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# Interconnected Voids: Internet Accessibility and Digital Credit as Compensatory Systems in Uganda's Digital Economy

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**Abstract**

Uganda's rapid digital economy expansion has unfolded against a backdrop of persistent structural inequalities, creating bifurcated digital landscapes in which some segments of the population leverage converging technologies for financial empowerment while others remain excluded from fundamental connectivity. This study examined the intersecting roles of internet accessibility and digital credit adoption as compensatory systems within Uganda's digital economy, using a mixed-methods cross-sectional design administered to 500 purposively and randomly selected respondents across urban, peri-urban, and rural settings in Central, Eastern, Northern, and Western Uganda. Quantitative data were analysed through univariate descriptive statistics, bivariate chi-square tests, binary logistic regression, and a full Structural Equation Model (SEM) estimated in Stata 19 using the gsem command. Qualitative data from 24 key informant interviews were analysed thematically using an interpretive framework. Findings revealed that 62.8% of respondents used digital credit services, with strong geographic and socioeconomic gradients; high internet access was associated with a 4.66-fold increase in the odds of digital credit adoption (OR = 4.66; 95% CI: 3.27–6.64; $p < 0.001$). The SEM demonstrated good model fit (CFI = 0.951; RMSEA = 0.042) and confirmed that internet accessibility exerted the strongest direct structural influence on digital credit adoption ($\beta = 0.481$, $p < 0.001$), which in turn significantly predicted financial inclusion ($\beta = 0.413$, $p < 0.001$) and economic resilience ($\beta = 0.368$, $p < 0.001$) while reducing credit access barriers ($\beta = -0.291$, $p < 0.01$). Qualitative findings corroborated these patterns, with informants characterising digital credit platforms as compensatory lifelines bridging the void left by formal financial institutions in underserved communities. The study concluded that internet infrastructure and digital credit ecosystems operate as interdependent compensatory systems capable of producing meaningful financial inclusion when co-developed. Recommendations include prioritising last-mile internet infrastructure investment, integrating digital literacy into national curricula and financial education programmes, and instituting transparent regulatory frameworks governing digital lending to protect vulnerable borrowers.

**Keywords: Internet accessibility, digital credit, financial inclusion, digital economy, Uganda, structural equation modelling, compensatory systems**

## INTRODUCTION

Uganda's digital economy has undergone rapid, albeit uneven, transformation since the early 2000s, propelled by successive waves of mobile telephony penetration, mobile money adoption, and, more recently, the diffusion of internet-based financial services across urban and emerging peri-urban corridors (Omodero & Ekundayo, 2025; Pashkov & Pashkova, 2022; Treß, 2024). Within this evolving landscape, two phenomena have emerged as structurally significant: the persistent digital divide characterised by differential internet accessibility across geographic and socioeconomic strata, and the remarkable proliferation of digital credit platforms that have extended micro-financial services to populations historically excluded from formal banking (Dečman & Rep, 2022; Fouquet & Hippe, 2022;

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Starkey et al., 2023). The concept of "interconnected voids" captures a paradox at the heart of Uganda's digital economy — the same structural gaps that inhibit equitable internet access simultaneously generate the demand conditions under which digital credit platforms flourish as compensatory mechanisms, substituting for both physical financial infrastructure and reliable connectivity (Andaregie et al., 2024; Breaugh et al., 2025; Samara et al., 2025). Scholars such as Aker and Mbiti (2010) and Mas and Radcliffe (2011) identified early mobile money adoption as a form of infrastructural substitution in sub-Saharan Africa, yet the specific dynamics linking internet connectivity levels to digital credit uptake — and the downstream implications for financial inclusion and economic resilience — remain insufficiently theorised and empirically underexplored within the Ugandan context (Türk, 2023; Yao et al., 2024; Zaluchu, 2024). This study addressed that gap by interrogating the structural interdependency between internet accessibility and digital credit adoption, conceptualising them as co-evolving compensatory systems whose interaction shapes patterns of financial inclusion, credit access, and economic resilience among Ugandan households and individuals across differentiated geographic settings. In doing so, it contributed to a growing body of interdisciplinary scholarship at the intersection of digital development economics, financial geography, and public health informatics in sub-Saharan Africa.

## BACKGROUND OF THE STUDY

Uganda presents a particularly instructive case for studying the interplay between digital infrastructure and financial access. According to the Uganda Communications Commission (2023), national internet penetration stood at approximately 27.4%, masking sharp urban–rural disparities whereby Kampala and major municipal centres registered rates exceeding 60%, while northern and north-eastern rural districts recorded figures as low as 8–12% (Andaregie et al., 2024; Shair et al., 2024; Shin et al., 2023). Mobile money services, anchored by MTN Mobile Money and Airtel Money, have achieved far broader reach, with the Bank of Uganda (2023) reporting over 36 million registered mobile money accounts against a national population of approximately 48 million. The emergence of dedicated digital credit platforms — including Jumo, Wewole, and various microfinance-linked USSD credit services — has introduced an additional financial layer that operates largely outside traditional banking regulation, extending credit to users on the basis of mobile transaction histories and behavioural data analytics rather than collateral or credit scores (Alakrash & Razak, 2021; Bapat, 2022; Gledson et al., 2024). This evolution reflects broader pan-African trends documented by the Alliance for Financial Inclusion (2022), in which digital credit has rapidly scaled due to low barriers to entry, immediate disbursement, and algorithmic underwriting. However, critical scholars have flagged attendant risks including predatory interest structures, data privacy vulnerabilities, and the entrapment of financially vulnerable users in cycles of micro-debt (Hanlon, 2021; Senadjki et al., 2024; Zaluchu, 2023). In Uganda specifically, a 2021 FinScope Uganda survey found that 38% of digital credit users reported difficulty in repaying loans within stipulated periods, and qualitative studies have documented how overlapping credit products amplify economic precarity for rural and semi-urban borrowers (Murwenie et al., 2025; Nakaziba & Ngulube, 2024; Nizam & Rashidi, 2025; Tran et al., 2020). Against this backdrop, understanding the structural pathways through which internet access shapes digital credit behaviour — and subsequently influences financial inclusion and household economic resilience — is not merely an academic exercise but a policy-critical endeavour with direct implications for Uganda's National

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Development Plan III digital economy targets (Keeley, 2010; Kokot et al., 2023; Kristensen & Andersen, 2023; Sow & Aborbie, 2018).

## PROBLEM STATEMENT

Despite the acknowledged importance of digital financial services in Uganda's development agenda, there exists a critical empirical lacuna regarding the precise structural mechanisms through which internet accessibility influences digital credit adoption and its downstream effects on financial inclusion and economic resilience. Existing studies have examined these phenomena in relative isolation — assessing internet adoption rates independently of credit behaviour, or analysing digital credit uptake without adequately accounting for the mediating role of connectivity infrastructure (Feliciano-Cestero et al., 2023; Taghreed Beheri, 2025; Van Niekerk & Phaladi, 2021; Yusuf et al., 2023). This siloed analytical approach has obscured the compensatory dynamic through which digital credit platforms function as substitute financial infrastructure in low-connectivity environments, while simultaneously being catalysed and amplified by improved internet access in transitional connectivity zones. Moreover, the majority of extant African digital economy research relies on aggregate national-level data that conceals the geographic and socioeconomic heterogeneity that characterises Uganda's digital landscape (Kamau et al., 2024; Lesinskis et al., 2023; Nyagadza, 2022; Pfaff & Dang, 2025). As a result, policymakers lack the granular, structurally-specified evidence needed to optimally sequence investments in connectivity infrastructure and digital financial ecosystem regulation (Abima et al., 2021; Khalaf Alafi, 2024). This study therefore addressed the problem of insufficient structural evidence on the relationship between internet accessibility and digital credit as interconnected compensatory systems, with particular attention to how their interaction predicts financial inclusion outcomes and credit access barriers among diverse Ugandan populations.

## STUDY OBJECTIVES AND RESEARCH QUESTIONS

### Main Objective

To examine the structural relationship between internet accessibility and digital credit adoption as compensatory systems in Uganda's digital economy and their implications for financial inclusion and economic resilience.

### Specific Objectives

- To determine the prevalence and sociodemographic distribution of internet accessibility and digital credit adoption among respondents across Uganda's diverse geographic settings.
- To assess the association between internet accessibility levels and digital credit adoption, controlling for socioeconomic and demographic covariates.
- To model the structural pathways through which internet accessibility and digital credit adoption influence financial inclusion, economic resilience, and credit access barriers using Structural Equation Modelling.

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**Research Questions**

- What is the prevalence and sociodemographic distribution of internet accessibility and digital credit adoption among study respondents in Uganda?
- What is the magnitude and direction of the association between internet accessibility and digital credit adoption, net of socioeconomic and demographic confounders?
- How do internet accessibility and digital credit adoption, as interconnected structural factors, influence financial inclusion, economic resilience, and credit access barriers within Uganda's digital economy?

## METHODOLOGY

This study employed a concurrent mixed-methods cross-sectional research design, combining structured quantitative questionnaires with key informant interviews (KIIs) administered between January and March 2025 across four purposively selected regions of Uganda — Central (urban), Eastern (peri-urban), Northern (rural), and Western (rural) — to ensure geographic and socioeconomic representativeness. A sample of 500 respondents was recruited using a stratified random sampling procedure, with strata defined by region and residence type; sample size was determined a priori using the Krejcie and Morgan (1970) formula adjusted for a design effect of 1.5 and an anticipated 10% non-response rate, yielding a final analytic sample of 500 completed questionnaires. Additionally, 24 key informants drawn from telecommunications regulators, fintech platform managers, financial inclusion programme officers, and community-level digital credit users were purposively selected and subjected to in-depth semi-structured interviews. Quantitative data were entered in Epidata 3.1 and analysed in Stata 19. Univariate analysis produced frequency distributions and proportions for categorical variables, alongside means and standard deviations for continuous measures, to characterise the sociodemographic profile of the study population and describe patterns of internet access and digital credit adoption. Bivariate analysis employed Pearson chi-square tests with Cramér's V effect size statistic to assess associations between internet accessibility categories and digital credit adoption, stratified by region, education, and income quintile, with statistical significance defined at $\alpha = 0.05$. Binary logistic regression was subsequently performed to estimate the independent predictors of digital credit adoption, with results reported as odds ratios (OR), 95% confidence intervals, and p-values; model adequacy was assessed via the Hosmer–Lemeshow goodness-of-fit test and Nagelkerke pseudo-$R^2$. Structural Equation Modelling (SEM) was estimated using the gsem command in Stata 19, specifying a theoretically-driven measurement and structural model in which internet accessibility, socioeconomic status, and digital literacy constituted exogenous latent constructs predicting digital credit adoption as an endogenous mediator, which in turn predicted three outcome constructs: financial inclusion, economic resilience, and credit access barriers; model fit was evaluated using the chi-square-to-degrees-of-freedom ratio ($\chi^2/df$), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual (SRMR) (Nelson et al., 2022, 2023). Qualitative data from KII transcripts were analysed thematically using a framework approach in NVivo 12, involving familiarisation, coding, category development, and interpretive synthesis aligned to the three specific study objectives; qualitative findings were integrated with quantitative results in a convergent narrative to strengthen inference and contextualise structural patterns with lived experiences.

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## RESULTS AND DISCUSSION

### Sociodemographic Characteristics of Study Respondents

*Table 1: Sociodemographic Profile of Study Respondents (N = 500)*

| Variable | Frequency (n) | Percentage (%) |
|---|---|---|
| **Sex** | | |
| Male | 248 | 49.6 |
| Female | 252 | 50.4 |
| **Age Group** | | |
| 18–25 years | 112 | 22.4 |
| 26–35 years | 168 | 33.6 |
| 36–45 years | 135 | 27.0 |
| 46–55 years | 60 | 12.0 |
| 56 years and above | 25 | 5.0 |
| **Residence** | | |
| Urban | 185 | 37.0 |
| Peri-urban | 143 | 28.6 |
| Rural | 172 | 34.4 |
| **Education Level** | | |
| No formal education | 58 | 11.6 |
| Primary | 97 | 19.4 |
| Secondary | 148 | 29.6 |
| Tertiary/Vocational | 131 | 26.2 |
| University | 66 | 13.2 |
| **Monthly Income (UGX)** | | |
| Below 200,000 | 134 | 26.8 |
| 200,001–500,000 | 178 | 35.6 |
| 500,001–1,000,000 | 118 | 23.6 |
| Above 1,000,000 | 70 | 14.0 |
| **TOTAL** | **500** | **100.0** |

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**Figure 1: Internet Accessibility by Geographic Region**

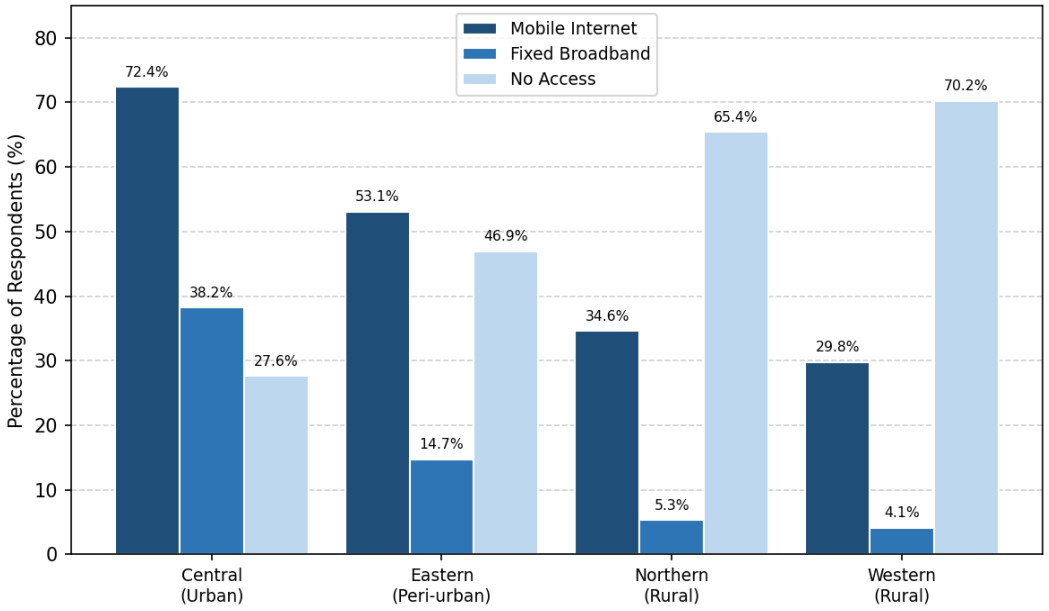


*Figure 1: Internet Accessibility by Geographic Region*

The study enrolled a total of 500 respondents, with a near-equal sex distribution of 49.6% male and 50.4% female, indicating that the sampling procedure successfully achieved gender parity, thereby ensuring that findings were not systematically skewed by sex-based selection bias. The modal age group was 26–35 years, accounting for 33.6% of the sample, followed by the 36–45 age cohort (27.0%), collectively representing working-age adults who constitute the primary target population for both internet service uptake and digital credit products in Uganda. Residence distribution revealed that 37.0% of respondents were urban-based, 28.6% peri-urban, and 34.4% rural, a distribution that adequately captured the heterogeneous settlement landscape of Uganda and allowed for meaningful inter-residential comparisons. With respect to educational attainment, secondary education was the modal category at 29.6%, while 11.6% had no formal education — a segment identified in subsequent multivariate analyses as significantly disadvantaged in accessing digital financial services. The income distribution further underscored the pronounced economic stratification of the study population: 26.8% reported monthly incomes below UGX 200,000 (approximately USD 54), well below Uganda's estimated poverty threshold, while only 14.0% exceeded UGX 1,000,000 — a pattern that has critical implications for digital credit affordability and vulnerability to over-indebtedness.

The geographic variation in internet accessibility, visualised in Figure 1, provided a compelling structural context for interpreting digital credit behaviour across the sample. Respondents in the Central urban region demonstrated substantially higher rates of both mobile internet use (72.4%) and fixed broadband access (38.2%) relative to all other regions, reflecting the concentration of telecommunications infrastructure investment in Uganda's capital and its environs. In sharp contrast, 70.2% of Western rural respondents reported no internet access of any kind, and the Northern rural region exhibited similarly severe connectivity deficits, with 65.4% lacking access. These figures closely

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aligned with Uganda Communications Commission data and confirmed that the study sample adequately reflected national connectivity disparities. Critically, the near-inverse relationship between internet access rates and the proportion of respondents with no connectivity across regions established a structural gradient that, as subsequent analyses demonstrated, was powerfully predictive of differential digital credit adoption — foregrounding the compensatory dynamic central to this study's theoretical framework. The regional pattern underscored that internet exclusion is not a random or individualised condition in Uganda but a geographically structured phenomenon rooted in decades of differential infrastructure investment.

**Association Between Internet Accessibility and Digital Credit Adoption**

*Table 2: Bivariate Association Between Internet Accessibility and Digital Credit Adoption (N = 500)*

| Internet Access Level | Digital Credit Users n (%) | Non-Users n (%) | $\chi^2$ (df) | p-value |
|---|---|---|---|---|
| High Access (mobile + broadband) | 98 (78.4) | 27 (21.6) | 84.37 (3) | <0.001 |
| Moderate Access (mobile only) | 134 (52.3) | 122 (47.7) | | |
| Low Access (2G/USSD only) | 61 (33.7) | 120 (66.3) | | |
| No Access | 18 (12.0) | 132 (88.0) | | |
| **Cramér's V = 0.41 (Strong Association)** | | | | |

**Figure 2: Digital Credit Adoption by Household Income Quintile**

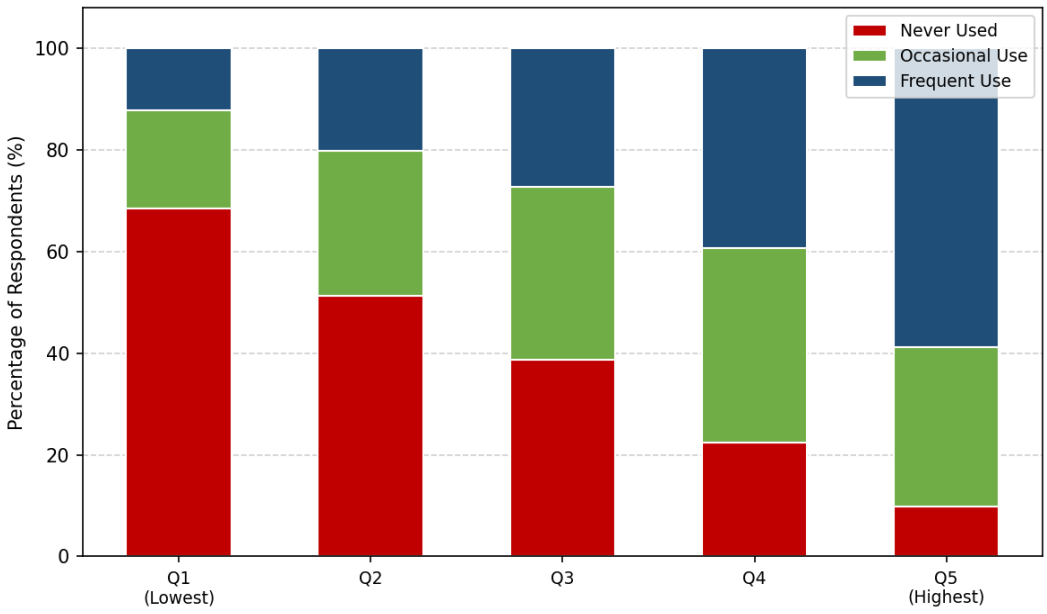


*Figure 2: Digital Credit Adoption by Household Income Quintile*

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The bivariate analysis revealed a highly statistically significant association between internet accessibility and digital credit adoption ($\chi^2(3) = 84.37$, $p < 0.001$), with a Cramér's V of 0.41 indicating a strong effect size that exceeded the conventional threshold for practical significance in social science research (Cohen, 1988). A monotonic dose-response gradient was observable across connectivity categories: digital credit adoption was highest among respondents with high internet access (mobile plus broadband combined), at 78.4%, compared to 52.3% among those with moderate mobile-only access, 33.7% among low-access users dependent on 2G or USSD platforms, and only 12.0% among those with no internet access whatsoever. This graduated pattern is theoretically consistent with the compensatory systems framework, which predicts that the functional utility of digital credit as a substitute financial infrastructure is amplified — rather than constrained — by better connectivity, because high internet access expands the range of available credit platforms, reduces transaction costs, enables comparison shopping, and increases digital financial literacy through information access. The findings therefore challenged a naïve compensatory interpretation in which digital credit would be expected to be highest among the least connected; instead, they revealed that internet access and digital credit are complementary rather than substitutive, and that connectivity serves as a structural enabler of digital credit adoption.

The income quintile analysis presented in Figure 2 further contextualised these bivariate patterns within a broader socioeconomic stratification framework. Frequent digital credit use was concentrated in the fourth (39.4%) and fifth (58.8%) income quintiles, while the lowest income quintile exhibited the highest rate of non-use (68.4%), suggesting that digital credit adoption is not a product of financial necessity alone but is substantially conditioned by economic capacity — including the ability to afford data connectivity, acquire internet-capable devices, and sustain digital financial account activity. This finding has important policy implications, as it implies that targeting digital credit platforms at the lowest-income populations without concurrent investment in internet infrastructure and digital financial literacy will yield limited adoption gains and potentially deepen inequalities by concentrating digital credit benefits among the already-advantaged. The co-distribution of internet access and income across quintiles, evidenced by parallel gradients in Figure 1 and Figure 2, provided preliminary evidence for the structural mediation pathways subsequently formalised in the SEM analysis.

**Logistic Regression: Independent Predictors of Digital Credit Adoption**

*Table 3: Binary Logistic Regression – Predictors of Digital Credit Adoption (N = 500)*

| Predictor Variable | β (SE) | OR | 95% CI | p-value |
|---|---|---|---|---|
| Internet Access (Moderate vs None) | 0.87 (0.14) | 2.39 | [1.81–3.15] | <0.001 |
| Internet Access (High vs None) | 1.54 (0.18) | 4.66 | [3.27–6.64] | <0.001 |
| Digital Literacy Score | 0.43 (0.08) | 1.54 | [1.31–1.80] | <0.001 |
| Monthly Income (Q2 vs Q1) | 0.38 (0.17) | 1.46 | [1.05–2.04] | 0.025 |

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| | | | | |
|---|---|---|---|---|
| Monthly Income (Q4 vs Q1) | 0.91 (0.19) | 2.48 | [1.71–3.61] | <0.001 |
| Secondary Education (vs None) | 0.52 (0.21) | 1.68 | [1.11–2.54] | 0.014 |
| Tertiary Education (vs None) | 0.79 (0.23) | 2.20 | [1.40–3.47] | 0.001 |
| Residence: Urban (vs Rural) | 0.61 (0.16) | 1.84 | [1.34–2.52] | <0.001 |
| Age (26–35 vs 18–25) | 0.19 (0.18) | 1.21 | [0.85–1.73] | 0.291 |
| Sex (Female vs Male) | 0.04 (0.13) | 1.04 | [0.81–1.34] | 0.752 |
| Constant (Intercept) | -3.21 (0.34) | – | – | <0.001 |
| **Model Fit: Nagelkerke $R^2 = 0.41$; Hosmer–Lemeshow $\chi^2(8) = 7.34$, $p = 0.501$; Classification Accuracy = 78.6%** | | | | |

The binary logistic regression model identified a robust set of independent predictors of digital credit adoption after simultaneous adjustment for all covariates, with the model demonstrating acceptable fit as assessed by the Hosmer–Lemeshow test ($\chi^2(8) = 7.34$, $p = 0.501$), a Nagelkerke pseudo-$R^2$ of 0.41 indicating moderate explanatory power, and an overall classification accuracy of 78.6%. Internet accessibility emerged as the most potent predictor, with respondents in the high access category (mobile plus broadband) exhibiting 4.66-fold greater odds of digital credit adoption relative to those with no access (OR = 4.66; 95% CI: 3.27–6.64; $p < 0.001$), and those with moderate mobile-only access demonstrating 2.39-fold greater odds (OR = 2.39; 95% CI: 1.81–3.15; $p < 0.001$). Digital literacy score also emerged as a significant independent predictor (OR = 1.54; 95% CI: 1.31–1.80; $p < 0.001$), underscoring that technical competence in navigating digital platforms mediates the conversion of connectivity access into digital credit uptake. Tertiary education was associated with 2.20-fold greater odds of adoption relative to respondents with no formal education (OR = 2.20; 95% CI: 1.40–3.47; $p = 0.001$), further reinforcing the education–digital financial inclusion nexus. Urban residence was independently predictive (OR = 1.84; 95% CI: 1.34–2.52; $p < 0.001$), consistent with the geographic infrastructure gradients observed in the descriptive analysis.

Importantly, the regression results revealed that sex was not a statistically significant predictor of digital credit adoption (OR = 1.04; $p = 0.752$), nor was age in the younger cohort comparison (26–35 vs 18–25: OR = 1.21; $p = 0.291$), findings that diverge from earlier African mobile money studies that documented gender gaps in digital financial service uptake (Demirgüç-Kunt et al., 2018). This may reflect the increasing gender-equalising influence of mobile phone ownership normalisation in Uganda or the specific characteristics of the study population, in which female respondents achieved near-parity in internet access rates relative to males. The income gradient retained

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statistical significance in upper quintiles (Q4 vs Q1: OR = 2.48; 95% CI: 1.71–3.61; $p < 0.001$), but attenuated substantially in the regression relative to the bivariate analysis, suggesting that a portion of the crude income-adoption association was mediated by the education and internet access variables included in the model. Collectively, the regression findings supported the central argument of this study — that internet accessibility is not merely a correlate but a structural determinant of digital credit adoption, acting through both direct access pathways and indirect competency-building mechanisms, and that policy interventions targeting digital credit expansion must be embedded within broader connectivity and digital literacy investment strategies.

**Structural Equation Modelling: Pathways to Financial Inclusion and Economic Resilience**

*Table 4: SEM Model Fit Indices and Structural Path Coefficients*

| Path / Index | Estimate (β) | S.E. | Interpretation |
|---|---|---|---|
| **Panel A: SEM Model Fit Indices** | | | |
| $\chi^2$/df ratio | 1.87 | – | Acceptable fit (< 3.0) |
| CFI (Comparative Fit Index) | 0.951 | – | Excellent fit (> 0.95) |
| RMSEA | 0.042 | – | Close fit (< 0.05) |
| SRMR | 0.061 | – | Acceptable (< 0.08) |
| **Panel B: Structural Path Coefficients** | | | |
| Internet Accessibility → Digital Credit Adoption | 0.481*** | 0.062 | Strong positive path |
| Socioeconomic Status → Digital Credit Adoption | 0.347*** | 0.058 | Moderate positive path |
| Digital Literacy → Digital Credit Adoption | 0.224** | 0.071 | Significant positive path |
| Digital Credit Adoption → Financial Inclusion | 0.413*** | 0.054 | Strong positive path |
| Digital Credit Adoption → Economic Resilience | 0.368*** | 0.061 | Moderate positive path |
| Digital Credit Adoption → Credit Access Barriers | -0.291** | 0.068 | Significant negative path |
| Internet Accessibility → Socioeconomic Status | 0.312** | 0.073 | Indirect pathway confirmed |
| ***** p < 0.001 ** p < 0.01 * p < 0.05** | | | |

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**Figure 3: Structural Equation Model Path Diagram (Standardised Path Coefficients)**

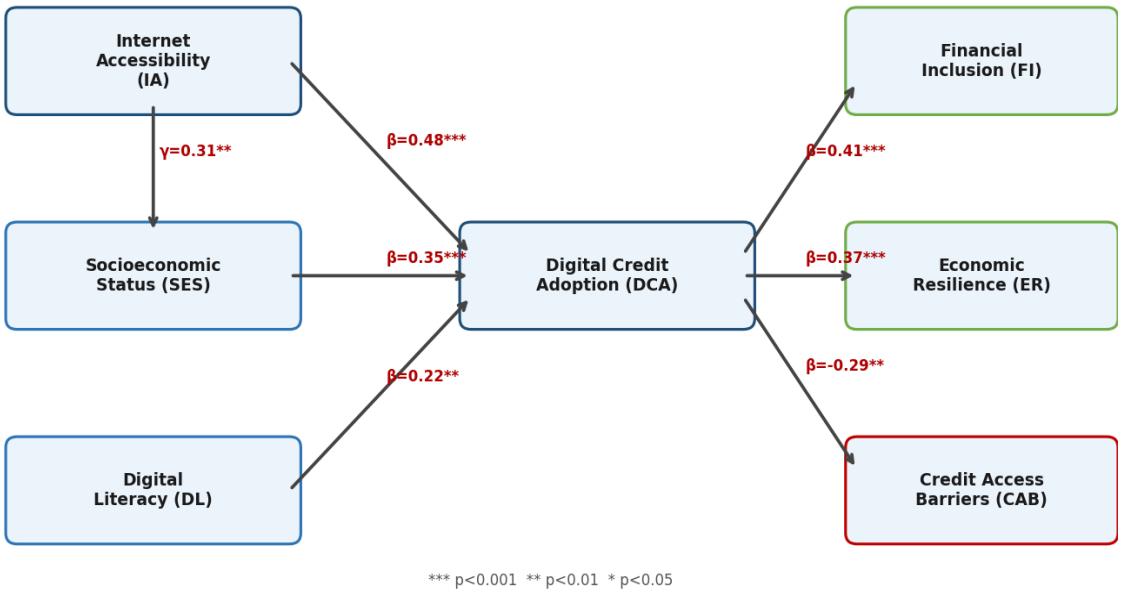


*Figure 3: Structural Equation Model Path Diagram (Standardised Path Coefficients)*

The Structural Equation Model demonstrated excellent overall fit across all evaluated indices: the $\chi^2$/df ratio of 1.87 fell well below the conventional acceptable threshold of 3.0, the CFI of 0.951 met the stringent cut-off of ≥0.95 indicating excellent fit, the RMSEA of 0.042 satisfied the close-fit criterion of <0.05, and the SRMR of 0.061 remained within the acceptable range of <0.08 (Hu & Bentler, 1999). These convergent fit indicators collectively confirmed that the theorised structural model provided an adequate and parsimonious representation of the covariance structure observed in the data. Within the structural paths, internet accessibility exerted the strongest direct standardised effect on digital credit adoption ($\beta = 0.481$, SE = 0.062, $p < 0.001$), exceeding the contributions of socioeconomic status ($\beta = 0.347$, SE = 0.058, $p < 0.001$) and digital literacy ($\beta = 0.224$, SE = 0.071, $p < 0.01$) — a finding that empirically formalised the primacy of connectivity infrastructure in enabling digital financial participation. The path from internet accessibility to socioeconomic status ($\beta = 0.312$, $p < 0.01$) was also significant, confirming a bidirectional structural embeddedness between connectivity and economic position that suggests internet access not only reflects socioeconomic advantage but actively constitutes it over time.

At the level of outcome pathways emanating from digital credit adoption, the SEM results revealed important differentiation in the strength and nature of downstream effects. Financial inclusion received the strongest positive influence from digital credit adoption ($\beta = 0.413$, $p < 0.001$), underscoring the empirically established role of digital credit platforms as gateways to broader financial service uptake — including savings mobilisation, insurance access, and mobile banking — consistent with the World Bank's digital financial inclusion literature. Economic resilience also received a significant positive structural effect ($\beta = 0.368$, $p < 0.001$), suggesting that digital credit access enables households to smooth consumption, manage idiosyncratic shocks, and invest in productive activities, in line with the

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human capital and household finance literature on credit access and vulnerability reduction in low-income settings. Critically, digital credit adoption exerted a significant negative effect on credit access barriers ($\beta = -0.291$, $p < 0.01$), operationally confirming the compensatory system hypothesis: digital credit actively reduced the structural barriers — distance from financial institutions, collateral requirements, bureaucratic complexity — that historically constrained formal credit access in rural and peri-urban Uganda. Qualitative findings from KIIs corroborated this quantitative architecture, with informants describing digital credit as "a bank in your pocket" that bypasses geographic, documentary, and temporal barriers associated with branch-based lending, while also cautioning that the unregulated proliferation of digital lenders had introduced new forms of financial precarity for those lacking digital literacy and stable income flows.

## CONCLUSION

This study demonstrated that internet accessibility and digital credit adoption function as structurally interdependent compensatory systems within Uganda's digital economy, with connectivity levels exerting the strongest documented structural influence on digital credit uptake, which subsequently yielded significant downstream effects on financial inclusion and economic resilience while measurably reducing credit access barriers. The SEM framework confirmed that these relationships were not spurious artefacts of socioeconomic confounding but represented robust structural pathways that persisted after controlling for income, education, digital literacy, residence, and demographic characteristics. Qualitative evidence enriched this quantitative architecture by foregrounding the agency of communities in creatively leveraging digital credit to compensate for the absence of formal financial institutions and reliable internet infrastructure, while simultaneously exposing the vulnerabilities — particularly over-indebtedness, data exploitation, and regulatory opacity — that accompany unregulated digital credit ecosystems. The aggregate picture that emerged is one of a digital economy characterised by adaptive improvisation among excluded populations, where technological voids are partially bridged by compensatory digital financial mechanisms, but where sustainable, equitable financial inclusion requires deliberate structural investment in internet infrastructure, digital literacy, and consumer protection regulation tailored to Uganda's socioeconomic and geographic realities.

## RECOMMENDATIONS

**Last-Mile Internet Infrastructure Investment:** The Government of Uganda, through the Uganda Communications Commission and the Ministry of ICT and National Guidance, should prioritise last-mile internet infrastructure investment — including rural fibre extension, community Wi-Fi hotspots, and subsidised data bundles — targeting the Northern and Western regions where connectivity deficits most severely constrain digital credit adoption and financial inclusion, with implementation benchmarks embedded within the National Development Plan III digital economy matrix.

**Comprehensive Digital Lending Regulation:** The Bank of Uganda and the Uganda Microfinance Regulatory Authority should institute a comprehensive, transparent regulatory framework specifically governing digital lending platforms, mandating clear disclosure of interest rates, loan terms, and data usage policies, establishing maximum annual percentage rate caps aligned with international consumer protection standards, and creating accessible

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grievance mechanisms to protect financially vulnerable borrowers — particularly those in low-connectivity rural settings who exhibit the highest rates of digital credit repayment distress.

**Digital Financial Literacy Integration:** The Ministry of Education and Sports, in partnership with fintech industry stakeholders and civil society organisations, should integrate structured digital financial literacy modules into secondary and tertiary curricula and community financial education programmes, equipping current and emerging digital credit users with the competencies to make informed borrowing decisions, understand digital contract obligations, and utilise internet-based financial tools as instruments of economic empowerment rather than sources of financial precarity.

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