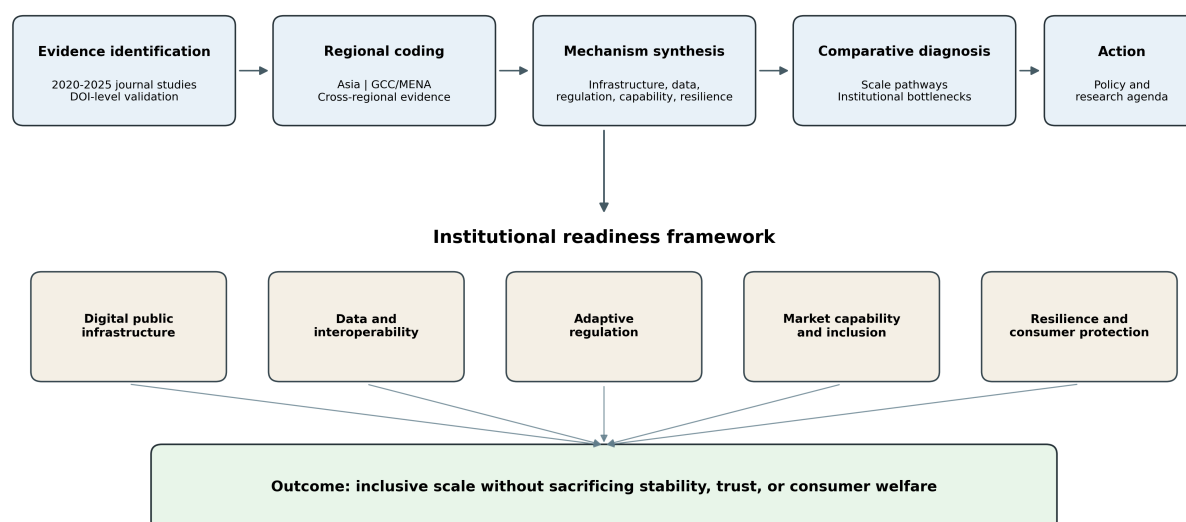


Figure 1. Graphical abstract: evidence workflow and institutional-readiness logic.

plication can expand access. The same application can contribute to exclusion if users don't have documentation or digital skills. While algorithmic credit reduces screening costs, it can also magnify or reinforce hidden discrimination or over-borrowing. While a regulatory sandbox can help mitigate uncertainties when experimenting, its benefits are lessened if the positive outcomes of the experiment do not translate to market-ready licensing, supervisory learning, or interoperable market standards. The evidence from China, the ASEAN countries, the OIC economies, MENA, and Gulf+ emerging markets thus suggests a single takeaway: digital-finance outcomes depend on institutional complements [1, 2, 3, 4, 5]. There has been rapid but fragmented growth of the literature. Each stream looks at issues related to inclusion and growth, bank efficiency and profitability, financial stability, and regulation and innovation ecosystems. While these separate streams have been discussed in existing reviews, no review has attempted to view Asia and Middle East in an integrated implementation perspective. This is important because the regions have varying priorities across the borders, demographic characteristics, governance frameworks and market conditions, yet the innovation ambitions are high and shared. This review addresses three questions:

- RQ1:** Which institutional conditions convert digital-finance innovation into inclusion, efficiency, growth, and stability?
- RQ2:** How do the evidence profiles and scaling pathways differ between Asia and the Middle East?
- RQ3:** What implementation and research priorities follow for national programs and emerging ASEAN-GCC financial corridors?

The article makes three contributions. First, it shifts the unit of analysis from individual technologies to the institutional architecture needed for trustworthy scale. Second, it offers a regional comparison that separates evidence on infrastructure-led expansion in Asia from regulator- and bank-led transfor-

mation in the Middle East. Third, it translates the synthesis into a five-pillar readiness framework and a staged implementation pathway that can guide regulators, financial institutions, and researchers.

2. REGIONAL PROBLEM FRAMING

2.1 Asia: scale, platforms, and uneven institutional depth

Asian financial innovation is distinguished by scale. China has generated extensive evidence on digital financial inclusion, bank efficiency, household consumption, poverty alleviation, and growth quality [6, 7, 8, 9, 10]. Southeast Asian work emphasizes the role of digitalisation in extending access to lower-middle-income populations and SMEs [11, 12, 13, 14]. Asia-Pacific cross-country evidence further links digitalisation and financial inclusion with economic growth, while warning that national readiness remains uneven [4].

Scale, however, creates new policy problems. Digital credit can widen access and simultaneously increase household debt exposure [15]. FinTech can improve bank efficiency, but benefits may accrue unevenly across institutions with different technological and organizational capabilities [7, 16]. Regional disparities in connectivity, literacy, and local economic structure can also cause the same national platform to produce geographically unequal gains. The Asian challenge is therefore not simply to expand use, but to govern the distributional and stability consequences of mature digital ecosystems.

2.2 The Middle East: regulator-led modernization and bank-centered integration

The Middle Eastern trajectory is more visibly policy-led. Many jurisdictions have combined national digital strategies with sandboxes, digital-bank licensing, instant payments, and open-finance initiatives. Empirical research finds that governance and regulatory conditions shape whether inclusion contributes to growth in MENA [2]. GCC evidence similarly suggests that FinTech adoption and bank stability are connected through the quality of the regulatory environment [3].

Studies of Middle Eastern users emphasize trust, security, and financial literacy as practical adoption constraints [17], while MENA bank evidence points to performance opportunities that depend on institutional and cross-country conditions [18].

The region's high connectivity and strong banking systems provide a favorable base, but they may also encourage an overly bank-centric model. Innovation can remain concentrated in large institutions and affluent users unless policy explicitly addresses migrant workers, microenterprises, youth, women-owned firms, and users outside formal credit histories. Cross-border remittances and trade finance create additional opportunities, but these require interoperable identity, data, compliance, and settlement arrangements rather than isolated domestic applications.

2.3 Why a comparative institutional lens is needed

The two regional patterns are complementary. Asian markets show what happens when digital finance reaches mass scale; Middle Eastern markets show how coordinated policy can accelerate institutional change. Asia's main question is how to make scale safer and more evenly distributed. The Middle East's main question is how to convert strategic initiatives into

broad, interoperable, and evidence-based use. A comparative framework can therefore identify transferable mechanisms without assuming that a successful product, sandbox, or platform can be copied independently of its institutional context.

3. RELATED WORK

Recent reviews have substantially improved the conceptual foundations of FinTech research. Ecosystem research explains how new entrants, incumbents, regulators, and complementary providers co-evolve [19]. Critical information-systems scholarship stresses that financial innovation should be evaluated against social value rather than adoption alone [20]. Other reviews synthesize the inclusion-stability trade-off, bank profitability, vulnerable-group inclusion, regulatory sandboxes, and emerging-market research patterns [21, 22, 23, 24, 25, 26].

Table 1 shows that the dominant reviews are global or topic-specific. Their contributions are important, but they do not provide a comparative institutional diagnosis for Asia and the Middle East, nor do they connect evidence to a staged implementation sequence.

Table 1. Related review studies and the gap addressed in this article

Study	Primary focus	Main contribution	Remaining gap relevant to this review
[19]	FinTech ecosystems	Explains ecosystem evolution and disruptive innovation relationships	Does not compare institutional readiness across Asian and Middle Eastern scaling pathways
[20]	FinTech and social value	Reorients research toward development and societal consequences	Offers a global agenda rather than an operational regional framework
[21]	Inclusion and stability	Synthesizes beneficial and detrimental effects of FinTech	Limited integration of infrastructure, data governance, and implementation sequencing
[22]	Banking profitability	Consolidates evidence on FinTech-bank performance relationships	Narrow outcome focus and no Asia-Middle East institutional comparison
[23]	FinTech and inclusion	Maps the state of financial-inclusion research	Does not distinguish region-specific institutional mechanisms for scaling
[24]	Emerging markets	Provides bibliometric structure and a future research agenda	Bibliometric emphasis offers limited guidance for policy implementation
[25]	Regulatory sandboxes	Reviews sandbox innovation and sustainability roles	Sandbox-centered; limited attention to complementary market and infrastructure conditions
[26]	Vulnerable groups	Identifies inclusion barriers and underserved populations	Does not connect vulnerable-group outcomes to regional financial architecture

This review differs in four respects. It treats institutional complementarity as the explanatory core; compares Asia and the Middle East explicitly; connects technology, mechanism, and outcome through article-level coding; and proposes national as well as cross-border implementation pathways.

4. REVIEW DESIGN

4.1 Search and selection logic

The review followed a structured integrative protocol informed by PRISMA 2020 reporting principles [27]. Searches combined terms related to FinTech, digital finance, financial inclusion, bank efficiency, financial stability, regulatory sandboxes, digitalisation, Asia, ASEAN, China, GCC, MENA, OIC, and emerging markets. Candidate records were traced through publisher platforms and bibliographic indexes. Titles, publication details, and DOI records were checked before inclusion.

Studies were eligible when they: (1) were peer-reviewed journal articles; (2) were published from 2020 through 2025; (3) examined a financial innovation, digital-finance infrastructure, or regulatory mechanism; (4) reported an economic, institutional, adoption, inclusion, or stability outcome; and (5) provided direct evidence from Asia or the Middle East, cross-regional emerging-market evidence with regional relevance, or a high-value conceptual/review contribution. Editorial notes, non-peer-reviewed reports, purely technical model papers without a financial-system outcome, and items lacking verifiable publication information were excluded.

The final corpus contains 34 studies. It is intentionally analytical rather than exhaustive: the objective is to identify mechanisms and regional contrasts, not to estimate a pooled causal effect. The coded dataset supplied with the article records publication year, geography, region, method, innovation, financial function, institutional pillar, principal outcome, reported direction, risk boundary, and a transparent design-

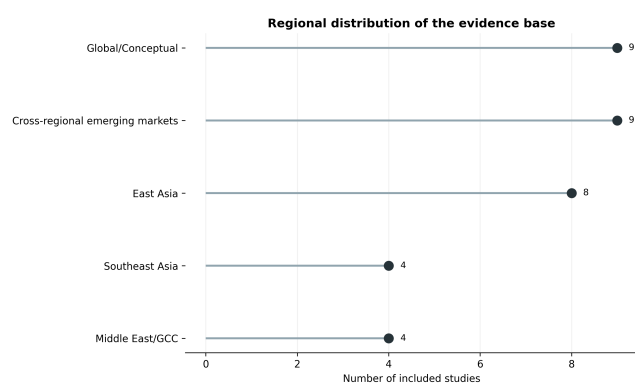


Figure 2. Regional distribution of the 34 included studies. Counts describe the coded review corpus.

strength score used only for sensitivity description.

4.2 Coding framework

Coding proceeded in three stages. First, each study was assigned to a regional evidence group. Second, the financial innovation was mapped to its primary institutional mechanism. Third, reported outcomes and limiting conditions were extracted. The five institutional pillars emerged through iterative comparison of recurring mechanisms:

1. **Digital public infrastructure:** identity, connectivity, payment rails, and broad access channels.
2. **Data and interoperability:** standardized interfaces, consent, portability, and usable data exchange.
3. **Adaptive regulation:** sandboxes, proportional licensing, supervisory learning, and coordination.
4. **Market capability and inclusion:** institutional absorptive capacity, user capability, competition, and access.
5. **Resilience and consumer protection:** cybersecurity, market discipline, redress, transparency, and stability controls.

The analysis code reproduces all descriptive figures directly from the article-level dataset. The resulting counts describe the composition of this review and should not be interpreted as estimates of the entire literature.

5. EVIDENCE PROFILE

The corpus is regionally diverse but uneven. Figure 2 shows that global and cross-regional studies remain prominent, while direct Middle Eastern evidence is less extensive than evidence from East Asia. This imbalance is itself a substantive finding: policy experimentation in the GCC and MENA has advanced faster than peer-reviewed outcome evaluation.

The evidence also differs by method. Asian studies frequently use household, regional, and bank panels, enabling analysis of consumption, poverty, efficiency, and growth. Middle Eastern work is more likely to examine governance, bank-level adoption, or user perceptions. Cross-regional studies are particularly important for stability because spatial spillovers and institutional heterogeneity are difficult to identify within one country [1, 28, 5].

Table 2 summarizes representative empirical findings. The pattern is not uniformly optimistic. Inclusion and efficiency gains are common, but they are conditional on governance, market discipline, capability, and safeguards.

6. FROM INNOVATION TO OUTCOMES: THE INSTITUTIONAL MECHANISM

Figure 3 links the coded innovation classes to institutional pillars and observed outcomes. The figure makes two points. First, technologies rarely affect outcomes directly; their influence is mediated by infrastructure, regulation, market capability, data arrangements, or safeguards. Second, the same innovation class can produce several outcomes. Digital-finance rails support inclusion and growth, but they also create stability and consumer-protection obligations. FinTech-bank integration can improve efficiency while increasing competitive and systemic interdependence [29, 16].

6.1 Digital public infrastructure

Digital identity, connectivity, and payment rails lower the fixed cost of participation. Evidence from China, ASEAN, and Asia-Pacific connects these foundations to inclusion, consumption, poverty reduction, and growth [6, 8, 12, 4, 14]. Their value depends on reach and usability. Infrastructure that exists formally but remains costly, difficult to authenticate, or weakly accepted by merchants does not constitute effective access.

For the Middle East, this pillar has particular importance for migrants, remittance users, and cross-border SMEs. National systems are advancing, but regional value will remain limited unless identity assurance, compliance data, and payment standards can interoperate across jurisdictions.

6.2 Data governance and interoperability

Digital finance depends on data access, yet unrestricted data concentration can undermine competition and privacy. Interoperability allows smaller providers to compete, reduces duplication in know-your-customer processes, and enables portable financial histories. The evidence on bank efficiency suggests that technology creates larger gains where institutions can absorb and integrate it [7, 16]. In MENA, FinTech-bank performance effects similarly depend on the surrounding institutional environment [18].

The policy objective should therefore be governed interoperability rather than maximal data sharing. Consent, purpose limitation, liability, auditability, and standardized interfaces must be designed together. Open-finance mandates without enforcement capacity may simply move risk from incumbents to consumers and smaller providers.

6.3 Adaptive regulation

Sandboxes are useful when they generate regulatory learning, reduce uncertainty, and create a pathway to authorization. South Korean and comparative evidence shows that sandboxes can support open innovation, but institutional design determines whether experiments scale [30, 31]. Reviews similarly identify the weakness of post-sandbox evaluation and transition mechanisms [25].

For GCC regulators, the next stage is not more experimen-

Table 2. Representative regional evidence and boundary conditions

Study	Setting and method	Innovation/function	Principal finding	Boundary or risk
[6]	China; regional panel	Digital financial inclusion	Supports economic growth	Regional digital inequality affects gains
[7]	China; bank panel	FinTech and banking	Improves bank efficiency	Effects differ across bank capabilities
[15]	China; household evidence	Digital credit and inclusion	Expands access	Can increase debt stress
[11]	ASEAN; cross-country	FinTech for SMEs	Improves financing conditions	Firm absorptive capacity remains unequal
[13]	Vietnam; bank panel	FinTech and stability	Benefits depend on market discipline	Weak discipline can offset stability gains
[12]	ASEAN; cross-country	Digitalisation and inclusion	Supports inclusion	Infrastructure gaps remain material
[4]	Asia-Pacific; panel	Digitalisation and inclusion	Links inclusion with growth	National readiness is heterogeneous
[2]	MENA; cross-country panel	Inclusion and growth	Governance strengthens the growth channel	Weak governance limits transmission
[3]	GCC; bank panel	FinTech adoption	Stability effect is regulation-dependent	Regulatory inconsistency weakens benefits
[17]	Middle East; survey	User FinTech adoption	Perceptions shape adoption	Trust, literacy, and security are barriers
[18]	MENA; bank evidence	FinTech and bank success	Indicates performance opportunities	Institutional heterogeneity remains important
[28]	25 countries; spatial analysis	FinTech and stability	Effects cross national borders	Spillovers complicate domestic supervision

tation alone. It is the conversion of sandbox evidence into reusable rules, supervisory technology, cross-border recognition, and clear exit routes. A sandbox that produces isolated pilots without market entry or supervisory learning has limited public value.

6.4 Market capability and inclusive adoption

Access does not equal meaningful use. Users need trust, literacy, affordable interfaces, and recourse. Financial institutions and SMEs need skills, data practices, and integration capacity. Middle Eastern perceptions research identifies trust and security as adoption constraints [17]; ASEAN SME evidence shows that FinTech can improve finance while organizational capability remains decisive [11, 32]. Reviews of vulnerable groups reinforce that digital channels can reproduce exclusion when products assume stable connectivity, formal identity, or high literacy [26].

This pillar also includes competition. An ecosystem dominated by a small set of banks or platforms may achieve rapid adoption while limiting innovation diversity and data portability. Policy should evaluate not only user numbers, but also switching costs, provider diversity, service quality, and distribution across vulnerable groups.

6.5 Resilience and consumer protection

The stability literature provides the clearest warning against technology-first policy. FinTech may support diversification and efficiency, but it can increase interconnectedness, speed of contagion, and risk-taking [29, 1, 28, 5]. Digital finance can also intensify household debt when credit becomes frictionless [15]. Market discipline and regulatory quality moderate these effects [13, 3].

Resilience must therefore be built into product and infrastructure design. Minimum requirements include cyber-risk controls, model governance, fraud monitoring, operational-resilience testing, transparent pricing, complaint handling, and mechanisms for correcting erroneous automated decisions. Cross-border services additionally require clear responsibility when data, providers, and consumers are located in different jurisdictions.

7. REGIONAL COMPARISON

Figure 4 compares the share of direct Asian and Middle Eastern studies assigned to each pillar. It is a descriptive coverage profile, not a readiness ranking. Asian evidence is more distributed across infrastructure, data, inclusion, and resilience. Middle Eastern evidence is concentrated in regulation, adoption, and bank outcomes. This difference reflects both market development and research availability.

7.1 Asia's scaling pathway

The dominant Asian pathway is *infrastructure to use to socioeconomic outcome*. Large user bases and transaction volumes create datasets that support household, regional, and bank-level evaluation. The strengths of this pathway are measurable reach, rapid feedback, and opportunities for low-cost service provision. Its weaknesses are platform concentration, uneven regional capability, over-borrowing, and systemic spillovers.

Asian policy priorities should therefore move from access expansion toward quality and distribution: responsible digital credit, data portability, competition, local-language accessibility, and outcome evaluation for rural areas, older users, and small firms. Regional ASEAN initiatives should also address differences in identity systems, consumer redress, and data-governance maturity.

7.2 The Middle East's scaling pathway

The dominant Middle Eastern pathway is *strategy and regulation to institutional adoption*. Strong policy coordination can accelerate digital-bank licensing, instant payments, and open-finance programs. The strengths are strategic alignment, investment capacity, and the ability to modernize formal financial institutions quickly. The weaknesses are limited independent outcome evaluation, possible concentration in incumbents, and incomplete inclusion of lower-income and migrant populations.

The next policy phase should prioritize evidence and interoperability. Regulators need common outcome measures, post-sandbox evaluation, and mechanisms that allow innovations to cross borders without duplicative compliance. Financial institutions need incentives to serve segments that are

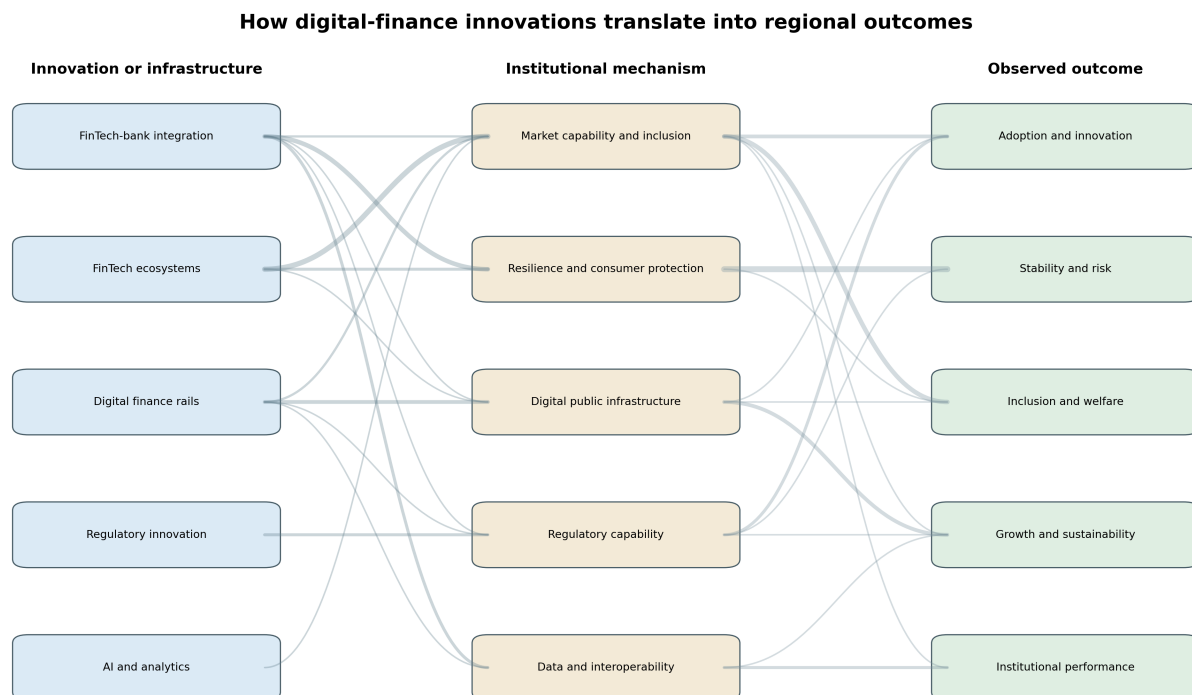


Figure 3. Coded pathways from innovation or infrastructure to institutional mechanism and observed outcome. Line width reflects the number of studies in the review corpus.

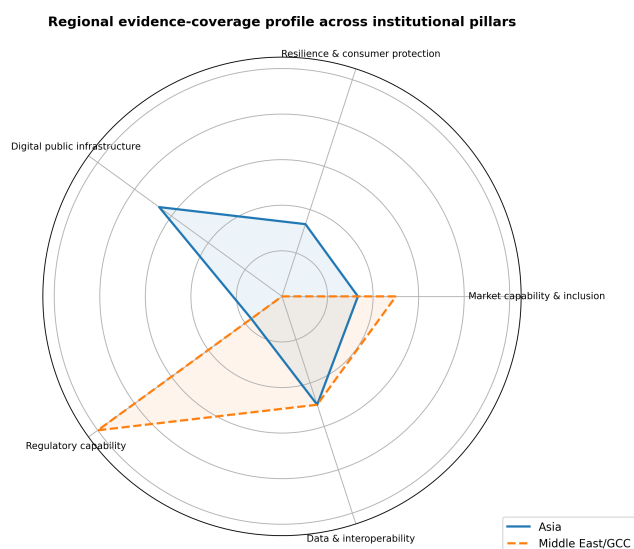


Figure 4. Descriptive evidence-coverage profile for direct Asian and Middle Eastern studies. Values are pillar shares within each regional subset.

commercially marginal but economically important.

7.3 Common constraints

Despite different pathways, both regions face the same five failure modes:

- infrastructure without usable access;
- data sharing without enforceable consent and liability;
- experimentation without scalable authorization;
- adoption without capability or competition;

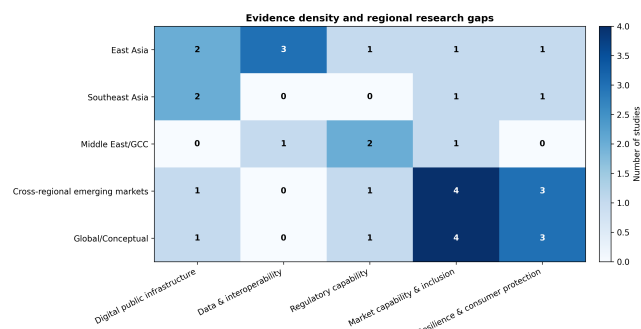


Figure 5. Evidence density by region and institutional pillar. Empty or low-count cells indicate priorities for future empirical work.

- rapid growth without resilience and consumer protection.

The evidence-density map in Figure 5 shows where research is concentrated and where it remains thin. Direct Middle Eastern work on public infrastructure, interoperability, and consumer protection is particularly limited. Southeast Asian evidence on adaptive regulation also requires expansion.

8. INSTITUTIONAL READINESS FRAMEWORK

The synthesis supports a five-pillar framework in which readiness is a system property. No pillar is sufficient alone, and weakness in one can neutralize investment in the others.

8.1 Pillar 1: universal and contestable digital rails

Governments should ensure reliable identity, connectivity, and payment access while avoiding infrastructure that locks users into a single provider. Core rails should support broad participation, low-cost transactions, and fair access for regu-

lated innovators.

8.2 Pillar 2: governed interoperability

Interoperability should be based on explicit standards for consent, authentication, data minimization, liability, audit logs, and revocation. A phased approach is preferable: begin with low-risk account and payment data, evaluate harm and competition effects, then expand to credit, insurance, and investment data.

8.3 Pillar 3: regulation that learns and scales

Regulatory experimentation should have defined hypotheses, consumer safeguards, evaluation criteria, and exit pathways. Lessons should feed into licensing rules, supervisory guidance, and shared technical standards. Regional cooperation can reduce duplication through common testing templates and reciprocal recognition of selected controls.

8.4 Pillar 4: capabilities and inclusive market formation

Readiness requires capable institutions, viable innovators, informed users, and accessible products. Public policy should combine digital and financial literacy with support for SME adoption, local-language design, accessible interfaces, and measurement of distributional outcomes. Competition indicators should be monitored alongside adoption.

8.5 Pillar 5: embedded resilience and redress

Cybersecurity, operational continuity, model risk, fraud controls, pricing transparency, and complaint resolution should be tested before scale. Consumer protection must cover automated decisions and cross-border services. Stability monitoring should include network and spatial spillovers, not only institution-level risk.

8.6 A complementarity condition

Let I , D , R , M , and S denote the effective maturity of infrastructure, data interoperability, regulation, market capability, and safeguards. A simple representation of trustworthy scaling is:

$$T = A \times (IDRMS)^{1/5},$$

where A is the level of technological adoption. The multiplicative form captures a practical reality: very low maturity in one pillar constrains the total value of high adoption and investment elsewhere. This is a conceptual diagnostic, not an estimated production function.

9. IMPLEMENTATION PATHWAYS FOR ASIA AND THE MIDDLE EAST

9.1 National sequencing

A four-stage sequence follows from the framework:

Stage 1: Foundation. Establish identity, payments, connectivity, baseline cyber controls, and measurable inclusion objectives.

Stage 2: Interoperability. Introduce common APIs, consent standards, data portability, and clear liability allocation.

Stage 3: Controlled scaling. Link sandboxes and innova-

tion offices to licensing, supervisory technology, and post-market monitoring.

Stage 4: Outcome governance. Evaluate competition, inclusion quality, over-indebtedness, resilience, and distributional effects; revise rules using observed outcomes.

Countries should not treat these stages as strictly linear. Advanced markets may operate across all four, but the sequence helps identify missing complements. For example, an open-finance mandate introduced before consent enforcement and API reliability can increase operational risk without creating effective competition.

9.2 An ASEAN-GCC corridor model

A practical cross-regional application is an ASEAN-GCC digital-finance corridor focused initially on remittances and SME trade. The corridor could be developed through five modules:

1. interoperable electronic know-your-customer assertions with local control over source identity data;
2. standardized payment and invoice APIs for regulated participants;
3. a mutual testing protocol for sandboxed cross-border services;
4. shared minimum rules for fraud reporting, redress, and service continuity;
5. an evaluation dashboard covering cost, speed, access, failed transactions, complaints, and concentration.

The corridor should begin with a narrow set of use cases and providers. Expansion would depend on verified reductions in cost and friction without deterioration in fraud, complaints, or market concentration. This model is more realistic than immediate regulatory harmonization because it builds interoperability around defined transactions and measurable controls.

10. RESEARCH AGENDA

Future work should move beyond adoption counts and broad national indexes. Table 3 sets out designs that can test the institutional mechanisms identified in this review.

Three methodological improvements are especially important. First, studies should distinguish availability, adoption, active use, and welfare outcomes. Second, causal designs should exploit phased reforms, licensing changes, and infrastructure rollouts. Third, regional research should use comparable definitions and outcome measures so that cross-country learning does not depend on incompatible national indexes.

11. DISCUSSION

The review changes how we read financial innovation in three ways, it kinda sounds simple at first but then it doesn't. First, it rejects a simple diffusion model where, more adoption is automatically presumed to be better. Adoption becomes an amplifier it magnifies both the strengths and weaknesses of the institutional environment, so it is not just "good spread"

Table 3. Priority research agenda for Asia and the Middle East

Research priority	Core question	Recommended design	Priority setting
Post-sandbox outcomes	Do sandbox participants reach authorization, scale safely, and generate supervisory learning?	Longitudinal participant-control comparison with post-exit tracking	GCC, Singapore, ASEAN
Open-finance distribution	Who gains from data portability, and does it reduce concentration?	Difference-in-differences around phased API mandates; provider and user heterogeneity	GCC and advanced Asian markets
Digital-credit welfare	When does easier credit improve resilience rather than produce debt stress?	Linked transaction-credit-household panels with shock analysis	China, Indonesia, India, MENA
Cross-border interoperability	Which identity, consent, and liability standards reduce remittance and SME-trade friction?	Corridor pilots with pre-registered cost, failure, fraud, and complaint metrics	ASEAN-GCC corridors
Vulnerable-user inclusion	Do products improve effective use among migrants, women-owned firms, older users, and rural households?	Mixed-method field studies with accessibility and re-dress outcomes	GCC, MENA, South and South-east Asia
Systemic spillovers	How do platform, bank, and cross-border dependencies transmit operational and liquidity shocks?	Network stress tests and spatial econometrics using supervisory and market data	Regional financial centers
AI accountability	Can explanations, human review, and bias controls improve credit outcomes without excluding thin-file users?	Field experiments and algorithmic audits with subgroup performance reporting	Asia and Middle East
Green digital finance	Can digital data and FinTech channels improve credible sustainable-finance allocation for SMEs?	Loan-level and firm-level quasi-experiments with verified environmental outcomes	ASEAN and GCC transition sectors

thinking, more adoption can also amplify bad setups. Second, it puts interoperability and consumer protection right at the center, not as kind of secondary compliance matters you tack on later. Third, it shows that regional transfer needs mechanism matching, and that's the big point really: a sandbox design, a credit model, or a payment platform can only be transferred when the receiving market has compatible identity systems, data rules, supervisory capacity, and user protections.

The findings also qualify the more upbeat accounts of digital inclusion. Research pretty consistently reports improvements in access, growth, SME finance, and poverty reduction [6, 11, 10, 4]. Still, inclusion is not inherently stable, nor automatically welfare-improving. Debt stress, risk-taking, exclusion via data and capability constraints, plus cross border spillovers stay as credible countervailing effects [15, 1, 28, 26]. So policy evaluation should lean on a balanced scorecard, instead of relying on a lone adoption measure or an account ownership statistic, as if that alone tells the whole story.

For financial institutions, the framework implies that technology investment should be judged against integration and governance capability. Banks that digitize front end services while not modernizing data architecture, model governance, and resilience might end up with visible innovation but not durable productivity. FinTech firms, same idea, need practical routes toward licensing, interoperable infrastructure, and credible consumer protection if they want to go past pilot scale, because otherwise the "launch" doesn't really turn into long term performance.

12. LIMITATIONS

This review has four limitations. First, it is a structured integrative review, not a statistical meta-analysis, as the outcome measures and research designs are too heterogeneous to permit a defensible pooled estimate. Secondly, the corpus is biased towards studies with direct institutional and regional relevance and is not claimed to represent all publications on digital finance. Third, the volume of publications does not imply the maturity of policies and thus the regional descriptive figures should not be interpreted as national rankings. Fourth, some Middle Eastern reforms are recent, and peer-reviewed evidence on outcomes lags policy implementation. These limitations do not weaken the institutional interpretation, but rather emphasize the need for transparent longitudinal evaluation.

13. CONCLUSION

Asia and the Middle East are entering a phase where the central financial-innovation question is not really whether digital technologies can scale, but rather can they scale and keep trust, inclusion, competition and stability at the same time. The reviewed evidence sort of suggests that results hinge on five complements, digital public infrastructure, governed data interoperability, adaptive regulation, market capability, and something like embedded resilience with consumer protection.

Asia shows pretty strong evidence on scaling, and also on socioeconomic outcomes, but it also brings out risks like concentration, uneven capability, and frictionless debt. The Middle East, meanwhile, demonstrates the force of coordinated regulatory modernization, and at the same time it points to the need for wider inclusion, interoperability, and independent evaluation of outcomes. The proposed framework and

the ASEAN-GCC corridor model take these lessons and turn them into a more practical sequence.

Trustworthy digital finance is not just the product of technology alone. It comes from institutions that make innovation usable, contestable, accountable, and resilient.

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