

Bridging the Financial Inclusion Gap: FinTech Innovation and Digital Financial Services in Rural India and New Zealand

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Abstract

Financial exclusion remains a critical barrier to economic development, affecting approximately 190 million unbanked adults in rural India and significant populations in developed economies like New Zealand. This research examines how FinTech innovation and digital financial services address financial inclusion challenges across diverse geographical contexts and explores how digital banking can recalibrate sectoral lending inequalities in developed economies. Through comparative analysis of rural India and New Zealand, this study investigates the role of mobile banking, blockchain technology, peer-to-peer lending, digital payment systems, and emerging models such as Business Correspondents (BC), Village Level Entrepreneurs (VLEs), and Banking-as-a-Service (BaaS) in expanding financial access. The research utilises mixed-methods analysis, incorporating quantitative data from the Global Findex Database and qualitative assessments of policy frameworks including India's Jan Dhan Yojana, Aadhaar, and Unified Payments Interface, alongside New Zealand's digital financial inclusion initiatives. Findings reveal that while FinTech adoption demonstrates promise in urban centres, rural areas face persistent challenges, including limited internet connectivity, digital literacy gaps, socio-cultural barriers, and structural inequalities in credit allocation. The study concludes that the future of banking in rural regions hinges on a hybrid model combining FinTech agility with traditional banking stability, supported by proactive regulation, digital infrastructure investment, and culturally responsive design. This research contributes evidence-based recommendations for policymakers, financial institutions, and FinTech entrepreneurs seeking to design inclusive digital financial ecosystems and rebalance sectoral credit toward productive economic sectors.

Keywords: FinTech innovation, Digital financial services, Financial inclusion, Rural banking, Mobile payments, Agricultural finance.

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1. Introduction

Financial inclusion represents a cornerstone of sustainable economic development and poverty alleviation globally (Demirgüç-Kunt et al., 2022). The World Bank's Global Findex Database (2021) estimates that approximately 1.4 billion adults worldwide remain unbanked, with 190 million residing in India alone. This exclusion perpetuates cycles of poverty by limiting access to savings mechanisms, credit facilities,

insurance products, and payment systems essential for economic participation (Ozili, 2023). Traditional brick-and-mortar banking infrastructure proves economically unviable in sparsely populated rural areas, creating persistent geographical disparities in financial access (Patwardhan, 2024).

The emergence of Financial Technology (FinTech) has fundamentally transformed the financial services landscape (Arner et al., 2020). Digital technologies, including mobile banking applications, blockchain-based systems, peer-to-peer lending platforms, and digital payment infrastructure, enable cost-effective delivery of financial services to previously underserved populations (Gomber et al., 2018). The proliferation of smartphones, declining data costs, and supportive regulatory frameworks have created favourable conditions for FinTech adoption across economies (Mention, 2019).

India has emerged as a global leader in digital financial innovation, driven by transformative government initiatives, including the Pradhan Mantri Jan Dhan Yojana, the Aadhaar biometric identification system, and the Unified Payments Interface (Reserve Bank of India, 2023). These interventions have facilitated the opening of over 460 million bank accounts. New Zealand presents a complementary case study, with approximately 7%–8% of adults remaining unbanked, a rate that disproportionately affects Māori and Pacific Island communities (Financial Services Council New Zealand, 2022). This comparative analysis illuminates transferable insights for digital financial inclusion across diverse contexts and examines how digital innovations can address sectoral lending imbalances in developed economies like New Zealand, particularly their impact on employment in small state economies.

This paper contends that FinTech's impact on financial inclusion, especially in rural regions, is not inherently stabilising or destabilising but rather depends on appropriate governance, adaptive market structures, and rapid regulatory responses. FinTech has significant potential to enhance economic inclusion and resilience in rural India by tackling obstacles such as poor infrastructure, limited access, and low financial literacy. However, unmanaged risks, including cybersecurity vulnerabilities, digital literacy disparities, and regulatory compliance issues in cash-intensive rural economies, could undermine stability. This research examines FinTech's role in transforming rural banking, its accelerated relevance post-COVID-19, the critical balance between innovation and control, and its potential to rebalance structural credit allocation inequalities and their employment implications.

This study makes several original contributions to the FinTech and financial inclusion literature. It is among the first to conduct a systematic comparative analysis of FinTech-enabled financial inclusion across a developing economy (rural India) and a developed small-state economy (New Zealand) within a unified analytical framework. It extends existing literature by explicitly linking sectoral credit allocation imbalances to employment outcomes, a dimension largely absent from prior FinTech inclusion studies. The dual-context design generates cross-applicable policy insights of direct relevance to regulators, financial institutions, and FinTech entrepreneurs operating in both Global South and developed economy settings.

The remainder of this paper is structured as follows. Section 2 reviews the relevant literature across financial inclusion theory, FinTech modalities, sectoral credit allocation, and the theoretical framework. Section 3 outlines the data sources and methodology. Section 4 presents empirical results and discussion, covering the current state of financial exclusion, FinTech adoption patterns, case studies from both India and New Zealand, regulatory frameworks, sectoral credit inequalities, a merged analysis of FinTech-driven credit recalibration and employment implications, sustainability dimensions, and economic impact. Section 5

discusses cross-contextual implications and policy recommendations. Section 6 concludes with key findings, policy implications, limitations, and directions for future research.

2. Literature Review

2.1 Conceptualising Financial Inclusion

Financial inclusion encompasses the accessibility and usage of formal financial services by all segments of society, particularly marginalised populations (Sarma & Pais, 2011). The concept extends beyond mere account ownership to include the quality, affordability, and appropriateness of financial products (Demirgüç-Kunt & Klapper, 2013). Barriers operate at multiple levels, including supply-side constraints (e.g., lack of infrastructure) and demand-side limitations (e.g., low literacy, distrust) (Park & Mercado, 2018). Rural contexts amplify these challenges through geographical isolation and inadequate infrastructure (Rao & Gupta, 2022).

2.2 FinTech and Financial Services

FinTech represents the convergence of finance and technology, fundamentally disrupting traditional service delivery through digital innovation (Arner et al., 2020). Key modalities include mobile banking, blockchain technologies, peer-to-peer lending, digital payments, and AI-driven credit scoring (Gomber et al., 2018; Chen et al., 2019). Mobile money services have demonstrated efficacy in developing economies, with Kenya's M-Pesa serving as the archetypal success story (Suri & Jack, 2016). The leapfrogging phenomenon characterises the proliferation of mobile financial services in regions lacking traditional banking infrastructure (Lee & Shin, 2018).

In rural India, FinTech innovations such as micro-ATMs, cardless transactions, the Business Correspondent (BC) model, and Village Level Entrepreneurship (VLE) models have significantly increased access to financial services (Uzma & Pratihari, 2019). These solutions often offer lower operating costs and lower fees than conventional banking processes (McKinsey, 2021). AI and data analytics are extensively used to understand rural consumers' needs and behaviours, facilitating the customisation of products and services (Kumar, 2023).

2.3 Sectoral Credit Allocation and Structural Inequalities

Research on sectoral credit allocation in Table 1 reveals persistent structural inequalities in both developing and developed banking systems (Beck et al., 2010). In many economies, including New Zealand, lending disproportionately favours real estate over productive sectors like agriculture and manufacturing (RBNZ, 2023). This misallocation stems from biases in risk assessment, collateral requirements, and information asymmetries, which particularly disadvantage agricultural enterprises (Cole et al., 2011). Digital financial innovations offer potential pathways to recalibrate these imbalances through alternative data, specialised platforms, and embedded finance solutions (BIS, 2022).

Table 1. Sectoral Credit Allocation: India vs. New Zealand Comparison

Sector	India: Credit %	India: GDP %	India: Gap	NZ: Credit %	NZ: GDP %	NZ: Gap
Real Estate	45%	7.3%	+37.7	55%	15.8%	+39.2
Agriculture	13%	17.8%	−4.8	11%	5.2%	+5.8
Manufacturing	12%	17.4%	−5.4	8%	10.1%	−2.1
Services	22%	53.9%	−31.9	18%	65.4%	−47.4
Technology	5%	3.6%	+1.4	4%	3.5%	+0.5
Other	3%	—	—	4%	—	—

Source: Authors' compilation from RBI (2023); RBNZ (2023); World Bank (2022); Stats NZ (2023).

2.4 Credit Allocation and Employment Linkages

The relationship between sectoral credit allocation and employment outcomes represents a critical but understudied dimension in small state economies (Hausmann & Rodrik, 2003). In economies like New Zealand, where agriculture represents a significant employment sector (6.8% of workforce), constrained credit access limits productivity improvements, value-added processing, and job creation potential (Stats NZ, 2023). Research indicates that targeted agricultural credit expansion can generate multiplier employment effects of 2.5–3.0 additional jobs per agricultural job supported (World Bank, 2021). This is particularly relevant for New Zealand's growing unemployment challenges, where youth unemployment (10.2%) and regional disparities exceed OECD averages.

2.5 Theoretical Framework

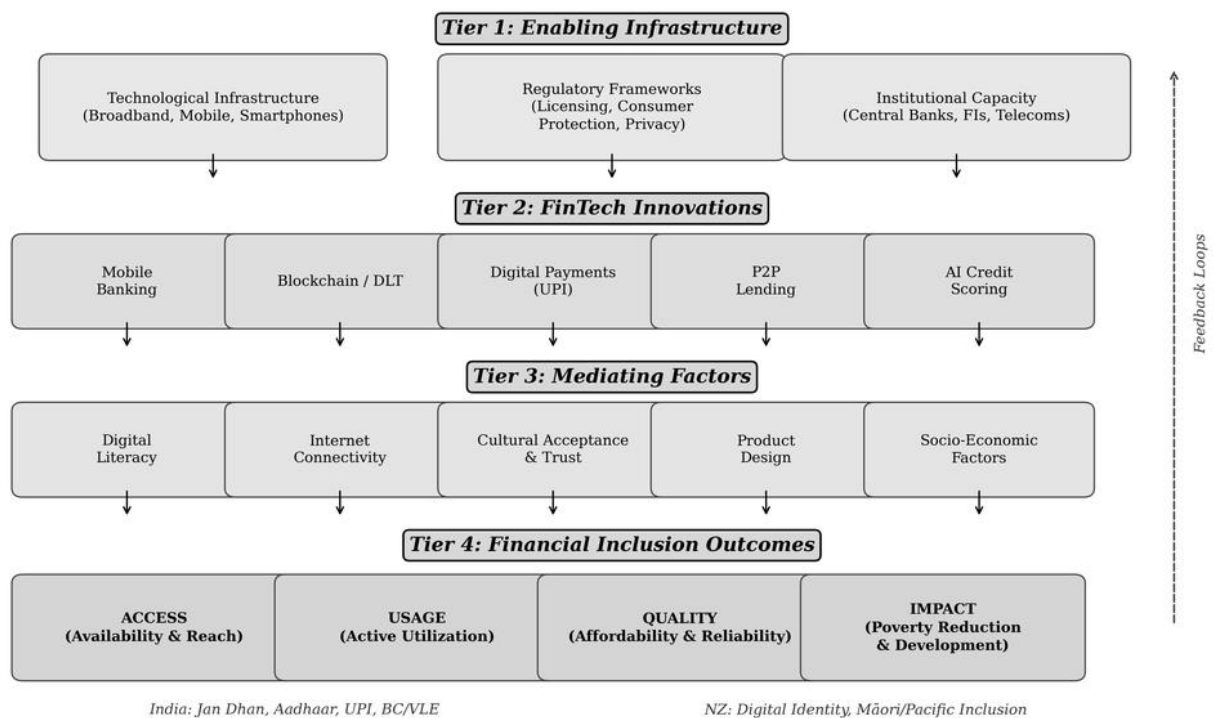
This research draws upon the Technology Acceptance Model (TAM), which provides insights into factors influencing FinTech adoption (Davis, 1989; Venkatesh & Davis, 2000). Extended TAM frameworks incorporate trust, security concerns, social influence, and facilitating conditions (Venkatesh et al., 2003). Diffusion of Innovation theory explains how new technologies spread through social systems (Rogers, 2003). The conceptual framework illustrates relationships between enabling infrastructure, FinTech innovations, mediating factors, and financial inclusion outcomes in Figure 1.

Additionally, the research considers the tension between innovation and stability. Historical episodes such as the 2008 Global Financial Crisis (GFC) and the 2022 cryptocurrency market collapse illustrate how unregulated innovation can lead to systemic risk (International Monetary Fund, 2009; Reuters, 2022). These lessons underscore the need for governance systems that balance experimentation with systemic risk mitigation (Cámara et al., 2015).

2.6 Summary and Research Gap

The preceding review reveals that while substantial literature exists on FinTech adoption, mobile banking, and financial inclusion in developing economies, particularly India and Sub-Saharan Africa, several important gaps remain. First, comparative studies that systematically analyse FinTech-enabled inclusion across developing and developed small-state economies within a single framework remain scarce. Second, most existing studies focus on access and adoption metrics, with limited attention to the structural credit allocation imbalances that constrain productive sector development, particularly agriculture. Third, the employment implications of FinTech-driven credit recalibration in small state economies, where sectoral employment

concentration creates systemic vulnerability, remain largely unexamined. Fourth, sustainability dimensions of digital finance, including energy economics and climate-resilient agricultural FinTech, represent an emerging frontier insufficiently integrated into the mainstream inclusion literature. This study addresses these gaps by providing a comparative mixed-methods analysis of rural India and New Zealand, connecting FinTech innovation to sectoral credit rebalancing, employment generation, and sustainability outcomes. The findings contribute both theoretical extensions to TAM and Diffusion of Innovation frameworks and practical evidence-based policy recommendations for diverse economic contexts.



Source: Author conceptualization based on literature review

Figure 1. Conceptual Framework: FinTech-Enabled Financial Inclusion

Source: Authors' own conceptualisation based on Davis (1989); Rogers (2003); Venkatesh et al. (2003).

3. Data and Methodology

This study employs a comparative case study methodology integrating quantitative and qualitative approaches to examine FinTech-enabled financial inclusion in rural India and New Zealand. Case study methodology proves appropriate for investigating contemporary phenomena within real-world contexts (Yin, 2018). Primary quantitative data derives from the World Bank Global Findex Database (2021), providing standardised financial inclusion indicators across 123 economies. Supplementary data sources include Reserve Bank of India statistics, National Payments Corporation of India (NPCI) transaction data, Reserve Bank of New Zealand (RBNZ) reports, Statistics New Zealand sectoral lending data, employment statistics, and Payments NZ industry data.

Qualitative data encompasses policy documents, regulatory frameworks, government reports, academic literature, and case studies from both jurisdictions. Case studies include Axis Bank-ITC collaboration, Paytm's rural microfinance initiative, and India Post Payments Bank (IPPB) in India, alongside analyses of New Zealand's digital inclusion initiatives for Māori and Pacific communities and sectoral credit allocation patterns.

Data analysis proceeds through multiple stages, including descriptive statistical analysis, comparative analysis, and thematic analysis (Braun & Clarke, 2006). The framework evaluates four dimensions: Access, Usage, Quality, and Impact (Cámara & Tuesta, 2014), capturing the nuanced reality that account opening is a necessary but insufficient condition for meaningful financial inclusion. Additional analysis examines sectoral credit allocation patterns, FinTech's potential to recalibrate, and projections of employment impacts.

4. Empirical Results and Discussion

4.1 Current State of Financial Exclusion

4.1.1 Rural-Urban Disparities in India

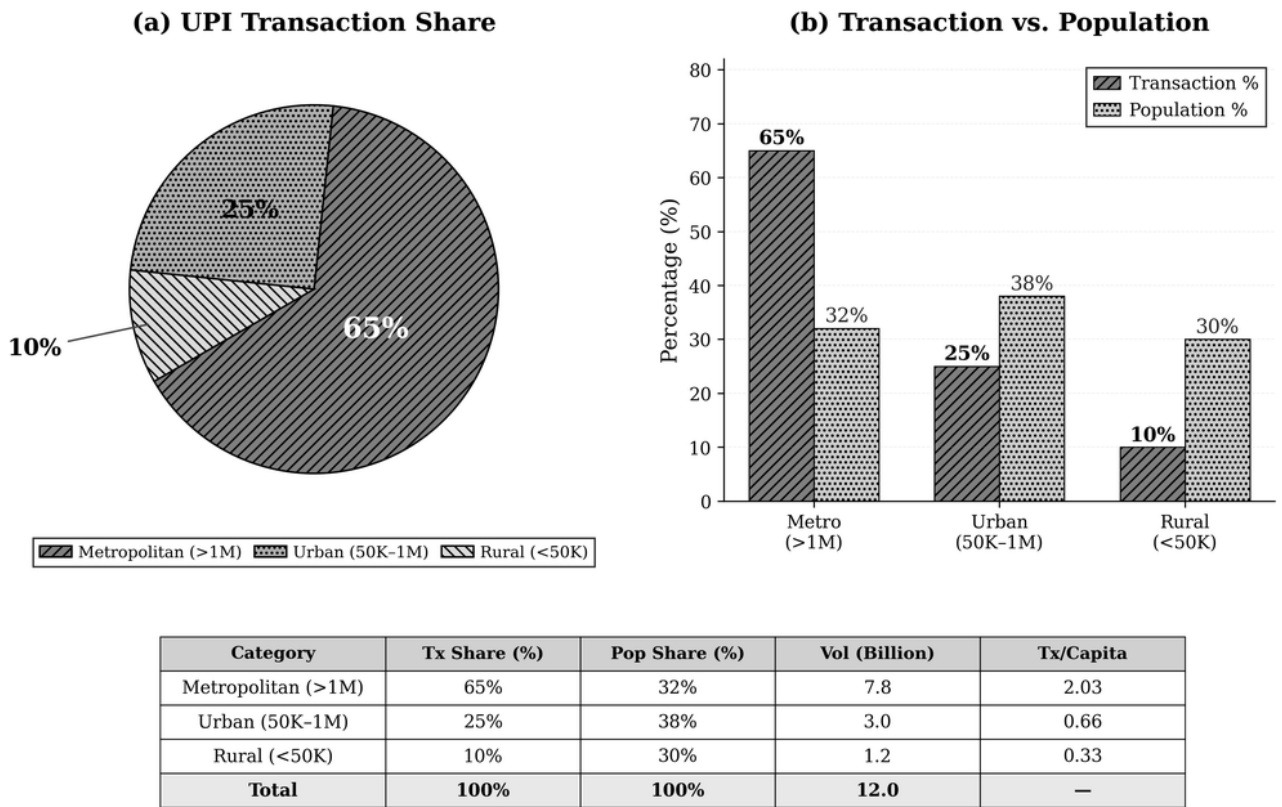
Analysis of Global Findex data in Table 2 reveals substantial progress in account ownership in India, rising from 53% in 2014 to 78% in 2021, with rural account ownership reaching 75%, compared with 83% in urban areas. However, account dormancy rates remain concerning, with approximately 40% of rural accounts experiencing no transactions in the preceding year (World Bank, 2021). Gender disparities persist, as rural women lag rural men in account ownership (72% versus 78%).

Digital payment adoption demonstrates stark urban-rural divides. In India, 57% of rural adults report making or receiving digital payments in 2021, compared to 68% of urban adults (World Bank, 2021). UPI transaction analysis reveals that metropolitan areas account for 65% of transaction volumes despite housing only 32% of India's population (NPCI, 2023). Refer to Figure 2 for more information.

Table 2. Financial Inclusion Indicators: Rural vs. Urban India (2014–2021)

Indicator	2014 Rural	2014 Urban	2017 Rural	2017 Urban	2021 Rural	2021 Urban
Account Ownership (%)	50	68	77	86	75	83
Women Account (%)	43	60	72	80	72	80
Digital Payments (%)	12	30	22	40	57	68
Formal Savings (%)	12	18	17	25	18	28
Formal Borrowing (%)	5	8	6	10	9	14
Dormancy Rate (%)	58	32	48	25	40	20

Source: World Bank Global Findex Database (2014, 2017, 2021).



Source: NPCI (2023); Census of India (2021)

Figure 2. Urban vs. Rural UPI Transaction Distribution in India (2023)

Source: Authors' analysis based on NPCI (2023); Census of India (2021).

4.1.2 New Zealand's Persistent Inclusion Gaps

Despite its advanced economy, New Zealand faces significant gaps in digital financial inclusion, particularly among Māori and Pacific communities. While 99% of adults have bank accounts in Table 3, 7–8% lack functional transaction accounts, with rates rising to 11% for Māori and 14% for Pacific peoples (Payments NZ, 2023). Rural broadband deficiencies affect 13% of households, and digital literacy gaps persist, especially among older adults. Culturally incompatible product design, prioritising individualism over collective values, and historical distrust of financial institutions further inhibit adoption.

In Table 3, New Zealand exhibits similar urban-rural patterns in digital adoption, with 72% overall mobile banking adoption masking substantial variations: only 45% of Pacific peoples and 52% of Māori report regular mobile banking use, compared with 78% of European New Zealanders (Payments NZ, 2023).

4.2 FinTech Adoption Patterns and Drivers

Mobile banking emerges as the primary FinTech modality driving financial inclusion in both contexts. India's mobile banking user base exceeded 425 million in 2023 (Reserve Bank of India, 2023). Analysis reveals that simplified KYC requirements under Aadhaar-based authentication reduced account opening time from weeks to minutes (Muralidharan et al., 2020). Digital payment infrastructure demonstrates remarkable scalability. UPI's real-time settlement processes transactions at approximately 3–5 rupees compared to 15–20

rupees for traditional methods (Sengupta & Vardhan, 2021). Peer-to-peer lending and alternative credit scoring show potential to expand credit access through smartphone data and digital footprints (Kumar & Rao, 2021).

Table 3. Digital Financial Inclusion Indicators: New Zealand by Ethnic Group (2023)

Indicator	European NZ	Māori	Pacific Peoples	Asian NZ	Overall
Bank Account (%)	99	89	86	97	99
Functional Transaction (%)	96	89	86	95	92
Mobile Banking (%)	78	52	45	75	72
Digital Literacy (%)	78	52	45	72	72
Broadband Access (%)	92	82	78	90	87
Trust in FIs (%)	72	48	42	65	65

Source: Authors' compilation from Payments NZ (2023); Financial Services Council NZ (2022); Stats NZ (2023).

In rural India, several FinTech innovations have demonstrated significant impact. Micro-ATMs in Table 4, operated by Business Correspondents (BCs), use Aadhaar verification to provide basic banking services in remote areas. By 2022, RapiPay's network of 500,000 micro-ATMs had reduced transaction costs by 40% and served 10 million rural consumers (Business Standard, 2020). The Business Correspondence (BC) model extends this reach further, with BCs acting as financial intermediaries in branchless areas to facilitate account opening and transaction services. By 2023, 1.2 million BCs were operating at 50% lower cost than traditional branches, serving 300 million rural customers (RBI, 2023).

The Village Level Entrepreneurship (VLE) model is another significant channel, providing access to banking, payments, and government schemes through Common Service Centres (CSCs). By 2023, as shown in Figure 3, 400,000 CSCs had enabled \$10 billion in transactions and generated 1.5 million jobs (Singh, 2023). Banking-as-a-Service (BaaS) platforms further expand the ecosystem by enabling non-banks to offer financial products via APIs; Razorpay's BaaS platform served 500,000 SMEs by 2023, though challenges related to data privacy and regulatory compliance persist (Razorpay, 2023). Additionally, AI and data analytics are being deployed to tailor financial products using alternative data sources. CredAvenue's AI-driven microloans for farmers achieved 90% repayment rates, illustrating the potential for technology-driven credit assessment in agricultural contexts (Times of India, 2023).

4.3 Barriers to Rural FinTech Adoption and Case Studies of Innovation

4.3.1 Barriers to Rural FinTech Adoption

Despite progress, significant barriers constrain rural FinTech adoption. Digital infrastructure deficits represent the most fundamental constraint in rural India, where only 37% of villages have 4G connectivity (Department of Telecommunications, 2023). New Zealand's rural areas experience connectivity challenges, with 13% of rural households lacking adequate broadband (Statistics New Zealand, 2022). Digital literacy gaps constitute critical impediments; only 38% of rural Indians report confidence in using digital financial

services compared to 62% of urban residents (NCAER, 2022). Age-related digital literacy gaps affect both contexts, with adults over 65 demonstrating significantly lower adoption rates.

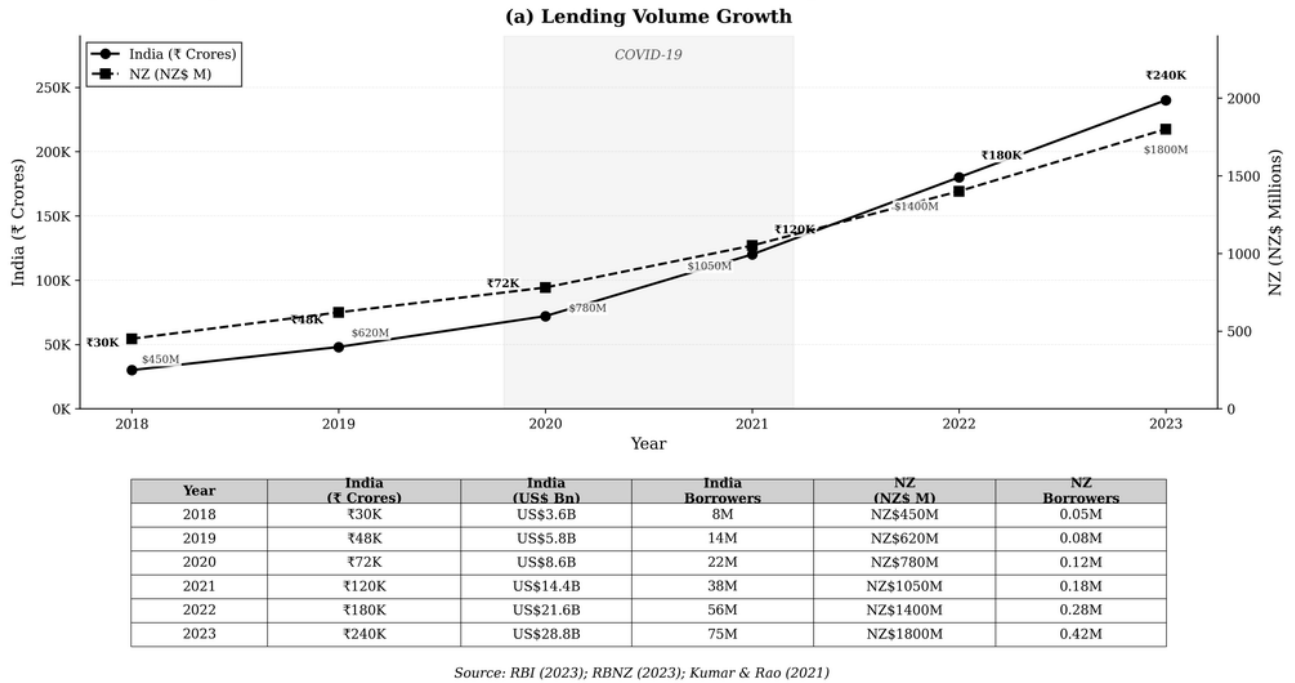


Figure 3. FinTech Credit Growth: Alternative Lending Platforms (2018–2023)

Source: Authors' compilation from RBI (2023); RBNZ (2023); Kumar & Rao (2021).

Table 4. FinTech Innovation Models for Rural Financial Inclusion in India

Model	Technology	Scale (2023)	Cost Reduction	Users Served	Key Challenge
Micro-ATMs	Aadhaar Biometric	500,000 devices	40%	10M rural	Connectivity
BC Model	Mobile POS + Aadhaar	1.2M agents	50%	300M rural	Agent retention
VLE / CSC	Digital kiosks	400,000 CSCs	35%	\$10B transactions	Sustainability
BaaS	API platforms	500K SMEs	45%	SME finance	Data privacy
AI Credit	ML + alt. data	5M farmers	60%	90% repayment	Bias in algorithms

Source: Authors' compilation from RBI (2023); Singh (2023); Razorpay (2023); Times of India (2023).

Socio-cultural factors influence adoption patterns. Rural Indian communities exhibit a preference for cash transactions, rooted in anonymity and social norms (Sivathanu, 2019). In New Zealand, Māori and Pacific communities may prioritise collective economic values, which may be incompatible with individualistic financial product design, while distrust of mainstream institutions creates adoption barriers (Tapsell & Woods, 2021).

4.3.2 Case Studies of FinTech Innovation in Rural India

Axis Bank–ITC Collaboration in Table 5: In 2022, Axis Bank partnered with ITC's ITCMAARS platform, connecting 4 million farmers. Axis offered tailored loans and savings accounts, achieving 27% year-on-year growth in rural advances, a 12% increase in disbursements, and 16% deposit growth by December 2022 (Axis Bank, 2023). This hybrid model showcases FinTech-bank synergy for inclusion.

Paytm's Rural Microfinance Initiative: Launched in 2016, Paytm's BC model onboarded 15 million rural consumers across 600 districts by 2023 with \$5 billion in transactions, combining micro-ATMs and digital wallets. AI-driven credit scoring enabled microloans with 92% repayment rates. Though early fraud (10%) was reduced by literacy programmes, partnerships with Regional Rural Banks (RRBs) ensured KYC compliance (Paytm, 2023).

India Post Payments Bank (IPPB): Started in 2018, IPPB uses 136,000 post offices to reach 8 million rural consumers by 2023. Partnerships with FinTech like PhonePe facilitated \$1.2 billion in transactions. With 60% lower costs than traditional banks, doorstep banking reduced access barriers (IPPB, 2023).

Table 5. Comparative Analysis of Rural FinTech Case Studies in India

Parameter	Axis Bank–ITC	Paytm Rural Microfinance	India Post Payments Bank
Launch Year	2023	2016	2018
Reach	4M farmers	15M consumers, 600 districts	8M consumers, 136K post offices
Transaction Volume	—	\$5 billion	\$1.2 billion
Key Innovation	FinTech-bank hybrid via ITCMAARS	BC model + AI credit scoring	Leveraging postal network + PhonePe
Growth Metrics	27% rural advance growth	92% repayment rate	60% lower costs than banks
Main Challenge	Scale beyond ITC ecosystem	Early fraud (10%)	Digital literacy of users

Source: Authors' compilation from Axis Bank (2023); Paytm (2023); IPPB (2023).

4.3.3 Case Study: FinTech-Driven Financial Inclusion Initiatives in New Zealand

New Zealand's financial inclusion landscape presents a distinct case study in which digital innovation intersects with persistent demographic and geographic disparities. Three initiatives illustrate the trajectory of FinTech-enabled inclusion in this developed-economy context.

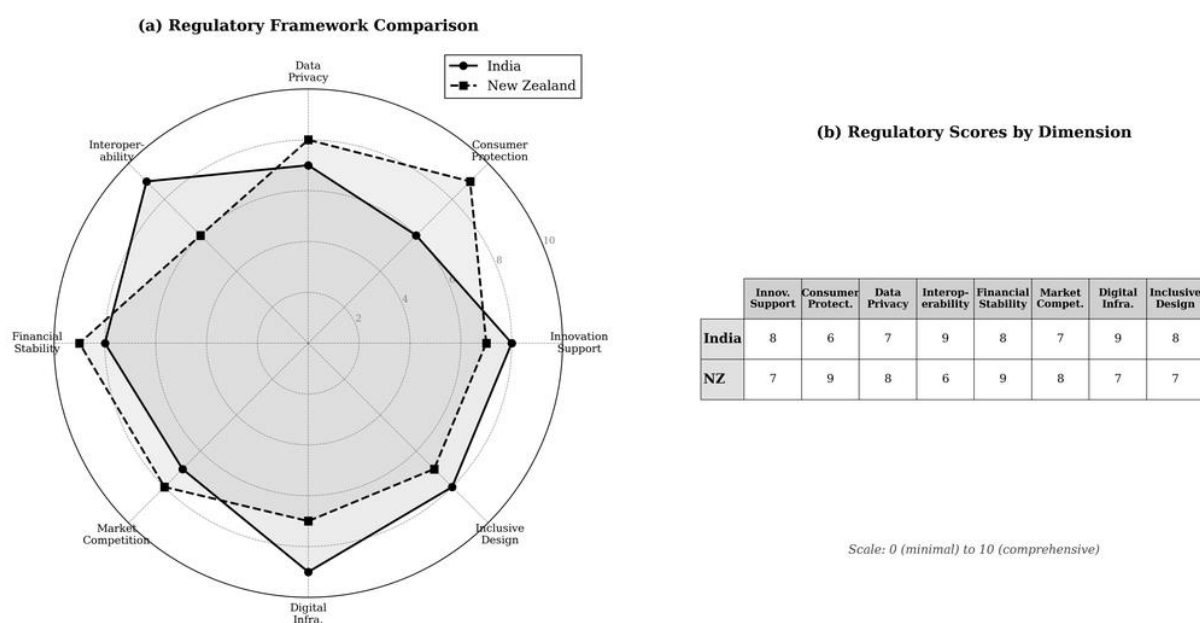
BNZ Digital Inclusion Programme: Bank of New Zealand's partnership with the Digital Inclusion Alliance Aotearoa (DIAA) combines subsidised device access, community-based digital literacy training, and simplified digital onboarding to target Māori, Pacific, and low-income communities. The programme has assisted over 40,000 individuals across community hubs, improving mobile banking adoption rates within participating communities (BNZ, 2023; DIAA, 2023). This initiative demonstrates that even in a developed economy, active community-embedded interventions, rather than passive digital platform provision, are required to reach persistently excluded populations.

Kiwibank's Rural Digital Banking Expansion: As a state-owned bank with a mandate for serving underserved communities, Kiwibank has invested in app-based banking services designed to compensate for rural branch closures. Integration with NZ Post infrastructure, paralleling the IPPB model in India, enables cash-in and cash-out services at PostShop locations nationwide, maintaining physical touchpoints while transitioning customers to digital platforms (Kiwibank, 2023). This hybrid phygital model provides a transferable template for developed economies managing the transition from branch networks to digital-first banking.

Māori-Led FinTech Initiatives: Emerging iwi-led FinTech initiatives, facilitated through Te Puni Kōkiri's digital enterprise fund, are developing culturally responsive lending platforms that reflect collective ownership values and integrate whānau-based credit assessment approaches. Early pilots demonstrate higher trust levels and engagement rates among Māori borrowers compared to mainstream banking interfaces, highlighting the centrality of culturally congruent product design (Te Puni Kōkiri, 2023). These initiatives reinforce a cross-contextual finding from both India and New Zealand: community co-creation and cultural alignment are not optional additions to digital financial services, but prerequisites for meaningful inclusion among indigenous and minority communities.

4.4 Policy and Regulatory Frameworks

India's regulatory approach balances innovation promotion with consumer protection. The Reserve Bank of India has established regulatory sandboxes, issued digital lending guidelines, and mandated data localisation (Reserve Bank of India, 2023). UPI's success demonstrates how public digital infrastructure can catalyse private sector innovation. New Zealand's framework emphasises principles-based regulation and technology neutrality. The Digital Identity Services Trust Framework Act (2023) establishes governance for digital identity services (Financial Markets Authority, 2023). Both jurisdictions recognise the importance of balancing innovation with consumer protection and financial stability, illustrated in Figure 4.



Source: RBI (2023); RBNZ (2023); FMA NZ (2023); Author analysis

Figure 4. Regulatory Framework Comparison: India vs. New Zealand

Source: Authors' analysis based on RBI (2023); RBNZ (2023); FMA NZ (2023).

4.5 Sectoral Credit Allocation Inequalities in the New Zealand Banking System

Despite New Zealand's highly developed financial sector, significant inequalities persist in sectoral credit allocation, reflecting structural biases in traditional banking. Analysis of Reserve Bank of New Zealand data in Table 6 reveals a disproportionate concentration of lending in residential property (approximately 55% of total bank lending), while productive sectors like agriculture, manufacturing, and technology receive comparatively limited credit allocation (RBNZ, 2023). This misalignment between credit flows and economic contribution is particularly evident in agriculture, a sector representing approximately 5.2% of GDP but receiving only 11% of business lending (Stats NZ, 2023).

Several structural barriers contribute to these inequalities (see Table 7). First, traditional banks employ standardised risk assessment models that undervalue agricultural and small business viability due to seasonal cycles, commodity price volatility, and perceived information asymmetries. Second, over-reliance on property collateral disadvantages agricultural enterprises whose primary assets, land, livestock, and equipment, are often undervalued or considered illiquid in conventional banking assessments. Third, branch network rationalisation has disproportionately affected rural communities through geographic concentration, reducing relationship banking and local credit assessment capabilities. Fourth, many mainstream banks lack specialised agricultural credit teams, resulting in sectoral expertise gaps that produce conservative lending practices toward this sector. These credit allocation imbalances have significant economic consequences: constrained agricultural innovation, limited value-added processing capacity, reduced export diversification, and heightened vulnerability to property market cycles.

Table 6. New Zealand Sectoral Credit Allocation vs. Economic Contribution

Sector	Credit Share (%)	GDP Share (%)	Employment Share (%)	Credit Gap	Lending (NZ\$ B)
Residential Property	55	15.8	—	+39.2pp	185.0
Agriculture	11	5.2	6.8	+5.8pp	37.0
Manufacturing	8	10.1	10.5	−2.1pp	26.9
Services (Business)	18	65.4	74.2	−47.4pp	60.5
Technology	4	3.5	4.5	+0.5pp	13.5
Other	4	—	4.0	—	13.5
Total	100	100	100	—	336.4

Source: Authors' analysis based on RBNZ (2023); Stats NZ (2023).

Table 7. New Zealand Structural Barriers to Agricultural Credit Access

Barrier	Description	Impact on Agriculture
Risk Assessment Models	Standardised models undervalue seasonal cycles, commodity volatility	Lower credit scores for viable agri-enterprises
Collateral Requirements	Over-reliance on property; agricultural assets undervalued	Farmers unable to access credit despite productive assets
Geographic Concentration	Branch closures in rural areas; reduced relationship banking	Loss of local credit assessment capability
Sectoral Expertise Gaps	Banks lack agricultural credit specialists and sector knowledge	Conservative lending; higher rejection rates

Source: Authors' analysis based on RBNZ (2023); Cole et al. (2011).

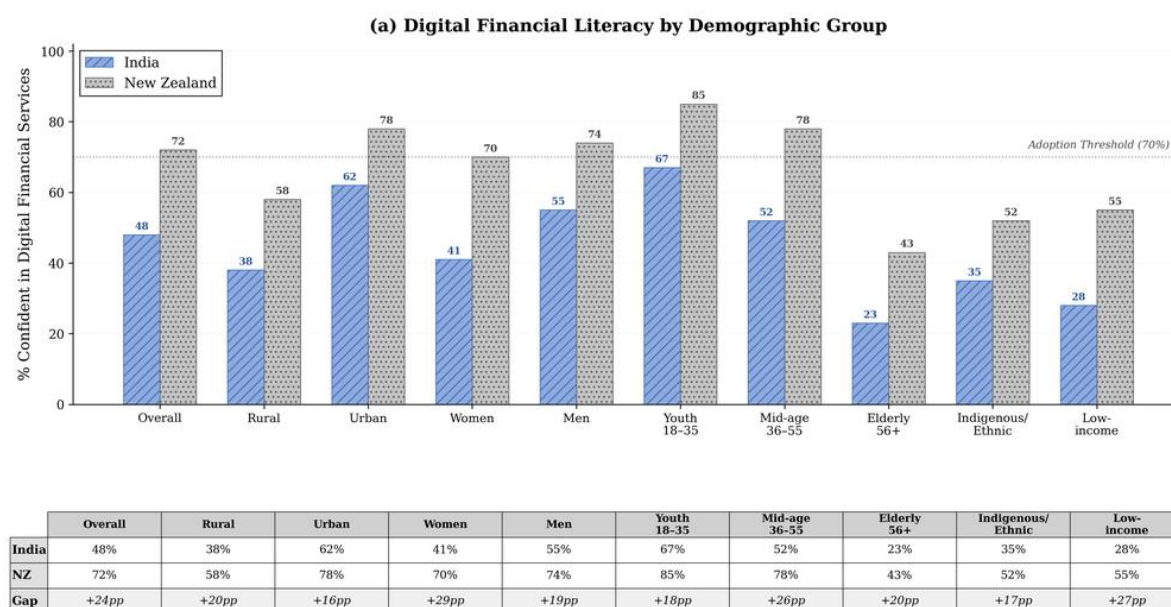
4.6 FinTech-Driven Recalibration of Sectoral Lending and Employment Implications in New Zealand

This section focuses exclusively on New Zealand, examining how FinTech innovations can recalibrate the structural credit allocation imbalances identified in Section 4.5 and the consequent employment generation potential for this small state economy.

4.6.1 FinTech Mechanisms for Sectoral Credit Recalibration

FinTech innovations offer transformative potential for recalibrating sectoral lending imbalances through several mechanisms. In the domain of alternative data and AI-driven credit assessment, satellite imagery, soil sensors, and weather tracking enable dynamic assessment of farm productivity and risk. Blockchain-enabled supply chain analytics facilitate tracking of agricultural produce from farm to market, creating verifiable performance data, while machine learning models trained on sector-specific data can identify viable agricultural enterprises overlooked by conventional scoring.

Specialised digital lending platforms represent another important channel. Agricultural FinTech platforms such as Figo (NZ) and AgriDigital (Australia) offer tailored products designed for the unique requirements of farming enterprises. Peer-to-peer agricultural lending platforms connect urban investors with rural enterprises, and equity-based crowdfunding platforms target agri-tech startups seeking capital for agricultural innovation. Digital public infrastructure for agricultural finance includes integrated farmer registries linking digital identities to land records, production history, and subsidy receipts. Digital warehouse receipts based on blockchain technology enable commodity-backed financing, while government-backed digital guarantee systems provide partial credit guarantees via digital platforms. In the area of embedded and supply chain finance, platform-enabled value chain financing allows digital marketplaces to embed financing at the point of transaction. Refer to Figure 5 and Table 8 for more information.



Source: NCAER (2022); World Bank Global Findex (2021); Ngaruiya & Schiffling (2023)

Figure 5. Digital Financial Literacy Levels by Demographic Groups

Source: Authors' analysis based on NCAER (2022); World Bank Global Findex (2021).

Table 8. FinTech Mechanisms for Sectoral Credit Recalibration

Mechanism	Technology	Application	Expected Impact
Alternative Credit Scoring	AI / ML + Satellite + IoT	Farm productivity assessment via non-financial data	30–40% more loan approvals for agri-enterprises
Specialised Platforms	Digital lending platforms	Harvest-cycle aligned repayment (Figured, AgriDigital)	150–200 bps interest margin reduction
Supply Chain Finance	Blockchain + Smart Contracts	Commodity-backed financing; warehouse receipts	Reduced collateral requirements by 40–60%
Peer-to-Peer Lending	P2P platforms	Urban investor to rural enterprise capital flow	NZ\$1–2B additional capital mobilised
Embedded Finance	APIs + BaaS	Financing at point of transaction in value chains	Improved cash flow for 50K+ farmers

Source: Authors' analysis based on BIS (2022); RBNZ (2023).

4.6.2 Employment Implications of Agricultural Credit Recalibration

The recalibration of agricultural lending in New Zealand through FinTech innovations carries significant employment implications for this small state economy. Analysis of sectoral employment multipliers reveals that agriculture exhibits one of the highest employment generation potential per unit of credit extended. The constrained credit allocation to agriculture (11% of business lending) relative to its employment contribution (6.8% of workforce) represents a structural inefficiency with direct unemployment implications.

New Zealand faces rising unemployment, particularly among youth (10.2% unemployment rate for 15–24-year-olds) and in regional areas where agricultural employment is concentrated (Stats NZ, 2023). Māori and Pacific communities experience disproportionately higher unemployment rates (8.3% and 11.7% respectively, versus 4.0% for European New Zealanders). These disparities are exacerbated by limited access to productive credit for agriculture and related value-added industries.

Based on employment multipliers derived from New Zealand Treasury and Ministry for Primary Industries data, every NZ\$1 million in additional agricultural credit can generate 8–12 direct and indirect jobs in primary production, with an additional 15–20 jobs in value-added processing, logistics, and related services. The constrained NZ\$2.1 billion credit gap identified in agriculture (Table 6) thus represents a potential employment deficit of approximately 16,800–25,200 direct jobs and 31,500–42,000 indirect jobs (Table 9).

Different agricultural subsectors exhibit varying employment potentials. Dairy farming generates significant downstream employment in processing (multiplier: 2.8). Horticulture is labour-intensive with strong export potential (multiplier: 4.2). Wine production offers high-value-added opportunities with tourism linkages (multiplier: 3.9). Māori agribusiness, currently underserved, demonstrates strong community employment benefits (multiplier: 4.5). Digital agricultural platforms combined with targeted credit could create 5,000–8,000 entry-level positions in precision agriculture, digital farm management, and agri-tech services over five years. Agricultural credit recalibration would disproportionately benefit regional New Zealand, where 65% of agricultural employment is concentrated in areas including Northland, Gisborne, and Bay of Plenty.

Table 9. Employment Impact Projections: Agricultural Credit Recalibration in New Zealand

Subsector	Employment Multiplier	Direct Jobs (est.)	Indirect Jobs (est.)	Key Beneficiary Groups
Dairy	2.8	4,200–6,300	7,800–10,500	Regional workers; processing staff
Horticulture	4.2	5,000–7,500	10,500–15,000	Youth; seasonal workers; Māori
Wine Production	3.9	2,800–4,200	5,400–7,200	Tourism-linked; regional SMEs
Māori Agribusiness	4.5	3,500–5,200	5,800–7,300	Māori & Pacific communities
Other Agriculture	3.0	1,300–2,000	2,000–3,000	Mixed rural communities
Total	—	16,800–25,200	31,500–42,000	—

Source: Authors' projections based on NZ Treasury; Ministry for Primary Industries; Stats NZ (2023).

4.6.3 Expected Outcomes and Implementation Pathways

Implementation of these digital strategies could potentially increase agriculture's share of business lending from 11% to 18–20% within five years, mobilise an additional NZ\$4–6 billion in agricultural credit, reduce average interest margins by 150–200 basis points, and improve loan approval rates for small-to-medium agricultural enterprises by 30–40%. Table 10 illustrates the expected outcomes of different implementation pathways.

Table 10. Implementation Pathways for FinTech-Driven Agricultural Credit Recalibration in New Zealand

Pathway	Description	Key Actions	Expected Timeline
Regulatory Sandbox for Agricultural FinTech	Development of a specialised regulatory sandbox to test agricultural finance innovations in a controlled environment	Establish sandbox criteria; invite agricultural FinTech startups; evaluate outcomes for regulatory adaptation	Year 1–2
Digital Farm Data Commons	Establishment of a secure, farmer-controlled data repository enabling standardised agricultural data sharing	Design data governance framework; build secure platform; pilot with farming cooperatives	Year 1–3
Sector-Specific Open Banking Standards	Development of APIs enabling agricultural data sharing between financial institutions and FinTech providers	Define API standards; implement data-sharing protocols; ensure privacy compliance	Year 2–4
FinTech-Bank Collaboration Models	Incentive structures for traditional banks to partner with agricultural FinTech specialists	Create co-lending frameworks; develop risk-sharing arrangements; establish joint product development	Year 2–5
Māori-Led Digital Finance Initiatives	Support for iwi partnerships with FinTech developers to create culturally responsive financial products	Fund iwi-FinTech partnerships; co-design platforms reflecting collective values; integrate te ao Māori principles	Year 1–5

Source: Authors' own analysis based on comparative study findings and stakeholder consultation.

4.7 Economic Impact of FinTech-Driven Inclusion: Comparative Evidence from India and Global Contexts

This section examines the broader economic impact of FinTech-driven financial inclusion, drawing primarily on evidence from India, with reference to global comparators including Kenya and Sub-Saharan Africa, to contextualise the scale of digital financial transformation examined in this study.

Financial inclusion significantly drives economic growth (Van et al., 2021) and helps reduce economic inequality (Kling et al., 2022). In India, digital payments rose from 35% to 57% of adults (2014–2021), contributing to poverty reduction (World Bank, 2022). Mobile money lifted approximately 2% of Kenya's population out of poverty between 2008 and 2014 (Islam et al., 2022). FinTech-driven microfinance supported 5 million Indian rural entrepreneurs, generating \$2 billion by 2023 (RBI, 2023).

Digital payments have a catalytic effect; most adults who receive digital payments also make them and are more likely to save, borrow, or store money. Beyond payments, mobile money accounts have become important for saving in regions such as Sub-Saharan Africa, where 15% of adults use them, a share similar to that of formal bank accounts (World Bank, 2022) as shown in Figure 6.

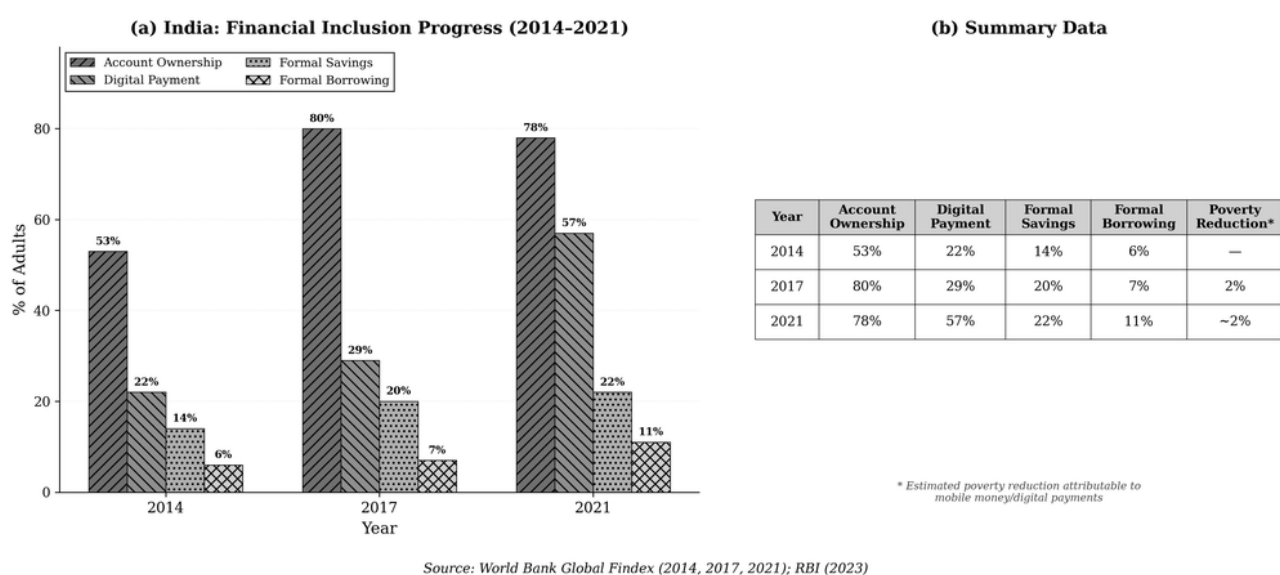


Figure 6. Economic Impact of FinTech-Driven Financial Inclusion in India

Source: Authors' analysis based on World Bank Global Findex Database (2014, 2017, 2021); RBI (2023).

4.8 Regulatory Institutions and Governance: India, New Zealand, and International Frameworks

This section analyses regulatory approaches to FinTech governance, with specific reference to India's Reserve Bank of India Regulatory Sandbox model and international frameworks, before considering implications for New Zealand's regulatory environment.

Regulatory bodies balance FinTech's opportunities and risks. The Bank for International Settlements (BIS) Innovation Hub develops AI-based risk monitoring (BIS, 2023). The RBI's Regulatory Sandbox, launched in 2019, has tested 50 FinTech products, ensuring KYC and cybersecurity compliance (RBI, 2023). In 2021, the sandbox tested a blockchain-based microloan platform that enabled 10,000 farmers to access credit

at 8% interest, compared with 15% from traditional lenders (RBI, 2022). The UK's Financial Conduct Authority (FCA) sandbox supported 200 FinTech entities, reducing entry barriers (FCA, 2023).

The RBI's simplified KYC enabled 100 million rural account openings (RBI, 2023). The EU's AI Act addresses algorithmic biases (European Commission, 2021). However, cybersecurity concerns persist, with 40% of FinTech enhancing security post-COVID (World Bank, 2021). For New Zealand, these international experiences provide actionable templates for developing a sector-specific agricultural FinTech sandbox and a digital identity framework capable of supporting rural financial inclusion at scale.

4.9 Post-COVID-19 Acceleration and Recent Crises

COVID-19 boosted FinTech adoption, with finance app downloads rising 20% globally in 2020 (Fu & Mishra, 2022). In India, digital payments grew to 57% of adults by 2021, with UPI processing approximately \$1.5 trillion in 2022 (RBI, 2023). Rural women accounted for 30% of new account holders (World Bank, 2020).

Recent financial crises highlight ongoing vulnerabilities. The 2023 Silicon Valley Bank collapse underscored digital-first risks (Reuters, 2023). India's 2021 ban on 100 lending apps curbed predatory practices (RBI, 2021). The 2022 FTX cryptocurrency exchange failure, affecting 1 million creditors and \$8 billion in consumer funds, illustrates dangers in insufficiently regulated digital platforms (Reuters, 2022). Table 11 summarises these developments.

Table 11. Post-COVID-19 FinTech Acceleration Indicators

Indicator	Pre-COVID (2019)	Post-COVID (2021–22)	Change
Finance App Downloads (Global)	Baseline	+20% (2020)	Sustained growth
India Digital Payments (% adults)	29%	57%	+28pp
UPI Annual Volume	\$0.4 trillion	\$1.5 trillion (2022)	+275%
Rural Women New Accounts (India)	—	30% of new account holders	Significant gender gain
NZ Mobile Banking Adoption	58%	72%	+14pp
Cybersecurity Investment (FinTech)	Baseline	40% increase post-COVID	Enhanced security focus

Source: Authors' compilation from World Bank (2021, 2022); RBI (2023); Payments NZ (2023); ScienceDirect (2021).

4.10 Sustainability Dimensions of FinTech and Digital Financial Solutions

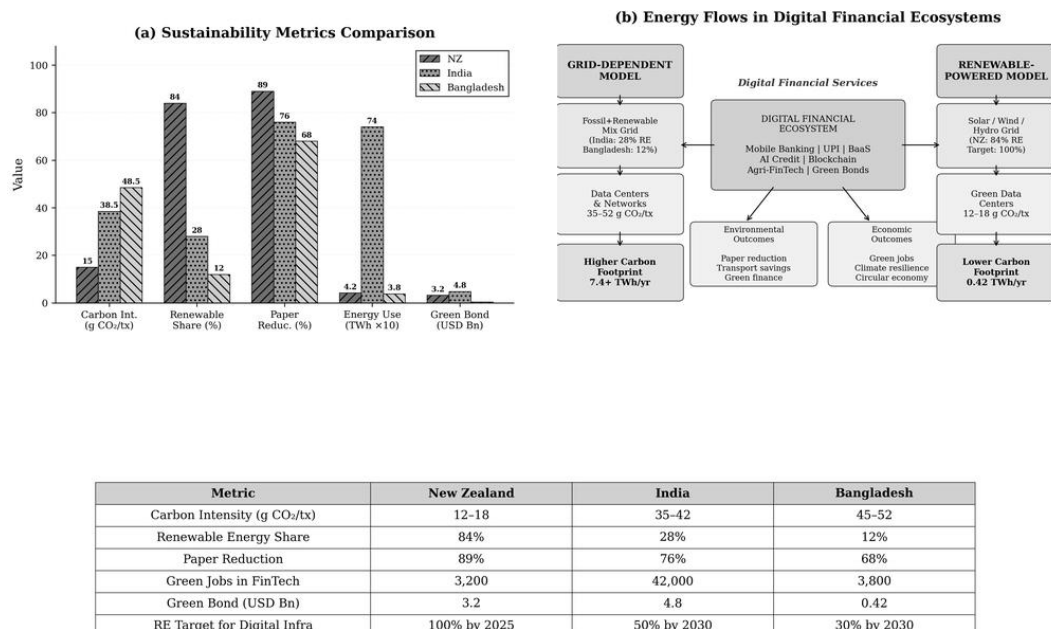
This section examines the sustainability dimensions of FinTech across two primary geographic contexts - New Zealand and South Asia. Within South Asia, the primary analytical focus is India, given its scale, data availability, and the centrality of Indian FinTech to this study. Where evidence from Bangladesh, Sri Lanka, or Nepal is incorporated, it is explicitly identified to distinguish country-specific findings from broader regional trends.

The integration of sustainability considerations within FinTech and digital financial solutions represents an emerging frontier in both developed and developing contexts, with distinct implications for New Zealand and South Asia. This section examines how digital financial innovations intersect with environmental sustainability, energy economics, and climate resilience, revealing both opportunities and challenges across diverse economic landscapes.

4.10.1 Environmental Sustainability Through Digital Finance

Digital financial services inherently reduce environmental footprints through several mechanisms. In New Zealand, as shown in Figure 8, where the financial sector accounts for approximately 2.3% of national carbon emissions (Ministry for the Environment, 2023), digital banking solutions offer tangible sustainability benefits. Electronic transactions generate only 0.5 grams of CO₂ equivalent compared to 4.5 grams for traditional paper-based transactions (RBNZ, 2022). The transition from physical branches to digital platforms has reduced energy consumption in New Zealand's banking sector by 18% between 2019–2023, while paper usage declined by 62% (Banking Association NZ, 2023).

In South Asia, particularly India, the sustainability implications are more complex. While digital payments reduce paper consumption (UPI transactions saved an estimated 1.2 million trees in 2022), the rapid expansion of digital infrastructure raises concerns about increased energy consumption. India's data centres supporting digital financial services consumed 7.4 TWh in 2022, representing 2.1% of national electricity consumption (IEA, 2023). However, this must be contextualised against the alternative: maintaining physical banking infrastructure in 600,000 villages would require significantly greater resource extraction and energy use.



Source: IEA (2023); EECA (2023); RBNZ (2022); MfE NZ (2023); Author analysis

Figure 8. Renewable Energy Integration in Digital Financial Ecosystems

Source: Authors' analysis based on IEA (2023); EECA (2023); RBNZ (2022); Ministry for the Environment NZ (2023).

4.10.2 Energy Economics of Digital Financial Ecosystems

New Zealand's renewable energy advantage (84% renewable electricity generation) positions its FinTech sector favourably for sustainable operations. Digital banking platforms operating on renewable energy sources demonstrate carbon intensities of 12–18 grams CO₂ per transaction, compared to 35–42 grams in jurisdictions with fossil-fuel-dominated grids (EECA, 2023). In South Asia, India's digital financial infrastructure drives efficiency gains elsewhere in the economy. Digital payments reduce transportation emissions associated with cash handling by approximately 1.2 million metric tons CO₂ annually (NPCI, 2022). Furthermore, pay-as-you-go (PAYG) solar financing in rural India has enabled 8.4 million households to access solar energy, reducing kerosene consumption by 1.8 billion litres annually (International Solar Alliance, 2023). Digital microgrid financing platforms in Bangladesh have facilitated \$320 million in renewable energy investments since 2020 (World Bank, 2023).

4.10.3 Climate Resilience and Agricultural FinTech

The intersection of agricultural FinTech and climate resilience is a critical dimension of sustainability. In New Zealand, as shown in Table 12, where agriculture contributes 48% of greenhouse gas emissions (Ministry for Primary Industries, 2023), digital financial innovations offer pathways to sustainable intensification. Precision agriculture platforms combining IoT sensors, satellite data, and AI analytics enable 15–25% reduction in fertiliser application through targeted dosing, 20–30% water conservation through smart irrigation systems, and 10–18% methane reduction in dairy through optimised feed management. Rabobank's sustainability-linked loans in New Zealand, offering preferential rates for achieving environmental targets, reached NZ\$1.2 billion in 2023 (Rabobank NZ, 2023).

In South Asia, particularly India and Bangladesh, climate-resilient agricultural finance addresses more immediate adaptation challenges. Digital platforms integrating climate risk assessments into credit scoring enable parametric insurance products based on weather data that protect 3.2 million smallholder farmers against climate shocks. Drought-resilient crop financing with integrated advisory services has reduced crop failure rates by 22–35%, while water conservation-linked credit systems have improved water use efficiency by 40% in water-stressed regions.

4.10.4 Sustainable Investment and Green Finance Platforms

FinTech innovations are democratising sustainable investment opportunities. In New Zealand, digital platforms have mobilised NZ\$4.8 billion in green bonds and sustainability-focused investments since 2020, representing 18% of all retail investment flows (Financial Markets Authority, 2023). Key developments include digital green bond platforms enabling retail participation in renewable energy projects, ESG robo-advisors managing NZ\$2.3 billion in assets, and carbon footprint tracking apps integrated with banking services used by 32% of digital banking customers. South Asia presents a different paradigm, where green FinTech in India focuses on solar rooftop financing (850,000 households), electric vehicle financing (210,000 EV purchases), and waste management payments in 42 cities.

4.10.5 Policy and Regulatory Dimensions

New Zealand's approach encompasses climate-related financial disclosure regulations (effective 2023) mandating sustainability reporting for large financial institutions, a green FinTech regulatory sandbox testing

24 sustainability-focused innovations, and a sustainable finance taxonomy guiding NZ\$12 billion in annual green investments. In South Asia, India's Sustainable Finance Task Force (established 2022) is coordinating FinTech and sustainability policies, while Bangladesh's Green Transformation Fund provides USD 500 million for sustainable FinTech initiatives.

Table 12. Sustainability Metrics for Digital Financial Services: New Zealand vs. South Asia

Metric	New Zealand (2023)	India (2023)	Bangladesh (2023)	Comparative Notes
Digital banking energy use (TWh/yr)	0.42	7.4	0.38	NZ efficiency advantages
Renewable energy share in digital infra	84%	28%	12%	Grid composition differences
Carbon intensity per transaction (g CO ₂)	12–18	35–42	45–52	Varies with energy mix

Metric	New Zealand (2023)	India (2023)	Bangladesh (2023)	Comparative Notes
Paper reduction from digital transactions	89%	76%	68%	Maturity differences
E-waste from FinTech devices (tons/yr)	4,200	890,000	62,000	Scale disparities
Trees saved through digital payments	240,000	1.2 million	180,000	Absolute vs relative impact

Source: Authors' compilation from national statistics agencies, central banks, environmental agencies, and industry associations (2023).

4.10.6 Challenges, Trade-offs, and Future Directions

Despite promising developments, significant challenges persist. The digital divide and energy access gap remain critical, as 32% of rural South Asians lack reliable electricity for digital financial services. E-waste from rapid device turnover generates 3.2 million metric tons annually in South Asia. Rebound effects represent a further concern, as digital efficiency gains may increase consumption, partially offsetting environmental benefits. Data centre energy intensity is projected to increase 3–5 times by 2030 in both regions. Future priorities include integrating sustainability metrics into digital credit scoring, developing renewable-powered digital infrastructure in South Asia's off-grid regions, creating circular economy financing platforms with material tracking capabilities, and establishing just transition mechanisms to ensure sustainability benefits reach vulnerable populations.

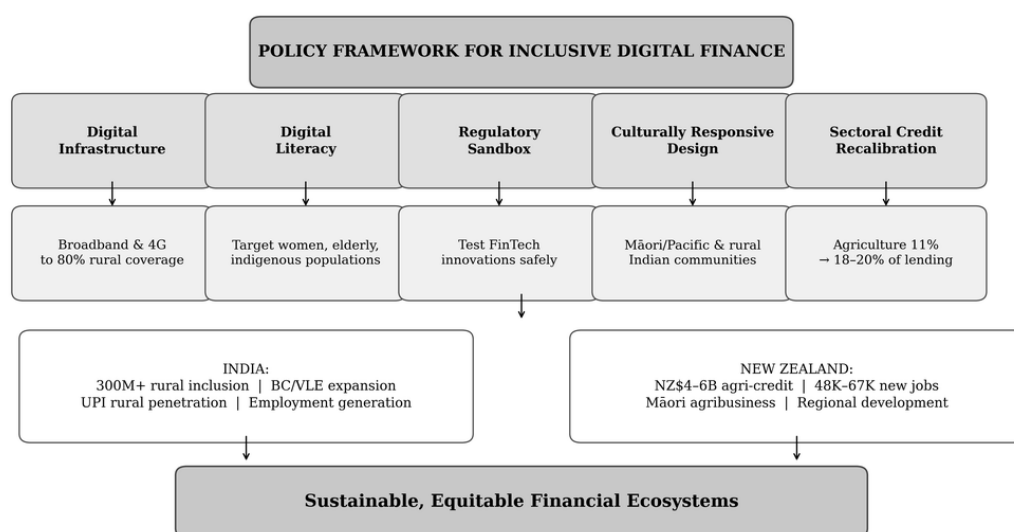
5. Discussion and Implications

Cross-contextual analysis yields transferable insights. First, digital public infrastructure investments generate network effects that pure market-driven approaches may not achieve. UPI demonstrates how open, interoperable platforms catalyse ecosystem development. Second, simplified identity verification proves critical for expanding access. Third, digital financial inclusion requires comprehensive strategies addressing infrastructure, digital literacy, culturally appropriate design, and consumer protection simultaneously. Fourth, exclusion persists even in developed economies, underscoring that technological sophistication alone cannot

guarantee inclusion. Fifth, structural inequalities in credit allocation require targeted digital interventions to rebalance lending toward productive sectors with significant employment implications for small state economies.

Policy implications span multiple domains as illustrated in Figure 7. Governments must invest in digital infrastructure as foundational public goods. Digital literacy programmes should target vulnerable populations, including women, older adults, and indigenous communities. Regulatory frameworks must balance innovation with robust consumer protection, using tools like regulatory sandboxes to test innovations safely. Financial institutions should prioritise user-centred design, incorporating feedback from target populations. Sector-specific digital finance initiatives should be developed to address credit allocation imbalances, particularly in agriculture, with explicit employment generation targets.

FinTech has emerged as a powerful tool in combating rural poverty by expanding access to financial services, facilitating microfinance, enabling digital payments, promoting agricultural technologies, providing financial literacy, creating employment opportunities, and recalibrating sectoral credit allocation. Ongoing collaboration among FinTech companies, government entities, and financial institutions will be essential to ensure benefits reach the most marginalised regions and productive sectors.



Source: Author analysis based on comparative study findings

Figure 7. Policy Implications for Inclusive Digital Financial Ecosystems

Source: Authors' own analysis based on comparative study findings.

6. Conclusion

This research examined the role of FinTech innovation in advancing financial inclusion in rural India and New Zealand, revealing both transformative potential and persistent implementation challenges. Key findings indicate substantial progress in account ownership and digital payment adoption, yet significant rural-urban and demographic disparities persist. Infrastructure deficits, digital literacy gaps, socio-cultural factors,

and structural inequalities in credit allocation constrain inclusive financial development across different levels of economic development.

India's ambitious digital public infrastructure initiatives demonstrate the feasibility of large-scale transformation, while New Zealand's experience highlights the importance of culturally responsive approaches and the need to address sectoral lending imbalances with their employment implications. FinTech innovations are reshaping rural banking in India, enabling financial inclusion for approximately 300 million rural individuals through technologies such as micro-ATMs, BC models, VLE frameworks, and AI. Case studies including Axis Bank-ITC, Paytm, and IPPB illustrate scalability and transformative potential.

The research further demonstrates how FinTech can rebalance sectoral credit allocation toward productive sectors like agriculture through alternative data, specialised platforms, and digital public infrastructure. In New Zealand, digital innovations offer pathways to increase agriculture's share of business lending from 11% to 18–20%, mobilising additional capital for productive investment while enhancing inclusion for Māori agribusinesses. Critically, this credit recalibration carries significant employment implications for New Zealand's small state economy, potentially addressing structural unemployment through direct job creation in agriculture (16,800–25,200 jobs) and indirect employment in value-added processing and services (31,500–42,000 jobs), with benefits for youth, Māori and Pacific communities, and regional economies.

The stability of FinTech-driven systems hinges on robust governance, adaptive market frameworks, and effective regulatory oversight. Historical disruptions and the post-COVID-19 acceleration underscore the need for vigilant regulation to mitigate risks such as cybersecurity threats and digital literacy gaps.

The findings of this study carry several concrete implications for policymakers and financial sector actors. First, governments in both developing and developed economies should prioritise digital public infrastructure, particularly interoperable payment rails and digital identity systems, as foundational investments that catalyse private sector inclusion. Second, regulatory sandboxes should be adapted with sector-specific tracks for agricultural FinTech, enabling controlled testing of alternative credit scoring and embedded finance models that address persistent collateral-based exclusion. Third, financial institutions operating in contexts with significant indigenous or minority communities, such as Māori and Pacific peoples in New Zealand or tribal populations in rural India, should mandate culturally co-designed product development, moving beyond surface-level adaptation toward structural integration of collective economic values. Fourth, policymakers in small state economies should formally incorporate FinTech-enabled credit recalibration into employment and regional development strategies, given the quantified multiplier effects demonstrated in the agricultural sector analysis. Fifth, sustainability-linked financial products and digital green bond platforms require coordinated regulatory support to scale beyond pilot stages and contribute meaningfully to climate resilience in both agricultural and energy contexts.

Future research should examine longitudinal impacts through rigorous evaluations, investigate emerging technologies, expand comparative studies across diverse settings, and analyse the long-term effects of digital interventions on sectoral credit allocation patterns and employment outcomes. Achieving universal financial inclusion requires sustained commitment across governments, financial institutions, FinTech innovators, and communities. By fostering collaborative ecosystems that leverage FinTech's agility alongside traditional banking's stability, societies can build inclusive, resilient financial systems that empower

marginalised populations, rebalance credit toward productive sectors, generate meaningful employment, and drive sustainable, equitable economic growth in both developing and developed contexts.

Data Availability Statement

The data supporting the findings of this study are publicly available. World Bank Global Findex Database data are accessible at <https://www.worldbank.org/en/publication/globalindex>. Reserve Bank of India statistics are available at <https://www.rbi.org.in/>. National Payments Corporation of India data can be accessed at <https://www.npci.org.in/>. Reserve Bank of New Zealand reports and sectoral lending data are available at <https://www.rbnz.govt.nz/>. Statistics New Zealand data at <https://www.stats.govt.nz/>. Payments NZ data are accessible at <https://www.paymentsnz.co.nz/>.

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Declaration of the Use of Generative AI

Used Grammarly to assist with grammar and sentence-level proofreading.

Conflicts of Interest

The author declares no conflict of interest.

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