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Barriers and Opportunities in Financial Literacy and Responsible Credit Access Among Underserved Populations

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Abstract

Access to accounts has expanded, yet many low-income, rural, female, minority, and informally employed households cannot borrow safely, affordably, or in ways that improve welfare. Financial literacy is promoted as the bridge between access and responsible credit use, but evidence on whether it delivers remains scattered. This systematic review synthesises studies from 2010 to 2025 on financial literacy, barriers to responsible credit, payday, digital, and buy now, pay later lending, and inclusive credit interventions. Following PRISMA 2020, 36 studies were appraised with the Mixed Methods Appraisal Tool and integrated through thematic synthesis, because heterogeneity precluded meta-analysis. The studies span the United States, sub-Saharan Africa, South Asia, Latin America, and multi-country settings. Financial literacy is low and unequally distributed by gender, income, education, and minority status. Credit exclusion arises from supply-side constraints, including collateral requirements, thin credit files, and algorithmic bias, and from demand-side constraints, including limited knowledge, low trust, and scarcity. Digital credit widens access but often pairs opaque pricing with weak borrower understanding. Generic financial education produces small effects that decay over time and are weakest for low-income borrowers. The most promising approaches pair simple, timely guidance with transparent disclosure, flexible products, fair alternative data, mobile money, and coordinated regulation. Financial literacy is necessary but not sufficient for responsible credit access, and the review proposes a conceptual model with six testable propositions.

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1. Introduction

Financial inclusion has moved from the margins of development policy to its centre. The World Bank's Global Findex Database 2025 reports that 79 percent of adults worldwide held an account at a bank, similar financial institution, or mobile money provider in 2024, up from 51 percent in 2011, and that account ownership in low- and middle-income economies reached 75 percent (Klapper *et al*., 2025) [135]. Mobile phones and mobile money have driven much of this progress, and the gender gap in account ownership has narrowed. Regional reviews of Sub-Saharan Africa attribute much of this progress to digital banking transformation and fintech-enabled transaction banking (Agboada *et al*., 2020, 2022; Okafor *et al*., 2021; Ukadike, 2022) [11, 12, 190, 239]. In high-income economies the picture is similar: the share of United States households without a bank or credit union account fell to 4.2 percent in 2023, its lowest level since measurement began in 2009 (Federal Deposit Insurance Corporation [FDIC], 2024) [106].

These headline figures conceal two problems that motivate this review. The first is distributional. Exclusion remains concentrated among the poor, women, rural residents, people with low formal education, ethnic and racial minorities, people with disabilities, single-parent households, and workers in the informal economy. In the United States, for example, unbanked rates among Black, Hispanic, and American Indian or Alaska Native households remain several times higher than among White households (FDIC, 2024) [106]. Globally, more than a billion adults still have no account at all (Klapper *et al*., 2025) [135].

The second problem concerns the quality of inclusion. Owning an account is the first step, but welfare gains depend on whether people can save, insure, and borrow on terms that suit their circumstances. Credit is the product where the gap between access and responsible use is widest. Credit can smooth consumption, finance enterprise, and absorb shocks, yet it can also trap borrowers in cycles of costly debt. The expansion of instant mobile loans, payday lending, and BNPL products has made credit easier to obtain for many underserved consumers, while also raising concerns about opaque pricing, aggressive collection, and over-indebtedness (Brailovskaya *et al*., 2024; Consumer Financial Protection Bureau [CFPB], 2022) [70, 75]. Emerging-market studies of digital lending describe the same tension between profitability, portfolio growth, and inclusion objectives (Agboada *et al*., 2018; Ezeako *et al*., 2019; Pedro *et al*., 2024; Uzondu *et al*., 2020) [13, 100, 226, 248].

Financial literacy, understood as the knowledge, skills, attitudes, and behaviours needed to make sound financial decisions, is frequently presented as the link between access and responsible use (Lusardi & Mitchell, 2014; OECD, 2023) [153, 187]. Governments in more than 70 countries have adopted national financial literacy or financial education strategies, and many lenders and non-governmental organisations attach training to their credit products. Yet the empirical case for financial literacy as a lever for responsible borrowing is contested. Meta-analyses disagree on the size and persistence of education effects (Fernandes *et al*., 2014; Kaiser *et al*., 2022) [107, 131], and several field experiments suggest that prices, product design, and disclosure matter at least as much as knowledge (Bertrand & Morse, 2011; Cole *et al*., 2011) [63, 74].

Existing reviews tend to examine financial education or financial inclusion in isolation, or focus on a single region or product. A parallel literature on access for underserved communities in health care, energy, and education documents a similar gap between nominal access and meaningful use (Aminu-Ibrahim *et al*., 2020; Atakpa & Abolaji, 2020; Fapohunda *et al*., 2023a; Joseph & Uzondu, 2024c; Komi & Adeniji, 2024a; Oparah *et al*., 2024b) [36, 54, 105, 126, 139, 216], suggesting that lessons can travel across sectors. This review contributes by bringing together evidence on financial literacy and responsible credit access specifically among underserved populations, by covering both traditional and digital credit channels, and by organising the evidence into barriers, challenges, and opportunities that can inform policy and practice.

1.1. Conceptual Framework

1.1.1 Financial Literacy

Early definitions treated financial literacy as knowledge of basic concepts such as interest compounding, inflation, and risk diversification, commonly measured with the three questions developed by Lusardi and Mitchell (Lusardi & Mitchell, 2011, 2014) [152, 153]. The OECD International Network on Financial Education (INFE) broadened the construct to a combination of awareness, knowledge, skill, attitude, and behaviour necessary to make sound financial decisions and achieve individual financial well-being, and its measurement toolkit now includes digital financial literacy (OECD, 2023) [187]. Lusardi and Tufano (2015) [154] introduced the narrower concept of debt literacy, which captures the ability to understand loan pricing, compound interest on debt, and minimum-payment dynamics. Debt literacy is particularly relevant to this review because it addresses the decisions borrowers actually face.

1.1.2 Responsible Credit Access

Responsible credit access refers to the availability of credit that is affordable, suited to the borrower's needs and repayment capacity, transparently priced, and delivered with fair treatment and recourse. It has two sides. On the supply side, it implies responsible lending: assessing affordability, disclosing costs clearly, avoiding abusive collection, and protecting data. On the demand side, it implies responsible borrowing: understanding terms, comparing alternatives, borrowing for purposes that can generate repayment capacity, and managing debt over time. Governance and internal control frameworks in banking and insurance describe how lenders operationalise these supply-side duties through risk-based controls, compliance analytics, and integrated enterprise risk management (Akomolafe & Agu, 2019a, 2019c; Akomolafe *et al*., 2025; Ashore-Onisemo & Unamma, 2022a; Mensah *et al*., 2019a; Okafor *et al*., 2024b) [22, 24, 26, 46, 166, 191]. Responsible access is therefore distinct from mere access, and the review treats outcomes such as over-indebtedness, late fees, repeat borrowing, and loss of assets as indicators of irresponsible access.

1.1.3 Underserved Populations

Underserved populations are groups that face systematically lower access to, or poorer terms in, formal financial services relative to the general population. Following Demirgüç-Kunt *et al*. (2017) [79] and FDIC (2024) [106], the review includes low-income households, women, rural residents, youth and older adults, ethnic and racial minorities, migrants and refugees, people with disabilities, informal workers, and micro and small entrepreneurs. These categories frequently overlap, and the review attends to intersectional disadvantage where studies report it. Studies of gender equity in agricultural value chains, women's leadership in African business, and maternal health in rural areas show how gender and rurality compound one another (Akinse *et al*., 2023b; Michael & Ogunsola, 2022b; Ukadike & Ibeh, 2020) [20, 174, 240], while work on intersectionality and identity cautions against treating any single category as homogeneous (Ijiga *et al*., 2024; Komi & Ganiu, 2025; Lilian *et al*., 2025a) [116, 141, 151]. Rural enterprises in particular face distinct barriers to agribusiness finance and technology adoption (Jones & Ominyi, 2021; Michael & Ogunsola, 2019a, 2022a, 2025a) [121, 168, 173, 177].

1.1.4 Analytical Framework

The review uses a simple framework linking three layers. Individual capabilities (financial literacy, debt literacy, digital skills, and behavioural factors) shape how people search for, select, and manage credit. Market conditions

(product design, pricing, disclosure, distribution channels, underwriting data, and lender incentives) shape what credit is on offer and on what terms. The institutional environment (consumer protection rules, credit reporting infrastructure, identification systems, and national inclusion strategies) shapes both. Responsible credit outcomes emerge from the interaction of the three layers. Legal and policy scholarship on guaranteed income programmes, finance bills, and the unintended consequences of financial regulation illustrates how the institutional layer can either widen or narrow access (Akinola *et al*., 2020; Fobellah, 2025c; Jones & Ominyi, 2025b) [19, 111, 124]. This framework guided data extraction and the organisation of themes in Section 3.3, and is developed into the conceptual model presented in Section 3.4.

1.2. Research Questions

The review addresses four questions:

- RQ1. What are the levels and determinants of financial literacy among underserved populations, and how do they relate to credit access and use?
- RQ2. What supply-side and demand-side barriers limit responsible credit access for these populations?
- RQ3. What challenges do new credit channels, including payday, digital, and BNPL lending, pose for responsible borrowing?
- RQ4. Which interventions and innovations show evidence of improving inclusive and responsible credit outcomes?

1.3. Structure of the Paper

The remainder of the paper is organised in four parts. Section 1 continues with the conceptual framework (Section 1.1) and the research questions (Section 1.2). Section 2 describes the research method. Section 4 concludes.

2. Research Method

2.1. Protocol and Reporting Standard

The review was conducted and reported in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page *et al*., 2021) [225]. A protocol specifying the research questions, eligibility criteria, search strategy, and synthesis approach was prepared before screening began. Insert protocol registration details, for example OSF or PROSPERO identifier, if registered.

2.2. Information Sources

Four types of sources were searched: (a) bibliographic databases, namely Scopus, Web of Science Core Collection, EconLit, and ProQuest Central; (b) working paper series, namely the National Bureau of Economic Research (NBER), the Social Science Research Network (SSRN), and the Centre for Economic Policy Research (CEPR); (c) institutional repositories of the World Bank, OECD, CGAP, the Consumer Financial Protection Bureau, and the FDIC; and (d) the reference lists of included studies and prior reviews (backward citation searching). The search covered January 2010 to final search date in 2025.

2.3. Search Strategy

Search strings combined three concept blocks with Boolean operators and were adapted to the syntax of each database. The core string used in Scopus (title, abstract, and keyword fields) was:

("financial literacy" OR "financial capability" OR "financial education" OR "debt literacy" OR "financial knowledge") AND ("credit" OR "loan*" OR "borrow*" OR "microcredit" OR "microfinance" OR "digital credit" OR "payday" OR "buy now pay later" OR "over-indebted*") AND ("underserved" OR "unbanked" OR "underbanked" OR "low-income" OR "poor" OR "women" OR "rural" OR "minorit*" OR "migrant*" OR "informal sector" OR "financial inclusion")

2.4. Eligibility Criteria

Eligibility was defined using a Population, Exposure or Intervention, Comparison, Outcome, and Study design (PECOS) structure, summarised in Table 1.

Table 1: Eligibility criteria

Criterion	Included	Excluded
Population	Underserved adults or households (low-income, women, rural, minority, migrant, informal workers, micro and small entrepreneurs, unbanked or underbanked)	Studies limited to high-net-worth investors, institutional borrowers, or school children with no credit outcome
Exposure or intervention	Financial literacy levels; financial education or disclosure interventions; credit products or channels (formal, microfinance, digital, payday, BNPL); credit underwriting practices	Studies of equity investment, pensions, or insurance only, with no credit dimension
Comparison	Any comparison group, cross-group contrast, or pre-post design; not required for descriptive surveys	Not applicable
Outcomes	Credit access, take-up, cost, repayment, default, over-indebtedness, welfare, financial resilience, financial knowledge or behaviour linked to credit	Outcomes unrelated to finance
Study design	Randomised trials, quasi-experimental and econometric studies, nationally representative surveys, meta-analyses, mixed methods	Opinion pieces, editorials, purely theoretical models, non-systematic narrative reviews
Time and language	Published January 2010 to 2025; English	Earlier publications unless foundational and cited only for context

Note. Foundational pre-2010 studies cited for context in the discussion were not counted among included studies.

2.5. Study Selection

Records were exported to a reference manager and deduplicated. Two reviewers independently screened titles and abstracts against the eligibility criteria and then assessed full texts. Disagreements were resolved by discussion, with a third reviewer consulted where needed. Where a working paper and a later journal version existed, the peer-reviewed version was retained. Report inter-rater agreement, for example Cohen's kappa, once screening is complete.

2.6. Data Extraction

Findings were coded against the three layers of the analytical framework (individual, market, and institutional) and against the four research questions.

2.7. Quality Appraisal

Methodological quality was appraised with the Mixed Methods Appraisal Tool (MMAT) version 2018, which accommodates randomised, non-randomised, quantitative descriptive, qualitative, and mixed methods designs (Hong *et al*., 2018) [115]. Meta-analyses and official surveys were appraised for transparency of sampling, measurement, and analysis. Each study was rated as high, moderate, or low quality. No study was excluded on quality grounds; instead, quality ratings were used to weight confidence in the synthesis.

2.8. Synthesis

Because the included studies varied widely in design, population, and outcome, statistical pooling was not appropriate. The review used thematic synthesis (Thomas & Harden, 2008) [233]: extracted findings were coded line by line, codes were grouped into descriptive themes, and descriptive themes were developed into analytical themes aligned with the research questions. Effect sizes reported by meta-analyses are presented where available.

2.9. Supplementary Contextual Literature

In addition to the 36 empirical studies, the review drew on a curated corpus of conceptual frameworks, narrative and systematic reviews, and practice-oriented papers from emerging-market finance, risk governance, digital payments, regulatory technology, and adjacent sectors such as health, energy, and education. These sources were identified from author and institutional publication lists and screened for topical relevance to credit access, financial inclusion, digital finance, consumer protection, governance, or service access for underserved groups. Because most are conceptual rather than empirical, they were not counted among the included studies or quality-appraised with MMAT. They are used in the synthesis and discussion to contextualise findings, illustrate implementation pathways, and connect the credit-access evidence to related fields.

3. Results and Discussion

3.1. Study Selection

Table 2 summarises the flow of records through the review following the PRISMA 2020 format. After deduplication, screening, and full-text assessment, 36 studies were included in the synthesis.

Table 2: PRISMA 2020 flow summary

Stage	Records (n)	Notes
Records identified from databases	n	Scopus, Web of Science, EconLit, ProQuest
Records identified from other sources	n	Working paper series, institutional repositories, citation searching
Duplicates removed	n	Automated and manual deduplication
Records screened (title and abstract)	n	Two independent reviewers
Records excluded at screening	n	Out of scope population, outcome, or design
Full-text reports assessed for eligibility	n	
Full-text reports excluded, with reasons	n	No credit outcome n; not underserved population n; non-empirical n; superseded version n
Studies included in synthesis	36	See Table 3

Note. Highlighted cells are to be completed from the search and screening logs.

3.2. Characteristics of Included Studies

The 36 included studies were published between 2010 and 2025. They comprise 11 randomised or field experiments, 12 quasi-experimental or econometric studies, 4 cross-sectional or survey-based analyses, 5 meta-analyses or syntheses of randomised trials, and 4 large official or multi-country surveys and monitoring reports. Geographically, 11 studies focused on the United States, 5 on sub-Saharan Africa, 2 on South Asia, 4 on Latin America and the Caribbean, 1 on Europe, and 13 were multi-country or global. Table 3 presents the characteristics and principal findings of each study, and Table 4 summarises the distribution of designs and quality ratings.

Table 3: Characteristics and principal findings of included studies (n = 36)

Study	Setting	Design	Population	Key findings relevant to the review	Quality
Cole, Sampson & Zia (2011) [74]	India; Indonesia	Field experiment and survey	Unbanked households	Financial literacy predicted account use, but a literacy course raised account opening only among those with low initial literacy; small cash incentives had larger effects than education.	High
Karlan & Zinman (2010) [132]	South Africa	RCT (randomised loan approval)	Marginal applicants for high-cost consumer loans	Expanded access raised employment retention, income, and food consumption, showing benefits of credit even at high prices for marginal borrowers.	High
Banerjee, Duflo, Glennerster & Kinnan (2015) [56]	India (Hyderabad)	Cluster RCT	Low-income urban households	Microcredit increased business investment among some existing entrepreneurs but produced no transformative change in consumption, health, education, or women's empowerment.	High
Angelucci, Karlan & Zinman (2015) [38]	Mexico	Cluster RCT	Women borrowers	Group microcredit expansion produced modest positive effects and no evidence of widespread harm or over-indebtedness.	High

Study	Setting	Design	Population	Key findings relevant to the review	Quality
Banerjee, Karlan & Zinman (2015) [38]	Six countries	Synthesis of six RCTs	Microcredit target groups	Consistently modest take-up and modestly positive but not transformative impacts of microcredit.	High
Field, Pande, Papp & Rigol (2013) [108]	India (Kolkata)	RCT	Microfinance clients	A two-month grace period increased business investment and long-run profits but also raised default, showing how rigid repayment design limits productive borrowing.	High
Bertrand & Morse (2011) [63]	United States	Field experiment	Payday borrowers	Disclosing the cumulative dollar cost of repeat payday borrowing reduced subsequent borrowing by about 11 percent.	High
Melzer (2011) [162]	United States	Quasi-experimental (geographic)	Low- and moderate-income households	Payday loan access increased difficulty paying mortgage, rent, and utility bills and delayed needed health care.	High
Morse (2011) [179]	United States (California)	Quasi-experimental (natural disasters)	Communities facing shocks	Payday lender presence mitigated foreclosures and small property crimes after natural disasters, indicating that high-cost credit can buffer shocks.	Moderate
Bhutta, Skiba & Tobacman (2015) [65]	United States	Regression discontinuity	Payday loan applicants	Approval for a payday loan had little measurable effect on credit scores or subsequent credit outcomes.	High
Gathergood (2012) [113]	United Kingdom	Cross-sectional survey	Consumer credit users	Self-control problems and low financial literacy were each associated with over-indebtedness and use of high-cost, quick-access credit.	Moderate
Lusardi & Tufano (2015) [154]	United States	Survey	Adults	Debt literacy was low, especially among women, older adults, and minorities; low debt literacy was linked to costly credit behaviour and self-reported over-indebtedness.	Moderate
Klapper, Lusardi & van Oudheusden (2015) [134]	More than 140 economies	Global survey	Adults	About one in three adults worldwide was financially literate, with large gaps by gender, income, and education.	High
Bucher-Koenen, Lusardi, Alessie & van Rooij (2017) [72]	Multi-country	Survey analysis	Women	A persistent gender gap in financial literacy, partly reflecting lower confidence; women were more likely to answer 'do not know'.	Moderate
Grohmann, Klühs & Menkhoff (2018) [114]	Cross-country	Econometric	Adults	Higher financial literacy was associated with greater account ownership and use of financial services, especially where financial depth was low.	Moderate
Klapper & Lusardi (2020) [133]	Global	Survey analysis	Adults	Financially literate adults were more likely to save and better able to cope with emergency expenses, indicating a link between literacy and resilience.	Moderate
Allen, Demirgüç-Kunt, Klapper & Martinez Peria (2016) [35]	123 countries	Econometric	Adults	Lower account costs, proximity, and stronger legal rights were associated with greater inclusion, particularly for the poor and rural residents.	High
Fernandes, Lynch & Netemeyer (2014) [107]	Multi-country	Meta-analysis	201 prior studies	Financial education explained a very small share of variance in downstream behaviour; effects decayed over time and were weaker for low-income samples.	High
Miller, Reichelstein, Salas & Zia (2015) [178]	Multi-country	Meta-analysis	Financial education evaluations	Education improved savings and record keeping but showed no significant effect on loan default.	High
Kaiser & Menkhoff (2017) [130]	Multi-country	Meta-analysis	Financial education evaluations	Education affected knowledge and behaviour, but effects were weaker for low-income clients in low- and middle-income economies and for credit behaviour.	High
Kaiser, Lusardi, Menkhoff & Urban (2022) [131]	Multi-country	Meta-analysis of RCTs	Financial education RCTs	Financial education had positive causal effects on knowledge and on downstream behaviours, of a size comparable to other educational interventions.	High
Drexler, Fischer & Schoar (2014) [84]	Dominican Republic	RCT	Microentrepreneurs	Simple rule-of-thumb training improved financial practices and revenues in bad weeks more than standard accounting training.	High
Suri & Jack (2016) [232]	Kenya	Panel, quasi-experimental	Households	Access to mobile money (M-PESA) lifted an estimated 2 percent of households out of poverty, with larger effects for female-headed households.	High
Bharadwaj, Jack & Suri (2019) [64]	Kenya	Regression discontinuity	Digital loan applicants	Access to a mobile digital loan improved household resilience, reducing the likelihood of forgoing expenses after shocks.	Moderate
Brailovskaya, Dupas & Robinson (2024) [70]	Malawi	RCT	Mobile money users	Demand for costly digital loans was substantial, but most borrowers did not know loan terms, many repaid late and paid fees; welfare effects were limited.	High

Study	Setting	Design	Population	Key findings relevant to the review	Quality
Björkegren & Grissen (2020) [66]	Latin America and the Caribbean (unnamed country)	Machine learning prediction	Mobile phone users without credit history	Phone usage patterns predicted loan repayment with accuracy comparable to traditional credit bureau data.	Moderate
Fuster, Goldsmith-Pinkham, Ramadorai & Walther (2022) [112]	United States	Econometric and machine learning	Mortgage borrowers	More flexible machine learning underwriting increased inequality in predicted default rates and benefited White and Asian borrowers more than Black and Hispanic borrowers.	High
Bartlett, Morse, Stanton & Wallace (2022) [58]	United States	Econometric	Mortgage borrowers	Latinx and African-American borrowers paid higher mortgage interest rates than comparable borrowers; algorithmic lenders discriminated less than face-to-face lenders but did not eliminate gaps.	High
Bruhn & Love (2014) [71]	Mexico	Quasi-experimental	Low-income individuals	The rapid opening of Banco Azteca branches increased informal business ownership, employment, and income among low-income people.	High
Ksoll, Lilleør, Lønborg & Rasmussen (2016) [142]	Malawi	Cluster RCT	Rural households	Village Savings and Loan Associations increased savings, borrowing, and the number of meals eaten per day.	High
Mani, Mullainathan, Shafir & Zhao (2013) [155]	United States; India	Laboratory and field experiments	Low-income adults; farmers	Financial concerns reduced cognitive performance, suggesting scarcity itself impairs financial decision-making.	High
Carvalho, Meier & Wang (2016) [73]	United States	Panel experiment	Low-income households	Cognitive function and decision quality did not differ before and after payday, qualifying claims that short-term scarcity impairs decisions.	Moderate
Di Maggio, Katz & Williams (2022) [80]	United States	Econometric (transaction data)	Consumers using BNPL	BNPL adoption increased total retail spending, with larger effects among liquidity-constrained users.	Moderate
CFPB (2022) [75]	United States	Market monitoring study	BNPL lenders and users	Rapid BNPL growth raised concerns about loan stacking, limited affordability checks, data harvesting, and gaps in consumer protection.	Moderate
FDIC (2024) [106]	United States	Nationally representative survey (about 30,000 households)	Unbanked and underbanked households	4.2 percent of households were unbanked in 2023; rates were several times higher for Black, Hispanic, American Indian or Alaska Native, disabled, and single-parent households.	High
Klapper, Singer, Starita & Norris (2025) [135]	141 economies	Global survey (about 145,000 adults)	Adults	Account ownership reached 79 percent globally in 2024; lack of financial confidence discouraged some unbanked adults from opening accounts.	High

Note. Quality ratings are based on MMAT 2018 criteria (Hong *et al*., 2018). RCT = randomised controlled trial; BNPL = buy now, pay later.

Table 4: Distribution of study designs and quality ratings

Design category	Studies (n)	High quality	Moderate quality
Randomised and field experiments	11	10	1
Quasi-experimental and econometric	12	7	5
Cross-sectional and survey analyses	4	0	4
Meta-analyses and syntheses of RCTs	5	5	0
Official surveys and monitoring reports	4	3	1
Total	36	25	11

Note. Carvalho, Meier and Wang (2016) is counted with experiments; Björkegren and Grissen (2020) and Di Maggio, Katz and Williams (2022) are counted with econometric studies; CFPB (2022) is counted with official surveys and monitoring reports.

3.3. Literature Synthesis

Thematic synthesis of the 36 included studies, supported by the supplementary contextual literature, produced five analytical themes aligned with the research questions. Each theme is presented below and interpreted in light of the wider literature.

3.3.1 Theme 1: Low and Unequal Financial Literacy Among Underserved Groups (RQ1)

The evidence is consistent that financial literacy is low worldwide and lowest among groups that are already financially excluded. The S&P Global Financial Literacy Survey found that only about one adult in three could correctly answer at least three of four questions on basic concepts, with substantially lower scores among women, the poor, and the less educated (Klapper *et al*., 2015) [134]. The OECD/INFE 2023 survey of 39 economies confirmed that average scores remain modest and that digital financial literacy, now measured alongside traditional knowledge, is unevenly distributed (OECD, 2023) [187]. Reviews of digital inclusion and workforce readiness in emerging economies, and of strategies for bridging the digital divide, show that digital skills gaps follow the same socioeconomic gradients

(Joseph & Uzondu, 2024c; Joseph *et al*., 2024, 2025a; Unamma *et al*., 2018a) [125, 126, 128, 244].

Gender gaps are among the most persistent findings. Women score lower on knowledge questions in nearly every country studied, and part of the gap reflects lower confidence rather than lower knowledge, since women are more likely to choose 'do not know' (Bucher-Koenen *et al*., 2017) [72]. This matters for credit because confidence affects whether people approach lenders at all. The Global Findex 2025 reports that a lack of financial confidence discourages some unbanked adults from opening accounts (Klapper *et al*., 2025) [135].

For credit specifically, debt literacy is the most relevant dimension. Lusardi and Tufano (2015) [154] showed that a large share of American adults could not answer questions about compound interest on debt or minimum-payment arithmetic, that low debt literacy was concentrated among women, older adults, and minorities, and that it was associated with costly credit behaviour and self-reported over-indebtedness. Gathergood (2012) [113] found similar associations in the United Kingdom, while also showing that self-control problems contributed independently to over-indebtedness. Conceptual work on cognitive biases in financial decision-making and on behavioural financial analytics reaches a similar conclusion at the organisational level: knowledge does not guarantee sound choices when biases are systematic (Ebisi *et al*., 2023; Fobellah, 2025a; Lawal & Oduleye, 2023b) [87, 110, 150].

At the macro level, literacy and inclusion move together. Cross-country analysis shows that higher financial literacy is associated with greater account ownership and service use, and that literacy matters more where financial systems are shallow (Grohmann *et al*., 2018) [114]. Financially literate adults are also more likely to save and to report being able to raise emergency funds, an outcome that reduces reliance on costly emergency borrowing (Klapper & Lusardi, 2020) [133]. Studies from health communication, emergency alerting, and community energy projects also show that source-specific trust and culturally relevant messaging shape whether people act on information (Abutu & Alawode, 2022; Komi & Adeniji, 2024b; Komi, 2024; Odejide, 2024) [1, 137, 140, 182], a point with direct relevance to how financial information is delivered. These associations do not establish causality, but they consistently indicate that literacy gaps overlap with, and probably reinforce, credit exclusion.

3.3.2 Theme 2: Barriers to Responsible Credit Access (RQ2)

3.3.2.1 Supply-Side Barriers

Five supply-side barriers recur across the literature. The first is collateral and documentation requirements. Underserved borrowers often lack titled land, formal payslips, or identification documents. Account costs, distance to providers, and weak legal rights are associated with lower inclusion, particularly for the poor and rural residents (Allen *et al*., 2016) [35]. In the United States, insufficient funds to meet minimum balance requirements is the most cited reason for being unbanked, and households without an account are effectively shut out of mainstream credit (FDIC, 2024) [106]. Privacy-preserving digital identity frameworks and blockchain-supported KYC and anti-money laundering (AML) compliance are proposed as ways to lower onboarding barriers without weakening integrity safeguards (Atakpa, 2021; Bello *et al*., 2025c; Kumuyi *et al*., 2024b; Ominyi & Anichukwueze, 2021) [52, 59, 144, 206].

The second is thin or absent credit files. Lenders who rely on bureau data cannot price risk for people with no formal history, so they ration credit or charge a premium. This creates a circular problem: borrowers cannot build a history without credit, and cannot obtain credit without a history. A growing body of reviews and models on machine learning for credit risk, default prediction, and early-warning analytics argues that richer data can partly break this cycle (Agu *et al*., 2025; Ashore-Onisemo *et al*., 2020; Mensah *et al*., 2022; Okoli *et al*., 2022; Unamma, 2022) [16, 49, 165, 193, 242].

The third is rigid product design. Classic microfinance contracts require weekly repayment starting shortly after disbursement. Field *et al*. (2013) [108] showed that introducing a two-month grace period increased business investment and long-run profits, demonstrating that the standard contract discourages the very investments microcredit is meant to support. At the same time, default rose, illustrating the tension lenders face between flexibility and portfolio risk. Practice-oriented frameworks for SME and trade finance product design, relationship banking, and CRM-based forecasting in multichannel lending institutions point to similar design levers (Agboada *et al*., 2018; Dada *et al*., 2021b; Ezeako *et al*., 2019; Okafor *et al*., 2021) [13, 77, 100, 190].

The fourth is discrimination. Evidence from the United States shows that minority-owned small businesses were more likely to be denied credit and paid higher rates after controlling for creditworthiness (Blanchflower *et al*., 2003) [67], and that Latinx and African-American mortgage borrowers paid higher interest rates than comparable White borrowers (Bartlett *et al*., 2022) [58]. Algorithmic lenders discriminated less than face-to-face lenders in the latter study, but did not eliminate gaps.

The fifth is algorithmic bias. Machine learning models can extend credit to people with thin files, but they can also amplify existing inequalities. Fuster *et al*. (2022) [112] found that more flexible underwriting models increased disparities in predicted default between groups and delivered larger gains to White and Asian borrowers than to Black and Hispanic borrowers, even without using race as an input. Reviews of fairness and bias auditing in credit decision models, algorithmic accountability and model risk management, and anti-discrimination compliance for automated decision-making confirm that bias can enter through data, model design, and deployment (Annan, 2024, 2025a; Ominyi & Anichukwueze, 2023, 2024; Unamma & Ashore-Onisemo, 2023) [43, 44, 207, 208, 243]. Evidence from energy load forecasting showing that accurate forecasts are not necessarily fair forecasts offers a cautionary parallel (Komi, 2023) [136].

3.3.2.2 Demand-Side Barriers

On the demand side, limited knowledge interacts with behavioural and contextual factors. Low debt literacy makes it harder to compare offers or understand the true cost of borrowing (Lusardi & Tufano, 2015) [154]. Present bias and limited self-control make high-cost, quick-access credit attractive even when cheaper options exist (Gathergood, 2012) [113]. Distrust of formal institutions, shaped by past experiences of exclusion or fraud, deters people from applying, and low confidence compounds this, especially for women (Bucher-Koenen *et al*., 2017) [72].

A distinct strand of research examines the cognitive effects of poverty. Mani *et al*. (2013) [155] found that financial concerns reduced cognitive performance in laboratory and

field settings, suggesting that the mental load of scarcity can impair borrowing decisions independently of knowledge. However, Carvalho *et al*. (2016) [73] found no difference in cognitive function or decision quality before and after payday among low-income Americans, which suggests the effect may depend on the severity and salience of financial stress. The literature therefore supports a cautious conclusion: scarcity can affect decisions, but its effect is not uniform.

Finally, price sensitivity can outweigh knowledge. In Indonesia, Cole *et al*. (2011) [74] found that small subsidies for opening an account had considerably larger effects than a financial literacy course, which helped only those with very low initial literacy. This finding is important for credit as well: for many underserved households, cost and convenience are binding constraints that education alone cannot relax. Compliance costs passed on by providers and complex regulatory requirements for small firms and traders can further raise the effective price of formal finance (Eyetsemitan *et al*., 2021; Fobellah, 2025c; Jones & Ominyi, 2020, 2025a; Mensah *et al*., 2025) [95, 111, 120, 123, 164]. Research on agribusiness finance and technology adoption in rural communities similarly identifies collateral, information, and extension gaps as joint constraints (Michael & Ogunsola, 2019a, 2021d, 2021e, 2022a) [168, 171, 172, 173].

3.3.3 Theme 3: Challenges of New and High-Cost Credit Channels (RQ3)

3.3.3.1 Payday and High-Cost Short-Term Credit

The evidence on payday lending is mixed and depends on borrower circumstances. Melzer (2011) [162] found that access to payday loans increased the difficulty of paying essential bills among low- and moderate-income households. In contrast, Morse (2011) [179] found that payday lenders helped communities absorb natural disasters, reducing foreclosures, and Bhutta *et al*. (2015) [65] found that payday loan approval had little effect on subsequent credit scores. Karlan and Zinman (2010) [132] showed that access to high-cost consumer credit in South Africa improved employment and food security for marginal applicants. Taken together, these studies suggest that high-cost credit is neither uniformly harmful nor uniformly beneficial; harm appears concentrated where borrowing becomes repeated and where borrowers underestimate cumulative costs.

This interpretation is supported by Bertrand and Morse (2011) [63], who found that showing payday borrowers the cumulative dollar cost of rolling over a loan reduced subsequent borrowing by about 11 percent. The result shows that well-designed disclosure targeting a specific cognitive error can change behaviour at the moment it matters.

3.3.3.2 Digital Credit

Instant mobile loans have spread rapidly in sub-Saharan Africa and South Asia. They require no branch visit, no collateral, and no formal credit history, relying instead on mobile money transaction data. In Kenya, access to a digital loan improved household resilience by reducing the likelihood that households forwent expenses after shocks (Bharadwaj *et al*., 2019) [64]. Phone usage data can also predict repayment with accuracy comparable to bureau data, opening credit to people with no formal history (Björkegren & Grissen, 2020) [66].

The risks are equally clear. In Malawi, Brailovskaya *et al*. (2024) [70] found substantial demand for a digital loan priced at a base rate of 10 percent over 15 days, yet most borrowers did not know the loan terms, many repaid late, and many incurred sizeable late fees. Providing information about costs did not reduce demand, and the welfare effects of access were limited. The authors characterise the market as one in which opaque terms coexist with low consumer financial literacy. Digital credit thus combines the speed and reach of technology with the opacity that literacy and disclosure are supposed to address. Digital channels also expose new borrowers to fraud, synthetic identity abuse, and account takeover, and a substantial literature reviews machine learning and adaptive risk-scoring approaches to detect such fraud in banking and payment systems (Adesuyi *et al*., 2025a; Atakpa & Abetoh, 2022; Bello *et al*., 2025a; Elebe *et al*., 2023; Fadayomi *et al*., 2024; Okoruwa *et al*., 2025; Unamma *et al*., 2021) [7, 53, 62, 94, 102, 194, 245]. Data protection is a related concern: privacy-preserving architectures, data protection impact assessments, and legal and ethical risk models are recommended for platforms handling sensitive personal and financial data (Annan, 2022; Atakpa & Abolaji, 2022; Mbonu *et al*., 2018, 2022a; Unamma *et al*., 2024) [42, 55, 156, 158, 246], and cyber risk preparedness in African financial services and insurance remains uneven (Bello *et al*., 2024; Fadero *et al*., 2020, 2021) [61, 103, 104]. Behavioural studies of password practices, security awareness, and insider threats show that human factors are often the weakest link (Onche & Ogbonna, 2022; Onche *et al*., 2020, 2024) [211, 212, 213].

3.3.3.3 Buy Now, Pay Later

BNPL is a newer channel that splits purchases into short interest-free instalments. It appeals to younger and credit-constrained consumers and has spread from high-income markets into emerging economies. Transaction data show that BNPL adoption increases total retail spending, with larger effects for liquidity-constrained users (Di Maggio *et al*., 2022) [80]. Regulators have raised concerns about loan stacking across multiple providers, limited affordability checks, late fees, data harvesting, and the fact that BNPL debts are often invisible to credit bureaus (CFPB, 2022) [75]. The evidence base on welfare effects for underserved users remains thin. Research on web-based payment portal adoption, digital collections platforms, and scalable blockchain payment gateways describes the infrastructure on which such products depend (Adesuyi *et al*., 2023b; Agyei *et al*., 2019; Akomolafe *et al*., 2024a, 2025b; Olaogun *et al*., 2025; Osuji *et al*., 2021) [5, 17, 29, 32, 198, 220].

3.3.3.4 Microcredit

Microcredit, once promoted as a transformative tool for poverty reduction, now has the strongest causal evidence base of any credit channel for underserved groups. Six randomised evaluations across four continents found modest take-up and modestly positive, but not transformative, average effects (Banerjee, Karlan, *et al*., 2015) [57]. Microcredit increased business investment for some existing entrepreneurs but did not significantly change consumption, health, or women's empowerment on average (Banerjee, Duflo, *et al*., 2015) [56], and in Mexico it produced modest benefits without evidence of widespread harm (Angelucci *et al*., 2015) [38]. These findings temper expectations: access alone is not enough, and benefits accrue mainly to those with productive opportunities and the capacity to use credit well.

3.3.3.5 Remittances and Cross-Border Payments

Remittances are a major source of income for many underserved households, and their cost and reliability shape the ability to save, repay, and borrow. The Global Findex 2025 includes, for the first time, data on the share of adults receiving international remittances (Klapper *et al*., 2025) [135]. A cluster of conceptual and modelling studies examines how artificial intelligence, distributed ledgers, and collaborative governance can lower costs, manage liquidity, and reduce risk in cross-border payments (Adesuyi *et al*., 2024, 2025b; Akomolafe *et al*., 2022, 2023, 2024b, 2025a; Kumuyi *et al*., 2023; Olaogun *et al*., 2023) [6, 8, 25, 27, 30, 31, 143, 197]. Others address correspondent banking risk, digital trade regulation, and tamper-proof regulatory recordkeeping (Anichukwueze *et al*., 2021; Jones & Ominyi, 2024b; Okafor *et al*., 2024a) [41, 122, 189]. Although this literature is largely conceptual, it highlights that cheaper and more transparent remittance channels can strengthen the cash flows that underpin responsible borrowing.

3.3.4 Theme 4: Effectiveness of Financial Literacy Interventions (RQ4)

Five meta-analyses and syntheses address whether financial education changes behaviour. Their conclusions differ in emphasis but converge on several points (Table 5).

Table 5: Meta-analytic evidence on financial education

Study	Evidence base	Main conclusion	Relevance to underserved borrowers
Fernandes *et al*. (2014) [107]	201 studies	Education explained a very small share of variance in behaviour; effects decayed within about 20 months.	Effects were weaker in low-income samples; just-in-time education recommended.
Miller *et al*. (2015) [178]	Impact evaluations in developed and developing countries	Positive effects on savings and record keeping.	No significant effect on loan default.
Kaiser & Menkhoff (2017) [130]	126 impact evaluations	Education changes knowledge and behaviour.	Weaker effects for low-income clients in emerging economies; credit behaviour harder to change than saving.
Kaiser *et al*. (2022) [131]	76 randomised experiments	Positive causal effects on knowledge and behaviours, comparable to other education programmes.	More optimistic, but credit outcomes still less responsive than saving outcomes.
Banerjee, Karlan & Zinman (2015) [38]	Six microcredit RCTs	Access to credit has modest, not transformative, average effects.	Suggests education attached to microcredit cannot be expected to transform outcomes on its own.

Three conclusions follow. First, financial education has real but small average effects, and the more recent and methodologically rigorous evidence is somewhat more favourable than earlier work (Kaiser *et al*., 2022) [131]. Second, effects on credit outcomes such as default and debt management are weaker than effects on saving (Kaiser & Menkhoff, 2017; Miller *et al*., 2015) [130, 178]. Third, effects are weaker for low-income populations and decay over time (Fernandes *et al*., 2014) [107].

Format matters more than content volume. Drexler *et al*. (2014) [84] found that simple rules of thumb, such as separating business and household cash, improved the financial practices of microentrepreneurs in the Dominican Republic more than standard accounting training. Bertrand and Morse (2011) [63] showed that a targeted disclosure delivered at the point of decision changed payday borrowing. Both studies support a shift from comprehensive classroom instruction towards simple, timely guidance delivered where decisions are made. Longitudinal evidence on entrepreneurial training, reviews of entrepreneurship and agribusiness education, and comparative studies of vocational and strategic management education reinforce the value of practical, applied formats (Dada *et al*., 2024; Ebhojie *et al*., 2023b; Joseph *et al*., 2025b; Michael & Ogunsola, 2019b, 2023e; Onwuzulike *et al*., 2024) [78, 86, 127, 169, 176, 214], and work on AI-enabled personalised learning suggests that digital platforms can tailor content to learners' circumstances (Joseph & Uzondu, 2024a; Orise & Niniola, 2020; Seun *et al*., 2024) [125, 217, 230].

3.3.5 Theme 5: Opportunities for Inclusive and Responsible Credit (RQ4)

3.3.5.1 Mobile Money and Digital Infrastructure

Mobile money provides the foundation for much of the recent progress in inclusion. In Kenya, access to M-PESA lifted an estimated 2 percent of households out of poverty, with larger effects for female-headed households, largely through better financial resilience and shifts in women's occupations (Suri & Jack, 2016) [232]. Globally, mobile money has been central to account growth since 2014, and mobile accounts are now a significant savings channel in sub-Saharan Africa and Latin America (Klapper *et al*., 2025) [135]. These rails make it cheaper to deliver small loans, collect repayments, and build the transaction histories that alternative credit scoring needs. Reviews of digital banking in Sub-Saharan Africa, multi-vertical digital ecosystem platforms, customer data platforms, and analytics-led digital inclusion partnerships describe how these rails can be extended into broader service ecosystems (Agboada *et al*., 2022; Osuji *et al*., 2024; Rukh *et al*., 2023a; Ukadike, 2022; Unamma *et al*., 2018a) [12, 219, 229, 239, 244].

3.3.5.2 Alternative Data with Fairness Safeguards

Alternative data, including mobile phone usage, mobile money flows, and utility payments, can extend credit to people without bureau histories (Björkegren & Grissen, 2020) [66]. However, evidence that flexible models can widen disparities (Fuster *et al*., 2022) [112] means that alternative data must be paired with fairness testing, explainability, and data protection. Evidence that algorithmic lenders

discriminate less than face-to-face lenders (Bartlett *et al*., 2022) [58] suggests that well-governed automation can reduce some forms of bias. Governance frameworks for responsible AI, and organisational readiness for AI regulation offer practical models for doing so (Ominyi & Anichukwueze, 2023, 2024; Ominyi *et al*., 2024b; Unamma & Ashore-Onisemo, 2023; Unamma *et al*., 2025b) [207, 208, 210, 243, 247], and inclusive leadership in investment committees is proposed as a complementary safeguard (Oguntegbe *et al*., 2023) [188].

3.3.5.3 Product Design and Transparent Disclosure

Product features shape outcomes as strongly as borrower knowledge. Flexible repayment schedules can enable productive investment (Field *et al*., 2013) [108], and disclosure framed around total cost can reduce costly repeat borrowing (Bertrand & Morse, 2011) [63]. The Malawi evidence, in which information alone did not reduce demand for costly digital loans (Brailovskaya *et al*., 2024) [70], suggests that disclosure must be paired with product-level protections such as caps on late fees, cooling-off periods, and affordability checks. Work on customer journey analytics, product innovation cycles, and CRM adoption in financial services shows how providers can design for customer outcomes rather than volume alone (Agboada *et al*., 2018, 2020; Ezeako *et al*., 2019; Okoli *et al*., 2025; Oluwo *et al*., 2022; Ukadike & Ibeh, 2023) [11, 13, 100, 192, 200, 241].

3.3.5.4 Community-Based and Proximate Finance

Community-based savings and lending groups offer an alternative route. In Malawi, Village Savings and Loan Associations increased savings, borrowing, and household food consumption (Ksoll *et al*., 2016) [142]. Such groups build financial skills through practice, rely on social trust rather than collateral, and can serve as a stepping stone to formal credit. Physical proximity also matters: the opening of Banco Azteca branches in Mexico increased business ownership, employment, and income among low-income people (Bruhn & Love, 2014) [71]. Localised supply chain models, value chain linkages, and rural innovation hubs offer further community-anchored routes to income stability (Anene & Clement, 2024; Jones & Ominyi, 2021; Michael & Ogunsola, 2021b, 2023d, 2025a) [37, 121, 170, 175, 177], and community health worker and outreach models in public health show how trusted local intermediaries can extend services to hard-to-reach groups (Abutu & Alawode, 2024; Omaghomi *et al*., 2025a; Oparah *et al*., 2021) [2, 202, 215].

3.3.5.5 Coordinated Policy Frameworks

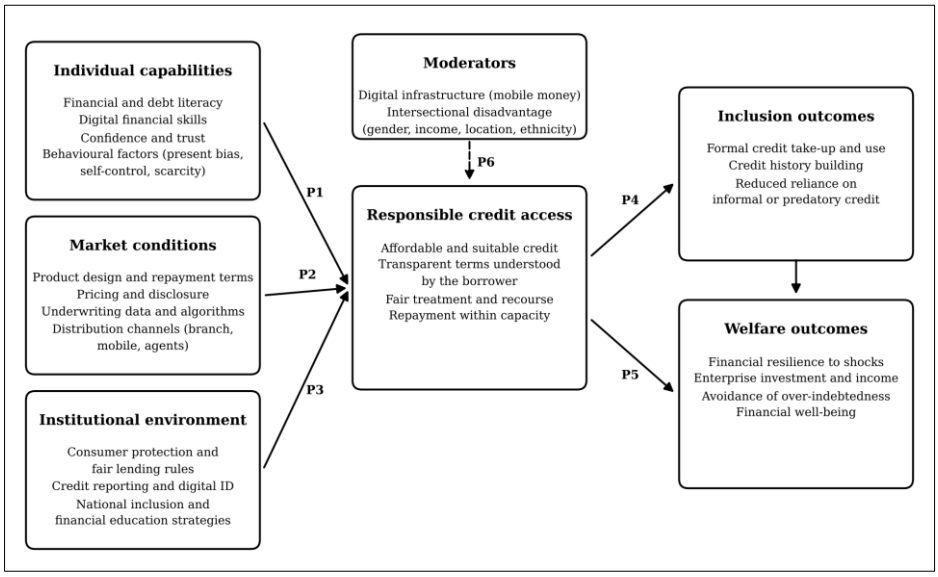
The evidence points towards integrated strategies that combine national financial literacy programmes, consumer protection regulation, credit reporting reform, and digital public infrastructure. Lower account costs, better proximity, and stronger legal rights are associated with greater inclusion of the poor (Allen *et al*., 2016) [35], and regulators have identified the need to bring new products such as BNPL within the scope of existing consumer credit rules (CFPB, 2022) [75]. Studies of technology risk controls and regulatory reporting, regulatory technology for fraud reporting, data-driven tax compliance in banks, and integrated cybersecurity and AML governance show how supervisors and institutions can monitor emerging risks in real time (Akomolafe & Agu, 2019b; Akomolafe *et al*., 2023b; Bello *et al*., 2025b; Bola-Sadipe *et al*., 2022; Fadayomi *et al*., 2021; Mbonu *et al*., 2021; Okwesa *et al*., 2023; Oluwo *et al*., 2025) [23, 25, 60, 69, 101, 157, 195, 199]. Comparative work on merger clearance, post-merger compliance, SOX frameworks, and cross-border tax governance highlights the coordination demands of regional markets (Agu *et al*., 2023a; Lawal & Oduleye, 2018b; Ominyi & Anichukwueze, 2020; Ominyi, 2020) [14, 146, 204, 205].

3.3.5.6 Finance for Small and Informal Enterprises

Micro and small enterprises are a central channel through which credit can raise household incomes. Fintech-enabled transaction banking and digital lending are presented as catalysts for SME growth (Okafor *et al*., 2021) [190], while predictive analytics, due diligence, and portfolio risk models are proposed to channel investment towards smaller firms and reduce fraud exposure (Eboh & Aliliele, 2023, 2024, 2025a, 2025b) [88, 89, 90, 91]. For borrowers, the capacity to use credit productively depends on basic financial governance and operational discipline; lean-digital frameworks, standard operating procedures, change management, user acceptance testing, AI readiness assessment, and affordable IT support models offer practical scaffolding for small businesses (Alieme *et al*., 2023; Anyanwu, 2020; Eboh *et al*., 2025; Eyetsemitan *et al*., 2022, 2023a, 2023b, 2025) [33, 45, 90, 96, 97, 98, 99]. ESG adoption in SME supply chains is also emerging as a factor in access to finance (Akinleye, 2023) [18].

3.4. Conceptual Model

Drawing the five themes together, this section proposes an integrated conceptual model of responsible credit access for underserved populations (Figure 1). The model extends the analytical framework in Section 1.1.4 by specifying how the three layers relate to one another, to responsible credit access, and to inclusion and welfare outcomes, and by stating propositions that future research can test.



Note. Solid arrows denote proposed direct relationships; the dashed arrow denotes moderation. P1 to P6 correspond to the propositions in Section 3.4.2. Source: author's synthesis.

Fig 1: Integrated conceptual model of responsible credit access among underserved populations

3.4.1 Components of the Model

Antecedents. Three layers shape credit outcomes. *Individual capabilities* include financial and debt literacy, digital financial skills, confidence and trust, and behavioural tendencies such as present bias and the cognitive load of scarcity (Lusardi & Tufano, 2015; Mani *et al*., 2013) [154, 155]. *Market conditions* include product design, pricing and disclosure, underwriting data and algorithms, and distribution channels (Field *et al*., 2013; Fuster *et al*., 2022) [108, 112]. The *institutional environment* includes consumer protection and fair lending rules, credit reporting and identification systems, and national inclusion and financial education strategies (Allen *et al*., 2016; OECD, 2023) [35, 187].

Mediator. *Responsible credit access* is the central construct. It is present when credit is affordable and suited to the borrower's purpose, its terms are transparent and understood, the borrower is treated fairly with access to recourse, and repayment is within capacity. The model treats responsible access as distinct from, and more demanding than, credit take-up.

Outcomes. Responsible access leads to *inclusion outcomes*, such as formal credit use, credit history building, and reduced reliance on informal or predatory credit, and to *welfare outcomes*, such as resilience to shocks, enterprise investment and income, avoidance of over-indebtedness, and financial well-being (Bharadwaj *et al*., 2019; Klapper & Lusardi, 2020) [64, 133]. Inclusion outcomes can in turn feed welfare outcomes, for example when a repayment history lowers the price of later credit.

Moderators. *Digital infrastructure*, especially mobile money, alters the cost and reach of credit and the data available for underwriting (Suri & Jack, 2016) [232]. *Intersectional disadvantage* across gender, income, location, ethnicity, and disability conditions the strength of every relationship in the model (Bucher-Koenen *et al*., 2017; FDIC, 2024) [72, 106].

3.4.2 Propositions

P1. Higher financial, debt, and digital literacy increases responsible credit access, but the effect is modest on its own and strongest when guidance is simple and delivered at the point of decision (Drexler *et al*., 2014; Kaiser *et al*., 2022) [84, 131].

P2. Market conditions, particularly transparent pricing, flexible repayment, and fair underwriting, have an effect on responsible access at least as large as individual literacy (Bertrand & Morse, 2011; Brailovskaya *et al*., 2024) [63, 70].

P3. Institutional quality, including consumer protection, inclusive credit reporting, and digital identification, raises responsible access directly and strengthens the effects of P1 and P2 (Allen *et al*., 2016; CFPB, 2022) [35, 75].

P4. Responsible credit access, rather than credit access alone, predicts sustained formal credit use and credit history building among underserved borrowers.

P5. Responsible credit access improves resilience and enterprise outcomes, whereas access without responsibility increases the risk of over-indebtedness (Melzer, 2011; Karlan & Zinman, 2010) [132, 162].

P6. Digital infrastructure amplifies both the benefits and the risks of credit access, and intersectional disadvantage weakens the translation of capabilities and market improvements into responsible access unless programmes are deliberately targeted.

3.5. Discussion

3.5.1 Summary of Findings

This review set out to understand how financial literacy relates to responsible credit access among underserved populations. Across 36 studies, the evidence shows that underserved groups face low and unequal financial literacy, overlapping supply-side and demand-side barriers, and growing exposure to fast but opaque forms of credit. Financial education helps, but its effects are small, decay over time, and are weakest for the low-income borrowers and credit outcomes that matter most here. The most promising approaches integrate education with product design, transparent disclosure, fair use of data, and regulation.

Table 6 maps the main barriers identified in the review to the opportunities that the evidence suggests can address them.

Table 6: Mapping barriers to evidence-based opportunities

Barrier	Level	Evidence-based opportunity	Key supporting studies
Low financial and debt literacy	Individual	Simple rules of thumb; just-in-time education at the point of borrowing	Drexler *et al*. (2014) [84]; Fernandes *et al*. (2014) [107]
Underestimation of cumulative borrowing costs	Individual and market	Disclosure in total-cost terms; repeat-borrowing warnings	Bertrand & Morse (2011) [63]
Opaque digital loan terms and late fees	Market	Standardised pricing disclosure; fee caps; affordability checks	Brailovskaya *et al*. (2024) [70]
Thin or absent credit files	Market and institutional	Alternative data from mobile phones and mobile money	Björkegren & Grissen (2020) [66]; Bharadwaj *et al*. (2019) [64]
Algorithmic and human discrimination	Market and institutional	Fairness audits; explainable models; fair lending enforcement	Fuster *et al*. (2022) [112]; Bartlett *et al*. (2022) [58]
Rigid repayment schedules	Market	Grace periods and flexible repayment	Field *et al*. (2013) [108]
Distance, cost, and documentation	Institutional	Mobile money rails; branch expansion; low-cost accounts	Suri & Jack (2016) [232]; Bruhn & Love (2014) [71]; Allen *et al*. (2016) [35]
Low trust and confidence	Individual	Community savings groups; peer-based learning	Ksoll *et al*. (2016) [142]; Bucher-Koenen *et al*. (2017) [72]
Regulatory gaps for new products	Institutional	Extend consumer credit rules to BNPL and digital lenders	CFPB (2022) [75]; Di Maggio *et al*. (2022) [80]

3.5.2 Financial Literacy Is Necessary but Not Sufficient

The clearest conclusion is that financial literacy cannot carry the weight of responsible inclusion alone. When cost and convenience are binding constraints, subsidies and product changes move behaviour more than education (Cole *et al*., 2011) [74]. When lenders keep terms opaque, even informed borrowers struggle to protect themselves, and information alone may not reduce demand for costly products (Brailovskaya *et al*., 2024) [70]. Literacy is better understood as one component of a system that also includes product design, market conduct, and regulation.

3.5.3 Responsibility Is Shared Between Borrowers and Lenders

Much of the policy discourse places the burden of responsible borrowing on individuals. The evidence reviewed here suggests a more balanced allocation. Lenders control pricing, disclosure, repayment design, collection practices, and underwriting models, all of which shape outcomes as much as borrower knowledge. Responsible credit access requires responsible lending, and regulators have a central role in aligning lender incentives with borrower welfare. Literature on strategic accounting systems, financial reporting models, budget compliance, reconciliation controls, segregation of duties, audit liaison, public-sector close controls, and predictive oversight shows that transparency and accountability depend on strong internal systems (Adelanwa *et al*., 2023b; Ashore-Onisemo & Unamma, 2022b; Bola-Sadipe *et al*., 2019; Dogbatsey & Ebhojie, 2018; Dogbatsey *et al*., 2019, 2021; Ebhojie *et al*., 2023a; Medon & Oduleye, 2022; Oyeleye *et al*., 2025; Ozowara *et al*., 2025b) [4, 47, 68, 81, 82, 83, 85, 159, 221, 223]. Responsible AI in auditing, ethics and compliance training, and consumer protection law in multinational marketing extend this accountability to conduct and culture (Anichukwueze *et al*., 2019, 2020; Elebe & Anunagba, 2025) [39, 40, 93].

3.5.4 Lessons from Adjacent Sectors

Credit is not the only service where underserved populations face a gap between nominal access and meaningful use, and several lessons transfer from neighbouring fields. In health care, expanding diagnostic infrastructure, telehealth adoption among rural and underserved communities, analytics-based needs assessment, trauma-informed and maternal health models, last-mile medicine distribution, equitable access to chronic therapies, digital equity in health education, chronic disease management, care plan design around social determinants, and community-based outreach all show that access must be paired with trust, affordability, and continuity (Abutu & Alawode, 2024; Akinse *et al*., 2023a, 2023b; Aminu-Ibrahim *et al*., 2020; Asiedu & Asiedu, 2022, 2024a; Atakpa & Abolaji, 2020; Fapohunda *et al*., 2023a; Omaghomi *et al*., 2025a, 2025b; Oparah *et al*., 2021, 2024b; Orise & Niniola, 2024b; Peteranaba *et al*., 2024) [2, 20, 21, 36, 50, 51, 54, 105, 202, 203, 215, 216, 218, 227]. In energy, studies of financing mechanisms for inclusive renewable energy, smart solar microgrids, hybrid microgrids for underserved communities, intersectional climate justice, and community trust find that no single instrument reaches the poor and that universal programmes can deepen inequality when design ignores local conditions (Ijiga *et al*., 2023b; Komi & Adeniji, 2020, 2024a, 2024b; Komi & Ganiu, 2025; Komi, 2023, 2024) [117, 136, 137, 138, 139, 140, 141]. Low-income housing research makes a parallel case for affordability-centred design (Nwafor *et al*., 2019c; Uduokhai *et al*., 2024b) [180, 238].

Work on inclusive and multilingual emergency alerting shows how accessibility, language, and trust determine whether information reaches vulnerable groups (Odejide, 2023, 2024, 2025) [181, 182, 183], an insight directly applicable to financial disclosures. Evidence on guaranteed income programmes underlines that income stability is a precondition for responsible borrowing (Jones & Ominyi, 2025b) [124]. Finally, models for cyber risk pricing, insurance underwriting with machine learning, and the financial impact of cyber incidents in health systems show how risk transfer products can protect both providers and users as financial services digitise (Adebayo *et al*., 2023; Oluwo *et al*., 2024; Ozowara *et al*., 2022, 2025a) [3, 201, 222, 224].

3.6. Implications

The literature synthesis and the conceptual model carry implications for policymakers and regulators, for financial service providers and community organisations, and for theory. They are set out in turn below.

3.6.1 Implications for Policy

- **Integrate financial education into the credit journey.** Replace or complement classroom programmes with short, timely, and contextual guidance delivered within

loan applications, mobile money menus, and repayment reminders.

- **Mandate clear and comparable disclosure.** Require total-cost-of-credit disclosure in local currency amounts, not only percentage rates, for digital, payday, and BNPL products.
- **Strengthen product-level protections.** Consider caps on late fees and rollovers, cooling-off periods, and proportionate affordability checks, particularly for instant digital loans.
- **Govern alternative data and algorithms.** Require fairness testing, explainability, and data protection for models that use alternative data, and extend fair lending supervision to algorithmic lenders. Frameworks for enterprise AI governance, health information governance, cross-border data privacy, AI-assisted compliance monitoring, real-time compliance pipelines, API governance, and data auditability provide transferable templates (Aliliele *et al*., 2023b; Annan, 2022; Ashore-Onisemo *et al*., 2024; Okwesa & Ashore-Onisemo, 2023; Ominyi *et al*., 2024a; Peteranaba *et al*., 2022; Uchechi *et al*., 2022, 2025) [34, 42, 48, 195, 209, 228, 236, 237].
- **Modernise credit reporting.** Include positive repayment data from microfinance institutions, mobile lenders, and BNPL providers in credit bureaus so that responsible borrowers can build histories.
- **Target persistent gaps.** Design programmes for women, rural residents, minorities, and people with disabilities, attending to confidence and trust as well as knowledge.

3.6.2 Implications for Practice

Financial service providers can improve outcomes by simplifying products, building flexibility into repayment schedules, testing disclosures with real customers, and monitoring indicators of distress such as repeated late payment or loan stacking. Community organisations and savings groups can serve as trusted intermediaries that build skills through practice and link members to formal credit. Development partners can support these approaches by funding rigorous evaluation rather than one-off training. Lenders and microfinance institutions can also draw on financial planning and analytics models, such as predictive forecasting, cost management, scenario modelling, cash flow and working capital optimisation, capital allocation, and executive dashboards, to price products sustainably and monitor portfolio stress (Adesuyi *et al*., 2022, 2023a; Agu *et al*., 2023b; Dada *et al*., 2021a; Filani *et al*., 2023; Isiekwu *et al*., 2021; Lawal & Oduleye, 2018a, 2019b, 2021a, 2021b; Medon & Oduleye, 2023, 2024; Oduleye & Medon, 2021, 2023a, 2023b; Shah *et al*., 2025; Tonoyan *et al*., 2021a, 2021b; Walawalkar *et al*., 2025) [9, 10, 15, 76, 109, 118, 145, 147, 148, 149, 160, 161, 184, 185, 186, 231, 234, 235, 249]. Asset-liability, capital adequacy, and post-pandemic resilience frameworks help ensure that inclusive lending remains prudent (Isiekwu *et al*., 2025; Mensah *et al*., 2019b, 2023) [119, 163, 167].

3.6.3 Theoretical Implications

The review has three implications for theory. First, it supports a shift from deficit models that treat underserved borrowers as lacking knowledge towards ecological models in which literacy, product design, and institutions jointly produce credit outcomes. Second, it suggests that responsible credit access should be modelled as a mediating construct between capabilities and welfare, rather than equated with credit take-up. Third, it highlights the need to integrate behavioural and digital dimensions, including trust, confidence, scarcity, and digital skills, into measures of financial capability, consistent with the OECD (2023) [187] move towards digital financial literacy and with conceptual work on behavioural financial analytics (Fobellah, 2025a; Lawal & Oduleye, 2023b) [110, 150].

3.8. Future Research

The gaps identified in this review suggest the following priorities for future research. Each is linked to the propositions of the conceptual model in Section 3.4.

1. **Long-term welfare outcomes.** Most studies measure short-term outcomes. Longer follow-ups are needed to assess whether digital and microcredit access improves resilience, assets, and well-being over years.
2. **Digital credit in low-income settings.** Evidence on digital lending remains concentrated in a few East and Southern African markets. Evaluations are needed in West Africa, South Asia, and Latin America, including Nigeria and other large markets where digital lending has grown quickly.
3. **Intersectional analysis.** Few studies examine how gender, income, ethnicity, disability, and location interact. Disaggregated data and intersectional designs would sharpen targeting.
4. **Evaluation of regulation.** Rigorous evidence on the effects of fee caps, disclosure mandates, and affordability rules on underserved borrowers is limited.
5. **Digital financial literacy.** As credit moves onto phones, research should assess the skills needed to recognise fraud, protect personal data, and compare digital offers.
6. **Algorithmic fairness in emerging markets.** Studies of algorithmic bias are concentrated in the United States mortgage market; evidence from mobile lending in low- and middle-income economies is scarce.
7. **Testing the conceptual model.** Studies that measure capabilities, market conditions, and institutional factors together, ideally with longitudinal or multi-country data, could test Propositions 1 to 6 and estimate the relative weight of each layer.

4. Conclusion

Financial inclusion has advanced remarkably in the past decade, but access to accounts has not translated into responsible credit access for many underserved people. This review finds that low and unequal financial literacy, interacting supply-side and demand-side barriers, and the spread of fast but opaque credit channels together limit the benefits of inclusion. Financial education has a role to play, but its effects are modest and weakest where they are most needed.

The evidence points to a more integrated agenda. Education works best when it is simple, timely, and embedded in the borrowing process. Products work best when they are flexible and transparent. Markets work best when alternative data expands access without entrenching bias, and when regulation keeps pace with innovation. Achieving responsible financial inclusion therefore requires shared responsibility among borrowers, lenders, regulators, and communities. Future research that tracks long-term welfare, evaluates regulatory reforms, and attends to the diversity

within underserved populations will be essential to guide that agenda.

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