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Leveraging FinTech to Combat Protection Fees in Township Economies: Advancing Sustainable Economic Resilience Through Digital Payment Solutions

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Abstract

Criminal extortion and protection fees have emerged as significant threats to the sustainability of township businesses in South Africa, undermining entrepreneurship, formalisation, investment, and local economic development. This study examines how FinTech and complementary digital technologies may reduce the vulnerabilities associated with cash-based transactions while supporting longer-term economic resilience. It presents a qualitative systematic literature review of evidence published between 2016 and 2026, drawn from Scopus, Web of Science, Google Scholar, and supplemented by AI-assisted searching. The search yielded 8704 records, of which 114 were assessed in full-text and 48 were included in the final synthesis. The findings indicate that mobile money, digital payments, and blockchain-enabled systems may reduce cash dependency, improve transaction transparency and security, and strengthen financial participation. Complementary digital reporting and community platforms may further support collective responses to extortion. The review also identified a potential longer-term pathway from digital transaction records to greater financial visibility and formal financial participation; however, digital adoption does not automatically produce access to credit or eliminate extortion. Diffusion of innovation theory is used to explain how relative advantages, compatibility, complexity, trialability, and observability shape adoption. The study contributes to a governance-oriented FinTech framework in which digital payment adoption is understood as both a financial inclusion mechanism and a potential risk-reduction and formalisation pathway that could influence the sustainability of businesses. Its effectiveness depends on digital literacy, affordable infrastructure, institutional trust, enabling regulation, and multi-stakeholder collaboration.

Keywords: FinTech; blockchain; digital payments; mobile money; township enterprises; protection fees; economic resilience; sustainable development

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Academic Editor: Fabrizio D'Ascenzo

Received: 27 August 2026
Revised: 29 September 2026
Accepted: 5 October 2026
Published: 27 October 2026

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1. Introduction

Township businesses, often categorised as part of the informal economy, are a hallmark of resilience and resourcefulness in the face of socio-economic adversity in most African countries [1–3]. These businesses provide essential goods and services, create employment opportunities, and contribute to the local circulation of income. However, they are characterised by informality, which often excludes them from formal support mechanisms, such as

access to credit, infrastructure, and legal protections [4,5]. These structural constraints are especially consequential where enterprises depend heavily on physical cash. Cash-based transactions may be necessary for inclusion in low-resource environments, yet they can also increase exposure to theft, coercion and protection-fee demands while producing limited verifiable records of business activity.

Protection fees and extortion must therefore be understood not only as criminal risks but also as economic and institutional constraints on enterprise development. Ragolane and Khoza [6] link extortion and protection fees in South African townships to the interaction of socio-economic inequalities, ineffective governance and the remnants of apartheid spatial planning. Under apartheid, black South Africans were relocated to townships designed largely as labour reservoirs for urban industries, while these areas experienced systematic deficiencies in infrastructure, economic opportunities and law-enforcement presence [7,8]. Persistent unemployment, poverty, uneven infrastructure, and insecurity can consequently create conditions in which criminal networks exploit business vulnerability [9].

The nature and scale of extortion vary across township contexts. Informal businesses may be targeted individually, while in other areas extortion can become more organised, with networks controlling particular streets or sectors [10]. Businesses that resist or fail to comply with demands may face threats, vandalism or physical violence, creating a climate of fear and coercion [11]. For affected enterprises, repeated demands can reduce working capital, interrupt operations, discourage reinvestment and constrain entrepreneurial activity. Fear of retaliation can also discourage business owners from reporting incidents, while limited law-enforcement capacity may constrain efforts to address organised extortion [6,12]. Extortion therefore extends beyond the immediate financial cost of a payment to affect enterprise sustainability, institutional engagement and local economic development.

These vulnerabilities can be reinforced where entrepreneurs remain dependent on cash and operate outside formal support systems. Limited financial visibility, weak access to formal finance and constrained opportunities for technology upgrading may restrict enterprises' ability to absorb shocks and strengthen their resilience. The literature therefore points to the need for responses that address both immediate transaction-level vulnerability and the wider institutional conditions within which township enterprises operate.

FinTech innovations provide one potential pathway by reducing dependence on physical cash, strengthening transaction security and improving financial inclusion. Blockchain-enabled payment systems, for example, may reduce reliance on cash and increase the transparency of transactions, while mobile and digital payment solutions can support safer and more traceable commercial activity [13]. Complementary digital technologies, including smart security solutions such as surveillance and alarm systems, may support crime prevention and law-enforcement responsiveness [14]. Community-based digital alert platforms can further facilitate collective reporting, information sharing and coordinated responses to extortion [15].

The potential contribution of these technologies extends beyond reducing cash exposure. FinTech may support the resilience of township enterprises and contribute to inclusive local economic development by enabling more secure and transparent business environments. These potential contributions align with Sustainable Development Goals (SDGs) 8, 9 and 10, which focus respectively on decent work and economic growth, industry, innovation and infrastructure, and reduced inequalities [16]. Digital financial technologies can therefore be considered not only as technological innovations but also as potential enablers of more sustainable and inclusive township economies.

However, FinTech and complementary digital technologies should not be treated as stand-alone solutions. Their effectiveness depends on governance arrangements, enabling policies, institutional capacity and community participation [17]. Digital exclusion, limited

digital literacy, inadequate infrastructure and weak governance may restrict adoption or deepen existing inequalities [18]. High initial costs and inadequate institutional frameworks may further constrain the effectiveness and sustainability of technological interventions [19]. However, adoption of these technologies could be beneficial. For example, Juma'h and Albizri [20] demonstrated that voluntary reporting of crypto-asset activity can intersect with management discretion and long-term financing considerations. Appropriate technology access, digital literacy, inclusive digital governance and collaboration among businesses, government and civil society are therefore important conditions for translating technological adoption into meaningful economic outcomes.

This review therefore argues that these innovations represent a potential pathway rather than an automatic causal relationship. Cash-based business practices may increase exposure to protection-fee demands [21]. However, the use of secure digital payment mechanisms may reduce physical-cash exposure and improve transaction visibility, promoting financial inclusion [22]. This digital footprint helps build reliable transaction records and may create opportunities for financial inclusion and business resilience [23,24]. Nevertheless, these potential outcomes depend on the institutional, infrastructural, and social environment in which digital technologies are adopted. Digitalisation may also shift rather than eliminate risk when criminal actors adapt to new technologies or when reporting and law-enforcement systems remain weak.

This complexity of linking FinTech to protection-fee vulnerability, governance, risk reduction, and pathways to economic resilience creates a need for systematic synthesis across literature fragmented among FinTech, digital financial inclusion, informal enterprise, crime, governance, and development research [21–24]. Against this background, this study conducts a qualitative systematic literature review to synthesise evidence on the relationship between FinTech adoption, protection-fee vulnerability and economic resilience in township and comparable informal-enterprise contexts. The review explores mobile money, digital payment technologies, blockchain-enabled financial systems and complementary community-based digital platforms and how they could influence township business sustainability. The study uses Diffusion of Innovation (DOI) theory as an interpretive frame to examine how innovation characteristics and enabling conditions shape the potential contribution of these technologies. Therefore, the following research questions guided the review:

- What are the dynamics of extortion and protection fees in township economies and their impact on the sustainability of small and informal enterprises?
- How effective are FinTech innovations, including blockchain-enabled payments, mobile money, and community-based digital platforms, in reducing protection fees and strengthening the economic resilience of township businesses in comparable local and global socio-economic contexts?
- What policy, governance, and stakeholder collaboration approaches are identified in the literature as enabling FinTech innovations to strengthen township businesses' resilience to extortion?

The remainder of the paper is organised as follows. Section 2 presents the theoretical lens. Section 3 explains the systematic review design, search strategy, screening, appraisal and synthesis procedures. Section 4 presents the review findings across extortion dynamics, FinTech mechanisms and policy conditions. Section 5 discusses the findings, including the potential pathway from digital transaction security to financial inclusion and economic resilience. Section 6 concludes the paper and identifies directions for future empirical research.

2. Theoretical Lens: Diffusion of Innovation Theory

This study employs Diffusion of Innovation (DOI) theory as the primary interpretive framework for understanding FinTech adoption within township business environments. Developed by Rogers and refined through successive versions, DOI explains how new ideas, practices and technologies spread within a social system over time [25]. Adoption occurs through five stages: knowledge, persuasion, decision, implementation and confirmation and is influenced by the perceived relative advantage, compatibility, complexity, trialability and observability of an innovation [26].

Diffusion of innovation is particularly relevant to FinTech because digital payment and financial technologies introduce alternative ways of conducting transactions and accessing financial services [25]. Their adoption may vary according to organisational competence, risk awareness and broader structural characteristics within the business environment [25]. For township enterprises, perceived advantages such as reduced reliance on physical cash and greater transaction convenience may encourage adoption, whereas costs, complexity, limited digital capabilities and incompatibility with established practices may constrain it. Additionally, governance, trust, affordability, digital literacy, infrastructure, and community relationships are considered contextual conditions that may enable or constrain adoption and sustained use. This extends the application of DOI beyond individual technology-choice behaviour by recognising that innovation diffusion is embedded within the institutional, socioeconomic and security conditions of township business environments. This theory therefore provides a basis for understanding why township enterprises may adopt FinTech innovations differently.

3. Materials and Methods

This study employed a qualitative systematic literature review to investigate the role of FinTech innovations in facilitating economic resilience and protection against protection fees for township enterprises. A systematic review was chosen because of its rigorous, transparent, and reproducible approach to synthesising fragmented knowledge [27]. This methodology has gained increased visibility in the social sciences after 2000, as it is particularly valuable for combining evidence in sensitive, complicated, or underdeveloped contexts [28,29]. The review followed an eight-step process: (1) formulation of the research questions; (2) development of the review protocol; (3) literature search; (4) screening of studies; (5) quality appraisal; (6) data extraction; (7) thematic synthesis; and (8) reporting of findings [29].

Systematic reviews utilise a formal process to enhance academic dependability and restrict bias [30]. According to Kitchenham [31], this process is divided into three general phases: planning, execution, and reporting. Throughout the present study, the review process was utilised via an eight-step process [32] that involved formulation of the research questions, development of the review protocol, literature search, screening of studies, quality appraisal, data extraction, thematic synthesis, and reporting of findings. The research question was developed using the SPIDER framework [33], which is particularly well-suited to qualitative and mixed-methods research. The elements of the framework were as follows:

- Sample (S): Township-based entrepreneurs and small businesses operating in informal or semi-formal economic contexts.
- Phenomenon of Interest (PI): Adoption and diffusion of FinTech innovations, and the mediating influence of protection fees or related structural mechanisms.
- Design (D): Empirical studies employing qualitative, quantitative, or mixed-methods approaches.

- Evaluation (E): Outcomes related to adoption behaviour, barriers and enablers of diffusion, business performance, stakeholder perceptions, and institutional responses.
- Research type (R): Peer-reviewed journal articles, policy-oriented studies, and empirical reports.

The search strategy combines terms relating to township and informal enterprises, FinTech and digital technologies, and protection fees, extortion or related forms of coercion. Scopus and Web of Science formed the core database searches, while Google Scholar and supplementary AI-assisted searches were used to identify additional relevant peer-reviewed and grey literature. The eligibility window was 2016–2026. The complete database-specific search strings and screening results are retained in Appendix A to improve transparency without interrupting the main narrative.

The primary databases used for this review were Scopus and Web of Science, due to their extensive coverage of peer-reviewed literature and strong multidisciplinary indexing [34]. These served as the foundation of the systematic search and provided the core dataset for analysis. To minimise the risk of overlooking relevant material, Google Scholar and Gemini 3.10 were used as secondary, supplementary search tools. Google Scholar enabled the identification of additional peer-reviewed and citation-linked studies not indexed in the main databases [35]. At the same time, Google's Gemini 3.10 (accessed [31 July 2026]) was used as a supplementary AI-assisted search tool to identify potentially relevant research outputs and grey literature [36]. These supplementary searches captured forms of grey literature and practice-oriented reports that are often absent from traditional databases. This included key sources from the Global Initiative Against Transnational Organised Crime (GI-TOC), FinMark Trust, and INTERPOL. Such sources were critical in ensuring that the review incorporated empirical and practical insights not commonly represented in academic publications.

Across the search sources, we initially identified 8704 records. After title and abstract screening, 114 full-text records were assessed against the eligibility criteria, resulting in a final sample of 48 studies. The study-selection process followed PRISMA principles to improve transparency and reproducibility (Figure 1). Appendix A reports the search-source totals, and the PRISMA diagram presents the four stages of the screening process.

From Google Scholar, 1270 records were retrieved. The top ten pages of results were screened for relevance, yielding 104 studies. From title and abstract screening, 75 were excluded, and 29 remained for full-text review. Of these, 14 were in accordance with the objectives: 9 were completely relevant and included. A Web of Science search yielded 313 records. After title and abstract screening, 59 were selected. These were then reduced to 33 at full-text review, of which 12 were included in the final sample.

The AI-assisted search using Gemini 3.10 identified 14 records. After screening, 9 were excluded for irrelevance, leaving 5 for full-text review. All 5 were fully relevant and included. This AI-assisted search and citation tracking were useful for locating additional studies that complemented the core dataset and ensured broader coverage of the research objectives. On the other hand, the Scopus search produced 7107 records. After title screening, 108 were retained for abstract assessment, with 47 being progressed to full-text assessment. Ultimately, 22 studies met the inclusion criteria and were part of the final sample.

The study included reports and articles on the use of digital technologies, FinTech, mobile money, or other tools in township or informal South African enterprises, especially concerning extortion and protection fees. Peer-reviewed articles and grey literature, including GI-TOC, FinMark Trust, and INTERPOL, were used to obtain empirical and practical facts that are not widely addressed in academic literature. Table 1 outlines the inclusion and exclusion criteria applied to the reviewed literature studies.

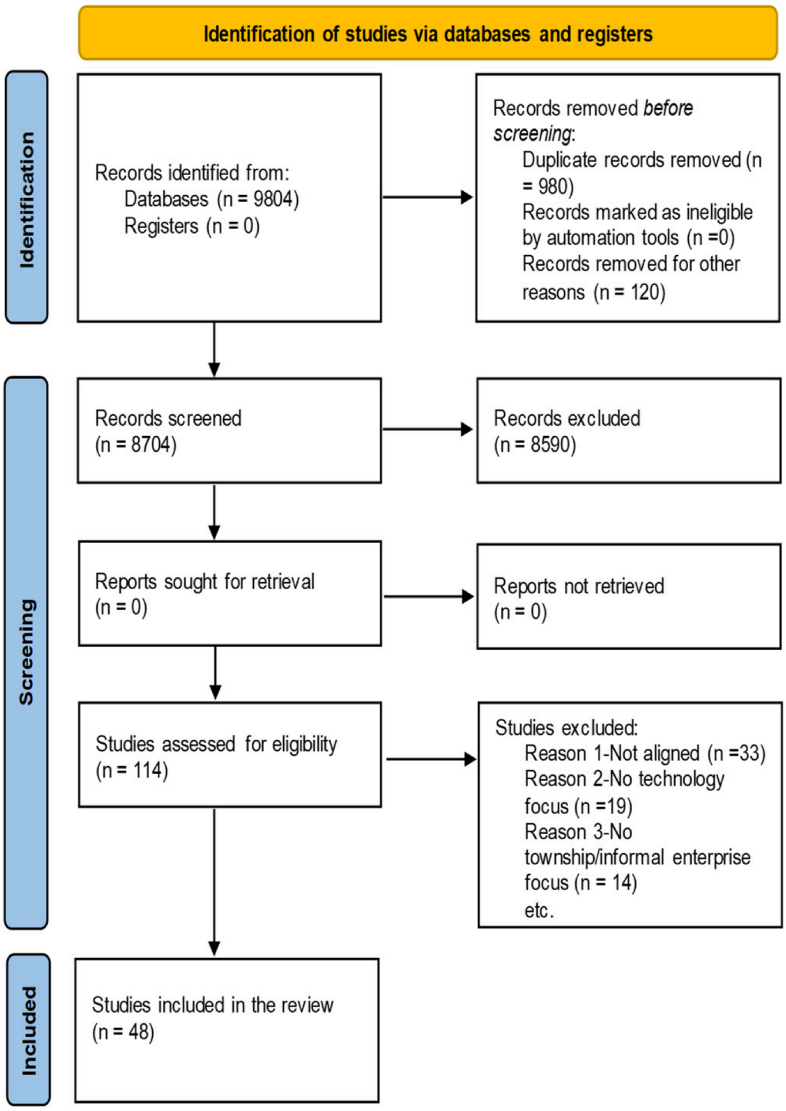


Figure 1. PRISMA flow diagram adapted from [37].

Table 1. Inclusion and exclusion criteria.

Inclusion	Exclusion
Publications focusing on South Africa	Publications not focusing on the South African context.
Publications written in English, published between 2016 and 2026, and accessible in full text.	Non-English publications, studies not accessible in full text, and publications published before 2016
Studies examining digital technology adoption, digital innovation, ICT use, FinTech, digital financial inclusion, or technology-enabled business practices among township enterprises and informal businesses.	Studies unrelated to township enterprises, informal businesses, entrepreneurship, or digital technologies
Studies addressing protection fees, extortion, criminal governance, informal governance, informal taxation, business security, coercion, or related institutional constraints affecting township enterprises.	Publications not addressing governance, security, institutional constraints, or business operating environments.
Peer-reviewed journal articles, conference papers, book chapters, and relevant grey literature.	Editorials, opinion pieces, news articles, and non-scholarly publications.

Source. Researcher's construction.

Methodological quality was assessed using the Critical Appraisal Skills Programme (CASP) checklists, as advised by Dalton, Booth, Noyes, and Sowden [38], for rigour, credibility, and relevance. Only studies with a minimum quality threshold were included in the review. Additionally, data were extracted using a systematic template guided by SPIDER categories, such as study context, study design, participants, type of technology, barriers/enablers, and evidence on protection fees. Thematic synthesis was conducted in accordance with Clarke and Braun's [39] six-phase process, enabling systematic coding and organisation of qualitative data. Data analysis was inductive to allow for emergent thought processes [40]. The PRISMA checklist is provided in the Supplementary Materials [37].This systematic literature review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines, and the review was not prospectively registered in a systematic review registration database.

4. Results

This systematic review investigated how Fintech innovations can be used to mitigate extortion and protection fees for businesses in the townships of South Africa. This section presents the study's findings, which are discussed through an integrated analysis and examined through the lens of DOI theory, which places adoption concerns of relative advantage, compatibility, complexity, trialability, and observability at its centre [20]. The results are structured around the research questions posed in Section 1, which have been used to formulate broad categories linked to the identified themes, illustrated in Table 2, followed by the analysis.

Table 2. Review focus area and themes.

Focus Area	Themes
Dynamics of Extortion and Protection Fees	Extortion as Informal Taxation
	Extortion as Parallel Governance
	Impact on Business Sustainability
FinTech Innovations for Mitigating Protection Fees	Mobile Money and Fintech Inclusion
	Digital Payment Innovation and Blockchain-Enabled Financial Systems
	Crowdsourced Digital Reporting and Community Security Platforms
	Digital Platforms for Collective Bargaining and Community Solidarity
Policy and Practice Recommendations	Strengthen Institutional and Policy Frameworks
	Promote Digital Literacy and Capacity Building
	Facilitate Affordable Access to Technology
	Encourage Digital Payment Adoption
	Community Empowerment
	Integrate Technology Adoption with Economic Policy

Source: Researcher's construction.

4.1. Focus Area 1: Dynamics of Extortion and Protection Fees

4.1.1. Extortion as Informal Taxation

Extortion and paying for protection in South African townships represent rampant systems of informal taxation that shape entrepreneurial behaviour and firm survival [41]. They are not isolated criminal acts but rather systemic structures of coercion, occasionally enforced by organised groups such as the "construction mafia" or facilitated by collusive

pacts with local authorities. The payments reduce working capital, restrict the possibility of reinvestment, and create continuous uncertainty, deterring entrepreneurial creativity and growth [42].

Informal taxation processes extend beyond simple fiscal extractions. Observations from comparative studies in Kenya reveal how "levies" based on kinship within microenterprise organisations constrain growth and formalisation, as with township patterns [42]. Similarly, Onyango [43] refers to the role of bureaucratic cartels in routinising coercion within the state structure, highlighting how extortion becomes systematised rather than episodic. By doing so, extortion acts both as an economic drain and as a second-governing regime that establishes the economic rules of the game. This aligns with Kempe's [44] argument on how the informal economy can reproduce parallel rules and corruption.

By requiring businesses to remain informal as a means of reducing exposure, extortion indirectly limits access to finance, state support, and technology upgrading possibilities. It is thus an innovation constraint and a constraint on long-run economic transformation. Rent-seeking dynamics exacerbate this process, with "coercive taxation" acting as a barrier to technological upgrading [45]. Diffusion of innovation theory suggests that, to challenge it, interventions that enhance perceived benefits and reduce adoption risks of new technology, such as cashless payments, blockchain-based record-keeping, and digital monitoring technology capable of disrupting extortion-based taxation networks, are required.

4.1.2. Extortion as Parallel Governance

Township economy extortion also functions as parallel governance, supplementing gaps in poor state institutions [41]. The networks establish rules, norms, and enforcement instruments to which companies must submit, in effect, quasi-institutions. Compliance is enforced using threats, violence, or intimidation, with "protection" fees serving as both a regulatory mechanism and a social control mechanism.

The structural and racialised nature of this governance is highlighted by MacLeavy and Pitts [46], who illustrate how informal coercion merges with labour exploitation and market exclusion. Extortion thus generates predictability but at the cost of solidifying dependency upon coercive actors. The same tendencies are observable in [43], where mafia-like behaviour in state institutions mirrors township dynamics by institutionalising informal coercion. Similarly, Bu, Luo, and Zhang [47] emphasise how crime and informality distort firm commitment, further entrenching governance by coercion.

Calling extortion governance has both conceptual and pragmatic implications. It indicates township economies are not governed in a vacuum but by hybrid systems in which state and criminal ones co-exist side by side. For diffusion of innovation, this means interventions cannot simply bypass these informal institutions; rather, they must navigate through them strategically. Community warning systems, people-security platforms, or technology-facilitated monitoring tools offer channels to decouple from coercive actors without losing social legitimacy.

4.1.3. Business Sustainability Impacts

The evidence on extortion establishes the problem that the FinTech discussion seeks to address. The next focus therefore moves from the source of vulnerability to the mechanisms through which digital finance may alter everyday transactions. The relationship is sequential but conditional: the review does not assume that technology eliminates extortion but considers whether reducing physical-cash exposure and improving transaction traceability may reduce one dimension of vulnerability while supporting wider financial participation.

Empirical evidence consistently demonstrates the negative impact of extortion on business performance. Mohan [48] shows how criminal enterprise undermines profitability and

investment prospects, while Grote and Neubacher [49] demonstrate how extortion erodes confidence, limiting informal enterprise growth. In South African townships, extortion is frequently cited as a significant impediment that disrupts cash flow, limits market access, and undermines long-term sustainability. Caribbean studies confirm the same effect of violent crime on firm performance in fragile economies [48], while rural contexts in developing countries also reveal similar cycles of underdevelopment sustained by crime [49].

Mhlongo and Daya [50] note that township entrepreneurs, as much as they are constrained by structural handicaps such as poor infrastructure and scarce finance, are burdened by an additional weight of criminal taxation. In the same vein, De Chiara and Manna [51] conclude that violent crime discourages growth, repels external investment, and maintains township economies in cycles of underdevelopment. Studies of immigrant small retailers in Mangaung further illustrate how localised extortion pressures intersect with entrepreneurial vulnerabilities [52].

FinTech has transformed the delivery of financial services through mobile banking, electronic wallets, digital payments, blockchain, and related technologies. In underserved settings, these innovations may improve access, efficiency, transparency, and security [50–52]. For township enterprises, their relevance extends beyond payment convenience. This study's findings identify a potential progression from reducing physical-cash exposure, increasing transaction traceability, to improving financial visibility and participation. This progression is conceptual and conditional. Digital transactions may generate verifiable records, but those records do not automatically result in formal finance or credit access. Their value depends on whether financial institutions, regulators, and entrepreneurs can use and trust the information generated by digital activity.

Extortion, therefore, seems to function as both an economic restraint through limiting profitability and deterring investment, and as a social control mechanism that shapes how entrepreneurs interact with governmental systems and society. Notably, in the DOI framework, such environments of uncertainty and coercion preclude innovation adoption by discouraging perceptions of benefit, compatibility, and ease. By contrast, risk-reducing interventions such as electronic payments, open transaction systems, and transparent innovation success stories can balance these limitations to position innovation diffusion on centre stage as a major avenue to resilience in extortion-prone economies.

4.2. Focus Area 2: FinTech Innovations for Mitigating Protection Fees

FinTech has transformed the delivery of financial services by integrating digital technologies into payments, savings, lending, insurance, and investment. Through innovations such as mobile banking, electronic wallets, digital payments, and blockchain, FinTech has improved access to financial services while promoting efficiency, transparency, and security, particularly among underserved populations and small enterprises [53]. In developing economies, FinTech is increasingly recognised as a catalyst for financial inclusion and economic resilience by reducing reliance on cash-based transactions and expanding access to formal financial systems [54,55].

The effectiveness of FinTech depends on the broader FinTech ecosystem, which comprises financial institutions, technology providers, mobile network operators, regulators, businesses, and consumers working within an enabling digital and regulatory environment [56,57]. These ecosystems facilitate inclusive finance by improving access to affordable financial services, enhancing transaction security, and supporting business participation in the formal economy. However, the benefits of FinTech remain uneven where digital infrastructure, affordability, institutional trust, and digital literacy are limited, particularly in marginalised communities [19,58].

Digital finance and payment innovation have become central components of modern FinTech ecosystems. Mobile banking, electronic wallets, Quick Response (QR) code payments, and other digital payment platforms reduce transaction costs, improve financial transparency, and minimise the risks associated with handling physical cash [59]. For township businesses, where cash transactions remain dominant, these innovations provide opportunities to reduce cash dependency, improve financial security, and limit exposure to protection fees and other forms of economic exploitation [60]. Against this backdrop, FinTech innovations provide practical mechanisms for strengthening the resilience of township businesses. By promoting financial inclusion, secure digital transactions, and payment innovation, FinTech has the potential to reduce cash-based vulnerabilities while supporting sustainable local economic development. The following sections examine specific FinTech innovations mobile money, digital payment systems, and blockchain-enabled financial technologies and evaluate their potential contribution to mitigating protection fees in township economies.

4.2.1. Mobile Money and Fintech Inclusion

Mobile money and FinTech inclusion are particularly relevant in contexts where financial exclusion reinforces cash dependency, making small businesses especially vulnerable to extortion [41]. Globally, mobile money has transformed financial habits in low-income economies by improving transactional security and reducing the circulation of hard cash. The M-Pesa case in Kenya is one such example, illustrating how simple, low-cost mobile-based financial services can increase financial inclusion, reduce the circulation of cash, and decrease the vulnerability of businesses as targets of extortion [61,62].

In South Africa, Capitec's low-cost digital bank model demonstrates how fintech products can expand into township economies, lowering barriers to entry while opening safer and more convenient transaction spaces [63]. By reducing the circulation of cash, these innovations restrict space for protection fees to be demanded. Nonetheless, persistent challenges remain. Asymmetric access to devices, expensive mobile data, and persistent digital literacy gaps constrain intensive use, subjecting many township enterprises to extortion pressure only partially [64,65].

Beyond reducing cash exposure, digital financial systems may create records of business activity that can contribute to financial visibility and longer-term formalisation. This finding is consistent with those of [20,21]. Although the corporate context of [20,23] differs substantially from township micro-enterprises, the study provides a useful comparison for considering how transparent digital records may become part of broader financial reporting and financing processes. The relevant implication for township businesses is therefore a potential pathway: repeated digital transactions may create verifiable histories that can help enterprises demonstrate economic activity when engaging with formal financial institutions. This should not be interpreted as evidence that digital payments automatically produce credit access. Rather, the literature supports further empirical investigation of whether transaction histories can improve financial visibility, documentation, and the ability to pursue formal financing. The effect will remain dependent on infrastructure, regulatory arrangements, affordability, and institutional trust.

4.2.2. Digital Payment Innovation and Blockchain-Enabled Financial Systems

Digital payment systems and blockchain technologies further expand opportunities for reducing extortion by creating secure, transparent, and tamper-resistant financial transactions. Digital payment platforms minimise reliance on cash, while blockchain provides immutable transaction records that limit opportunities for anonymous payments to extortion networks [15]. Comparative experiences reinforce this potential. In Kenya, M-Pesa

has normalised mobile transactions across society, while in South Africa retail groups such as Shoprite have introduced cashless payment systems in township stores, enabling micro-entrepreneurs and consumers to participate in safer commercial transactions [61,66]. Beyond facilitating cashless transactions, digital payment innovations have transformed the way small businesses receive and manage commercial payments. Merchant payment solutions, such as QR code payments, mobile wallets, and contactless payment technologies, enable businesses to accept secure electronic payments without relying on physical cash [59]. These payment mechanisms improve transaction efficiency, enhance financial transparency, and generate verifiable digital transaction records that reduce opportunities for informal cash-based exchanges. For township businesses, merchant payment systems can reduce cash exposure on premises, lowering the likelihood of becoming targets for robbery and protection-fee demands. Furthermore, interoperable payment platforms enable customers to transact seamlessly across different financial service providers, strengthening financial inclusion while supporting the growth of local enterprises [66].

Designed for township businesses, blockchain-enabled payment systems could reduce cash exposure by minimising physical cash handling, where protection fees are typically demanded. Such systems could also create immutable transaction ledgers that restrict unauthorised financial demands. Evidence from rWallet in migration settings demonstrates blockchain's effectiveness in fragile environments [67]. Likewise, evidence from China illustrates how technologically constrained firms developed innovative anti-extortion mechanisms [68]. African applications aimed at combating money laundering similarly validate blockchain's potential in disrupting criminal financial activities [69].

Beyond reducing extortion, blockchain-enabled financial systems may improve access to micro-credit and savings, reducing dependence on informal and predatory lending. However, their effectiveness depends on enabling conditions, including reliable infrastructure, supportive regulatory frameworks, and public trust in financial and state institutions. As Sithole and Mbukanma [70] argue, without addressing these structural barriers, blockchain adoption risks reinforcing existing inequalities.

4.2.3. Crowdsourced Digital Reporting and Community Security Platforms

Although financial technologies reduce cash-based vulnerabilities, extortion also flourishes where policing capacity is weak, and victims fear reporting incidents. Crowdsourced digital reporting platforms provide complementary mechanisms by enabling anonymous reporting, collective monitoring, and stronger community participation.

In South Africa, the Namola application demonstrates how mobile technologies can strengthen relationships between citizens and emergency services, helping bridge trust deficits between communities and law enforcement. Comparative evidence from Nairobi's Kibera settlement illustrates how integrated digital reporting systems improve security responses within informal settlements [71]. Experiences from Southeast Asia and Latin America further suggest that crowdsourced reporting platforms can document extortion demands, improve evidence collection, and generate collective pressure against criminal networks [72].

Within township economies, these platforms can reduce fear of retaliation through anonymous reporting, connect businesses to community-based early warning systems, and generate digital evidence that strengthens law enforcement responses. Nevertheless, concerns remain regarding privacy, misuse of information, and inconsistent institutional responses to community-generated intelligence.

4.2.4. Digital Platforms for Collective Bargaining and Community Solidarity

Beyond financial transactions and reporting systems, digital platforms can strengthen collective resilience by enabling township businesses to share information, issue warnings, coordinate responses, and collectively resist protection-fee demands. This finding aligns with [1,15], which demonstrate that digital platforms can facilitate information exchange, collaboration, and collective action. From a DOI perspective, these interactions enhance observability and compatibility by enabling entrepreneurs to learn from peers and recognise the relevance of digital tools in responding to shared vulnerabilities.

In South Africa, township digital cooperatives have demonstrated how resource pooling and collective purchasing can improve market access while strengthening resilience against predatory networks [73]. Internationally, platform cooperativism has similarly empowered marginalised entrepreneurs by strengthening collective bargaining power and reducing dependence on exploitative intermediaries [74]. Within township economies, these digital platforms shift power from isolated businesses towards organised collective action, reducing the influence of extortion networks. Their effectiveness, however, depends on high levels of participation, trust, and sustained collaboration. Risks also remain, including the potential misuse of social media platforms for criminal activities [75].

Collectively, FinTech innovations and complementary digital technologies provide township entrepreneurs with multiple mechanisms for resisting protection fees. Mobile money, digital payment systems, and blockchain technologies reduce cash-based vulnerabilities by improving financial security and transaction transparency. Crowdsourced reporting platforms strengthen accountability and facilitate safer engagement with law enforcement, while digital cooperatives enhance solidarity and collective bargaining among township businesses.

However, from a DOI perspective, the adoption of FinTech innovations and complementary digital technologies within township economies remains uneven due to infrastructural deficits, affordability constraints, and mistrust of formal financial systems. This uneven diffusion creates a dual economy in which digitally included entrepreneurs benefit from greater security, financial efficiency, and resilience, while digitally excluded businesses remain vulnerable to protection fees.

DOI further suggests that innovation adoption is both an individual and social process. When FinTech innovations are embedded within community-based structures such as digital cooperatives, collective reporting platforms, and local business networks, diffusion becomes more inclusive through peer learning, trust-building, and shared experiences. Consequently, FinTech innovations are most effective when supported by strong community institutions and broader developmental strategies that promote inclusive adoption rather than reinforcing existing socio-economic inequalities.

Taken together, the reviewed technologies are best understood as complementary rather than separate solutions. Mobile money and digital payments can reduce physical-cash exposure; blockchain-enabled systems can strengthen the integrity and traceability of records; digital reporting platforms can support collective documentation and communication; and community-based platforms can strengthen information sharing and collective action. The immediate mechanism concerns risk reduction and transaction security, whereas formalisation and resilience represent broader, longer-term outcomes that require additional institutional and economic conditions.

4.3. Focus Area 3: Policy and Practice Recommendations

1. Strengthen Institutional and Policy Support: By offering clear rules, legal frameworks, and trusted collaborations, policy measures will reduce perceived risk as suggested by

Singh [76], and entrepreneurs may feel more secure in adopting FinTech innovations, thereby increasing trialability and creating peer emulation [77].

2. Promote Digital Literacy and Capacity Building: Targeted training programs, combined with peer demonstrations and local promoters, may enhance understanding and usability of technology [78]. This addresses complexity and compatibility, enabling broader participation beyond early adopters.
3. Facilitate Affordable Access to Technology: Subsidised devices, connectivity, and shared-use platforms reduce adoption barriers. Lowering financial and infrastructural obstacles increases observability and trialability, enabling entrepreneurs to witness benefits and replicate innovations [20,41].
4. Encourage Digital Payment Adoption: Interoperable mobile money and secure digital payment systems demonstrate a clear relative advantage by reducing cash handling and vulnerability to extortion [78,79]. Successful examples, such as M-Pesa, serve as observable models for township entrepreneurs.
   Integrate Technology with Economic Policy: Embedding digital adoption within broader development strategies ensures infrastructure, legal, and economic support. Coupled with incentives for early adopters, this enhances observability and provides sustained momentum for the innovation's diffusion [80,81]
5. Empower Communities: Community-based digital alert platforms and cooperative approaches leverage social networks, enhancing social proof and collective adoption. Alignment with local values, such as Ubuntu-inspired systems, strengthens compatibility and fosters collective resilience [82–84].

These findings demonstrate that FinTech innovations can contribute to sustainable township development by reducing cash dependency, improving financial transparency, strengthening institutional trust, and enhancing the resilience of township enterprises. However, achieving these sustainability outcomes depends on complementary investments in digital literacy, enabling governance frameworks, accessible digital infrastructure, and multi-stakeholder collaboration to ensure that technological Innovations support inclusive and sustainable local economic development.

5. Discussion

The findings indicate that the relationship between FinTech and protection-fee vulnerability should be understood as a connected socio-economic process rather than a collection of isolated technologies. The central problem is the vulnerability created by cash dependence and constrained institutional protection. Digital payments potentially intervene at the transaction level by reducing the amount of physical cash handled and by creating records that can increase transparency. Community reporting and digital cooperation mechanisms operate alongside payment technologies by strengthening collective capacity to document, report, and respond to coercion. These mechanisms may therefore reinforce one another when supported by appropriate governance and institutional trust.

Drawing on DOI and the reviewed literature, Figure 2 presents the proposed conceptual framework linking cash-based vulnerability, FinTech adoption, transaction traceability, financial participation and economic resilience. The framework extends the DOI perspective by linking FinTech adoption to potential outcomes relevant to the security and resilience of township enterprises.

As illustrated in Figure 2, the conceptual pathway begins with cash-based vulnerability, reflecting the risks associated with physically handling and storing cash in environments where enterprises may face extortion, theft, and other forms of vulnerability as noted by [9,21]. These vulnerabilities provide the contextual basis for considering FinTech adoption, particularly digital payment mechanisms that may reduce reliance on physical cash.

Adoption may subsequently enhance transaction traceability by increasing the visibility of financial transactions [21,22]. Greater traceability may support financial participation by improving financial visibility and access to formal or digitally enabled financial services, potentially contributing to economic resilience [24] by strengthening enterprises' capacity to withstand, adapt to, and recover from economic and operational pressures.

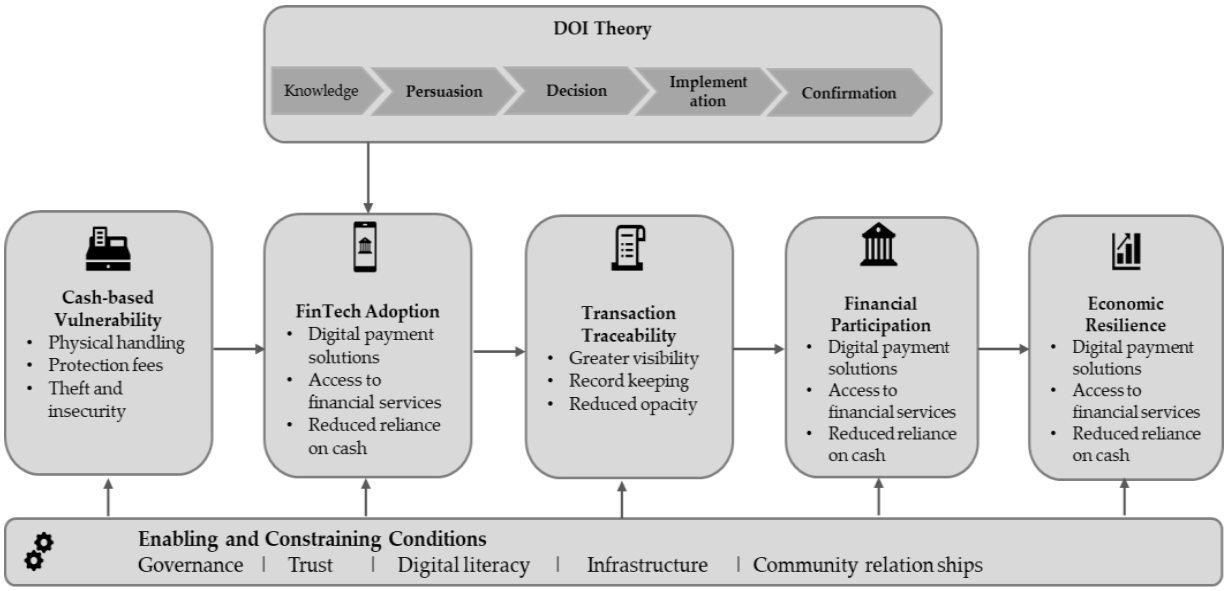


Figure 2. Proposed conceptual pathway linking FinTech adoption to economic resilience.

The pathway is not assumed to be linear or automatic. The extent to which FinTech adoption may generate these potential benefits is influenced by the enabling and constraining conditions identified above, including governance, trust, affordability, digital literacy, infrastructure and community relationships. These conditions operate across the framework and may affect both the adoption and sustained use of FinTech as well as the extent to which its potential benefits are realised.

The framework's conceptual contribution lies in bringing together three areas often examined separately: FinTech adoption, protection-fee vulnerability, and enterprise resilience. While DOI explains the processes and conditions influencing innovation adoption, the conceptual framework extends this explanation by proposing how reduced reliance on physical cash may relate to transaction traceability, financial participation and resilience within township enterprises. The framework therefore provides an explanatory pathway for examining these relationships without assuming a direct causal effect. It identifies potential mechanisms and contextual conditions that can guide future empirical investigation of FinTech and resilience in township economies. It further highlights the role of peer learning, community networks, and trusted intermediaries in diffusion, while connecting adoption to a potential pathway from safer, more visible transactions to economic resilience. In doing so, the study bridges technology diffusion, digital governance and protection-fee vulnerability, without assuming that digital adoption automatically leads to formalisation, credit access, or improved business outcomes.

6. Conclusions

This systematic literature review examined how FinTech and complementary digital technologies may reduce vulnerability to protection fees and strengthen economic resilience in township economies. The synthesis indicates that mobile money, digital payments and blockchain-enabled systems may reduce reliance on physical cash, improve transaction

transparency and security, and support financial participation. Complementary digital reporting and community platforms may strengthen collective capacity to document and respond to extortion. These findings support the proposed pathway from cash-based vulnerability through digital transaction security and traceability towards potential longer-term financial participation and resilience.

The principal theoretical contribution of this study is linking DOI theory to digital governance and sustainable economic resilience. The review showed that adoption is shaped by relative advantage, compatibility, complexity, trialability, and observability, but also by institutional trust, affordability, digital capability, and community relationships. The framework consequently treats FinTech adoption as a socio-institutional process rather than a purely technical or individual decision.

From a policy perspective, addressing extortion through technology requires more than innovation alone. It demands institutional strengthening to build trust, subsidized access to reduce cost barriers, targeted digital literacy programs to broaden inclusion, and community-centred approaches that align with local socio-cultural realities. Additionally, policymakers need to ensure the provision of adequate infrastructure to support FinTech uptake in South African Townships. Without these enabling conditions, technologies risk reinforcing dual economies, leaving the most marginalized entrepreneurs exposed.

The practical implication is that FinTech interventions should be designed within an enabling ecosystem. Affordable devices and connectivity, digital literacy, trusted intermediaries, interoperable payment systems, privacy protections, responsive reporting mechanisms and appropriate regulation are necessary conditions for inclusive adoption. Policy interventions should also recognise the distinction between immediate and longer-term outcomes. Reducing physical-cash exposure may be an immediate risk-reduction objective, while improved financial records, formal financial participation and enterprise resilience are longer-term outcomes that require cooperation from financial institutions and public agencies. This distinction can help prevent technology-centred interventions from overstating what digital payments can achieve on their own.

The review also identifies financial formalisation as a potentially important extension of the FinTech-resilience relationship. Digital transaction histories may increase the visibility of economic activity for enterprises that have limited conventional documentation. Recent work on voluntary crypto-asset reporting illustrates how digital-asset activity can intersect with financial reporting and financing considerations [20]. Similarly, recent Sustainability research emphasises the importance of linking digitalization to regulatory and institutional conditions in economic development [51]. For township enterprises, the proposed pathway should therefore be treated as an empirical proposition: digital records may strengthen documentation and financial visibility, which may improve the capacity to engage formal financial institutions, but access to credit or formalisation is neither automatic nor guaranteed.

The limitations noted for this study are methodology related. Given that this study is an SLR, the proposed pathway should not be interpreted as evidence of causal effectiveness in township businesses. In addition, much of the evidence concerns related but not identical phenomena, including digital finance, informal enterprise, crime, reporting systems and financial inclusion. The framework therefore aims to organise the evidence and identify mechanisms for future testing, rather than claim that a particular technology will independently reduce extortion or produce resilience. Moreover, the review synthesizes existing evidence and therefore does not provide direct empirical evidence that FinTech reduces protection-fee payments in township businesses. Also, the South African focus limits transferability to contexts with different governance, technological and institutional

conditions. These limitations reinforce the need to empirically test the proposed pathway rather than treat it as an established causal relationship.

Future research should test the proposed framework through empirical studies with township micro- and small enterprises. First, longitudinal studies could examine whether adopting digital payments changes physical-cash exposure, protection-fee vulnerability, business continuity, and investment behaviour over time. Second, mixed-methods studies could investigate how entrepreneurs experience the transition from cash to digital transactions and whether banks or other formal financial institutions recognise transaction histories. Third, comparative research across townships could examine how differences in digital infrastructure, governance capacity, community organization, and institutional trust shape adoption and outcomes. Fourth, future research should assess privacy, cybersecurity, and the possibility that criminal actors adapt their practices to digital environments. Finally, intervention studies could evaluate combinations of digital literacy, affordable connectivity, payment adoption, and community reporting rather than testing FinTech as a stand-alone intervention.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/su182110892/s1, PRISMA Checklist [37].

Author Contributions: Conceptualisation and original draft preparation, S.R.N.; reviewing, editing, and refining the manuscript, F.S.M., S.M. and D.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data supporting the findings of this study are available within the article. All data points used for this analysis were extracted from the primary studies, which are publicly available and fully cited in the References section of this paper.

Acknowledgments: During the preparation of this manuscript, the author(s) used Gemini 3.10 for assistance with additional searches of articles related to the topic, ChatGPT (GPT-5.5, OpenAI) for language refinement and literature exploration; Claude Sonnet 5 (Anthropic) for assistance with data cleaning and literature screening; and Grammarly (version 1.2.210) for editing. The authors have reviewed and verified all outputs and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A. Detailed Search Strategy and Results

Table A1 provides the database-specific search strings and screening results. The main text reports the aggregate search and selection figures so that the methodology remains readable.

Table A1. Search Strategy and Results.

Search Engine	Search String, Query Used	Results	After Screening	Full-Text Reviewed	Final Sample
Scopus	((“township business*” OR “township enterprise*” OR “township entrepreneur*” OR “informal sector” OR “informal economy” OR “street vendor*” OR “spaza shop*” OR “small business*” OR “SME*” OR “SMME*” OR “micro-enterprise*” OR “survivalist business*” OR “entrepreneurship” OR “developing countr*”) AND (“transformative technolog*” OR “emerging technolog*” OR “digital innovation*” OR “technological innovation*” OR “technological change” OR “ICT*” OR “blockchain” OR “smart technolog*” OR “digital platform*” OR “FinTech” OR “mobile technolog*” OR “mobile money” OR “digital adoption” OR “innovation diffusion” OR “innovation adoption” OR “technology adoption” OR “ICT4D”) AND (“protection fee*” OR “extortion” OR “racketeering” OR “gang violence” OR “organised crime” OR “organized crime” OR “criminal governance” OR “illegal taxation” OR “informal taxation” OR “street tax*” OR “extortion payment*” OR “safety fee*” OR “security fee*” OR “protection racket*” OR “coercion” OR “violence” OR “informal governance”) AND (“South Africa” OR “Sub-Saharan Africa” OR “developing countr*”)) AND PUBYEAR > 2009 AND PUBYEAR < 2026 AND PUBYEAR > 2009 AND PUBYEAR < 2026	7107	108 abstracts screened	47	22
Web of Science	TS=((“township business*” OR “township enterprise*” OR “township entrepreneur*” OR “informal sector” OR “informal economy” OR “street vendor*” OR “spaza shop*” OR “small business*” OR “SME*” OR “SMME*” OR “micro-enterprise*” OR “micro business*” OR “survivalist business*” OR “entrepreneurship” OR “developing countr*”) AND (“transformative technolog*” OR “emerging technolog*” OR “digital innovation*” OR “technological innovation*” OR “technological change” OR “ICT*” OR “blockchain” OR “smart technolog*” OR “digital platform*” OR “FinTech” OR “mobile technolog*” OR “mobile money” OR “digital adoption” OR “digital technolog*” OR “innovation diffusion” OR “innovation adoption” OR “technology adoption” OR “ICT4D” OR “innovation*”) AND (“protection fee*” OR “extortion” OR “racketeering” OR “gang violence” OR “organised crime” OR “organized crime” OR “criminal governance” OR “illegal taxation” OR “informal taxation” OR “street tax*” OR “extortion payment*” OR “safety fee*” OR “security fee*” OR “protection racket*” OR “crime” OR “coercion” OR “violence” OR “informal governance”) AND (“South Africa” OR “Sub-Saharan Africa” OR “developing countr*”) and Crime (OR—Search within topic) and Developing Countries (Search within topic) and 2016–2026 (Publication Years	313	59 abstracts screened	33	12

Table A1. *Cont.*

Search Engine	Search String, Query Used	Results	After Screening	Full-Text Reviewed	Final Sample
Artificial Intelligence (AI)-assisted search	(1) Show studies on township businesses OR informal economy OR micro-enterprises AND transformative or digital technologies (FinTech, mobile money, blockchain, ICT) AND protection fees, extortion, or informal taxation in South Africa or developing countries (2) give me the actual list of journals (3) Please list them in a table (4) give me more (5) table as well	14	5 full-text screened	5	5
Google Scholar	("township business" OR "informal economy" OR spaza shop" OR "street vendor" OR "SMME" OR "micro enterprise") AND ("digital technology" OR "emerging technology" OR "innovation adoption" OR "mobile money" OR "FinTech" OR "ICT") AND ("protection fee" OR extortion OR "organized crime" OR "informal taxation" OR "gang violence")	1270	75 abstracts screened	29	9

Source. Researcher's construction.

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