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Enhancing Financial Inclusion through Digital Literacy and Fintech: Evidence from Informal Micro-Enterprises in Johannesburg

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ABSTRACT

This paper investigates how digital literacy impacts fintech adoption and financial inclusion among informal micro-enterprises in developing economies. Employing a systematic literature review and qualitative thematic analysis, the study synthesizes insights from 68 academic and institutional sources and field data collected from 37 informal entrepreneurs in Johannesburg. Key findings reveal that digital knowledge gaps, trust deficits, and lack of support structures hinder fintech adoption. However, a latent willingness to learn and adapt exists, especially with localized support mechanisms. The study recommends policy, design, and training interventions tailored to low-literacy environments.

Keywords: Digital Literacy, Fintech Adoption, Financial Inclusion, Informal Sector, Micro-Enterprises, South Africa

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1. Introduction

1.1 . Background of the Study

In recent years, the rapid expansion of financial technology (fintech) has opened new avenues for enhancing financial inclusion in emerging economies. Fintech innovations—ranging from mobile payments and peer-to-peer lending to blockchain-based savings platforms—have the potential to bridge gaps in financial access, especially for individuals and businesses historically excluded from formal financial systems (Demirgüç-Kunt et al., 2022;Ozili, 2023). Among these underserved groups are informal micro enterprises, which represent a substantial segment of economic activity in developing regions but often operate outside formal regulatory and financial frameworks (Agyemang & Boateng, 2022).

Despite the promise of fintech, its benefits are not evenly distributed. One of the emerging barriers to its effective use—especially among informal micro-entrepreneurs—is the level of digital literacy possessed by the user. Digital literacy encompasses more than technical familiarity with devices; it also involves the cognitive, financial, and navigational skills required to engage meaningfully with digital platforms (Bashir & Madhavaiah, 2023;Van Deursen & Helsper, 2022). In environments where education levels are low and exposure to

technology is uneven, limited digital skills can impede adoption and reduce the long-term value of fintech tools.

Understanding how digital literacy influences the ability of informal micro enterprises to adopt and benefit from fintech is therefore critical. As governments and development agencies increasingly look to digital solutions to drive inclusive finance, questions also persist about the readiness of users and the structural supports needed to ensure equitable adoption. This research seeks to explore the ways in which digital literacy either facilitates or constrains the impact of fintech on financial inclusion in the informal sector.

Digital literacy has emerged as a foundational enabler for equitable participation in financial ecosystems, especially among informal micro-enterprises operating within developing economies. These enterprises—unregistered, small-scale, owner-operated businesses—face significant challenges in leveraging fintech tools due to digital skill deficits, infrastructural limitations, and mistrust. This review investigates how digital literacy influences fintech adoption and financial inclusion outcomes such as access, usage, and empowerment.

The rationale for this research lies in the quest to uncover the specific digital skills gaps hindering fintech adoption, explore the contextual factors influencing these gaps within Johannesburg's unique informal sector, and identify pathways to improve digital literacy and, consequently, financial inclusion. By focusing on Johannesburg, the study can provide targeted, actionable insights for policymakers, NGOs, and fintech providers to develop effective strategies that empower informal micro-enterprises, foster economic growth, and reduce financial disparities.

The set objectives in this study therefore are:

1. To examine the relationship between digital literacy and fintech adoption among informal micro-enterprises.
2. To identify key digital literacy-related challenges that hinder fintech use.
3. To explore the extent to which digital literacy influences financial inclusion outcomes.
4. To assess the role of capacity-building mechanisms.
5. To recommend strategies for inclusive digital financial ecosystems.

1.2 Theoretical Framework

This study is grounded in the intersection of two key theoretical concepts: Diffusion of Innovations Theory (Rogers, 2003) and the Digital Inclusion Framework (Van Dijk, 2020). Together, these theories provide a robust foundation for understanding how digital literacy facilitates or constrains the adoption of fintech solutions and their subsequent impact on financial inclusion within informal micro-enterprises.

The integration of Diffusion of Innovations Theory (DOI) and the Digital Inclusion Framework (DIF) in a mixed-methods approach provides a comprehensive lens to analyze how digital literacy shapes fintech's role in financial inclusion for informal micro-enterprises. DOI's focus on innovation attributes (e.g., perceived *relative advantage* of mobile payments or *compatibility* with existing cash-based practices) explains behavioral adoption patterns, while DIF's emphasis on *skills access* (digital literacy) and *material access* (device/internet availability) identifies structural barriers.

1.3 Diffusion of Innovations Theory (DOI)

Rogers' (2003) Diffusion of Innovations theory posits that the adoption of new technologies is influenced by factors such as perceived usefulness, complexity, trialability, and

observability. Within the context of informal micro-enterprises, digital literacy acts as a mediating factor that determines how easily fintech innovations are understood, evaluated, and integrated into daily business operations. Entrepreneurs with higher digital literacy are more likely to perceive fintech as useful and manageable. They could experiment with new financial tools and share knowledge with peers. Thus, digital literacy accelerates the diffusion of fintech innovations within the informal sector (Bashir & Madhavaiah, 2023).

1.4. Digital Inclusion Framework

Van Dijk's (2020) Digital Inclusion Framework emphasizes the multi-dimensional nature of digital inequality, highlighting four critical access levels: motivational, material, skills, and usage. This framework supports the conceptualization of digital literacy as not merely technical know-how, but also involving motivational and socio-economic capacities.

The study draws on this framework to:

i. Identify the different dimensions of digital literacy affecting fintech use
ii. Examine the barriers to effective and equitable digital participation
iii. Highlight the role of external enablers (e.g., training, interface design, community support)

2. Literature Review

2.1. Digital Literacy vis-à-vis Fintech Adoption among Informal Micro Businesses

Digital literacy is a foundational factor influencing the adoption of fintech solutions, particularly for informal micro-enterprises operating in resource-constrained environments. The concept of digital literacy encompasses the ability to access, understand, evaluate, and use digital technologies effectively (Carretero et al., 2017; Ng, 2012). For micro-entrepreneurs, this literacy determines how confidently they engage with mobile banking, digital wallets, payment apps, and online marketplaces.

Studies by Senyo et al. (2023) and Ismail et al. (2023) reveal a strong positive correlation between digital competency and fintech adoption. Informal entrepreneurs with higher digital literacy levels are more likely to adopt mobile-based savings platforms, credit services, and digital payment tools. In South Africa, Goldstuck and Stork (2023) report that digital self-confidence—not just access—was the strongest predictor of fintech adoption among micro-enterprises.

Moreover, digital literacy serves as a mediator between access to technology and real time usage. While mobile innovation is high in many developing regions, Ndung' and Signé (2020) observed that the actual usage of fintech tools remains uneven, largely due to skill gaps. This reinforces the critical role digital literacy plays in bridging the gap between access and meaningful adoption.

2.2. Barriers in Digital Literacy to Fintech Adoption among Underbanked Entrepreneurs

Although digital infrastructure and mobile access have expanded significantly in many developing regions, informal micro-enterprises still face significant literacy-related barriers that hinder the effective adoption of fintech solutions.

Firstly, low cognitive and technical competence remains a primary obstacle. Many informal entrepreneurs lack the skills to operate digital financial interfaces, navigate fintech applications, or resolve basic technical issues. For example, Ghosh and Vinod (2021) identified technical illiteracy as a leading reason why individuals in India's urban slums avoided using digital wallets.

Also, the complexity of language and platform interfaces further discourages uptake. Most fintech platforms are designed in dominant or global languages, often neglecting local linguistic diversity and

intuitive visual cues. As Mtebe and Raisamo (2021) assert, language inaccessibility effectively marginalizes non-English-speaking and first-time users, reinforcing exclusion.

Furthermore, digital anxiety and low self-efficacy compound the issue. Even when access exists, many users—particularly women and rural entrepreneurs—fear making costly mistakes, being defrauded, or misusing fintech tools. Arora and Rahman (2020) emphasize that this emotional barrier plays a major role in limiting user confidence and engagement.

Additionally, infrastructure constraints, such as inconsistent internet connectivity and unreliable electricity, further erode trust and limit opportunities for hands-on learning. As noted by Ndung'u and Signé (2020), these environmental factors lead to fragmented use patterns and undermine the development of routine fintech behaviors.

Finally, cybersecurity concerns and limited awareness of digital risks prevent many informal entrepreneurs from trusting fintech platforms. A significant proportion of users are unaware of how to safeguard personal data or recognize digital fraud, fueling reluctance to engage. Mohapatra and Yadav (2023) highlight that the absence of cybersecurity literacy reduces user confidence and exposes them to potential exploitation.

Together, these factors form a cascading barrier to inclusive fintech adoption, indicating that improving digital literacy must involve not just access, but tailored education, culturally relevant interface design, and infrastructural support.

These challenges emphasize the importance of addressing not just digital access, but user capability, confidence, and contextual design—especially for low-literacy, low-income populations.

2.3. Digital Literacy and Financial Inclusivity

Inclusively, therefore, and by relational connect, digital literacy directly impacts financial inclusion by enabling users to navigate and benefit from financial tools. Financial inclusion—defined as access to affordable, useful financial services—depends not only on availability but also on individuals' capability to use such services proficiently (OECD, 2023).

Fanta and Mutsonziwa (2022) found that digital literacy significantly influenced savings behavior and financial planning among low-income users in Sub-Saharan Africa. Literate users were more likely to compare financial products, avoid scams, and use digital budgeting tools.

Similarly, Valtonen et al. (2022) report that higher digital competency improves users' ability to manage online credit, interpret interest rates, and track expenses—outcomes essential for micro-enterprise sustainability. In this regard, digital literacy enhances not only access but also quality of engagement with financial services.

Furthermore, digital fluency promotes trust, which is vital for the use of fintech services such as digital lending and peer-to-peer transfers. As Pangrazio et al. (2020) argue, digital identity management and the ability to curate online reputations influence how users are perceived and scored on fintech platforms—an indirect but critical channel through which literacy shapes inclusion.

2.4. Evaluating the Impact of Capacity-Building Initiatives on Digital Financial Participation

Capacity-building mechanisms are essential in enabling informal micro-entrepreneurs to effectively access and navigate digital financial tools. These interventions enhance both the confidence and competence required for fintech adoption, particularly among users with low baseline digital literacy.

One notable approach is the use of community-based learning models, where peer-led sessions and mobile outreach programs offer localized support. These initiatives foster trust and familiarity through shared experience. Arief et al. (2023) demonstrated that women entrepreneurs in Indonesia significantly improved their fintech engagement after participating in smartphone-driven community training sessions.

In addition, mobile-first and blended learning approaches have emerged as effective channels for reaching digitally marginalized users. Training delivered via SMS or WhatsApp, especially when customized for low-literacy learners, promotes accessibility and retention. According to GSMA (2021), mobile-delivered, contextual digital education increased fintech knowledge retention by over 60% among informal workers.

Moreover, combining digital and financial competencies has proven especially impactful. Integrated e-literacy and financial training frameworks, such as the OECD's (2023) Digital Financial Literacy Framework, help learners acquire both the technical skills to navigate platforms and the conceptual understanding needed for responsible financial behavior.

Sustained adoption, however, often depends on mentorship and ongoing ecosystem support. Rather than relying on one-off interventions, programs that embed fintech agents within communities or pair users with digital mentors can offer continuous guidance and confidence-building. Ndiege et al. (2019) emphasize that this continuity fosters stronger long-term engagement with digital tools.

Therefore, in capacity-building, efforts must be contextual, sustained, and user-centric. Effective training is not just about transferring knowledge—it requires integrating local language, cultural relevance, and practical, experiential learning methods into every stage of the digital empowerment journey

2.5. A Brief Regional Review of the Relationship Between Digital Literacy and Fintech Adoption Among Informal or Underbanked Populations.

The data extraction process involved reviewing selected peer-reviewed journal articles and reports that directly addressed the relationship between digital literacy and fintech adoption, with emphasis on informal or underbanked populations. Each article was evaluated for its relevance to one or more of the three focal areas: (i) influence of digital skills on fintech tools such as mobile banking, e-wallets, online lending, and savings platforms; (ii) the relationship between digital confidence and the use of fintech services; and (iii) the extent to which improved digital literacy contributes to more responsible financial behaviors. The findings from the selected studies are discussed below.

2.5.1. Goldstuck and Stork (2023)

In a South African context, Goldstuck and Stork conducted a mixed-methods study to examine how digital confidence—defined as the belief in one's ability to effectively use technology—influences fintech adoption. Their findings indicate that users with high digital confidence were 42% more likely to consistently use mobile banking and savings apps. Interestingly, digital confidence was found to be a stronger predictor of usage continuity than even formal education level. The authors argue that building trust and reducing perceived complexity are as crucial as digital training itself.

2.5.2. Ghosh and Vinod (2021)

This Indian study analyzed e-wallet use among low-income urban residents. The authors found that even when fintech access is widespread, poor digital literacy significantly constrains adoption. Respondents who lacked basic navigation skills—such as understanding app permissions or identifying transaction errors—were more likely to avoid using fintech tools. The study also highlights the importance of contextual literacy, such as language localization and cultural familiarity with digital processes, in driving meaningful engagement with fintech platforms.

2.5.3. Fanta and Mutsonziwa (2022)

A survey of mobile savings platform users across three Sub-Saharan African countries revealed that digital literacy strongly correlated with the use of fintech services. Respondents

with a basic understanding of smartphone usage and financial terms were 35% more likely to use mobile savings apps effectively. Moreover, digitally literate users were more likely to set savings goals, use budgeting features, and report increased trust in digital financial service providers.

2.5.4. Arora and Rahman (2020)

This qualitative study from Bangladesh focused on the role of trust and digital skill in influencing digital lending behaviors. The authors found that users with low digital competence often experienced anxiety when using online lending apps due to fear of misinformation or data misuse. Those with moderate to high digital skills expressed greater confidence in managing digital credit applications and loan repayment schedules. The study concludes that trust is not merely a function of product reputation, but also of the user's digital fluency.

2.6. OECD (2023)

The OECD's global report on digital financial literacy presents compelling evidence that digital competence enhances financial behavior and resilience. Drawing from case studies across multiple regions, the report identifies that targeted digital literacy interventions led to measurable improvements in users' ability to compare financial products, avoid scams, and make informed financial decisions. Importantly, it emphasizes the integration of financial education with digital skill-building as essential for long-term inclusion.

2.7. Digital Literacy Assessment and Models Among Informal Small and Medium Entrepreneurs (SMEs)

As previously established in this review, digital literacy encompasses more than the ability to use digital devices—it includes cognitive, socio-emotional, and critical thinking skills necessary for engaging effectively in digital environments (Eshet, 2012;Ng, 2012). Among informal entrepreneurs, digital literacy is context-bound and often acquired informally or through peer learning (Pangrazio et al., 2020).

The informal economy, characterized by unregistered businesses, cash-based transactions, and low barriers to entry, often lacks institutional support for digital transformation (Williams & Shahid, 2016). This constrains the ability of entrepreneurs to access structured learning resources or formal assessments of digital skills. Consequently, assessments and models must be adapted to the lived realities of these entrepreneurs—such as mobile-first access, multilingual needs, and low exposure to formal education systems (Ofori-Atta & Mould-Millman, 2021; UNESCO, 2018). One common approach to assessing digital literacy among informal SMEs is e-readiness surveys, which evaluate an entrepreneur's preparedness to adopt and benefit from digital technologies.

For instance, Ismail et al. (2023) conducted a study in South Africa using a structured e-readiness tool tailored for informal sector service providers. The tool assessed awareness, device access, use of web-based portals, and self-efficacy. Results highlighted gaps in both access and confidence, underscoring the need for blended support that combines technical training with motivational elements. Frameworks such as the European Commission's DigComp have been adapted to evaluate digital competence in informal settings. Although originally designed for European citizens, its five areas—information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving—are increasingly applied in low-resource contexts to assess SMEs' digital capacities (Carretero et al., 2017).

In a study by Soomro et al. (2020), the DigComp framework was localized for informal markets in Pakistan, revealing that the majority of entrepreneurs exhibited basic content consumption skills but lacked skills in content creation or cybersecurity. More recent literature emphasizes culturally responsive assessments. A 2023 study by Hidayatullah et al. developed a community-based digital literacy rubric specifically for Indonesian women micro-entrepreneurs, incorporating dimensions such as mobile payment literacy, social media marketing proficiency, and online safety awareness. This tool emphasized practical digital tasks rather than abstract digital knowledge, making it more accessible to informal entrepreneurs with limited formal education.

2.8. Digital Literacy Development Models for Informal SMEs

2.8.1. Community-Based Educational Models

These models leverage local institutions such as women's groups, youth organizations, and cooperatives to deliver peer-based digital training. They emphasize social learning, affordability, and localized content. For example, Arief et al. (2023) implemented a community-based digital literacy model in Indonesia that improved marketing skills among rural women entrepreneurs through storytelling, peer mentoring, and hands-on mobile training. The study found that informal learning in familiar environments significantly boosted retention and adoption.

2.8.2. E-Literacy Adoption Model

Ndiege et al. (2019) introduced an e-literacy adoption model that links digital skills to business performance, particularly among informal SMEs in Sub-Saharan Africa. This model recognizes digital literacy as a moderating variable—it enhances the positive relationship between ICT adoption and improved business performance when e-literacy is present. This model includes the following components:

- Perceived usefulness of technology
- Digital confidence and self-efficacy
- Supportive business information strategies
- Training and mentorship availability

The model has been validated among women entrepreneurs in Nigeria and Kenya and emphasizes the importance of contextual variables such as education level, gender norms, and digital access.

2.8.3. Micro learning and Mobile-First Models

Given that most informal entrepreneurs in Africa and Asia access the internet primarily via mobile phones, mobile-first and micro learning models have gained traction. These models use WhatsApp, Facebook, or SMS for skill delivery. For instance, GSMA (2021) piloted a mobile-based digital literacy program for women-led informal businesses in Kenya, using WhatsApp to deliver short, audio-visual lessons on mobile money, cybersecurity, and online customer engagement. Results showed increased confidence and digital uptake within 3–6 months of participation.

2.9. Limitations in Current Assessments and Models

Despite notable advancements in the study and practice of digital literacy for informal SMEs, several critical limitations persist in existing assessments and development models. These gaps hinder the ability of researchers, policymakers, and practitioners to design scalable,

contextually relevant interventions. The following key limitations are consistently highlighted in recent academic literature:

2.9.1. Lack of Longitudinal Studies on the Sustained Impact of Digital Literacy Programs

Many digital literacy assessments and interventions for informal entrepreneurs are evaluated using short-term or cross-sectional data, which limits understanding of their long-term effectiveness or sustained behavioral change. This is particularly problematic given that digital skills, like any form of human capital, require reinforcement, adaptation, and integration over time (Carretero et al., 2023; Soomro et al., 2020).

A systematic review by Valtonen et al. (2022) found that most digital literacy interventions reported immediate improvements in confidence or skill acquisition but lacked follow-up studies beyond six months to determine if the skills translated into improved business outcomes or technology retention.

Furthermore, Ofori-Atta and Mould-Millman (2021) emphasize that informal entrepreneurs often revert to analog practices after training due to infrastructural challenges or lack of ongoing digital support. This relapse underscores the need for longitudinal mixed-methods studies that track not only skill retention but also the translation of those skills into sustained business performance.

2.9.2. Inadequate Disaggregation of Digital Literacy into Nuanced, Business-Relevant Competencies

Existing assessments frequently treat digital literacy as a monolithic construct, measuring basic functional skills (e.g., ability to use a smartphone or send emails) without differentiating among higher-order digital business skills such as data analysis, content strategy, digital marketing, and platform optimization (Soomro et al., 2020; Chigona & Mbhele, 2021). A 2023 study by Mohapatra and Yadav in Technology in Society highlighted that informal micro-entrepreneurs often lack exposure to digital financial analytics, SEO optimization, and customer data management, even though these are pivotal for competitive advantage in e-commerce environments. Yet, these skills are rarely covered in standard digital literacy modules. Moreover, Arief et al. (2023) argue for "entrepreneurial digital literacy," which incorporates skills like mobile advertising, digital branding, and marketplace platform use—especially critical for informal women entrepreneurs. They emphasize that lack of skill granularity in assessments limits the alignment of training content with actual market needs, thus reducing the effectiveness of such interventions.

2.10. Underrepresentation of Informal Entrepreneurs in Rural and Linguistically Diverse Regions

Global digital literacy frameworks and assessment tools (such as UNESCO's Digital Literacy Global Framework or EU's DigComp 2.1) are often created with urban, literate populations in mind and do not sufficiently accommodate the cultural, linguistic, and infrastructural realities of rural informal entrepreneurs in low- and middle-income countries (Mtebe & Raisamo; 2021UNESCO, 2020). This has several consequences which include;

- Language Bias: Assessments administered in colonial or national languages may exclude participants whose primary language is indigenous or regional, thus skewing results or discouraging participation (Aker & Mbiti, 2020).

- Access Gaps: Entrepreneurs in rural areas face limitations such as poor internet coverage, unreliable electricity, and limited access to digital devices—factors rarely accounted for in global assessment instruments.
- Invisible Informality: Informal businesses that are home-based, seasonal, or run by marginalized groups (e.g., women, refugees, disabled individuals) are often not captured in national statistics or research samples, rendering them invisible in digital capacity planning (Ndung'u & Signé, 2020).

A recent study by Amoako and Lyon (2024) found that even in national digital inclusion initiatives, informal rural entrepreneurs were the least likely to be consulted in policy design, and their digital challenges were often generalized or misunderstood.

2.11. Conclusion

The literature clearly demonstrates that digital literacy is a foundational enabler of fintech adoption among informal micro-enterprises, directly influencing the extent to which these entrepreneurs can benefit from digital financial services. While fintech holds immense promise for enhancing financial inclusion, persistent digital literacy gaps—ranging from cognitive and technical limitations to digital anxiety and infrastructural barriers—continue to undermine its equitable uptake.

The review highlights that the relationship between digital literacy and fintech adoption is neither linear nor uniform; rather, it is shaped by sociocultural, linguistic, gendered, and infrastructural contexts. Informal micro-entrepreneurs, often operating at the margins of formal education and financial systems, require tailored interventions to overcome these multifaceted challenges.

Capacity-building mechanisms—especially community-driven, mobile-first, and blended learning models—emerge as critical tools for bridging these divides. When designed to integrate digital and financial literacy, delivered in local languages, and embedded in trusted social networks, these initiatives significantly improve user confidence, knowledge retention, and platform engagement. Moreover, ongoing mentorship and ecosystem support amplify the sustainability of fintech use among marginalized groups.

In conclusion, fostering inclusive digital financial ecosystems demands a multidimensional strategy. Beyond improving infrastructure and access, policymakers, fintech developers, and development actors must prioritize culturally adaptive, literacy-sensitive, and locally anchored training programs. Only by addressing digital literacy as both a skill set and a structural barrier can we unlock fintech's full potential for advancing financial inclusion among informal micro-enterprises.

3. Methodology

3.1. Design

This study adopts a mixed-method design, combining a systematic literature review and qualitative field research which is appropriate for understanding complex social phenomena such as how digital literacy mediates fintech adoption among informal micro-enterprises. A qualitative approach allows for an in-depth exploration of perceptions, lived experiences, and socio-cultural contexts that are not easily quantifiable (Creswell & Poth, 2018; Yin, 2023). PRISMA guidelines shaped the review process.

3.2. Sample and Data Collection

A purposive sampling technique was employed to select information-rich cases based on the following criteria:

The enterprise is classified as informal (not registered with formal tax authorities or regulators)**.** The enterprise owner or manager has had exposure to or experience with fintech services (e.g., mobile money, digital savings, online credit)**.** The participant has varying degrees of digital literacy (low to high). This approach aligns with Palinkas et al. (2015), who recommend purposive sampling for research focusing on variation in participant experience and context. In context, according to Guest et al., (2020) a total of 15 to 20 participants are considered sufficient for thematic saturation in a typical qualitative research (Chen et al., 2020). In this study however, about 68 relevant articles from 2018–2024 were reviewed and 37 informal entrepreneurs in Johannesburg were interviewed. About 70.2% were male and 29.8% female. Close to 74.1% were aged 18–29 Trades included groceries, local foodstuffs, taxi drivers, artisans, and cloth dealers, cosmetics traders and Cab drivers.

3.3. Data Analysis

Data were analyzed using thematic analysis, guided by Braun and Clarke's (2021) six-step process: familiarization, coding, theme development, theme review, defining themes, and report writing. NVivo software was used to manage coding and categorization. Vivo Ensures traceability and transparency of coding. It also enhances reliability and inter-coder agreement while supporting qualitative rigor and replicability (Jackson & Bazeley; 2019 Zamawe, 2015). Triangulation was achieved through cross-referencing findings with the literature and using demographic data to support thematic patterns (Nowell et al., 2017). Themes were derived inductively, allowing patterns to emerge from participant narratives rather than imposing pre-defined categories.

4. Results and Discussion

Table 1: Demographic Profile of Participants

Category	Subcategory	Frequency	Percentage (%)
Gender	Male	26	70.2%
Gender	Female	11	29.8%
Age	18–29	27	74.1%
Age	30–39	5	14.3%
Age	40–49	2	5.6%
Business Type	Groceries	9	24.3%
Business Type	Foodstuffs	6	16.2%
Business Type	Taxi Drivers	5	13.5%
Business Type	Artisans	8	21.6%
Business Type	Cloth & Accessories	9	24.3%
Business Experience	<1 year	6	16.2%
Business Experience	1–3 years	14	37.8%
Business Experience	4–6 years	10	27.0%
Business Experience	>6 years	7	18.9%
Number of Employees	Self-employed	20	54.0%
Number of Employees	1–2 employees	12	32.4%
Number of Employees	3+ employees	5	13.5%
Digital Literacy Level	No Experience	11	29.7%
Digital Literacy Level	Basic Skills	18	48.6%
Digital Literacy Level	Intermediate	8	21.6%
Formal Financial Education	Yes	17	45.9%
Formal Financial Education	No	20	54.1%

N=37

A qualitative inquiry was conducted with 37 informal entrepreneurs in Johannesburg, revealing a complex interplay of digital literacy, trust, fintech exposure, and willingness to adapt. Participants included grocery traders, artisans, local foodstuff sellers, taxi drivers, and accessories retailers.

Thematic analysis (TA) was selected as the core qualitative method for interpreting interview data from 37 informal entrepreneurs in Johannesburg. This method is especially suited for exploring lived experiences, identifying patterns, and interpreting meaning in contexts where little formal research exists (Braun & Clarke, 2006; Nowell et al., 2017).

The five emergent themes were:

4.1. Theme 1: Digital Literacy as a Gateway to Fintech Usage

Participants consistently emphasized that digital literacy was foundational to their ability to engage with fintech services. Those who possessed basic mobile and financial skills demonstrated greater confidence in using mobile money, applying for digital loans, and navigating fintech apps.

"I had to learn from my son how to use the app. At first, I feared pressing the wrong button and losing money."
(Participant A, clothing trader).

This aligns with Bashir and Madhavaiah (2023), who argue that digital literacy improves technology self-efficacy, thereby increasing fintech adoption rates in low-income communities.Lack of literacy often resulted in dependence on third parties, increasing exposure to fraud or mismanagement—highlighting a gap in inclusive fintech design.

4.2. Theme 2: Barriers to Adoption Due to Digital Skill Limitations

Informal micro-entrepreneurs without adequate digital literacy faced multiple challenges: Misunderstanding fintech terms (e.g., interest, credit scores); fear of making errors on digital platforms; difficulty troubleshooting app errors or phone issues.

"I stopped using the wallet after I lost some money because I didn't understand the charges."
(Participant F, street food vendor)

Such findings support Van Deursen and Helsper's (2022) view that digital inequality extends beyond access to encompass comprehension and application. This theme illustrates how digital skill limitations can block fintech's potential to close financial gaps.

4.3. Theme 3: Impact of Digital Literacy on Financial Inclusion Outcomes

Participants with digital literacy indicate more positive financial outcomes-easier access to emergency loans, better record-keeping and business tracking and participation in online marketplaces

"Since I learned how to use the loan app, I no longer wait for family support. I can take care of stock problems quickly."
(Participant D, cosmetics seller)

These insights reinforce the findings of Agyemang and Boateng (2022), who noted that fintech can enhance entrepreneurial capacity when users have adequate digital support. Here, digital literacy is a critical enabler of financial empowerment.

4.4. Theme 4: Trust and Confidence as Extensions of Digital Competence

Several respondents linked digital literacy to a sense of control and trust in digital systems. This theme encompasses fears of fraud, uncertainty in digital transactions, and lack of recourse mechanisms. It reflects a consistent pattern in literature that informal users are wary of financial digitization without protective systems in place (Kikulwe et al., 2019). However, those who understood the platforms' logic, terms, and security measures were less likely to distrust the system or fall for scams.

"Now that I know how to check my balance and get alerts, I feel safer using the mobile wallet."
(Participant H, secondhand clothing dealer)

This finding echoes World Bank (2023), which emphasizes that financial literacy—especially in digital form—supports informed decision-making and safeguards against predatory practices.

4.5. Theme 5: Recommendations for Capacity Building

Despite challenges, most respondents indicated a willingness to learn and adapt. This theme aligns with Duflo and Banerjee's (2023) work showing potential for inclusive adoption if capacity-building support is provided. Participants widely expressed interest in receiving digital training through community centers, peer learning, or government-sponsored initiatives. Many noted that once trained, they could help others in their network, indicating the potential for community multiplier effects.

"If there was training nearby, I would go. I want to understand how these apps really work, so I can teach others too."
(Participant J, informal tailor)

This further substantiates the findings of Ragnedda and Mutsvairo (2021), who advocate for community-led digital inclusion strategies to address systemic inequities.

The findings demonstrate that digital literacy is not a peripheral skill, but rather a central enabler that determines whether fintech tools lead to real financial inclusion among informal micro-entrepreneurs. While fintech platforms are technically accessible, their value is severely diminished in low-literacy contexts. By situating these findings within the Diffusion of Innovations Theory and the Digital Inclusion Framework, the study confirms that the perceived complexity of fintech tools, combined with skill deficits, delays adoption and limits impact. Conversely, where digital literacy exists, fintech becomes a powerful tool for reducing exclusion, improving financial resilience, and supporting micro-enterprise development.

5. Policy and Design Recommendations

To enhance the digital engagement of informal micro-enterprises, a holistic, inclusive, and multi-stakeholder approach is needed. Policymakers should prioritize the establishment of community-based digital literacy hubs within informal trading zones, leveraging available infrastructure like libraries and municipal community centers. These hubs should offer free or subsidized training on basic digital and financial tools. Moreover, there is an urgent need to

embed digital and financial literacy modules into national vocational and entrepreneurship curricula, thereby institutionalizing skill-building for both youth and adults.

Fintech developers must adopt human-centered design strategies that involve informal users during development stages. Applications should feature voice-guided navigation and vernacular language options to cater to low-literacy users. Additional design considerations include providing SMS-based transaction receipts, incorporating offline functionality, and introducing fail-safe mechanisms that prevent erroneous financial entries.

For NGOs and training institutions, there is a need to offer mobile-friendly, scenario-based training content accessible even on basic phones. These organizations can also collaborate with mobile network operators to deliver SMS-based fintech education. Training community ambassadors or peer educators will foster continuous local mentoring and knowledge sharing.

Community-based digital literacy hubs, for example, should not be treated as temporary projects but embedded into municipal or national development plans. To ensure their continuity, partnerships with local governments, educational institutions, NGOs, and telecom providers should be formalized. These hubs can be monitored and evaluated through performance metrics such as user engagement rates, digital skill improvement, and fintech adoption levels. Utilizing mobile money agents and cooperatives as decentralized training nodes can further enhance sustainability by leveraging existing trust networks and physical infrastructure. Moreover, policy frameworks should incentivize fintech companies to support ongoing education efforts—possibly through corporate social responsibility commitments or innovation grants—while regulatory bodies must embed digital inclusion as a compliance requirement in fintech licensing protocols.

Cross-sectoral collaboration remains critical. Governments, academia, fintech firms, and civil society organizations must coordinate to develop, test, and scale context-sensitive digital literacy programs. Utilizing trusted intermediaries like mobile money agents and cooperatives as digital education points will improve uptake and sustainability.

6. Conclusion

This study confirms that digital literacy is a powerful enabler of fintech adoption and financial inclusion among informal micro-enterprises in developing contexts. The evidence shows that, despite pervasive access to mobile devices, usage of digital financial services remains constrained by skill gaps, mistrust, and poor support systems. However, the expressed willingness of participants to embrace digital tools if guided appropriately presents a strategic opportunity for intervention.

By improving digital competencies, particularly through inclusive and localized training strategies, informal entrepreneurs can be better positioned to benefit from mobile banking, e-wallets, and online credit solutions. Moreover, addressing gender and generational gaps, integrating community support, and improving the design of fintech products will further amplify their impact.

For policymakers, fintech developers, and NGOs, a coordinated effort toward embedding digital literacy within entrepreneurship ecosystems is critical. Only through such alignment can digital financial services evolve into truly inclusive platforms that bridge the economic divide and catalyze sustainable development in informal economies.

Finally, future longitudinal studies are recommended to observe how behavior and fintech engagement evolve over time, particularly after digital literacy interventions. These studies

would offer deeper insight into the social and economic returns of digital inclusion efforts and support evidence-based scaling of successful models.

References

Adeniran, A., & Akinbode, A. (2022). Fintech innovation and financial inclusion in Nigeria: Challenges and policy options. *Journal of Financial Innovation and Digital Economy*, *3*(1), 45–67.

Agyemang, F. S., & Boateng, H. (2022). Barriers to formal financial services for informal enterprises in sub-Saharan Africa. *Journal of African Business*, *23*(1), 115–132. https://doi.org/10.1080/15228916.2020.1844546

Aker, J. C., & Ksoll, C. (2019). Can mobile learning improve literacy and numeracy? *American Economic Journal: Applied Economics*, *11*(2), 1–30.

Aker, J. C., Blumenstock, J., & Chuang, E. (2021). Scaling digital literacy. *Journal of Development Studies*, *57*(4), 675–692.

Akpan, I., & Muthinja, M. (2021). Determinants of mobile fintech use among small businesses. *Journal of African Business*, *22*(1), 112–132.

Alampay, E., Roldan, A., & Angeles, L. (2020). Enhancing digital literacy in marginalized communities. *Information Technology for Development*, *26*(3), 456–474.

Amoako, I. O., & Lyon, F. (2024). Digital disengagement and informal economy in Africa: Implications for inclusive digital development. *International Journal of Information Management*, *74*, 102597.

Arief, M., Hidayatullah, R., & Hakim, L. (2023). Digital literacy model to improve the marketing skills of micro, small, and medium enterprises women with a community-based educational approach. *ResearchGate*. https://www.researchgate.net/publication/384380669

Arora, R., & Rahman, A. (2020). Trust, literacy, and fintech use among low-income consumers in Bangladesh. *Journal of Financial Services Marketing*, *25*(4), 234–248.

Banerjee, A., & Duflo, E. (2023). Financial lives of the poor revisited. *MIT Poverty Action Lab Working Paper*.

Bashir, M., & Madhavaiah, C. (2023). Digital financial literacy and its role in fintech adoption among micro-enterprises. *International Journal of Bank Marketing*, *41*(4), 823–843.

Boudreau, K. J., & Jeppesen, L. B. (2015). Unpaid crowd complementors: The platform network effect mirage. *Strategic Management Journal*, *36*(12), 1761–1777. https://doi.org/10.1002/smj.2324

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. SAGE Publications.

Carretero, S., Punie, Y., & Vuorikari, R. (2023). *The Digital Competence Framework for Citizens – DigComp 2.2: The new European digital literacy framework*. Joint Research Centre, European Commission.

Carretero, S., Vuorikari, R., & Punie, Y. (2017). *DigComp 2.1: The digital competence framework for citizens*. Joint Research Centre, European Commission.

Chigona, W., & Mbhele, B. (2021). Digital inclusion of informal women traders in South Africa: Opportunities and constraints of fintech. *South African Journal of Information Management*, *23*(1), Article a1311.

Chikweche, T., & Fletcher, R. (2021). Digital technology adoption in informal microenterprises: The role of digital literacy. *Journal of Small Business and Enterprise Development*, *28*(3), 448–467. https://doi.org/10.1108/JSBED-07-2020-0268

Chisita, C. T., & Abdullahi, A. M. (2022). Digital skills for entrepreneurship in Africa: Opportunities and limitations. *African Journal of Information Systems*, *14*(1), 34–48.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.

Demirgüç-Kunt, A., Klapper, L., & Singer, D. (2022). Fintech and financial inclusion: A tale of two countries. *World Bank Working Paper No. 10123*.

Eshet, Y. (2012). Thinking in the digital era: A revised model for digital literacy. *Issues in Informing Science and Information Technology*, *9*, 267–276. https://doi.org/10.28945/1621

Fanta, A. B., & Mutsonziwa, K. (2021). Financial inclusion and inclusive growth in Africa: Some evidence. *African Development Review*, *33*(S1), S77–S89.

Ferrari, A., Brecko, B., & Punie, Y. (2019). *Digital competence frameworks in education and development*. JRC Scientific and Policy Reports.

Ghosh, S., & Vinod, D. (2021). Barriers to e-wallet use in rural India. *International Journal of Finance & Economics*, *26*(1), 109–123.

Goldstuck, A., & Stork, C. (2023). Digital confidence and fintech in South Africa. *Journal of African Digital Finance*, *12*(3), 177–192.

GSMA. (2021). *The mobile gender gap report*. GSMA Intelligence.

GSMA. (2023). *Mobile Internet Skills Training Toolkit (MISTT)*. London: GSMA. https://www.gsma.com/mistt

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? *Field Methods*, *18*(1), 59–82. https://doi.org/10.1177/1525822X05279903

Guest, G., Namey, E. E., & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. *PLOS ONE*, *15*(5), e0232076. https://doi.org/10.1371/journal.pone.0232076

Hawkins, P. (2021). *Capacity building and systems change in development*. Practical Action Publishing.

Ifinedo, P. (2022). Determinants of digital payment adoption in sub-Saharan Africa. *Information Development*, *38*(1), 44–57.

Kende, M., & Quast, B. (2023). The role of mobile money in financial inclusion in Africa. *GSMA Mobile for Development Report*. https://www.gsma.com/mobilemoney

Kikulwe, E. M., Fischer, E., & Qaim, M. (2020). Mobile money, smallholder farmers, and household welfare in Kenya. *World Development*, *79*, 175–191.

Kumar, A., & Jha, R. (2021). Fintech awareness and adoption among small enterprises. *Asian Journal of Economics and Banking*, *5*(2), 101–118.

Kuss, D. J., & Griffiths, M. D. (2021). Digital competence and digital literacy in Africa: A systematic review. *Technology in Society*, *65*, 101574.

Mbogo, M. (2021). Mobile payments and microbusinesses in Kenya. *Journal of Language, Technology & Entrepreneurship in Africa*, *3*(1), 182–203.

Mehrotra, A., & Dahiya, R. (2020). Understanding the fintech adoption landscape in India. *Indian Journal of Economics and Development*, *16*(2), 95–105.

Mohapatra, S., & Yadav, V. (2023). Cybersecurity awareness in digital financial systems: A study on informal workers. *Cybersecurity & Privacy Journal*, *3*(1), 45–59.

Mtebe, J. S., & Raisamo, R. (2021). Challenges in delivering digital skills training in Tanzania. *International Journal of Education and Development using ICT*, *17*(1), 99–114.

Muriithi, S. (2023). Bridging the digital divide in Africa: Role of informal entrepreneurship. *Development in Practice*, *33*(2), 175–190.

Ndung'u, N., & Signé, L. (2020). The role of digital infrastructure in the African fintech ecosystem. *Brookings Africa Growth Initiative Report*.

Ndiege, J. R., Qwabe, B., & Akinlabi, B. (2019). Exploring fintech literacy among South Africa's township micro-entrepreneurs. *South African Journal of Business Management*, *50*(1), Article a1335.

OECD. (2023). *Digital financial literacy framework: Strengthening consumer capabilities in digital finance*. Organisation for Economic Co-operation and Development. https://www.oecd.org/finance/digital-financial-literacy-framework.htm

Patel, D., & Patel, M. (2023). Local language design in fintech: Improving user engagement. *User Experience Review*, *12*(3), 33–47.

Poushter, J., Bishop, C., & Chwe, H. (2023). *Smartphone ownership and internet use continue to climb globally*. Pew Research Center. https://www.pewresearch.org

Quartey, P., & Afful-Mensah, G. (2023). Microenterprises, digitalisation, and productivity in Ghana. *Journal of African Economic Policy*, *10*(2), 22–38.

Sarpong, D., & Mordi, C. (2022). Exploring the readiness of small firms for digital transformation. *Technological Forecasting and Social Change*, *180*, 121676.

Sharma, A., & Kukreja, M. (2021). Gendered perspectives on digital literacy in low-income areas. *Feminist Economics*, *27*(3), 92–117.

Stork, C., Calandro, E., & Gamage, R. (2022). Gender digital divide in sub-Saharan Africa. *Journal of ICT Policy and Regulation*, *6*(2), 201–223.

Tapscott, D. (2023). *Building digital nations: The future of inclusion*. Blockchain Research Institute Press.

Tsai, K., & Yang, J. (2023). Peer mentoring for digital learning: Building resilience in informal communities. *International Journal of Educational Technology in Higher Education*, *20*, Article 25.

Tushabe, R., & Ismail, Z. (2022). Strengthening fintech capacity among underserved entrepreneurs. *African Journal of Fintech*, *4*(1), 51–69.

UNCTAD. (2022). *Digital economy report 2022: Cross-border data flows and development*. United Nations Conference on Trade and Development. https://unctad.org

Van Dijk, J. (2020). *The digital divide*. Polity Press.

World Bank. (2021). *Financial inclusion indicators*. https://datatopics.worldbank.org/financialinclusion/

World Economic Forum. (2023). *Shaping inclusive digital economies in Africa*. https://www.weforum.org