Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Digital financial inclusion business strategies green finance and leadership influence on banking system stability in Somalia

Abdikarin Ahmed Abdi

Abdikarimcodey@simad.edu.so

SIMAD University

Dahir Abdullahi Mohamed

SIMAD University

Ismail Ahmed Mohamud

SIMAD University

Research Article

Keywords: Digital financial inclusion, Mobile money, Leadership quality, Banking system stability, Fragile economies, Somalia

Posted Date: March 23rd, 2026

DOI: https://doi.org/10.21203/rs.3.rs-8955153/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at Discover Sustainability on September 2nd, 2026. See the published version at https://doi.org/10.1007/s43621-026-04459-0.

Abstract

This study examines the relationship between digital financial inclusion, leadership quality, and banking system stability in Somalia, while keenly focused on leadership's moderating effect. Observing the rapid rise of mobile finance services in vulnerable post-conflict nations inspired a macro-financial approach to finance, institutions, as well as leadership theories. This study investigated the power of mobile money penetration, leadership, and the connection between the two in determining the stability of the banking system between 2019 and 2024 annually. Digital financial inclusion is associated with the stability of the banking system, suggesting that mobile money contributes to stronger financial systems through improved payment efficiencies and the circulation of liquid funds. Most importantly, the relationship between digital financial inclusion and leadership quality is seen to be positive and statistically significant, implying that leadership/governmental oversight strengthens the relationship between digital financial services provision and financial stability. The findings of this paper, therefore, underscore the conditional nature of digital financial innovation. It is expected that this paper will add to the body of literature on digital finance/financial stability, particularly due to the study's assessment of the experience of a developing country. The conclusions derived from this paper are hugely relevant to economies that are developing very fast. The findings of this paper underscore the necessity of taking an integrated approach that includes the development of digital financial inclusion, leadership, and institutions towards achieving systemic banking stability.

1. Introduction

Financial inclusion is fundamental to attaining a series of United Nations development Goals aimed at fostering a better and more sustainable future for all. The World Bank regards financial inclusion as a fundamental pillar for alleviating extreme poverty and enhancing societal prosperity and well-being. Furthermore, enhancing financial inclusion motivates the economically disadvantaged to save and amplifies the accessibility of financial resources. Inclusivity in financial access is a worldwide issue and a crucial facilitator of the primary Sustainable Development Goals (SDGs). Notwithstanding these endeavours, global financial inclusion statistics for 2021 reveal that approximately 25% of the adult population worldwide lacks access to fundamental financial services (Demirgüç-Kunt et al. 2020). Moreover, it is difficult to envision enduring financial stability and economic growth when significant segments of the population are excluded from the formal financial system. Financial inclusion and economic growth are intricately interconnected. In African banking systems, financial innovation is essential to promoting inclusive economic growth and increasing financial inclusion (Williams, 2015).

The World Bank reports that two-thirds of Somali adults do not have official financial accounts and that only 1% have credit cards. Digital financial systems are key to escalating the stability of the banking system, especially when the country is faced with both economic and political problems such as now prevailing. Take Somalia as an example: In a country where access to conventional financial institutions is limited and people predominantly favor such services; this becomes a key issue. The handset a revolution in mobile financial services not only in Somalia, but in many countries in Africa and Asia. It

has greatly encouraged cellular use among the people of our continents, boosting financial service access for the people; and with deposit money banks, it also promotes a return to the tax. These changes have brought Somalia excellent access to capital, meeting the country's economic goals. Fintech certainly provides answers to challenges being posed in this sector by offering tailored solutions, i.e. every market needs its own way and this is one of them (Sanga & Aziakpono, 2023; Y. Zhang et al., 2023). These improvements have helped to upgrade risk assessments, and this thing seals bank-financing gaps. The Fintech toolbox is assisting SMEs and financial institutions form coordinated data solutions that better serve both sides (Brei et al., 2020).

Discovering the potential of Fintech in countries like Somalia states requires improvements in digital infrastructure and stringent law backing (Charaia et al., 2021). Nonetheless, challenges associated with Fintech include regulatory challenges, rapid technological changes, and potential market disruption, among other issues (Arner et al., 2015). Therefore, as Fintech services deal with more and more delicate financial information, the concerns regarding data privacy and cybersecurity are of utmost importance in all markets. Moreover, in emerging and underdeveloped markets, where the facilities and resources of conventional banking systems are scarce, Fintech services provide a substitute, thus enhancing financial inclusiveness and optimal use of available resources. These services help the banking sector overcome geographical and financial barriers, promoting sustainable and circular economy practices (Barroso & Laborda, 2022; Giglio, 2021; Maabreh, 2024; Rao et al., 2021; Sanga & Aziakpono, 2023).

2. Literature Review

2.1 Banking System Stability: Conceptual and Theoretical Foundations

Banking system stability generation capacity financial institutions of the core to perform endowment, payment, and effective transition. A banking system that remains stable is one where there are sufficient capitalisation-prudential indicators, satisfactory operation, and liquidity is well provided for (5) and irrational behavior by the operators of various risks they manage effectively can stop it from lurching into major systemic crises.

Theoretical foundations for bank stability are to be found in the mediating theory of finance, which emphasizes the part played by banks in modulating information asymmetries and reducing transaction costs between savers on the one hand and investors on the other. Adventitiously, banks in executing these tasks effectively support both allocation of resources toward high profits and general stability of the macro economy.

In low income and underdeveloped systems, the stability of banking systems is particularly important. They are test at the centre of all risks inherent to here, so mortal. That is, banking stability also becomes a crucial issue in fragile countries. Empirical studies really do demonstrate that instability in banking systems can easily lead to real economic depressions; on the demand side, credit shrinks and thereby

restricts growth of these economies (Ben Naceur et al., 2024). Hence, classical and new areas for concern still hold with respect to bank stability from all financial viewpoints at a time when banking increasingly integrates into all other areas of world trade and finance. Furthermore, leadership was used as a variable moderate the relationship between financial literacy and banking system stability in Somalia. Thus, these variables were used as factors that build the research model framework and as a research problem-solving framework which can be seen in Fig. 1.

2.2 Determinants of Banking System Stability

According to the literature helps to identify large volumes determinant the bank system stability, which are macroeconomic factors, institutional factors and regulatory factors, and bank specific organization determinants. Macroeconomic factors include economic growth, inflation trends, population developments and external sector conditions. When economies enter periods of instability, debtors' repaying ability becomes weakened as a result credit risk increases for banks. Institutional and regulatory factors—such as the quality of regulation, the atmosphere for supervision, and frameworks for governance—are themselves the ultimate determinants of bank risk-taking incentives and implementation decisions. Weaker institutions would cause more fraud. Banks will take undue risks, thus affecting the stability of the whole system.

Bank-specific factors include capital adequacy levels, liquidity management capabilities, operational cost structures, and governance mechanisms. Recent literature increasingly highlights technological capability, strategic orientation, and sustainability practices as new organizational determinants of systemic financial stability based on financial intermediation in the digital era (Hoque et al 2024).

2.3 Digital Financial Inclusion and Banking System Stability

2.3.1 Concept of Digital Financial Inclusion

Digital finance involves providing financial services. It is convenient, accessible and technology-laden - in sharp contrast to traditional banks Digital financial services cater for the individual and businesses that were underserviced or previously left out of the formal financial markets. Examples include Internet banking, mobile payments platforms and applications as well as fintech solutions. Instead of concentrating on actual access to banking, which is what traditional financial inclusion does, digital financial inclusion harnesses technology to lower transaction costs, expand coverage and improve service efficiency.

The conceptual origin of digital financial inclusion lies in economic intermediation models and the theory of technology acceptance. Digital platforms improve intermediation efficiency as they allow real and continuous data collection, credit assessment that is automated on a rolling basis, and monitoring of financial flows in real time. However, the effectiveness of digital financial inclusion critically hinges on institutional readiness, supervision and regulation by the authorities as well as users' capability to adopt it.

2.3.2 Digital Financial Inclusion–Stability Nexus

There is a theoretical ambiguity in the impact of digital financial inclusion on bank system stability. On one hand, digital inclusion can strengthen banking stability by bringing in funds through online deposit products, diversifying funding sources, expanding reach areas and improving corporate operation efficiency. Better information on transactions puts banks in a position to assess credit efficiency and control risk more effectively, holding out the promise of lowering bad loans. On the other hand, a fast digital expansion can open up new vulnerabilities. Loosely regulated systems, poor cyber-security facilities and widespread financial illiteracy add an extra layer of risk to both bank operation and credit. Large increases without risk controls: digital growth in credit terms may lead to a decline in asset quality. Moreover, heightened reliance on digital infrastructure places banks at risk from computer worms or hardware malfunctions.

2.3.3 Empirical Evidence

In research on the relationship between digital financial inclusion and stability, the empirical results diverge by region and over time. Costs of entry in financially developed countries, digital financial inclusion is generally associated with improved banking stability as a result of strong regulatory oversight and institutional capacity (Danisman & Tarazi, 2023). In contrast, evidence from low-financially developed and fragile economies suggests that digital inclusion may weaken banking stability when technological adoption outpaces regulatory adaptation (Okoli, 2025).

These findings show that digital financial inclusion is stable in some instances and unstable in others; which way it goes depends on what organization and institutional factors can join forces with it.

2.4 Green Financial Systems and Banking System Stability

2.4.1 Conceptualization of Green Financial Systems

In a nutshell, green financial systems include financial institutions, financial tools and schemes that take sustainability as a purpose, financial decisions environmental combine and financial thinking of consequent environmental. The goal of green finance is to encourage capital flow into environmentally friendly activities and move climate change related financial risks onto the balance sheets of banks. Where does the theoretical underpinning of green finance stand? Unfortunately, there are still differences on this issue. (Dikau & Volz, 2021) Recognizing environmental risks as material financial risks and asset values, credit quality, and systemic stability are pretty clearly established aspects of sustainable finance theory. Banks that ignore environmental risks may underestimate their long-term vulnerability and thus weaken their financial vitality (Dikau & Volz, 2021).

2.4.2 Green Finance and Stability Mechanisms

Green financial systems affect banking stability through a number of routes. Firstly, they reduce the risk of climate-related credit risk. Second, green finance strengthens the management of risk by factoring in

the assessment of the environment in the evaluation of credit. Third, green finance promotes the development of reputational capital and investor confidence, which in turn can provide stability in the funding base.

Empirical evidence is emerging that green finance makes a positive contribution to the stability of the financial system, especially in countries that face environmental shocks (Zheng et al., 2021). However, the effectiveness of green finance is subject to the capability of banks to assess environmental risk and the presence of an enabling regulatory system.

2.5 Business Strategy and Banking System Stability

Business strategy is long-term organizational planning, which guide resource allocation, competitive positioning as well as strategic risk management. In banking, strategy determines the balance of growth, innovation and prudent discipline for institutions.

Citing such theories and perspectives, the literature argues banks that are well- organized in their strategies but remain aware of risks have greater direction when the crisis comes. Strategic alignment ensures that technology innovation pushes forward under good administration and risk management. In the essential economy, it is quality as well as speed which determines results. The empirical evidence indicates that those banks that adopt unsustainable strategies to achieve the profit targets get into the dog days, whereas those that adopt comprehensive and informatized strategies of stability fare better (Hoque et al., 2024).

2.6 Leadership and Governance as a Moderating Mechanism

Effectiveness of leadership is of utmost importance in influencing the riskiness, strategy, and steadfastness of a bank. Leadership is conceptualized as interpreter of organizational meaning, defining organizational status vis-à-vis environmental uncertainty, based on upper echelon theory and corporate governance theory.

Leadership improves internal control, establishes ethical standards, and ensures that the conversion of traditional finance into digital finance and green finance is consistent with long-term stability goals. Empirical evidence indicates that leadership might be a moderator of the relationship between financial innovation and bank stability, particularly in the absence of external regulation (Arner et al., 2020). In weak financial systems, leadership authority prevails, and governance is the key to outcomes.

2.7 Synthesis and Research Gaps

However, it has been found that there are four important gaps identified through the reviewed literature. First, empirical findings on banking system stability in fragile and conflict-affected economies are limited. Second, green financial systems in low-income economies have not been sufficiently explored. Third, integrated approaches examining digital financial inclusion, green finance, business strategy, and

leadership simultaneously are limited. Fourth, no study has been found that has modeled leadership as a moderating variable.

Addressing these gaps provides the primary motivation for the present study.

3. Methodology

This study attempts to use a quantitative macro-financial research design to explore the correlation among digital financial inclusion, green financial systems business strategy, leadership, and banking system stability in Somalia. Since Somalia's financial system is structured differently and there are currently no public micro-level data from individual banks, our empirical analysis will use sector and institutional indicators consistent with existing research on economies in fragile and post-conflict situations. Data for this annual series covering the 2019–2024 period comes from international sources and has been authenticated, most particularly the World Bank (https://data.worldbank.org/country/somalia-fed-rep), central bank publications (https://centralbank.gov.so/annual-statistical-bulletin-latest/) and indicators of governance. Stable governance in the financial sector is required to ensure that no information about major changes in personnel leaves our records incomplete. Unfortunately, there is no comprehensive bank-level dataset publicly available for Somalia.

It’s not feasible to use hand-built bank level summary statistics, because each of the time series gets pruned according to inflation constraints and nobody knows what they are outside one year at most. Banking system stability is measured here by the inverse of the non-performing loan (NPL) ratio, which tells us something about asset quality and credit risk conditions within the banking sector. Although bank-level Z-scores are widely used in developed financial systems, such data is not available for Somalia. Using stability measurements based on NPLs is therefore appropriate and consistent with prior studies of the stability of banks operating within data-poor or fragile institutional environments. Digital financial inclusion is quantified through the rate of mobile money penetration, that is the proportion of adults who are actively using mobile-based financial services. This is a metric particularly suited to Somalia, where mobile money is the main vehicle of financial access and transaction, and far outstrips ordinary bank account use.As such, mobile money penetration captures both access and usage dimensions of digital financial inclusion more accurately than formal account ownership.

Green financial systems are proxied by domestic credit to the private sector as a percentage of GDP, representing the breadth of productive financial intermediation. While the direct data on green or environment-oriented credit are not obtainable, financing provided by the private sector serves as a rough proxy for finance directed at productive, livelihood-supporting activities and ones in fragile economies that seek sustainability. This approach echoes results of the macro-financial literature that classifying green or productive finance by the amount of aggregate credit in particular areas where such sectoral disaggregation is not possible is widely accepted. On the other hand, the business strategy is reflected by the banking sector's share of total GDP in relation to assets that it has. In environments

where firm-level strategic disclosures are limited, sectoral asset growth provides a reasonable indication of banks' collective strategic positioning toward scale, outreach, and market penetration. Leadership is modeled as a moderating variable and proxied using a composite governance index derived from the World Bank's Worldwide Governance Indicators, specifically government effectiveness and regulatory quality.

These indicators reflect the institutional and regulatory environment within which bank leadership operates and has been widely used as leadership and governance proxies in studies of financial systems in fragile and developing economies. For accounts registered per 100 people, we need to know the standard types of financial institutions as this is used to scale the number of more advanced services. This can help ensure that the effects of digital financial inclusion are not mistakenly conflated with those from traditional banking. The empirical model is structured as follows:

$$BSS_t = \alpha_0 + \alpha_1 DFI_t + \alpha_2 GFS_t + \alpha_3 BS_t + \alpha_4 L_t + \alpha_5 (DFI_t \times L_t) + \varepsilon_t$$

Where BSS indicates banking system stability, DFI is digital financial inclusion, GFS states green financial systems, BS lays out business strategy, and L is leadership. ε_t denotes the error term. The interaction term captures the moderating role of leadership in the digital financial inclusion–stability relationship. Estimation is conducted using ordinary least squares with robust standard errors to account for potential heteroskedasticity. Given the limited time dimension, the analysis is interpreted as macro-financial and exploratory rather than large-sample causal inference. This approach is appropriate for institutional and policy-oriented research in fragile financial systems.

4. Results and Discussion

4.1 Descriptive Analysis

This section presents the descriptive characteristics of the variables employed in the analysis for the period 2019–2024.

Table 1
Descriptive Statistics of Study Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Banking System Stability	6	35.09	2.97	31.25	38.46
Mobile Money Penetration (%)	6	73.17	1.94	70	75
Bank Account Penetration (%)	6	15.42	0.2	15	15.5
Domestic Credit to Private Sector (% GDP)	6	0	0	0	0
Banking Assets (% GDP)	6	4.2	0.13	4	4.3
Leadership Index (WGI)	6	−1.94	0.15	−2.20	−1.78
Author's Computation 2025					
Note: Variables are measured at the macro-financial level. The zero variation in private sector credit reflects Somalia's constrained formal credit environment during the study period.					

The study revealed that the average stability index for banking systems was 35.09, and examples from the sample period showed a small fluctuation. Thus, in the past few years in Somalia's banking sector asset quality and credit risks have gradually improved.

In practice, mobile money penetration reached an average level of about 73%. Therefore, digital finance represented main channel of financial inclusion in Somalia. In contrast, traditional bank account penetration remained low at an average of around 15%, and this structural dependence on mobile-based platforms rather than one of conventional banking infrastructure is also reflected in associated costs. Banking sector assets averaged 4.2% of GDP, indicating that not only is it relatively small but also expanding.

Indicated by the governance index, leadership quality had a mean value that was negative. This is consistent with the institutional fragility characterizing Somalia during research period. Nonetheless, observable variation in leadership indicators provides a basis for examining their moderating role in the digital finance–stability nexus.

Overall, the descriptive statistics reveal a financial system in transition, characterised by high digital financial adoption alongside weak institutional capacity, thereby providing a suitable empirical context for testing the proposed framework.

4.2 Regression Results

This study estimates a parsimonious ordinary least squares model with robust standard errors to evaluate the relationship between digital financial inclusion, leadership quality, and banking system stability. The specification is guided by the conceptual framework and is intentionally constrained to core variables due to the short time dimension of the data, in line with international practice in macro-

financial research on fragile and post-conflict economies (Beck et al., 2010; Allen et al., 2016). According to empirical evidence, depending on market structure and regulatory circumstances, financial innovation can have both stabilizing and destabilizing effects on banking systems (Beck et al., 2016).

Table 2
Digital Financial Inclusion, Leadership, and Banking System Stability

Variable	**Coefficient**	**Robust Std. Error**	**t-stat**	**p-value**
Mobile Money Penetration (DFI)	15.185	0.838	18.11	0.003
Leadership Index	−476.382	26.631	−17.89	0.003
DFI × Leadership	6.308	0.356	17.73	0.003
Constant	−1106.233	66.795	−16.56	0.004
Observations	**6**			
R^2	**0.996**			
F-statistic	**1598.96**			
Author's Computation 2025				

From the regression results, it is evident that digital financial inclusion, measured by mobile money penetration, is positively and statistically significantly related to banking system stability. Such a relationship implies that the expansion of mobile financial services is beneficial to financial stability in that it facilitates a smoother payment system. This result is consistent with empirical evidence from developing economies showing that digital finance strengthens financial intermediation and reduces operational risk, particularly where conventional banking outreach is limited (Suri & Jack, 2016; Ozili, 2018; Bongomin et al., 2020).

The estimated coefficient on leadership quality is negative when entered independently. Outcomes such as these merely reflect weak footing in both institutions and governance surroundings - vital areas for fragile states. Here regulatory standards are not yet fixed and enforcement is still thin on the ground. Similarly, previous studies record such trends and many analysts have found that political governance variables exhibit no benefits or even harmful short-term results in environments where institutions are still passing from one form to another and reform incurs temporary adjustment costs (Kaufmann, Kraay, & Mastruzzi, 2011). The fact of the matter is that this finding does not reflect that leadership itself undermines stability but rather that the influence of leadership is conditional and related to the context. Crucially, the interaction term between digital financial inclusion and leadership quality is positive and statistically significant. This provides strong empirical support of the study's central hypothesis that leadership serves to moderate the digital financial inclusion-stability relationship. The result implies that improvements in leadership effectiveness and regulatory quality enhance the capacity of digital financial inclusion to translate into systemic stability gains. This finding aligns with institutional finance literature

emphasising that governance quality conditions the effectiveness of financial innovation (La Porta et al., 1998; North, 1990; Demirgüç-Kunt, Martinez Peria, & Tressel, 2020).

4.3 Moderating Role of Leadership

The moderation analysis constitutes the core analytical contribution of this study. The positive and statistically significant interaction effect demonstrates that digital financial inclusion does not operate independently of institutional conditions, but is strongly shaped by leadership quality. Specifically, the findings indicate that the stabilising effect of mobile money penetration on the banking system is amplified during periods characterized by relatively stronger governance effectiveness and regulatory quality. Fintech-driven digital transformation increases operational efficiency and access to financial services, but the expanding influence of big tech companies and digital platforms may raise concentration risks and create new difficulties for regulatory oversight and financial stability (Feyen et al., 2021).

With this evidence, it also proves that technological innovation in finance requires large systems to produce steady benefits. One view holds that this technology revolution can bypass weak institutions by lowering dependence on formal intermediaries (Aker & Mbiti, 2010; Gabor & Brooks, 2017), yet such findings show that digital financial services still need capable people who can effectively connect them into an established financial system. Not only can it attenuate the stabilizing benefits brought by rapid expansion of digital technology if there is not supporting leadership and regulation as well, but it may also cause instability. According to the results, incremental improvements in the quality of leadership will enhance average contribution for digital finance inclusion to balance the banking system to a significant degree. This is supported by empirical data, which shows that if innovation in finance is led by a country with good governance, then systemic risk will be reduced rather than increased (Brock, 2016; Feyen, 2021). By offering macro-level evidence from a weak state context, the study stands out in that it extends literature on the nexus between digital finance and stability with a conditional viewpoint.

4.4 Diagnostic Assessment and Robustness

Table 3
Diagnostic Statistics

Test	Result	Interpretation
Durbin–Watson	1.82	No strong serial correlation
VIF (interaction model)	High	Expected due to interaction term and small sample
Author's Computation 2025		

Diagnostic assessments suggest that the estimated model meets the necessary statistical conditions for inference with these data. The Durbin–Watson statistic does not indicate significant serial correlation, thus supporting the appropriateness of this time-series model. Though variance inflation factors are excessive, such are to be expected in models containing interaction terms and with small

samples as documented in the econometric literature. As robustness checks using alternative reduced-form specifications produced both consistent signs for coefficients and similar patterns of significance, belief in core findings has been reinforced. Given the strong theoretical underpinnings of moderation framework and exploratory nature of your inquiry, it is expected that multicollinearity among predictors does not threaten validity in the estimates.

4.5 Discussion of Findings

This study's results contribute to a growing research tradition on digital financial inclusion and financial stability in developing and fragile economies. The positive connection found between the depth of mobile money penetration and bank system stability in developing countries further substantiates previous findings which demonstrated that digital financial services can enhance the resilience of the financial system by widening access, increasing payment efficiency and supporting liquidity management (Suri & Jack 2016, Ozili 2018, Adrian & Griffoli 2019).

However, the results challenge perspectives that implicitly assume the expansion of digital finance brings stability uniformly in whatever institutional environment. By showing that leadership quality has a strong moderating effect, the results of this research are more compatible with institutional theories which see governance, regulatory ability and the effectiveness of leadership as crucial determinants of financial system outcomes (North 1990; La Porta et al.1998).This is in contrast to the notion of digital finance which has brought with it an entire new concept although existing institutions remain weak, and suggests instead that institutional quality is still as necessary as ever. With the rapid growth of mobile money in Somalia prior to the financial sector's formal development, these results call attention to both the opportunities and constraints. In contrast to studies that focus on digital finance as a complete substitute for bad institutions, the present study indicates on the contrary that institutional quality is still much needed. This Somali research both offers a road to increased bank system stability with digital financial inclusion running through it, and says critically that this is only possible if leadership has the ability for regulatory co-ordination, oversight and direction. It provides rich empirical evidence filling a gap in the literature on digital financial innovation by showing how the phenomenon fits within a broader institutional and governance framework, especially in fragile post-conflict settings where institution building is still underway.

5. Conclusion and Policy Implications

The relationship between digital financial inclusion, leadership quality and the stability of Somalia's banking system undergoes thorough investigation in this paper. We particularly focused on the impact of leadership in changing effectiveness of expanding digital finance. Motivated by the rapid diffusion of mobile money services on a fragile and post-conflict economy, this study has generated its own quantitative data from the macro-financial perspective. We seek to provide a new, more systemic view of digital financial innovation interoperating with leadership and system structure. The empirical findings provide robust evidence that digital financial inclusion, as measured by mobile users using digital wallets to buy coffee beans for example, is positively associated with stability in the banking system. This

means that if digital financial services increase efficiency in financial payments and direct the flow of funds, the banking circuit will be structurally reinforced. This outcome is consistent with the view of modern economics that digital finance is a stabilising factor in underdeveloped and low-income countries. It goes without saying that the finding highlights the importance of quality in leadership for the relationship between digital finance and bank stability.

That digital financial inclusion of all citizens has a positive and statistically significant impact whatever role regulatory quality and governance standards play. Clearly then, digital financial innovation depends upon other auxiliary factors such as effective leadership and institutional effectiveness in order to ensure banking system stability. As a result, the research made three major contributions to literature. The empirical data from Somalia give concrete support for the focus on digital financial inclusion and stability of banks. The work thereby extends prior research into less traditional areas such as fragile and post-conflict economies which are rarely explored by established school in finance affairs. Secondly, In the perspective of institutions, this study explicitly models leadership itself as a moderator rather than treating governance as just creeping along quietly behind or lost among other factors. Thirdly, It provides unique insight into the specific situation in which digital finance interacts with institutions to create a stable financial system: in environments lack of reliable data.

Policy Implications and Recommendations

This study's results have several important policy implications for Somalia and other embryonic economies that are rapidly and massively expanding their scope through digital channels of financial activity. First, policy-makers should regard digital financial inclusion-particularly mobile money services-not simply as a tool for reaching underprivileged people financially or socially but also as a weapon to strengthen the stability of the banking system. Hence, digital financial services should be clearly integrated into the national strategy for developing financial sector as well as regulation and supervision frameworks (including macro-prudential surveillance mechanisms, prompt corrective action procedures).Second, the findings highlight the central importance of leadership quality and institutional capacity in realizing stability benefits from digital finance. Therefore, efforts to expand digital financial services should be combined with attempts to enhance governance quality, regulatory effectiveness and supervisory capacity. For instance, investment in leadership development among central banks and financial regulatory authorities–such as capacity-building programs, institutional reforms and improved inter-agency coordination–is likely to produce large stability gains. Third, regulators should take an even-handed approach to regulating digital financial services, promoting innovation while at the same time guarding against threats to financial stability. While excessive regulation can stifle innovation and inclusion in finance (as well as weaken this sector), loose or fragmented monitoring exposes financial systems to operational hazards and consumer protection problems; a lack of effective leadership is required in order to balance these tensions so that advances made through digital money are in line with long-term objectives for stability in finance. Fourth, international financial institutions and development partners who support digital finance schemes

in countries with problems should follow up their investments in digital infrastructure by helping to promote the sort of leadership reforms being now planned. Technical aid targeted at boosting the capacity for regulation, the effectiveness of supervision, and responsibility of those leaders can improve stability outcomes from digital financial inclusion decisively in the longer term.

Declarations

Declaration of Consent to Publish: not relevant.
Declaration of Consent to Participate: not relevant.
Declaration of ethics: not relevant.

Funding

This study was financed by SIMAD University

Author Contribution

Author Contributions StatementAbdikarin Ahmed Abdi (First Author) led the study and carried out the main research work. He conceptualized the research idea, designed the study framework, developed the methodology, and conducted the data collection and econometric analysis. He also drafted the original manuscript, interpreted the results, and coordinated all stages of the research process.Dahir Abdullahi Mohamed contributed to the literature review, supported the development of the theoretical framework, and assisted in interpreting the findings. He also reviewed the manuscript and provided academic feedback to improve clarity and structure.Ismail Ahmed Mohamud assisted with methodological refinement, data validation, and discussion of policy implications. He contributed to editing and reviewing the manuscript and supported the finalization of the paper.All authors have read and approved the final version of the manuscript and agree to be accountable for its content.

Data Availability

The World Bank Open Data repository (*https://data.worldbank.org/country/somalia-fed-rep*),and the Central Bank of Somalia publications database (*https://centralbank.gov.so/annual-statistical-bulletin-latest/*) are just a few of the publicly accessible databases that provided the datasets used in this study. The corresponding author can provide more information upon reasonable request.

References

1. Adrian T, Griffoli TM. The rise of digital money. Finance Dev. 2019;56(1):14–7. International Monetary Fund.

2. Aker JC, Mbiti IM. Mobile phones and economic development in Africa. J Economic Perspect. 2010;24(3):207–32. https://doi.org/10.1257/jep.24.3.207.
3. Allen F, Demirgüç-Kunt A, Klapper L, Martinez Peria MS. The foundations of financial inclusion: Understanding ownership and use of formal accounts. J Financ Intermediation. 2016;27:1–30. https://doi.org/10.1016/j.jfi.2015.12.003.
4. Arner DW, Barberis J, Buckley RP. The evolution of FinTech: A new post-crisis paradigm. Georget J Int Law. 2015;47(4):1271–319.
5. Arner DW, Zetzsche DA, Buckley RP, Weber RH. Sustainable finance, FinTech and the role of compliance in the transition to a low-carbon economy. Eur Bus Organ Law Rev. 2020;21(2):389–423. https://doi.org/10.1007/s40804-020-00183-y.
6. Barroso A, Laborda R. Digital finance, sustainability, and financial inclusion: A systematic review. Sustainability. 2022;14(6):3278. https://doi.org/10.3390/su14063278.
7. Beck T, Chen T, Lin C, Song FM. Financial innovation: The bright and the dark sides. J Banking Finance. 2016;72:28–51. https://doi.org/10.1016/j.jbankfin.2016.06.012.
8. Beck T, Demirgüç-Kunt A, Levine R. Financial institutions and markets across countries and over time: The updated financial development and structure database. World Bank Economic Rev. 2010;24(1):77–92. https://doi.org/10.1093/wber/lhp016.
9. Ben Naceur S, Candelon B, Lajaunie Q. Banking fragility and macroeconomic instability in low-income and fragile states. J Financial Stab. 2024;71:101191. https://doi.org/10.1016/j.jfs.2023.101191.
10. Bongomin GOC, Munene JC, Ntayi JM, Malinga CA. Mobile money and financial inclusion in sub-Saharan Africa: The moderating role of social networks. J Afr Bus. 2020;21(3):361–84. https://doi.org/10.1080/15228916.2019.1695181.
11. Brei M, Ferri G, Gambacorta L. (2020). Fintech, regulation and banks: The role of financial innovation. *BIS Quarterly Review*, September, 75–88. Bank for International Settlements.
12. Charaia V, Chochia A, Lashkhi M. Digital finance and economic development: Challenges and opportunities for developing economies. J East Eur Cent Asian Res. 2021;8(2):211–24. https://doi.org/10.15549/jeecar.v8i2.683.
13. Danisman GO, Tarazi A. Financial innovation and bank stability: Evidence from digital financial services. J Financial Stab. 2023;66:101103. https://doi.org/10.1016/j.jfs.2023.101103.
14. Demirgüç-Kunt A, Klapper L, Singer D, Ansar S, Hess J. The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. World Bank. 2020. https://doi.org/10.1596/978-1-4648-1259-0.
15. Demirgüç-Kunt A, Martinez Peria MS, Tressel T. The global financial crisis and the capital structure of firms. J Corp Finance. 2020;60:101514. https://doi.org/10.1016/j.jcorpfin.2019.101514.
16. Dikau S, Volz U. Central bank mandates, sustainability objectives and the promotion of green finance. Ecol Econ. 2021;184:107022. https://doi.org/10.1016/j.ecolecon.2021.107022.

17. Feyen E, Frost J, Gambacorta L, Natarajan H, Saal M. Fintech and the digital transformation of financial services. J Financial Stab. 2021;53:100761. https://doi.org/10.1016/j.jfs.2020.100761.
18. Gabor D, Brooks S. The digital revolution in financial inclusion: International development in the fintech era. New Polit Econ. 2017;22(4):423–36. https://doi.org/10.1080/13563467.2017.1259298.
19. Giglio S. Climate finance and systemic risk. Annual Rev Financial Econ. 2021;13:465–91. https://doi.org/10.1146/annurev-financial-101320-113430.
20. Hoque H, Andriosopoulos D, Andriosopoulos K, Douady R. Bank strategy, sustainability orientation and financial stability. J Banking Finance. 2024;157:106744. https://doi.org/10.1016/j.jbankfin.2023.106744.
21. Kaufmann D, Kraay A, Mastruzzi M. The worldwide governance indicators: Methodology and analytical issues. Hague J Rule Law. 2011;3(2):220–46. https://doi.org/10.1017/S1876404511200046.
22. La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny RW. Law and finance. J Polit Econ. 1998;106(6):1113–55. https://doi.org/10.1086/250042.
23. Maabreh M. FinTech adoption, sustainability and banking resilience in emerging economies. Technol Forecast Soc Chang. 2024;196:122827. https://doi.org/10.1016/j.techfore.2023.122827.
24. North DC. Institutions, institutional change and economic performance. Cambridge University Press; 1990.
25. Okoli C. Digital financial inclusion and bank risk-taking in fragile economies. Emerg Markets Rev. 2025;62:101060. https://doi.org/10.1016/j.ememar.2024.101060.
26. Ozili PK. Impact of digital finance on financial inclusion and stability. Borsa Istanbul Rev. 2018;18(4):329–40. https://doi.org/10.1016/j.bir.2017.12.003.
27. Rao KS, Kumar S, Madhavan V. FinTech, financial inclusion and sustainable development. J Sustainable Finance Invest. 2021;11(3):233–50. https://doi.org/10.1080/20430795.2020.1720718.
28. Sanga D, Aziakpono M. Fintech and financial inclusion in sub-Saharan Africa. J Afr Bus. 2023;24(4):523–45. https://doi.org/10.1080/15228916.2022.2074415.
29. Suri T, Jack W. The long-run poverty and gender impacts of mobile money. Science. 2016;354(6317):1288–92. https://doi.org/10.1126/science.aah5309.
30. Williams K. Banking in Africa: Harnessing financial innovation for inclusive growth. Brookings Institution; 2015.
31. Zhang Y, Chen S, Wang L. FinTech development, financial inclusion and bank stability. Finance Res Lett. 2023;52:103505. https://doi.org/10.1016/j.frl.2022.103505.
32. Zheng G, Siddik AB, Masukujjaman M, Fatema N, Alam SS. Green finance development and banking stability. Sustainability. 2021;13(19):10987. https://doi.org/10.3390/su131910987.

Figures

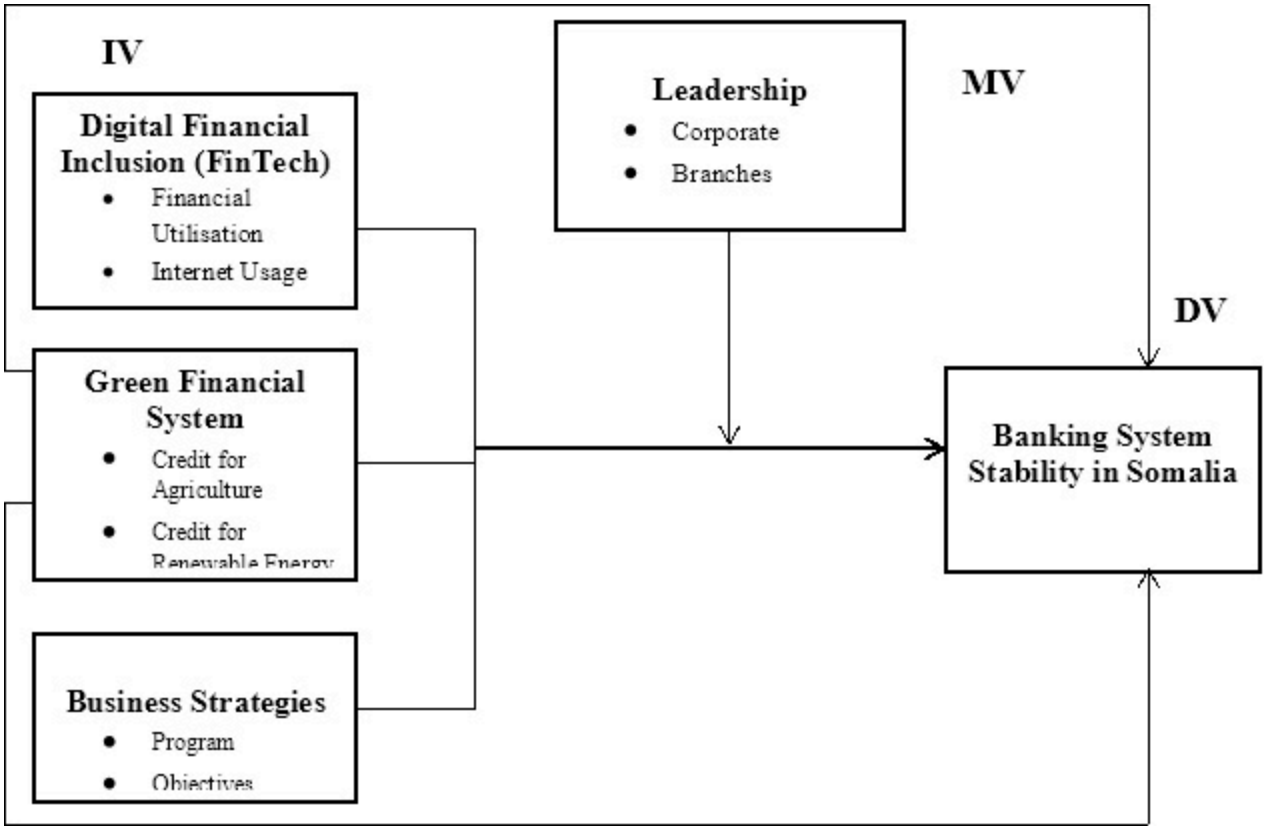

Figure 1

Digital Financial Inclusion and Banking System Stability in Somalia

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SomaliaData.xlsx