

When Banks Fail: Youth-Led Informal Digital Cash Governance in Sudan's Conflict Economy

Mona Suliman

The University of science and technology Omdurman, Sudan

***Corresponding Author:** Mona Suliman, The University of science and technology Omdurman, Sudan.

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Abstract

This paper examines the emergence of youth-led informal digital cash ecosystems in Sudan following the outbreak of armed conflict in April 2023. As formal banking systems collapsed across significant territories and humanitarian access remained constrained, decentralized networks coordinated through mobile banking applications and digital platforms became critical mechanisms for financial coordination, resource pooling, and last-mile distribution. Drawing on qualitative document analysis and digital ecosystem mapping using publicly available secondary data and visible public digital traces, the study argues that these networks function as trust-based parallel financial governance systems that temporarily substitute for selected institutional guarantees. The analysis contributes to humanitarian cash transfer literature, informal institution theory in fragile states, digital governance scholarship, and institutional economics. Findings show that public verification rituals, reputation economies, social proximity networks, and peer monitoring operate as functional equivalents to selected regulatory and accountability mechanisms. However, the same systems are constrained by platform dependency, fraud risk, liquidity discounts, digital access inequalities, gendered vulnerability, and security risks in contested territories. Available public evidence, treated cautiously and triangulated across secondary sources, suggests a plausible order-of-magnitude range of approximately USD 180-300 million during the first 12 months of conflict. This estimate indicates scale significance rather than a measured national total. The paper concludes that youth-led informal digital finance represents genuine local governance capacity under crisis conditions, but it should not be romanticized as a replacement for formal financial and humanitarian infrastructure. Long-term viability requires careful recognition, protection, and selective integration within broader humanitarian and public financial architecture.

Keywords: Sudan, Digital Finance, Informal Institutions, Trust, Humanitarian Cash, Conflict Economies, Youth Governance, Institutional Economics, Gender, Digital Exclusion, Platform Dependency.

Introduction

Context

The outbreak of armed conflict in Sudan in April 2023 precipitated a rapid collapse of formal financial access across large parts of the country. Commercial bank branches closed or operated at minimal capacity, liquidity evaporated in many locations, and the Central Bank of Sudan's ability to coordinate monetary policy across conflict lines weakened [1-3]. At the same time, international humanitarian assistance faced severe funding, access, and logistical constraints [1,4]. In this institutional vacuum, a distinct phenomenon emerged: youth-coordinated digital cash networks operating through mobile banking applications, social media platforms, and encrypted messaging services.

These networks began as spontaneous responses to immediate survival needs, but they evolved into structured systems for resource pooling, fund transfer, verification, and distribution coordination. Bankak, despite its formal institutional origins, became appropriated by informal networks as a practical infrastructure for peer-to-peer transfers outside normal

regulatory oversight [2,5]. Facebook groups, Telegram channels, and WhatsApp networks became coordination spaces in which donors, intermediaries, coordinators, merchants, and beneficiaries could interact without formal organizational mediation.

This transformation represents more than emergency adaptation. It constitutes the emergence of parallel financial governance: social systems that perform distributive, verification, risk-management, and accountability functions commonly associated with formal financial institutions, but through mechanisms rooted in social trust rather than legal enforcement. These systems do not make the formal state irrelevant. Instead, they reveal how governance practices can emerge under conditions of institutional failure and how such practices remain limited by their dependence on fragile digital and social infrastructures.

Research Gap

Existing literature on cash transfers in humanitarian contexts remains predominantly organized around formal institutional actors, including NGO-implemented programs, UN-coordinated

mechanisms, and government social-protection systems [6-8]. Even critical literature on localization often focuses on how international actors can partner with national organizations rather than how non-institutionalized networks coordinate resources outside humanitarian architecture [9]. Digital humanitarianism scholarship has similarly centered on how technology enables formal humanitarian action, rather than how technology enables locally generated action when formal humanitarian systems are absent or insufficient [10]. Sudan's digitally mediated informal finance therefore exposes a significant analytical blind spot: informal digital financial systems that operate without organizational affiliation, external funding, or regulatory recognition, yet achieve levels of coordination significant enough to sustain populations during crisis. While Syria, Yemen, Afghanistan, and Lebanon have generated substantial analysis of informal remittance systems, hawala networks, and informal dollar markets, Sudan's convergence of mobile banking infrastructure, social media coordination, youth leadership, and domestic humanitarian need produces a configuration that requires independent examination [11-13].

Research Questions

This paper addresses the following primary research question: How do youth-led informal digital cash ecosystems in Sudan operate as parallel financial governance systems during armed conflict?

Three sub-questions guide the analysis:

- How is trust constructed and maintained within these ecosystems without formal institutional guarantees?
- What accountability mechanisms replace formal regulatory oversight?
- What structural vulnerabilities constrain system sustainability and scalability?

Argument

The paper advances the following argument: in the absence of reliable formal banking and humanitarian infrastructure, youth-led digital cash networks in Sudan function as trust-based parallel financial governance systems that temporarily substitute for selected institutional guarantees. These systems do not merely facilitate transactions. They produce governance through trust-making practices that render financial coordination possible despite institutional collapse. However, because their enforcement capacity is social rather than legal, they contain inherent fragilities that limit long-term viability without some form of recognition, protection, or institutional support. This argument positions youth-led digital finance not as a simple stopgap humanitarian response, but as a governance phenomenon requiring theoretical and policy attention. The claim is not that informal systems should replace public financial infrastructure. Rather, the claim is that these systems demonstrate how financial governance can emerge from social relations when institutions fail, while also demonstrating why functional institutions remain indispensable.

Quantitative Context and Estimation Method

The Measurement Challenge

Precise quantification of informal digital financial flows in Sudan remains inherently difficult. The systems examined in this paper are non-institutionalized, fluid, security-sensitive, and distributed across multiple platforms. They do not produce centralized ledgers, and many participants avoid formal documentation for safety reasons. As a result, all volume estimates should be

interpreted as plausible order-of-magnitude approximations rather than precise measurements. The purpose of the estimates used in this paper is therefore limited: they establish that youth-led informal digital finance reached a scale significant enough to warrant theoretical and policy attention. They should not be treated as definitive national totals, and they should not be used for exact comparative accounting without further data collection. The estimate should be read as an analytical scale marker, not as a verified financial statistic.

Data Triangulation and Evidentiary Status

To reduce overclaiming, the revised analysis distinguishes between directly reported public data, secondary analytical estimates, and derived estimates produced by triangulation. The following table clarifies the evidentiary status of the main quantitative inputs and the source families used to support them.

Table 1: Data Categories and Evidentiary Status Used in the Revised Analysis

Evidence Category	Indicative Source Type	Use in Paper	Evidentiary Status
Public macro-economic and humanitarian reporting	World Bank updates, OCHA reports, ACAPS crisis overviews	Contextualizes banking disruption, humanitarian funding gaps, remittance decline, and access constraints	Public secondary data; contextual rather than transactional
Digital coordination spaces	Public Facebook groups, public Telegram channels, visible mutual-aid announcements	Identifies coordination practices, verification norms, and public accountability routines	Public digital traces; observable but incomplete
Mobile banking and public institutional communication	Published communications or publicly visible information related to Bankak, liquidity, and service disruption	Contextualizes the mobile banking infrastructure used by informal networks	Public or publicly visible secondary material; infrastructure context
Derived volume estimates	Triangulated from monthly transfer estimates, peer-to-peer transaction shares, remittance disruption, and humanitarian cash benchmarks	Used only to establish approximate scale significance	Order-of-magnitude estimate; not exact measurement

Estimation Procedure

Available public evidence supports treating the USD 180-300 million figure as an illustrative order-of-magnitude range rather than a verified transaction total. The lower and upper bounds annualize an indicative monthly range of approximately USD 15-25 million in informal digital transfer activity over the first 12 months of conflict. This range is cross-checked against three contextual indicators: the reported rise of informal channels relative to formal channels, observed peer-to-peer use of mobile banking, and comparison with formal humanitarian cash volumes during the same period [2,4,13,14]. The calculation should be read conservatively. It does not imply that every transfer was youth-coordinated, that all transfers were humanitarian, or that the range captures every informal financial channel. It indicates that the ecosystem likely operated at a scale large enough to shape household survival, local liquidity, and humanitarian access. Future research should refine this estimate through anonymized bank data, sampled platform data, merchant interviews, diaspora donor surveys, and network-based estimation methods.

Table 2: Transparent Logic for the Illustrative Order-of-Magnitude Financial Volume Estimate. The Range is not a Measured National Total

Estimate Component	Working Assumption	Analytical Purpose	Key Caveat
Lower-bound monthly flow	USD 15 million/month	Conservative lower range for visible informal digital coordination	May undercount private WhatsApp, diaspora, and merchant channels
Upper-bound monthly flow	USD 25 million/month	Plausible upper range for broader informal digital coordination	May include flows not fully youth-led or not humanitarian
Annualized range	12 months	Creates first-year order-of-magnitude estimate	Conflict intensity and network activity varied across months
Estimated annual volume	USD 180-300 million (plausible order-of-magnitude range)	Indicates scale significance	Not a precise national total and not directly observed
Formal humanitarian cash comparison	Approximate 40-60% range	Situates informal flows relative to organized response	Requires more rigorous humanitarian cash disbursement data

Average Transaction Size and Network Concentration

Public coordination spaces suggest that many domestic transfers were relatively small, often used for food, transport, medicines, emergency accommodation, or bill payments. A median range of SDG 5,000-50,000, with larger diaspora transfers, is retained only as an illustrative field-based assumption and should not be

treated as a measured median [13]. Network concentration also appears significant: the most visible and trusted coordination spaces handled a disproportionate share of activity, even though the ecosystem appeared decentralized. This concentration matters because it creates both efficiency and risk. Trusted hubs can coordinate more quickly, but they can also become points of failure, capture, or surveillance.

Conceptual Framework

This section establishes the theoretical foundations for analyzing informal digital cash ecosystems as governance systems rather than mere transaction mechanisms. The framework draws primarily from New Institutional Economics, while integrating scholarship on informal institutions, social capital, trust, platform governance, and conflict economies [15-18].

Institutions, Collapse, and Substitution

Institutions can be understood as formal and informal constraints that shape human interaction (North, 1990). In functioning economies, formal rules such as laws, property rights, regulatory systems, and contract enforcement coexist with informal constraints such as customs, reputational expectations, sanctions, and codes of conduct. When formal institutions collapse, the institutional matrix does not disappear. It reconfigures. Informal constraints become functionally dominant, not merely as supplementary mechanisms but as primary governance structures [16]. Sudan's youth-led digital cash ecosystems represent active institutional production: the construction of alternative rules, verification routines, and enforcement practices governing financial exchange when formal rules cease to function reliably. This does not mean that informal systems are equivalent to formal institutions. Rather, it means that they selectively reproduce some institutional functions - especially coordination, verification, and sanctioning - while lacking others, such as legal due process, consumer protection, standardized regulation, and broad risk pooling.

Institutional Voids and Transaction Costs

Institutional voids occur when market-supporting institutions are absent or non-functional [19]. In fragile and conflict-affected states, these voids may include legal enforcement, property rights, contract law, financial regulation, and dispute resolution [20]. Transaction costs rise sharply because actors must invest more effort in verifying identity, monitoring behavior, preventing fraud, enforcing agreements, and converting digital balances into usable cash or goods. Informal financial systems reduce some costs while increasing others. They reduce documentation burdens, regulatory compliance delays, and formal processing time. However, they increase verification costs, enforcement costs, information costs, and personal risk. In Sudan's collapse scenario, informal systems may impose lower costs than attempting to use broken formal systems, but higher costs than functioning public institutions would impose.

Trust as Substitute Governance

Trust is the core governance resource in the ecosystem. In stable financial systems, institutional trust enables impersonal exchange: individuals transact because they believe formal systems can enforce agreements. In collapsed systems, institutional trust becomes unavailable or insufficient, requiring a shift toward interpersonal and network-based trust [17,21,22]. This shift creates both possibility and constraint. Personal trust can enable transactions when legal enforcement fails, but it does

not scale easily. Digital platforms partially extend interpersonal trust. Screenshots, searchable archives, public comment threads, reputation alerts, and rapid cross-network verification allow trust information to travel faster and farther than in purely face-to-face networks. Yet this digital extension remains bounded by platform dependency, internet access, digital literacy, and the social capacity to verify claims.

Digital Mediation and Platform Dependency

Digital platforms do not merely transmit information; they structure financial coordination [10,18]. Bankak enables transaction execution and payment records. Facebook groups provide visibility, public solicitation, and member verification. Telegram provides channels for encrypted or semi-private coordination. WhatsApp supports trusted small-group coordination. Effective ecosystems combine several platforms simultaneously. This creates a paradox: informal governance depends on infrastructure controlled by formal or corporate institutions. Internet shutdowns, telecommunications failure, account suspensions, platform moderation, banking restrictions, or changes in application access can disable the very networks that communities use to survive [11,23,24]. Digital mediation therefore extends the scale of trust-based governance while introducing new vulnerabilities.

Gender and Digital Exclusion

Gender is not a demographic add-on; it is a structural determinant of governance capacity. Sudanese women have historically anchored social solidarity systems such as gameya and neighborhood mutual aid [25-27]. Digital coordination translates some of these practices into WhatsApp groups, public fundraising campaigns, and Bankak-based transfers. However, it also introduces barriers: lower smartphone ownership, reduced financial privacy, higher exposure to digital harassment, mobility constraints, and literacy gaps among older cohorts[28-30]. The shift from physical to digital coordination may reduce some physical risks while increasing visibility and digital security risks. Women coordinators often operate through closed-group coordination, intermediary roles, and hybrid systems that combine digital transfers with traditional verification. Ignoring gender therefore produces incomplete explanations of informal financial governance.

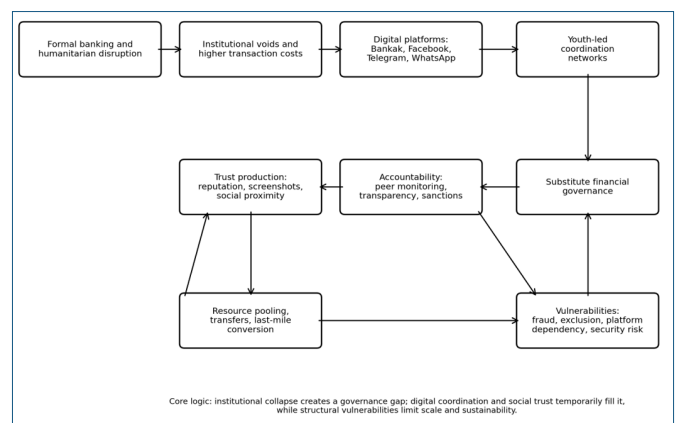


Figure 1: Conceptual Model of Youth-Led Informal Digital Financial Governance in Sudan. Source: Author's Conceptual Synthesis Based on the Framework and Findings.

Methodology
Research Design

This study employs qualitative document analysis combined with digital ecosystem mapping. The design is appropriate for a phenomenon that is primarily documented through public digital traces, secondary institutional reports, visible platform practices, and crisis-related economic reporting rather than through formal administrative records. The approach is interpretive rather than statistically representative, and it is designed to identify governance mechanisms, not to measure national transaction totals. Because the conflict context makes direct data collection sensitive and potentially risky, the study does not use interviews or surveys. This decision is ethically defensible, but it also limits the interpretation of motivations, lived experiences, and private coordination practices. The analysis therefore focuses on observable governance practices rather than private intent.

Data Sources

The study draws on publicly available secondary data and visible digital traces from April 2023 to December 2024. Sources include international financial institution reporting, humanitarian coordination reports, public digital coordination spaces, publicly visible mobile-banking information, economic crisis documentation, media reports, and analyst briefings [1,2,4,5,14]. No personal identifiers were collected, no private groups were entered, and no individual transactions were archived.

Table 3: Data Sources, Period, and Analytical Use

Source type	Specific source exam- ples	Time period	Analytical use
Internation- al financial institutions	World Bank Sudan economic updates, IMF country reporting	April 2023-Decem- ber 2024	Macroeco- nomic and financial disruption context
Humanitari- an coordina- tion	OCHA situa- tion reports, ACAPS crisis overviews	April 2023-Decem- ber 2024	Funding, access, and humanitari- an response context
Digital coordination spaces	Public Face- book groups and public Telegram channels related to aid and mutual support	April 2023-Decem- ber 2024	Observ- able rules, verification routines, ac- countability practices
Mobile-bank- ing documen- tation	Public Bankak-re- lated infor- mation and Central Bank communica- tions	April 2023-Decem- ber 2024	Digital financial in- frastructure context

Economic crisis documentation	Sudan Economic Observatory, media reports, analyst briefings	April 2023–December 2024	Liquidity, exchange, and discount economy analysis
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Sampling Strategy

Digital coordination spaces were purposively selected according to three criteria: public accessibility, documented activity related to financial coordination, and evidence of repeated governance content such as rules, verification requirements, balance reporting, fraud warnings, or dispute-management practices. Public member counts were used only as indicators of scale and visibility, not as direct measures of participation or transaction volume. The sample is therefore best understood as an analytically selected corpus of visible coordination practices rather than a representative map of all Sudanese informal finance. The study focuses on the first 18 months of conflict because this period captures system emergence, stabilization, and early adaptation before full institutional or humanitarian reconfiguration. Variation was sought across diaspora-to-domestic transfer networks, domestic mutual-aid groups, and professional coordination channels such as medical-worker or journalist networks. This variation enables analysis of how trust mechanisms differ across network types.

Analytical Strategy

Analysis proceeded through three stages. First, thematic coding identified recurring patterns in trust production, accountability mechanisms, and governance practices. Codes included verification practices, fraud responses, rule articulation, public reporting, enforcement mechanisms, and platform-switching behavior. Second, process tracing examined visible coordination sequences to identify causal mechanisms linking trust production to financial flow stabilization. Third, governance function mapping categorized observed practices according to core financial governance functions: verification, enforcement, risk management, dispute resolution, and resource distribution. This approach enables systematic comparison with formal financial governance while avoiding a false equivalence between informal networks and regulated institutions. The central analytical question is not whether informal networks are as secure or comprehensive as formal systems. The question is which governance functions they perform, how they perform them, and where their limits become visible. To strengthen methodological transparency, claims were retained only where similar patterns appeared across more than one source type, network context, or documentary trace. References that could not be traced to a public source were removed from the final reference list or replaced with broader, traceable sources. Where evidence was single-source, unstable, or difficult to verify, the analysis uses cautious language such as 'suggests,' 'appears,' 'indicative,' and 'plausible' rather than definitive causal or numerical claims. This audit-trail logic is especially important because public digital traces can be incomplete, deleted, selectively visible, or strategically curated during conflict.

Ethical Statement

The study uses exclusively publicly available secondary data and visible public digital traces. Ethical safeguards include: no interaction with human subjects, no collection of personal identifiers, no storage of identifiable transaction information,

analysis at aggregate level, and avoidance of details that could expose specific individuals or groups to security risk. In a conflict environment, protecting participants is more important than producing granular detail. The paper therefore deliberately avoids reproducing names, phone numbers, account information, or operational vulnerabilities that could be misused.

Findings

Actors and Roles in the Ecosystem

The youth-led digital cash ecosystem consists of distinct actor categories performing different governance functions. Youth coordinators, donors, intermediaries, beneficiaries, merchants, and platform gatekeepers interact through overlapping networks rather than through a single hierarchy.

Table 4: Actor Categories and Governance Roles in the Ecosystem

Actor	Main role	Source of authority	Risk exposure
Youth coordinators	Manage coordination spaces, verify requests, publish balances, organize redistribution	Demonstrated reliability, digital competence, network centrality	Surveillance, accusations, burnout, political targeting
Donors	Provide funds from diaspora, domestic elites, or international supporters	Financial capacity, social proximity, reputational concern	Fraud, information gaps, exchange-rate losses
Intermediaries	Connect donors and beneficiaries when direct contact is impossible	Social capital and willingness to assume reputational risk	Liability for false claims, social blame
Beneficiaries	Receive cash, goods, medicine, transport, or bill payments	Verified need and network connection	Exclusion if digitally disconnected or socially unverified
Merchants and cash couriers	Convert digital balances into goods, cash, fuel, medicine, or bread	Physical access to cash, goods, or mobility corridors	Security risk, liquidity risk, accusations of profiteering
Platform and connectivity gatekeepers	Control access to digital platforms, internet, or Starlink terminals	Infrastructure ownership and technical skill	Political attention, centralization risk

Youth coordinators form the core governance layer. Their authority does not derive from formal institutional positions but from demonstrated reliability, digital competence, speed of response, and centrality within social networks. Donors

prefer channels in which they can trace fund usage and verify beneficiary identity. Intermediaries become crucial when direct donor-beneficiary contact is impossible, but they also absorb reputational risk. Beneficiaries gain access through social verification, documentation of need, or connection to network members.

Trust Production Mechanisms

Trust production functions as infrastructure. It enables financial flows by reducing uncertainty and making cooperation possible without formal enforcement [17,21]. Four practices are especially visible: public reporting, screenshot verification, religious and moral framing, and social proximity networks. Public reporting practices include regular publication of funds received, funds distributed, remaining balances, and screenshots of Bankak transactions. These reports allow collective monitoring by network members. Screenshot verification creates audit trails, enables peer verification, and signals transparency commitment. Failure to provide evidence often leads to reputational loss or exclusion from the network. Religious and moral framing also matters. Invocations of zakat, sadaqah, and moral obligation increase reputational costs of fraud by transforming violations into moral transgressions rather than merely financial disputes. Social proximity networks reduce verification costs when coordination is organized around professional associations, university alumni groups, neighborhood origin, or diaspora hometown ties. Professional networks often stabilize faster than open public groups because they can rely on existing identity records and shared reputational histories.

Accountability Without Formal Regulation

Accountability mechanisms rely on social enforcement rather than legal authority. Oversight occurs through distributed peer monitoring: network members collectively observe transaction patterns, reporting consistency, coordinator behavior, and beneficiary verification. Digital spaces also maintain searchable archives of financial reports, enabling retrospective auditing when discrepancies are noticed after transactions occur [22,31]. Social sanctions include exclusion from groups, public naming within coordination spaces, warnings to related networks, and loss of access to future support. Because social connections enable survival in crisis environments, exclusion can carry material consequences. These mechanisms create meaningful accountability, but they also raise serious rights concerns. Informal punishment may lack due process, proportionality, appeal mechanisms, and safeguards against false accusation or reputational weaponization.

Technical Layers: Credit Trading, Parallel Liquidity, and Last-Mile Conversion

Sudan's informal digital finance extends beyond simple Bankak transfers. Airtime credit can function as a parallel liquidity instrument because mobile credit can be purchased, transferred, and liquidated across networks. Small credit transfers also serve as trust tests before larger Bankak transactions. Parallel currency exchange and cash conversion practices create a liquidity market in which digital balances, physical cash, and goods can carry different effective values [5,13]. The discount economy is the systematic value loss that occurs when Bankak balances are converted into physical cash or goods. It functions as an informal liquidity tax. The effective loss appears to vary geographically: lower in areas with relatively reliable cash and banking access, higher in conflict zones or siege conditions. Because the

available evidence is fragmentary, the ranges shown in Figure 2 are illustrative and require field validation before operational use. This matters for humanitarian planning because a nominal digital transfer may translate into substantially lower purchasing power once converted into bread, medicine, transport, or cash.

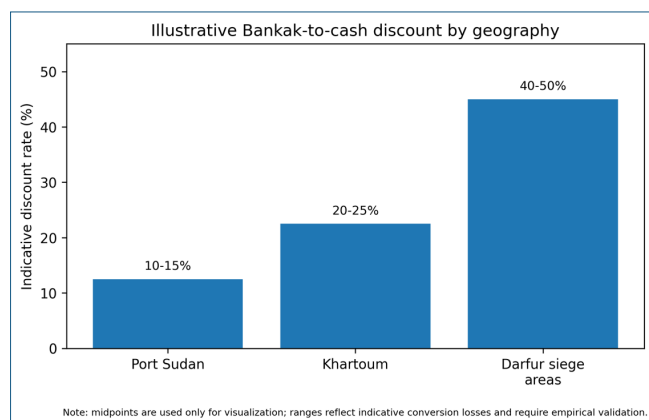


Figure 2: Illustrative Bankak-to-Cash Discount by Geography. Ranges are not Measured National Averages; they are Scenario Values used to Show How Liquidity Loss can Affect Purchasing Power. Source: On Visible Public Traces, Secondary Reporting, and the Estimation Logic Summarized in Table 2.

Merchants function as human ATMs by accepting Bankak balances and providing goods or cash at a premium. Cash couriers, pharmacy networks, fuel station operators, and bakery collectives become part of the last-mile financial infrastructure. Digital finance therefore remains dependent on physical conversion capacity. A digital balance only becomes survival support when it can be converted into food, medicine, transport, shelter, or safe cash.

Digital Exclusion and Unequal Participation

Digital finance enables inclusion for some groups while reproducing exclusion for others. The most included participants are often urban, educated, youth, diaspora-connected, and technically skilled. They possess stable internet access, smartphones, platform literacy, and social capital. The most excluded participants include displaced populations in remote camps, elderly persons, female-headed households, disabled populations, rural households, non-Arabic speakers, and people living in areas with severe connectivity disruption [29,30]. This exclusion has two dimensions. First, digitally excluded populations may be less able to request support directly. Second, they may receive aid while remaining excluded from governance decisions about verification, distribution priorities, fee transparency, and accountability. This distinction matters: being a beneficiary is not the same as being a governance participant. Digital informal finance may therefore widen governance inequality even when it improves emergency access to resources.

Youth Power and Internal Stratification

The category 'youth' should not be treated as homogeneous. Authority within networks is negotiated and stratified. Several authority types emerge: verification authority held by early founders or technical experts; exclusion authority held by group administrators; distribution authority held by people with

geographic access; and narrative authority held by influencers or communicators with social media reach [12,13]. Internal conflicts appear through verification disputes, competition between geographic groups, accusations of favoritism, platform control battles, and reputational weaponization. Elite youth with university education, urban access, and diaspora connections often hold more decision-making power. Working-class youth may handle physical distribution while having limited authority over allocation. Displaced youth may face conflicts of interest when they act simultaneously as coordinators and people in urgent need.

Security and Political Risks

Financial coordination in conflict zones carries inherent security risks. Armed actors may interpret transfers as opposition support, intelligence activity, foreign funding, or resource mobilization [32]. Coordinators may therefore use rotating administrators, pseudonymous accounts, multiple smaller transfers, platform diversification, offline beneficiary lists, and rapid shutdown contingency plans. These protective strategies create a tension between security and accountability. Transparency helps donors and beneficiaries monitor funds, but too much visibility can expose coordinators and recipients to surveillance, detention, extortion, or asset seizure. Networks survive by balancing these competing demands. The more accountable they are to the public, the more visible they become to hostile actors; the more secure they become, the harder public accountability becomes.

Systemic Fragilities

Despite functional governance, the ecosystem contains structural weaknesses. Fraud risk cannot be eliminated by trust. Documented or reported forms of risk include fake coordination groups, forged screenshots, exploitation of donor trust, and false accusations used to damage rivals. Losses are usually absorbed by network members because no institutional insurance or consumer protection exists. Internet shutdowns temporarily disable coordination infrastructure. During shutdowns, digital transfers stop, networks revert to cash-based coordination, and security risks increase. Platform dependency is equally important: networks rely on external platforms controlled by Meta, Telegram, telecommunications companies, and banking institutions. Policy changes, account suspensions, service discontinuation, or application restrictions can interrupt entire coordination systems [11,18,23]. Scalability remains the core limitation. Trust systems work best at moderate network size. As membership expands, verification costs increase, monitoring weakens, and governance becomes unstable. The most effective networks may therefore remain in the hundreds rather than becoming large-scale national systems. This is why informal networks can complement formal institutions in crisis, but cannot fully replace them.

Discussion

Resilient Adaptation or Forced Privatization of Survival?

Youth-led digital cash networks can be interpreted in two ways: as community resilience or as forced privatization of survival. The resilience framing emphasizes agency, creativity, and local innovation under extreme constraints. The privatization framing emphasizes abandonment: communities are forced to create survival systems because formal institutions and international systems are unable or unwilling to provide adequate support. Evidence supports both interpretations. Networks demonstrate genuine innovation in trust production and accountability

mechanisms, but the necessity of these systems reflects catastrophic institutional failure. Celebrating adaptation without acknowledging the violence that made adaptation necessary risks normalizing abandonment. Policy should therefore support existing informal systems without treating them as substitutes for public financial infrastructure.

Localization or International Abandonment?

Humanitarian localization agendas emphasize shifting resources and decision-making to local actors (Roepstorff, 2020). Sudan's youth-led systems represent localization without adequate international support: local actors assumed coordination functions because international actors could not access many areas or could not build operational mechanisms quickly enough. This autonomy can be empowering, but it can also mean exclusion from resources, protection, and recognition. Genuine localization requires more than praising local initiative. It requires resourcing local systems, protecting coordinators, recognizing locally legitimate accountability mechanisms, and ensuring that international engagement does not expose participants to political or security risk. Sudan's youth networks should be understood as partners in crisis governance, not as evidence that international responsibility can be withdrawn.

Can Trust-Based Systems Scale Without Institutionalization?

Trust-based governance functions effectively at limited scale where social enforcement remains feasible. Modern financial systems, however, require scale, standardization, consumer protection, and risk distribution. Historical comparisons suggest that trust-based systems either institutionalize or remain niche. Medieval merchant networks evolved into formal commercial law, and microfinance moved from group lending models toward regulated institutions [22,31]. Sudan's digital systems may follow a hybrid path. Institutionalization brings trade-offs. Formal recognition may provide regulatory oversight, consumer protection, liquidity support, and scalability. It may also create compliance costs, reduce flexibility, and expose networks to co-optation by political actors. Some networks may resist formalization to preserve autonomy, accepting limits in scale as the price of independence.

Comparative Perspective

Sudan occupies a distinct analytical space when compared with Lebanon, Syria, and Ukraine. Lebanon's financial collapse produced informal dollar markets, but international humanitarian presence remained more visible, creating hybrid formal-informal systems. Syria's hawala networks adapted to conflict conditions, but they built on older cross-border informal finance traditions. Ukraine's digital volunteer networks coordinated financial support during invasion, but state financial infrastructure remained more functional. Sudan combines deeper institutional collapse, stronger digital mediation than traditional hawala, and weaker international interface [11,32]. This distinctiveness justifies independent theoretical attention.

Historical Continuity: Digital Translation, Not Pure Innovation
Sudanese youth did not invent trust-based financial solidarity from nothing. They digitally translated older practices such as nuffad, khatta, gameya, jiwar, and zakat [25-27]. Technology is new, but much of the social infrastructure is historically rooted. The continuity points include collective responsibility, reciprocal obligation, social enforcement, moral framing, and

reputational accountability. The transformation points include speed, scale, screenshot documentation, platform archives, dispersed networks, and digital verification. This has an important policy implication: support systems should build on cultural foundations rather than impose external frameworks that ignore local legitimacy. Formal humanitarian actors may improve transparency and protection, but they should not erase the social trust mechanisms that made coordination possible in the first place.

Limitations

This study has several limitations. First, it relies on publicly available secondary data and visible digital traces. Private WhatsApp groups, closed Telegram channels, offline networks, and sensitive coordination practices are not captured. Second, the study does not include interviews or surveys. This avoids exposing participants to risk, but it limits the interpretation of motivations, emotions, lived experiences, and internal decision-making. Third, the financial volume estimates are approximate and should be treated as order-of-magnitude indicators rather than measured totals. Fourth, the study is context-specific. Sudan's combination of mobile banking infrastructure, conflict geography, diaspora networks, youth digital competence, and state collapse may not generalize easily to other fragile states. Fifth, gender, class, and power dynamics are likely undercounted because the most vulnerable participants are also the least visible in digital spaces. Sixth, technical complexity may be underestimated, especially in relation to parallel exchange, credit trading, cash couriers, merchant intermediation, and armed actor surveillance. Future research should combine anonymized transaction data, network sampling, merchant interviews, diaspora donor surveys, and carefully designed participant interviews with strong security protocols. Research should also examine how digital exclusion affects not only access to aid but also participation in governance and accountability.

Policy Implications

Humanitarian actors, financial regulators, and public institutions should engage youth-led informal digital cash networks cautiously and constructively. The goal should not be to absorb or control them entirely, nor to ignore them as informal irregularities. The goal should be to protect their useful functions while reducing harm, while treating all quantitative estimates as provisional until stronger empirical data become available.

Table 5: Policy Implications for Engaging Youth-Led Informal Digital Financial Networks.

Policy Area	Recommended Action	Rationale	Risk to Avoid
Recognition	Map and recognize legitimate coordination networks without exposing identities	Networks already perform critical governance and distribution functions	Turning recognition into surveillance

Liquidity planning	Account for Bankak-to-cash discount rates in transfer values	Digital nominal value may not equal purchasing power	Underfunding recipients through unrealistic face-value calculations
Digital inclusion	Support access for women, elderly, disabled persons, rural communities, and displaced populations	Participation depends on devices, connectivity, literacy, and security	Reproducing digital elite control
Consumer protection	Develop safe reporting, dispute resolution, and appeal mechanisms	Informal sanctions can be disproportionate and irreversible	Replacing social trust with rigid bureaucracy
Coordinator protection	Protect coordinators from political targeting, doxing, and burnout	Networks depend on trusted individuals who face high risk	Making coordinators more visible to armed actors
Hybrid integration	Create flexible partnerships between formal aid actors and trusted local networks	Hybrid systems may improve scale and protection	Co-optation, compliance burdens, or loss of local legitimacy

The most important policy lesson is that local trust systems are not a substitute for functioning public institutions, but they are also not simply informal noise. They are crisis governance infrastructures. Engagement should therefore be based on protection, transparency, inclusion, and negotiated legitimacy.

Conclusion

Youth-led informal digital cash ecosystems in Sudan represent sophisticated financial governance under extreme constraints. They emerged because formal banking, humanitarian access, and public financial infrastructure became insufficient or inaccessible for many communities. Through Bankak, Facebook, Telegram, WhatsApp, merchant networks, diaspora links, and social proximity, youth coordinators helped create alternative mechanisms for pooling resources, verifying need, distributing support, and enforcing accountability. The paper's central contribution is to conceptualize trust as substitute financial infrastructure. Public reporting, screenshot verification, reputational monitoring, religious framing, and social sanctions enable transactions in the absence of formal guarantees. Digital platforms extend the reach of these trust networks, but also introduce platform dependency, surveillance exposure, and digital exclusion. The ecosystem is therefore both powerful and fragile. The analysis also reframes youth as financial governance actors rather than merely volunteers or beneficiaries. Youth coordinators create rules, manage risk, distribute resources, and regulate behavior. Yet youth networks

are not uniformly egalitarian. Authority is stratified by technical skill, platform control, class, gender, geography, and diaspora connection. Digital governance does not eliminate hierarchy; it reorganizes it. Sudan's experience demonstrates community coordination capacity while underscoring the indispensable value of functional institutions. Informal digital finance should be recognized and protected, but it should not be normalized as a permanent replacement for public financial systems. The most likely and desirable future is a hybrid architecture: one that preserves local trust and flexibility while restoring formal guarantees, liquidity, consumer protection, and inclusive access [33].

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