The Rise of Emerging Markets in the Digital Age: Leapfrogging, Disruption and the Governance of Inclusive Digital Growth

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ABSTRACT

The rise of emerging markets in the digital age represents a structural reordering of the global economic landscape rather than a peripheral catching-up story. This paper examines the rapid digital transformation under way in these markets and analyses how technological advances — mobile internet, financial technology, e-commerce and multi-sided digital platforms — have simultaneously empowered firms and consumers. Drawing on an integrative review of scholarly literature and a synthesis of secondary evidence from the World Bank Global Findex, the GSMA, UN Trade and Development (UNCTAD) and national payment authorities, the paper argues that emerging economies are not merely adopting technologies developed elsewhere but are generating institutionally distinctive models of digital growth. Four drivers are identified: mobile-first connectivity, the mobile money and fintech revolution, platform-mediated commerce, and state-sponsored digital public infrastructure. Comparative evidence from India, Kenya, Brazil, Indonesia and Nigeria demonstrates that leapfrogging is real but conditional: it occurs where affordable connectivity, interoperable payment rails and permissive-yet-supervised regulation coincide. The paper also documents the constraints on this transformation. Although 96 per cent of the world's population lives within mobile broadband coverage, some 3.1 billion people who could connect do not, producing a usage gap driven by device cost, digital literacy, gender norms and locally irrelevant content. Data protection regimes remain uneven, platform concentration raises questions about where digital value is captured, and the emerging artificial intelligence divide threatens to reproduce old asymmetries in a new form. The paper contributes a Digital Leapfrogging Readiness framework organised around four interdependent conditions — infrastructural, institutional, capability and content conditions — and derives five strategic imperatives for firms competing in these markets. It concludes that the developmental promise of emerging-market digitalisation depends less on the pace of technology adoption than on the quality of the governance arrangements built around it.

Keywords: emerging markets; digital transformation; technological leapfrogging; financial inclusion; digital public infrastructure; fintech; platform economy; digital divide

INTRODUCTION

For most of the post-war period, the diffusion of technology followed a familiar geography. Innovations originated in advanced industrial economies, matured in their home markets, and arrived in lower-income countries years or decades later in adapted, simplified or second-hand form. Development theory largely accepted this sequence, treating late industrialisers as imitators whose task was to close a gap defined elsewhere. The digital era has disturbed that assumption. Over the past fifteen years, a set of economies conventionally labelled emerging — India, Brazil, Indonesia, Kenya, Nigeria, Vietnam, the Philippines and others — have become sites of digital innovation whose scale, architecture and social reach are, in several domains, without precedent in high-income countries.

The evidence is no longer anecdotal. India's Unified Payments Interface processed 23.66 billion transactions in a single month in July 2026, worth approximately ₹29.88 lakh crore, at an average of 763 million transactions per day. Globally, more than two trillion United States dollars flowed through mobile money wallets in 2025, a

figure that took twenty years to reach its first trillion and only four further years to double, with sub-Saharan Africa accounting for roughly two-thirds of that value. Worldwide account ownership at a bank or mobile money provider has reached 79 per cent of adults, and 75 per cent in low- and middle-income economies, up from 51 per cent globally in 2011. These are not marginal adjustments to an existing financial order; they describe the construction of parallel financial infrastructures at national scale, in economies where conventional banking had failed to reach the majority for a century.

Yet the same period has produced a second, less celebratory body of evidence. Mobile broadband networks now cover 96 per cent of the world's population, but 3.1 billion people — 38 per cent of humanity — live within that coverage and do not use it. The binding constraint has shifted from infrastructure to affordability, literacy, relevance and trust. Digitally deliverable services accounted for more than 60 per cent of services exports in advanced economies in 2024 but only 15 per cent in least developed countries. Fewer than one third of developing countries have a national artificial intelligence strategy. The digital age is therefore producing convergence and divergence simultaneously, and often within the same country.

This paper addresses the resulting analytical problem. If emerging markets are both leaders and laggards in digital transformation, the useful question is not whether they are catching up but under what conditions digital technologies translate into broad-based economic participation rather than into a new axis of exclusion. Three research questions organise the analysis. First, what are the principal drivers of digital transformation in emerging markets, and how do they differ from the drivers observed in advanced economies? Second, what does comparative evidence reveal about the conditions under which leapfrogging occurs, and where it fails to occur? Third, what strategic and regulatory responses follow for firms and policymakers operating in these environments?

The paper proceeds in eight further sections. Section II reviews the theoretical literature on leapfrogging, institutional voids, market-creating innovation and platform economics, and identifies the gap this study addresses. Section III sets out the integrative review methodology and its limitations. Section IV analyses four drivers of transformation. Section V presents comparative case evidence. Section VI assesses socio-economic impacts. Section VII examines the constraints and risks. Section VIII develops the Digital Leapfrogging Readiness framework and derives strategic implications. Section IX concludes.

CONCEPTUAL FOUNDATIONS AND LITERATURE REVIEW

A. Emerging markets as an analytical category

The term emerging market has always been more useful commercially than analytically. Khanna and Palepu (2010) offered the most durable conceptual anchor by defining emerging markets not by income level but by the presence of institutional voids — absent or unreliable intermediaries for information, contract enforcement, credit assessment, logistics and consumer redress. Firms in such settings must either supply the missing intermediation themselves or design business models that do not require it. This framing matters for the present analysis because digital technologies are, in essence, intermediation technologies. Where institutional voids are deep, the marginal value of a technology that reduces search, verification, transaction and enforcement costs is correspondingly high. That asymmetry, rather than any cultural enthusiasm for novelty, explains much of the adoption differential observed between emerging and mature markets.

B. Leapfrogging: promise and qualification

Leapfrogging describes the possibility that a late adopter bypasses an intermediate technological generation and adopts a frontier technology directly. Steinmueller (2001) provided the foundational treatment for information and communication technologies, arguing that leapfrogging is feasible but contingent on complementary capabilities rather than automatic. Subsequent empirical work has broadly confirmed both halves of that claim. Aker and Mbiti (2010) documented the welfare effects of mobile telephony in Africa in the absence of fixed-line infrastructure. Hjort and Poulsen (2019) exploited the staggered arrival of submarine fibre-optic cables to show substantial positive employment effects across African countries, with gains concentrated among more

skilled workers. Bahia and colleagues (2020) found significant consumption and poverty effects from mobile broadband expansion in Nigeria and Tanzania.

The qualification is equally well established. Leapfrogging in the adoption of a device does not imply leapfrogging in the capability to produce, adapt or govern it. Banga and te Velde (2018) warned that digitalisation could erode the labour-cost advantage on which African manufacturing strategies depend. The literature therefore supports a conditional rather than a triumphalist reading: leapfrogging is an available outcome, not a default one.

C. Market-creating innovation and the base of the pyramid

Prahalad (2005) reframed low-income populations as underserved consumers rather than aid recipients, arguing that unit-cost innovation could open markets previously dismissed as unviable. Christensen, Ojomo and Dillon (2019) sharpened this into the concept of market-creating innovation: innovations that make a product affordable and accessible to non-consumers generate their own infrastructure, employment and institutional demand. Digital services fit this description with unusual precision, because their marginal cost of service delivery approaches zero once network and platform infrastructure exist. The empirical record of mobile money is the strongest available validation of the thesis, though it also exposes its limits, since market creation at scale has depended heavily on regulatory permission rather than on entrepreneurial ingenuity alone.

D. Platform economics and network effects

Multi-sided platform theory (Eisenmann, Parker and Van Alstyne, 2006; Parker, Van Alstyne and Choudary, 2016) explains why digital intermediaries in emerging markets tend towards concentration and towards bundling. Where institutional voids are pervasive, a platform that solves one coordination problem accumulates the trust, identity and payment data required to solve adjacent ones, which accounts for the prevalence of super-apps in Asia and increasingly in Africa and Latin America. Nambisan, Zahra and Luo (2019) argue that global platforms unsettle conventional international business theory because platform-based firms internationalise through ecosystem participation rather than through staged resource commitment. Nambisan (2017) similarly reconceptualises digital entrepreneurship as a process in which both the entrepreneurial agent and the venture outcome are less bounded than traditional models assume. Applied to emerging markets, these perspectives predict rapid scaling, unstable competitive boundaries, and a persistent tension between the efficiency of concentration and the distributional consequences of it.

E. Digital public infrastructure

A more recent literature examines digital public infrastructure: state-sponsored, interoperable, open-protocol layers for identity, payment and consented data exchange. D'Silva, Filková, Packer and Tiwari (2019) analysed the Indian case for the Bank for International Settlements, identifying the sequencing of digital identity, then payments, then data portability as the mechanism by which private innovation was made possible on public rails. Carrière-Swallow, Haksar and Patnam (2021) extended this to open-banking implications for financial inclusion. The literature remains descriptive and heavily India-centric, and comparative theorisation is underdeveloped. Ozili (2018) and Gomber and colleagues (2018) situate these developments within the broader fintech literature, noting that inclusion gains and stability risks tend to arrive together.

F. The digital divide, reconceived

Van Dijk (2020) advanced the field beyond binary access measures by distinguishing motivational, material, skills and usage access. This multi-level conception is directly relevant to the contemporary usage gap, which is not an infrastructure problem and cannot be solved by infrastructure spending. Zuboff (2019) raises a distinct concern about the extractive logic of data accumulation, which has particular force in jurisdictions where data protection regimes are nascent and enforcement capacity is thin.

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G. Research gap

Three gaps emerge. First, the leapfrogging and digital divide literatures have developed largely in parallel, so that accounts of emerging-market digital success rarely integrate the evidence on non-adoption within the same economies. Second, the digital public infrastructure literature is dominated by single-country description and lacks a comparative analytical frame. Third, the strategic management literature offers limited guidance for firms operating where the payment layer, the identity layer and the regulatory posture are themselves in flux. This paper responds by synthesising adoption and exclusion evidence within a single framework and by deriving strategic implications from it.

METHODOLOGY

This study employs an integrative literature review combined with a synthesis of secondary quantitative evidence and purposively selected comparative cases. The integrative review method is appropriate where the objective is to generate a conceptual framework from a body of mature but fragmented scholarship rather than to estimate an effect size, and where relevant evidence is distributed across peer-reviewed articles, multilateral statistical reports and regulatory publications that a conventional systematic review protocol would exclude.

Three evidence streams were assembled. The first comprised peer-reviewed scholarship in development economics, information systems, international business and strategy, identified through Scopus, Web of Science and Google Scholar using combinations of the search terms emerging markets, digital transformation, leapfrogging, mobile money, fintech, digital public infrastructure and digital divide, restricted to English-language publications from 2001 to 2026. Seminal earlier works were retained where they remain foundational. The second stream comprised authoritative institutional data, principally the World Bank Global Findex Database 2025, the GSMA State of Mobile Internet Connectivity 2025 and State of the Industry Report on Mobile Money 2026, UNCTAD's Technology and Innovation Report 2025 and Digital Economy Report 2025, and monthly statistics published by the National Payments Corporation of India. The third stream comprised regulatory and central bank documentation for the case economies.

Five cases were selected purposively on the basis of maximum variation across three dimensions: the locus of innovation (state-led, operator-led or platform-led), regional context, and observed outcome. India, Kenya, Brazil, Indonesia and Nigeria satisfy these criteria while offering sufficient documentary depth for comparison. Case evidence was coded thematically against the four drivers identified in Section IV and the four readiness conditions developed in Section VIII.

Three limitations should be stated at the outset. First, the study relies on secondary data and therefore inherits the definitional and measurement conventions of the originating institutions; account ownership, active usage and internet use are operationalised differently across sources and are not strictly comparable. Second, purposive case selection introduces the possibility of selection on the dependent variable, since the most documented cases are frequently the most successful; Section VII partially offsets this by examining constraint and failure. Third, the field is moving quickly enough that headline figures reported here will date, though the structural relationships the paper identifies are expected to prove more durable than the values attached to them.

DRIVERS OF DIGITAL TRANSFORMATION IN EMERGING MARKETS

A. Mobile-first connectivity and the compression of the adoption curve

The foundational driver is that emerging markets became connected through mobile devices rather than through fixed-line infrastructure. This is not merely a difference in hardware. Fixed-line telephony and broadband required household-level capital investment, formal addressing, creditworthiness assessment and long installation cycles — precisely the institutional apparatus that was missing. Mobile connectivity required none of these, and prepaid billing removed the credit relationship entirely. The consequence was an adoption curve compressed into roughly fifteen years for a transition that took advanced economies half a century.

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The current position is one of near-universal coverage with substantially incomplete use. As of 2025, 4.7 billion people, or 58 per cent of the world's population, used mobile internet on their own device, an increase of 200 million during 2024, while 96 per cent of the global population lived within mobile broadband coverage. Approximately 300 million people, four per cent of the world, remain outside any coverage, concentrated in least developed countries, landlocked developing countries and small island developing states where the economics of deployment are least favourable. Average global data consumption reached 16 gigabytes per connection per month in 2024, but monthly usage in least developed and landlocked developing countries remained at three to four gigabytes, and average download speeds, while rising from 51 to 64 megabits per second globally, remain sharply stratified by income. Device affordability is now the operative constraint: the GSMA has argued that a thirty-dollar handset would bring connectivity within reach of as many as 1.6 billion people currently priced out of networks already passing their homes.

B. Mobile money and the fintech reconstruction of financial access

The second driver is the construction of financial infrastructure outside the banking system. Mobile money originated in East Africa in the late 2000s as a mechanism for domestic remittance and has since become a general-purpose financial platform. The scale is now systemic rather than supplementary. Registered mobile money accounts reached 2.3 billion globally in 2025, growing by 268 million during the year, while monthly active accounts rose 15 per cent to 593 million, the strongest growth since 2021. Transaction values exceeded two trillion dollars in 2025, of which approximately 1.4 trillion was transacted in sub-Saharan Africa, a region accounting for over half of all accounts and around two-thirds of global transaction value. Merchant payments, at roughly 155 billion dollars, were the fastest-growing category.

The causal evidence for welfare effects is unusually strong for a development intervention of this kind. Jack and Suri (2014) demonstrated that mobile money improved risk-sharing by reducing the transaction costs of informal transfers, so that households with access were better able to smooth consumption after a negative shock. Suri and Jack (2016) subsequently estimated that access to M-Pesa lifted approximately 194,000 Kenyan households, some two per cent of the population, out of poverty, with effects concentrated among female-headed households and associated with occupational shifts from subsistence agriculture into business activity. Beck and colleagues (2018) linked payment instrument availability to firm-level credit access and entrepreneurship.

The broader financial inclusion picture confirms the mechanism. Global account ownership stood at 79 per cent of adults in 2024, up from 74 per cent in 2021 and 51 per cent in 2011, with 75 per cent in low- and middle-income economies. Forty per cent of adults in developing economies saved formally in 2024, a sixteen-percentage-point increase since 2021 and the fastest rise in over a decade. More than 60 per cent of adults in low- and middle-income economies made or received digital payments, an increase of 27 percentage points from 2014. The gender gap in account ownership narrowed to four percentage points globally, with 81 per cent of men and 77 per cent of women holding accounts. Nevertheless, 1.3 billion adults remain without an account, and half of them live in only eight economies.

C. Platform-mediated commerce

The third driver is the platformisation of exchange. In economies where organised retail penetration is low, logistics are fragmented and consumer redress mechanisms are weak, digital marketplaces supply not only a storefront but the trust infrastructure that makes distance commerce possible: ratings, escrow, standardised returns and, critically, cash-on-delivery settlement during the transitional period before digital payment trust matured. The distinctive emerging-market variants are social commerce, in which transactions are conducted through messaging platforms and creator networks rather than through dedicated marketplaces, and the super-app, in which payment, messaging, mobility, delivery and credit are bundled within a single interface.

The bundling logic is economic rather than aesthetic. Each additional service reduces customer acquisition cost for the next, and every transaction generates behavioural data usable for credit underwriting in populations without formal credit histories. Kshetri (2016) documented this mechanism in the Chinese case, where transaction and behavioural data substituted for bureau data in extending credit to previously unscoreable borrowers. The same logic now operates in Southeast Asia, India, Latin America and West Africa. The strategic

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consequence is that competitive advantage accrues less to product quality than to control of the data-generating layer.

D. Digital public infrastructure and the state as platform architect

The fourth driver distinguishes the current period most sharply from earlier waves of technology diffusion. In several major emerging economies the state has acted not as a regulator of privately built digital infrastructure but as the architect of open, interoperable public rails on which private firms compete. The Indian sequence — a biometric digital identity system, then a bank-agnostic real-time payment protocol, then a consent-based data-sharing architecture — is the most developed instance, and D'Silva and colleagues (2019) argue that its significance lies in the deliberate separation of the infrastructure layer from the application layer, which prevented the payment rail from becoming the property of whichever firm reached scale first.

The comparative significance is that this represents an institutional innovation rather than a technological one, and institutional innovations are in principle transferable. Brazil's central-bank-operated instant payment system and its rapid displacement of card and cash transactions demonstrate that the model is not culturally specific to India. The counter-consideration is that digital public infrastructure concentrates population-scale data and identity functions in state hands, and the safeguards that make such concentration acceptable — independent oversight, judicially enforceable data rights, purpose limitation — are precisely the institutional capacities that are least developed in the settings where the infrastructure is being deployed fastest.

Table 1: Selected indicators of digital and financial adoption relevant to emerging markets

Indicator	Value	Source and reference year
Global mobile internet users	4.7 billion (58% of world population)	GSMA (2025), data for 2024
Mobile broadband coverage	96% of world population	GSMA (2025)
Usage gap (covered but not using)	3.1 billion people (38% of world population)	GSMA (2025)
Coverage gap	c. 300 million people (4%)	GSMA (2025)
Average mobile data use per connection	16 GB/month globally; 3–4 GB in LDCs and LLDCs	GSMA (2025), data for 2024
Global account ownership	79% of adults (75% in low- and middle-income economies)	World Bank Global Findex (2025), data for 2024
Adults without an account	1.3 billion; half in eight economies	World Bank Global Findex (2025)
Gender gap in account ownership	4 percentage points (81% men, 77% women)	World Bank Global Findex (2025)
Formal saving, developing economies	40% of adults, up 16 points since 2021	World Bank Global Findex (2025)

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Indicator	Value	Source and reference year
Registered mobile money accounts	2.3 billion globally	GSMA (2026), data for 2025
Monthly active mobile money accounts	593 million, up 15% year on year	GSMA (2026), data for 2025
Global mobile money transaction value	More than USD 2 trillion; USD 1.4 trillion in sub-Saharan Africa	GSMA (2026), data for 2025
UPI monthly transactions (India)	23.66 billion in July 2026; c. 763 million per day	NPCI (2026)
Digitally deliverable services as share of services exports	>60% advanced economies; 44% developing; 15% LDCs	UNCTAD (2025), data for 2024
Projected global AI market by 2033	c. USD 4.8 trillion	UNCTAD (2025)

Note. Figures are drawn from the most recent editions available at the time of writing. Definitions of account ownership, active usage and internet use differ across sources and are not strictly comparable.

COMPARATIVE CASE EVIDENCE

A. India: digital public infrastructure as national strategy

India offers the fullest realisation of the state-as-architect model. The Unified Payments Interface, launched in 2016 as an interoperable protocol permitting any application to initiate payment between any two bank accounts in real time, has become the dominant retail payment mechanism in the economy. Monthly volumes reached 23.66 billion transactions in July 2026, valued at roughly ₹29.88 lakh crore, representing year-on-year volume growth of approximately 22 per cent. The composition of that growth is analytically significant: transaction volumes are rising faster than transaction values, and average ticket sizes have declined, indicating that the system has moved from displacing high-value bank transfers to displacing small-denomination cash in everyday retail. Growth has been concentrated outside metropolitan areas. The protocol has also been extended internationally, with merchant acceptance live in several partner markets.

Two features distinguish the Indian case. The first is sequencing: identity infrastructure preceded payment infrastructure, which in turn preceded consented data portability, so that each layer resolved the precondition for the next. The second is the deliberate refusal to allow the payment rail to be owned by an application. Market share caps on individual applications, however imperfectly enforced, reflect an explicit policy judgement that infrastructure and competition should occupy different layers. This is the transferable insight, and it is institutional rather than technical.

B. Kenya: operator-led innovation under regulatory forbearance

Kenya remains the canonical leapfrogging case, and its lessons are frequently misread. The launch of M-Pesa in 2007 succeeded because a dominant mobile network operator possessed both an agent distribution network and a trusted brand in a market where bank branch density was low, and because the Central Bank of Kenya chose regulatory forbearance over the application of existing banking rules to a service it did not yet understand. The

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causal welfare evidence generated by this natural experiment (Jack and Suri, 2014; Suri and Jack, 2016) remains the strongest in the field.

The limitation of the model is that operator-led infrastructure is proprietary by default. Interoperability between providers arrived late and under regulatory pressure, and the resulting market structure has been persistently concentrated. Where India built a public rail and invited competition onto it, Kenya permitted a private rail and subsequently attempted to open it. Both routes produced inclusion; they differ in the distribution of the resulting economic rents.

C. Brazil: central bank as payment innovator

Brazil demonstrates that the digital public infrastructure model is not India-specific. An instant payment system designed and operated by the central bank, with mandatory participation for large institutions, achieved population-scale adoption within a few years and materially displaced both cash and card rails. Brazil has become the second-largest real-time payments market globally, though at a considerable distance behind India. The Brazilian case is instructive because the country entered the transition with a comparatively well-developed banking system, which contradicts the assumption that digital payment leapfrogging requires prior financial exclusion. What it required was a public actor willing to mandate interoperability against incumbent preference.

D. Indonesia and Southeast Asia: platform-led bundling

Southeast Asia illustrates the third pathway, in which private platforms rather than states or operators assemble the digital economy. Archipelagic geography, fragmented logistics and low pre-existing organised retail penetration created conditions in which ride-hailing platforms extended into payments, delivery, groceries and credit, producing regionally dominant super-apps. The advantage of the platform-led route is speed and capital efficiency, since private investment substitutes for public expenditure. The disadvantage is that the resulting infrastructure is privately owned, that competition takes the form of contests for market-wide dominance rather than competition within a market, and that the value generated accrues substantially to concentrated equity holders, frequently non-resident.

E. Nigeria: scale without settled governance

Nigeria supplies the necessary counter-case. It possesses Africa's largest population, a young and urbanising demographic, a fintech sector that has attracted significant venture funding, and rapid growth in digital payment volumes. It has nonetheless experienced repeated policy volatility, including abrupt monetary and currency interventions, uneven identity enrolment, and periods of severe operational strain on payment systems. Nigeria demonstrates that market size, entrepreneurial capacity and technological availability are jointly insufficient. Predictable regulation, reliable electricity and settled institutional arrangements are not background conditions to digital transformation; they are constitutive of it.

Table 2: Comparative profiles of five emerging-market digital pathways

Case	Locus of innovation	Core mechanism	Principal institutional enabler	Principal limitation
India	State-led	Open, interoperable payment protocol layered on digital identity	Deliberate separation of infrastructure and application layers	Data protection and oversight capacity lag deployment speed
Kenya	Operator-led	Agent network plus mobile wallet for domestic transfer	Regulatory forbearance during the formative period	Proprietary rail; late interoperability; concentrated market

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Case	Locus of innovation	Core mechanism	Principal institutional enabler	Principal limitation
Brazil	State-led	Central bank instant payment system with mandatory participation	Public authority to mandate interoperability	Incumbent resistance; fraud and consumer protection pressures
Indonesia and Southeast Asia	Platform-led	Super-app bundling of mobility, payment, commerce and credit	Large addressable market and deep venture capital supply	Private ownership of infrastructure; value capture concentrated
Nigeria	Mixed, unsettled	Fintech-led payments and remittance growth	Demographic scale and entrepreneurial density	Policy volatility; identity and power infrastructure gaps

Note. Classification reflects the dominant locus of innovation in each case and is not exclusive; all five cases exhibit mixed public and private contributions.

Read comparatively, the cases suggest that the locus of innovation shapes the distribution of gains more than the rate of adoption. State-led pathways were slower to originate but produced open infrastructure and dispersed rents. Operator-led and platform-led pathways moved faster but concentrated ownership of the resulting infrastructure. Nigeria indicates that where institutional predictability is absent, no locus of innovation compensates.

SOCIO-ECONOMIC IMPACTS

A. Financial inclusion and household resilience

The best-evidenced impact operates through the reduction of transaction costs in informal risk-sharing networks. Because digital transfers permit small, immediate, low-cost remittances across distance, households can draw on a wider network when a shock occurs, which raises effective insurance without any formal insurance product (Jack and Suri, 2014). The associated poverty and occupational effects (Suri and Jack, 2016) suggest that the mechanism extends beyond consumption smoothing to changes in economic activity, particularly for women. The Findex evidence that formal saving in developing economies rose sixteen percentage points between 2021 and 2024 indicates that the effect now extends to asset accumulation rather than payments alone.

B. Micro-enterprise formalisation and credit

Digital acceptance generates a verifiable transaction record for merchants who previously had none. That record functions as collateral substitute, enabling cash-flow-based lending to enterprises that no credit bureau could score. This is the most economically consequential second-order effect of payment digitalisation, and it explains why merchant payments have been the fastest-growing mobile money category. It also carries risk: algorithmic lending against transaction data has produced episodes of over-indebtedness in several markets, and the regulatory apparatus for digital credit conduct is generally less developed than that for digital payments.

C. Labour markets and the platform economy

Platform-mediated work has created substantial income opportunities in economies with high informal employment, while also formalising a form of precarity. Hjort and Poulsen (2019) found that fast internet arrival raised employment overall in the African countries studied, with larger gains for more skilled workers, indicating that connectivity is not distributionally neutral. UNCTAD (2025) estimates that artificial intelligence could affect as much as 40 per cent of global employment and warns that automation favouring capital over labour would

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erode the low-cost labour advantage on which many emerging economies have built their development strategies.

D. Gender

The gender dimension is genuinely ambiguous. The global gender gap in account ownership has narrowed to four percentage points, and meaningful gaps persist in 65 low- and middle-income economies but are narrowing in nearly all of them. At the same time, women are less likely to own a handset, less likely to use mobile internet where they do own one, and less likely to use device security measures. Digital financial services have therefore reduced one gap while a prior gap in device access and digital confidence continues to mediate who benefits.

E. Public service delivery

Digital identity and payment infrastructure have enabled direct benefit transfer at national scale, reducing leakage in subsidy delivery and permitting rapid emergency disbursement, a capability that proved consequential during the pandemic period. The same infrastructure raises exclusion risks where biometric authentication fails, connectivity is intermittent or enrolment is incomplete, and the populations most likely to be affected are those most dependent on the transfer.

CONSTRAINTS, RISKS AND UNRESOLVED PROBLEMS

A. The usage gap as the defining challenge

The single most important corrective to optimistic accounts is that coverage is no longer the binding constraint. With 96 per cent of the world covered and 3.1 billion covered people not connecting, the problem has migrated from supply to demand and from capital expenditure to the far harder terrain of affordability, literacy, relevance, safety and social permission. Infrastructure programmes cannot close a gap of this composition, and the policy instruments that can — device financing, handset taxation reform, vernacular content investment, digital literacy provision, and interventions addressing gendered norms around device ownership — are institutionally more demanding and politically less visible than network construction.

B. Affordability and device economics

The internet-enabled handset is now the principal gatekeeper. Import duties, luxury classification of devices in several tax codes, and the absence of consumer credit for handset purchase interact to place connectivity beyond reach for populations already within network range. This is a solvable problem with identifiable instruments, and its persistence reflects the low political salience of device affordability relative to network coverage targets.

C. Data protection and the governance deficit

Digital transformation in emerging markets has generally outpaced the construction of the legal and institutional apparatus required to govern it. Comprehensive data protection statutes have been enacted across much of the developing world in recent years, but enactment and enforcement diverge sharply, and supervisory authorities are frequently under-resourced, under-staffed and insufficiently independent of the executive. Where the state is simultaneously the architect of identity infrastructure and the supervisor of its use, the conflict is structural. Zuboff's (2019) analysis of data extraction acquires additional force in jurisdictions with weak enforcement, because the constraint on extractive practice is, in practice, regulatory capacity rather than law on the books.

D. Concentration and the location of value capture

Developing countries exported approximately 1.1 trillion dollars in digital services in 2024, roughly a fifth of the global total. Around 75 per cent of foreign direct investment to developing economies now flows to only ten countries, and capital is clustering into a narrow set of technology-adjacent sectors. Platform concentration compounds this: where the dominant platform, the cloud infrastructure it runs on and the equity that owns it are all non-resident, the domestic economy may capture the consumer surplus and the employment while the

economic rent accrues elsewhere. This is the central unresolved political economy question of emerging-market digitalisation, and it is not resolved by adoption statistics.

E. Fraud and consumer protection

Fraud has scaled with the systems. Nearly one in five phone owners in low- and middle-income economies has received an unsolicited message from an unknown sender, and social-engineering fraud on instant payment rails has become a systemic consumer protection concern precisely because irrevocable real-time settlement removes the reversal mechanisms that card systems provide. Transaction taxes imposed on mobile money in several jurisdictions, generally for revenue reasons, have additionally been shown to suppress usage among precisely the low-value users whose inclusion the systems were designed to achieve. Roughly three-quarters of registered mobile money accounts remain inactive on a monthly basis, which is a reminder that registration is a weak proxy for inclusion.

F. The emerging artificial intelligence divide

The most consequential risk is that the next technological wave reproduces the asymmetries the last one partially dissolved. UNCTAD (2025) projects an artificial intelligence market of approximately 4.8 trillion dollars by 2033 while reporting that one hundred firms, predominantly in the United States and China, account for 40 per cent of global private research and development investment, that the United States alone captures around 70 per cent of global private AI investment, and that 118 countries, largely in the Global South, are absent from global AI governance processes. Fewer than one third of developing countries have a national AI strategy. Unlike mobile telephony, frontier AI capability has substantial fixed-cost requirements in compute, energy and specialised talent that do not lend themselves to leapfrogging. The realistic strategy for most emerging economies is therefore adaptation and application at the deployment layer rather than competition at the frontier, combined with assertive participation in governance forums where the rules of access are being set.

G. Regulatory lag and the sequencing problem

Regulators face a genuine dilemma rather than a failure of diligence. Premature regulation of an unfamiliar service can foreclose an innovation, as would have occurred had Kenyan authorities applied banking rules to M-Pesa in 2007. Delayed regulation permits the accumulation of systemic risk and entrenched market power that later intervention cannot easily unwind. The regulatory sandbox is the standard institutional response, and it is a partial one: sandboxes address the entry problem while leaving the exit problem — what happens when a sandboxed service reaches systemic scale — largely unresolved.

THE DIGITAL LEAPFROGGING READINESS FRAMEWORK AND STRATEGIC IMPLICATIONS

The comparative evidence supports a conditional model of digital leapfrogging. Synthesising the case material against the literature, four interdependent conditions appear jointly necessary. The framework is offered as an analytical and diagnostic device rather than as a measurement instrument.

Infrastructural conditions. Affordable, reliable connectivity and, critically, affordable devices, supported by adequate electrical supply. Coverage without affordability produces the usage gap; connectivity without power produces intermittent participation.

Institutional conditions. Predictable and proportionate regulation, interoperability requirements, functioning identity infrastructure, enforceable data rights, and consumer redress. The Nigerian case indicates that these are constitutive rather than supplementary.

Capability conditions. Digital and financial literacy in the population, technical and managerial skills in firms, and supervisory and technical capacity in the state. Van Dijk's (2020) skills-access dimension operates at all three levels, and the state-capacity component is the most frequently neglected.

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Content and relevance conditions. Services in local languages addressing locally salient problems, delivered through trusted channels. A substantial share of non-adoption among covered populations reflects an accurate assessment that available services are not worth their cost, not a deficit of aspiration.

The conditions are interdependent and, in the observed cases, behave multiplicatively rather than additively: near-zero performance on any one condition suppresses returns to investment in the others. This explains the otherwise puzzling pattern in which substantial infrastructure investment yields disappointing adoption, and it implies that sequencing and balance matter more than aggregate expenditure.

A. Strategic implications for firms

Five imperatives follow for firms competing in these environments.

Table 3: Strategic imperatives for firms in digitalising emerging markets

Imperative	Rationale	Illustrative practice
Design for the constraint, not the exception	Intermittent connectivity, low-specification devices, shared handsets and prepaid data are the modal conditions, not edge cases	Offline-capable and low-bandwidth clients; lightweight applications; feature-phone and voice channels; data-light media
Build on public rails rather than around them	Where open payment and identity infrastructure exists, proprietary alternatives incur cost without defensible advantage	Native integration with national payment protocols and consent-based data-sharing frameworks
Treat trust as the scarce input	In settings with weak formal redress, adoption is gated by perceived safety rather than by product features	Transparent pricing; visible dispute resolution; fraud reimbursement policy; local-language support; human-assisted onboarding
Localise the problem, not merely the interface	Translation without redesign fails where the underlying use case does not match local economic organisation	Vernacular voice and video interfaces; cash-in and cash-out agent networks; assisted-use models; informal-sector workflow design
Anticipate the regulatory transition	Forbearance is a phase, not a settlement; systemic scale reliably attracts supervision	Early investment in compliance, data governance and interoperability capability; constructive regulatory engagement before intervention

B. Implications for policy

For policymakers, the analysis suggests four priorities. First, reorient digital inclusion policy from coverage towards usage, which means addressing device affordability, handset taxation, digital literacy and content relevance rather than announcing further coverage targets. Second, treat interoperability as a public good and mandate it before, not after, a dominant private rail becomes entrenched, since the Kenyan and Indian sequences differ chiefly in the timing of this decision. Third, build supervisory capacity concurrently with infrastructure, because a data protection statute without an adequately resourced and genuinely independent authority is a signalling device rather than a safeguard. Fourth, participate assertively in international AI and data governance

processes, since the absence of 118 countries from those forums is a governance failure with distributional consequences that will compound over the coming decade.

CONCLUSION

The rise of emerging markets in the digital age is a genuine structural transformation, and the evidence assembled here does not support scepticism about its scale. Population-scale payment systems processing tens of billions of monthly transactions, mobile money flows exceeding two trillion dollars annually, and account ownership rising from half to nearly four-fifths of the world's adults within thirteen years describe changes in the organisation of economic life that were not anticipated by the development literature of the 1990s and that have no analogue in the diffusion history of earlier technologies.

The central argument of this paper, however, is that the transformation is conditional and that its most important variable is institutional rather than technological. The comparative evidence indicates that where the transformation has produced broad-based participation, it has done so because interoperability was mandated, infrastructure was separated from application, regulation was proportionate and predictable, and the state possessed sufficient capacity to supervise what it had enabled. Where those conditions were absent, the same technologies produced adoption without inclusion, or scale without stability. Nigeria and Kenya were not distinguished by their technology; they were distinguished by their institutions.

The unresolved problems are correspondingly institutional. The usage gap of 3.1 billion people is a problem of affordability, literacy, relevance and trust, not of network engineering. The governance deficit is a problem of supervisory capacity, not of legislative drafting. The concentration question concerns where the economic rent generated by digital activity ultimately settles, and adoption statistics are silent on it. The AI divide threatens to reproduce, in a technology far less amenable to leapfrogging, the asymmetries that mobile connectivity partially dissolved.

For scholarship, three directions follow. The digital public infrastructure literature requires comparative rather than single-country theorisation, so that the transferable elements of the Indian and Brazilian experiences can be distinguished from their nationally specific ones. The usage gap requires more demand-side research on why covered populations decline to connect, an area where the survey evidence remains thinner than the infrastructure data. And longitudinal work is needed on where the value generated by emerging-market digital activity is ultimately captured, since that question determines whether digitalisation constitutes development or a more efficient form of extraction. The framework proposed here is offered as an analytical starting point for that work and invites empirical operationalisation and testing.

The digital age has demonstrated that emerging markets can innovate at the frontier rather than follow at a distance. Whether that capacity translates into shared prosperity depends on decisions that are political and institutional in character. Technology has already proved willing to travel. Governance is the constraint that has not yet been resolved.

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