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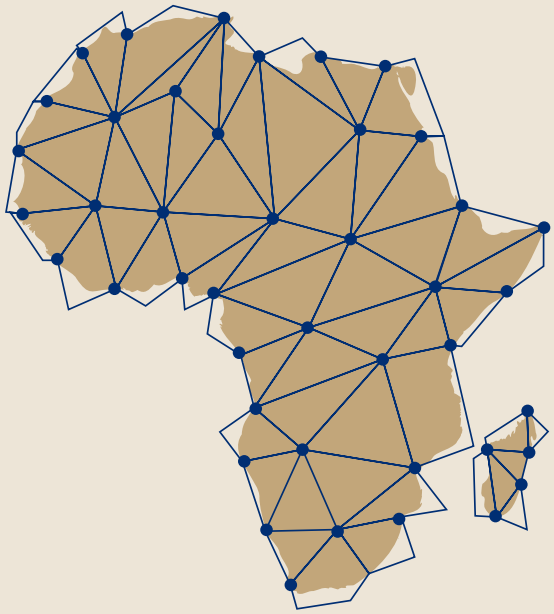
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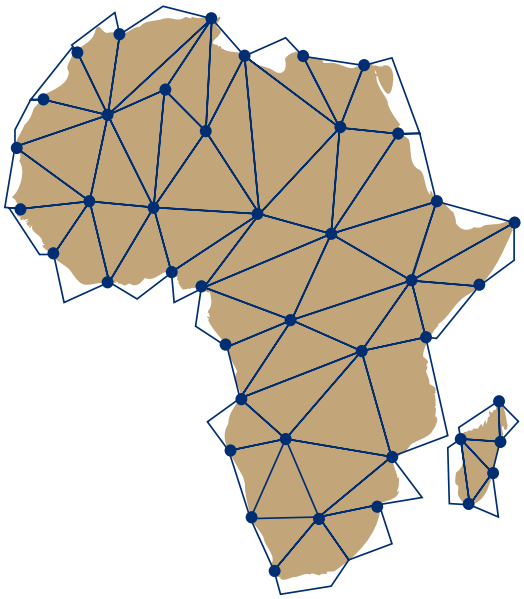
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Digital public infrastructure (DPI) across Africa: A national identity systems perspective

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Abstract
A rising global politics advocates for national investments in digital public infrastructure (DPI). The national DPI paradigm combines three core elements: digital national identity systems, digital national payment systems, and safe and secure data exchange. This study, grounded in literature on national identity systems and legal identity, assesses digital national identity systems in several African countries. Based on two of the core functions of identity systems (identification, authentication), as well as identity systems' linkages to national payments systems, the study conceptualises four main types of digital national identity systems present in African countries: identification-led, authentication-led, plural, and payments-led. The study tests the applicability of the typology on a set of 11 African jurisdictions and finds that eight of the jurisdictions fit within the typology: South Africa, Uganda and Zambia (identification-led systems); Ethiopia and Morocco (authentication-led systems); Ghana (plural system); and Kenya and Nigeria (payments-led systems). The study contributes to global DPI debates by emphasising the authentication function in identity systems, by problematising the relationship between national identity systems and payment systems, and by engaging with global DPI indicators.

Keywords
digital public infrastructure (DPI), digital national identity systems, digital national payments systems, identification, authentication, authorisation, identification-led identity system, authentication-led identity system, plural identity system, payments-led identity system, Africa

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1. Introduction

At global level, the promotion of national digital public infrastructure (DPI) has been mounting in recent years (Bhattacharya et al., 2023; Eaves et al., 2019; Macdonald, 2023a). In the African context, motivations for investment in national DPI initiatives are having a particular impact—and draw a degree of their particular politics—from their intersection with national digital identity and national digital payments systems under the care of governments. African national DPI initiatives have to date tended to take the form of public or public–private initiatives to change existing public service delivery systems (Musoni et al., 2026; Mzinyati & Cloete, 2025; Sang et al., 2025; Sani, 2025). The value claims of inclusion, security, and effective service delivery associated with these DPI initiatives have been met with resistance from certain civil society rights actors and with critical examination by certain human rights scholars—with these actors and scholars advocating for safeguards, including greater data protection and privacy rights (CHRGJ, 2022; Gurumurthy et al., 2025; Manby, 2021; Silva et al., 2023). Drawing on the corpus of literature on national identity systems and on legal identity, this article proposes a four-part typology of ideal digital national identity systems with which to assess African initiatives under the rubric of DPI.

Motivations for investment in DPI often refer to the globally recognised example of India's Aadhaar digital identity system. In terms of individual participants registered and monthly transactions supported, this built-

in-India platform is the largest government-issued identity programme in the world. Since India's Supreme Court judgment of 2018 shored up its formal authorisation, the Aadhaar system has been endorsed by many privacy advocates, with one advocacy body referring to it as "an interesting model to consider for large-scale deployments" (OpenID, 2023, p. 13). Implemented through India's Modular Open Source Identity Platform (MOSIP), Aadhaar's legitimacy was greatly enhanced during the COVID pandemic (Martin, 2021, p. 105). Aadhaar is the digital identity base for the country's India Stack DPI. With biometric data stored in the cloud through Aadhaar, India Stack's application programming interfaces (APIs) enable a range of functions, including enrolment and identity verification for government services. India Stack's APIs also provide other forms of digital identity, such as financial addresses (enabling the United Payments Interface (UPI) with which digital payment applications can interface) and provision of a consent layer allowing for the exchange of personal data (Dattani, 2020).

At national level, the DPI paradigm comprises three interconnected elements: a digital identity system including electronic verification/authentication; a digital payments system; and a set of ground rules for digital exchange of personal data. As Sandman and Eaves (2023) have observed:

> [...] the set of capabilities that enable participation in society is constantly evolving, but over the past two decades, several countries have converged on three capabilities that they manage as digital public infrastructure, specifically the ability to: Digitally verify identities; securely send or receive money; [and] safely exchange personal information.

The digital identity layer is regarded as the foundational layer of DPI. Without identity, neither payments nor data exchange would function.[1]

The DPI concept is most often applied to the adoption and implementation of infrastructure at country level, due to the national scale of most digital identity systems (Heslop, 2020). The example of the India Stack DPI and its Aadhaar digital identity system illustrates that the distinction may be made between: digital platforms that deliver services; and the corresponding technology, data, standards, governance arrangements, and other components that constitute the platform architecture (Roitman, 2023, p. 2). Often passed over in DPI advocacy, this is the difference between the functions that a DPI performs (or is expected to perform) and the constituent infrastructural elements of the DPI, which must be constructed.

Conceptual treatment of DPI is tightly bound up with its legitimacy and its justification. Also, in many renderings of the concept, the meaning of and call for DPI are abstracted from the specific context of the country or countries adopting such infrastructures. In recent years, the DPI paradigm has become increasingly coherent and is now arguably the subject of conceptual agreement (Eaves & Rao, 2025). This coherence has been accelerated by the DPI focus of successive G20 agendas promoted by the DPI-leading nations, namely India, Brazil, and South Africa (Le Roux, 2025; Shaffer, forthcoming). Further contributing to, as well as demonstrative of, this coherence, is the set of indicators allowing for global tracking of DPI that has recently been released as the DPI Map (IIPP, n.d.; Rao et al., 2025).

The assemblage of various DPIs in African countries poses questions of public value (Eaves et al., 2024; Eaves & Kedia, 2023). The funding and building of DPIs are typically conducted, or proposed to be conducted, through the public procurement authority of an African government, often with external assistance. It requires a series of well-resourced operations to obtain and assemble the necessary elements for building the identity, payments, and exchange systems of a country-level DPI.

This article surveys the DPI paradigm through the lens provided by the corpus of literature on national identity systems and legal identity. The article draws on these literatures to propose a four-part typology of African digital national identity systems, to explore the logic of the systems' operationalisation, and to explore the systems power dynamic in relation to payments systems. Eleven African national jurisdictions are identified for review, and eight are found to have national identify systems that correspond to one of the four types of digital national identity systems.

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1 The DPI terminology is admittedly "somewhat amorphous" (Shaffer, forthcoming, p. 7). In addition, and as a counterpoint to the payments-explicit definition employed here, see the UNDP's definition of DPI as "a combination of (i) networked open technology standards built for public interest, (ii) enabling governance, and (iii) a community of innovative and competitive market players working to drive innovation, especially across public programmes" (Shaffer, forthcoming, p. 7).

2. Digital national identity systems

A digital national identity system encompasses the relevant technology, the rules and processes regarding identity, and the implementation and practice of the rules and processes of the system. The system is embedded within a governance framework, whether explicit or implicit, consisting of the technical and operational specifications for the system and its legal rules (Nyst et al., 2016, p. 37). For digital national identity systems, the legal rules are "a combination of existing public law" that includes identity-specific statutes; generally applicable privacy and data protection law; and competition and consumer protection law, supplementing "contractual agreements between the parties and any standards adopted [usually in such contracts]" (Nyst et al., 2016, pp. 37–38).

There are three core functions to an identity system, namely: identification (also known as enrolment, or identity-proofing), authentication; and federation and assertions (functional authorisation) (NIST, 2023). Once enrolled and authenticated, an individual's identity can be further asserted in federated systems, as part of ongoing service delivery or party identification in transactions.[2] According to Nyst et al. (2016, pp. 28–29), identification requires the authorities and the system to establish baseline information unique to the individual or organisation, which involves examining source documents such as birth certificates; corroborating sources of data; and collecting biometric data, referred to as breeder documents. Authentication requires asserting an established identity through presenting and verifying supporting documents already in the system. Authentication can use biometric data for such verification. Authorisation implies determining which services are available to the authenticated person or entity. While Nyst et al. (2016) argue that a digital national identity system must include digital authentication, this study, grounded in the perspective of African identity systems with only partial digitalisation, regards digitalisation of any of the three identification functions—identification, authentication, or authorisation—as evidence of the presence of a digital national identity system, albeit (when not all three of the functions are digitised) one with limitations.

A conceptual distinction widely acknowledged in the field of identity systems is the distinction between foundational identity and functional identity (Gelb & Clark, 2013). An example of foundational identity is a passport or an adult national identity card issued to enrol an individual in the national identity system and to provide proof of legal identity. An example of functional identity is a driver's licence, which provides proof of driving competence and may also serve as a form of legal identification. From this article's perspective, legal identity may best be understood as "that identity that is associated with an individual who it has been formally established has a right to reside in a country, with all of the rights and responsibilities that flow from that" (Nyst et al., 2016, p. 30). In this sense, legal identity may be understood as a right of residence in a particular country, and distinct from and not restricted to citizenship status (Dahan & Gelb, 2015).

Establishment of legal identity is a requirement for authentication and authorisation of digital payments. Accordingly, there is a significant linkage between digital identity systems and the financial sector, specifically to digital national payments systems (Ricks, 2018). In the context of DPI, the linkage between digital identity and digital payments system is enabled both by digital technologies, such as payment platforms, and by supporting legal and regulatory modalities, such as contract law, legal identity, and financial-sector regulation (Carruthers, 2020, p. 152; Pistor, 2019).

3. Categorising digital national identity systems

The relationships among the core functions of identity systems, and the relative prominence of these functions, are central to understanding DPI. Also important is examining the linkages between national identity systems national payments systems. Through focus on these elements, this section constructs a proposed four-part typology of national identity systems present in African jurisdictions.

The primary function of an identity system is identification (also known as enrolment), and the secondary function is authentication. Prior to the adoption of digital systems, identification came sequentially and prominently before authentication. In the pre-digital dispensation, a person was first issued with an identity

2 Thus, one might reserve the term "digital legal identity system" for the set of state agencies that fulfil the enrolment and authentication functions.

document—upon presentation of breeder documents and the capture of biometric data at the primary issuing department. Then the person could use the proof of identity to exercise their right to vote at a polling station or to obtain a driver's licence at a testing station. Here the identification—acquisition and possession of the identity document—was more prominent than the authentication.

In digital national identity systems, the relative prominence of the identification and authentication functions is no longer clear. In the digital space, the two functions are often tightly coupled, as the same organisational entity may now be responsible for both identification and authentication, and may use many of the same processes or personnel for both actions. For example, the Aadhaar system in India is responsible for both the identification of residents of India and the subsequent authentication of their identity. In South Africa, the responsibility for these two functions also currently lies with a single entity, the Department of Home Affairs (DHA). However, the degree of interdependence between these two functions is much greater with Aadhaar, in part because the statutory entity implementing Aadhaar is the Unique Identification Authority of India (UIDAI)—a targeted entity designed to fulfil or ensured fulfilment of these two functions.

In the case of India's Aadhaar system, digitisation has impacted the identification function, but the key impact has been with respect to authentication, which digitisation has revolutionised, both in form and in speed—such that authentication is no longer primarily a decentralised operation at government service desks and is now largely mediated through a nationally centralised website or other electronic channel. Furthermore, this authentication happens instantaneously, providing heightened efficiency (or system failure when internet access or interoperability is disrupted).

It is possible to identify two types of digital national identity systems with respect to the sequencing and systemic coupling of identification and authentication:

- *identification-led systems*, which demonstrate clear sequencing and prominence of the identification function, with relatively loose coupling of the identification and the authentication functions.
- *authentication-led systems*, which demonstrate less-clear sequencing and a greater degree of prominence of authentication, as well as relatively tight coupling of the identification and authentication functions.

The prominence of a function within an identity system indicates its degree of system power (Medaglia et al., 2022). The relative power of the identification and authentication functions is coupled with the relative power of the governance framework of the legal rules (powerful in an identification-led system) or of the technical and operational specifications for the system (powerful in an authentication-led system). Both identification-led and authentication-led identity systems are implemented primarily using a foundational rather than a functional identity. Functional identification can be relatively prominent in national identity systems without prominent foundational identification. This points to a third type of digital national identity system:

- *plural systems*, which do not have prominent implementation of either the identification or the authentication functions.

In plural systems, sector-specific identification arrangements provide identification and authentication (bringing into view the third core function of an identity system, namely authorisation) but do so without any dominant identification or authentication scheme. These are non-dominant identity systems, in which multiple schemes of functional and foundational identification are provided and authenticated. Such identity systems that are characterised by a plurality of functional identities, without the dominance associated with foundational identity systems, are treated, in this study's typology, as examples of plural systems.

National identity systems across Africa tend to vary by virtue of their linkage or absence of linkage to a national payments system. The DPI paradigm envisions such linkage. The payments layer connects to both the digital identity layer and the data exchange layer. Credible and trusted identification is crucial for the authorisation of transactions within a payments system. In most countries, only persons above a legally defined age and with a legally defined citizen/immigration status can hold a bank account or register a mobile subscriber identifier module (SIM) card. Under contemporary regulatory capitalism, the use case

of a national payments system may influence or even drive the technologies, rules, and standards of the identity system with which it is linked. This generates a fourth type of digital national identity system:

- *payments-led systems*, as they are significantly influenced or driven by a national payments system, and by actors and dynamics within that system.

We are thus able to construct a four-part typology of digital national identity systems to use in assessing DPI approaches in African countries:

- An *identification-led* national identity system has a dominant foundational identification scheme that is digitally authenticated and is linked to, but not driven by, a national payments system.
- An *authentication-led* national identity system has a dominant digital authentication scheme, authenticates a foundational identity as well as other functional identities, and is linked to, but not driven by, a national payments system.
- A *plural* national identity system has multiple identification schemes, at least one of which is digitally authenticated but without any being dominant, and is linked to, but not driven by, a national payments system.
- A *payments-led* national identity system has at least one identification scheme that is digitally authenticated and is driven or significantly influenced by its linkage with the national payments system.

4. Identification of African national identity systems for review

This section identifies the African digital national identity schemes that are significant in the DPI context, using data recently collected for the DPI Mapping initiative at the Institute for Innovation and Public Purpose (IIPP) at University College London.[3] The initiative's key output is its DPI Map.[4] The DPI Map should be understood as a guideline or analytical tool for assessing certain DPI-related features, rather than as a definitive authority on DPI status.

In order to collect the base data for this review exercise, the African jurisdictions covered in the DPI Map were selected as the primary database. The DPI Map defines a digital identification system as ranging "from basic identification systems that provide digital authentication for users to more advanced systems that enable citizens to share their credentials with other institutions for a variety of purposes beyond mere self-identification. The Map focuses [on] national or federal-level ID systems that are governed by public institutions" (DPI Map, n.d.).

There are 52 African jurisdictions covered in the DPI Map database, and the Map's determination that a country digital national identity system is based on four required indicators:

- a digital identity documentation system;
- a digital authentication system;
- at least a planned or pilot digital ID; and
- two implementation use cases.

For this study, it was decided to focus on two indicators in order to select a set of African digital national identity systems that are significant: one indicator drawn from the four above-listed DPI Map indicators, and a second indicator focussed on national payments systems.

- The first chosen indicator is *existence of a digital authentication system*, labelled by the DPI Mapping initiative "digital authentication systems" (second in the list of four above). The key element of this indicator, for the purposes of this study, is that these systems operate as part of the national identity system. The list of "authentication methods" that satisfy this indicator, according to the DPI Mapping initiative, are appropriately diverse: "demographic details, biometric data (fingerprints/iris), facial recognition, OTP (one-time password via mobile or email)" (IIPP, n.d.).

3 The full method details and the compiled dataset are available at https://osf.io/86xdw/overview.
4 See The Digital Public Infrastructure Map at https://dpimap.org/

- The second chosen indicator is *existence of a digital real-time payments system*. Combined with the first indicator, the existence of a real-time national payments system is a sign of the significance of the identity system as an integral part of the country's DPI. (There appears to be no indicator in the DPI Mapping project that speaks directly to the linkage between the digital identity layer and the digital payments layer.)

It was decided that by using these two indicators, the DPI Map data can plausibly allow us to identify African digital national identity systems that are significant. The application of these two indicators as filters leads to a set of 11 African jurisdictions that each have a combination of a digital authentication system and a digital real-time payments system. Among the 11, five of the jurisdictions with leading national identity systems, which are frequently discussed in the literature, are present: Ethiopia, Ghana, Kenya, Nigeria, and South Africa. The other six jurisdictions are: Egypt, Mauritius, Morocco, Seychelles, Uganda, and Zambia.

5. Categorising African national identity systems

Eight of the 11 African national identity systems selected can be categorised in terms of the four-part typology of digital national identity systems proposed above:

- identification-led systems: South Africa, Uganda and Zambia
- authentication-led systems: Ethiopia and Morocco
- plural system: Ghana
- payments-led systems: Kenya and Nigeria

The three remaining national jurisdictions among the 11 found to be significant—Egypt, Mauritius, and Seychelles—could not be categorised in terms of the proposed four-part typology.

This section now provides short overviews of the digital national identity systems in South Africa, Ethiopia, Ghana, Kenya and Nigeria, thus providing at least one example of each of the four categories in the proposed typology. The overviews consider the key digital identity features, and the power dynamics of the identity systems, in each country.

South Africa: An identification-led system

South Africa's system has identification coupled with a working electronic authentication function as well as a digital national payments system. It is considered one of the world's leading identity systems, particularly for its use (and, under apartheid, abuse) of biometric technology (Breckenridge, 2014a). Albeit with a degree of inefficiency and corruption, South Africa's DHA provides birth registration and adult identification documentation for most citizens, permanent residents, and recognised refugees. In contrast to apartheid's failures in this respect (Breckenridge, 2014b), the post-apartheid government has largely succeeded in rolling out public-sector, biometrically enabled identification (Breckenridge, 2014a).

The foundational identity documents are authenticated in numerous use cases, including citizen identification, bank account verification, credit checks, and social grant distribution. National payments are facilitated through two electronic systems: PayInc (formerly BankServAfrica), which is an interbank system with real-time clearing that is operated by the South African Reserve Bank (SARB) and the commercial banks; and Payshap, a cross-domain digital system which is a collaboration including PayInc (Milne & Lawack, 2024). In May 2026, the DHA called for public comment on a set of draft amendments to Identification Regulations of 1998, with the amendments including provisions tentatively linking the DHA digital identity with the MyMzansi digital government platform, aiming to facilitate citizens' access to public services (DHA, 2026).

The power dynamics present in the implementation of South Africa's identity system, and between it and the payments system, warrant South Africa's classification as an identification-led digital national identity system. Neither the banks nor the telecommunications firms have broken the hegemony of the DHA in identity management (DHA, 2020). Where private firms play a significant role in this sector, they do so on

the specified and regulated terms of the state. For instance, the private service provider for non-citizen visas and immigration control, VFS, operates under the supervision of the DHA (De Gruchy, 2018). In addition, while the digital technology of the authentication function is crucial to the implementation of the system, it does not lead or drive the system's operation. The use cases for information-sharing from the Population Register are, as set out in section 21 of the Identification Act 68 of 1997, firmly within the legal foundation of the identity system. The DHA shares information from the Population Register with insurance businesses and banking institutions.[5]

In July 2025, the system received a major upgrade in its operating business model and increased its rates of cost recovery in order to keep pace with developments in the private-sector use of this service. The DHA negotiated and concluded service-level agreements with a set of trusted financial institutions, facilitating both the existing authentication service and enlisting some banks in the state-controlled identification enrolment function.6

The national payments system does not drive the identity system but is integrated with it under fairly close state supervision. Breckenridge (2019b) has detailed the origins and rise of a maverick firm, Net1, within the payments sector that had the potential to transform the identity system, but that firm's ambitions were ultimately thwarted by the combination of national regulation and existing globally dominant payment firms (Breckenridge, 2019b). South Africa's 2025 Roadmap from the Digital Transformation of Government includes provision for a "Functional Digital Identity for People to Securely and Remotely Access Services", which is planned within central bank regulation of the payments system and is to be integrated with the identity system (MyMzansi, 2025, p. 4).

Ethiopia: An authentication-led system

Ethiopia's National ID Program is coupled with a working electronic authentication function and is linked to a digital national payments system. Envisioned as the country's technology-based foundational identity, the biometric digital ID scheme Fayda, with a 12-digit unique identification number, was launched in 2021 (Sani, 2025, p. 6). By mid-2025, 15 million Ethiopians had enrolled, and the target is 90 million citizens by 2027 (Nkosi, 2025). Fayda replaces the Kebele ID, which is the de facto foundational identity (Ayano, 2018) and the project is intentionally prioritising women in its registration process (World Bank, 2025). Authentication is central to the identity system and is provided both online and offline (National ID, n.d.). Through use of Fayda's authentication function, the National Bank of Ethiopia began in 2023 to fast-track the Fayda ID as the primary ID for banking, demonstrating complementary roles for the identity and payments systems (Radier, 2023).

Fayda is based upon the MOSIP technology associated with India's Aadhaar. Developed, supported, governed, and promoted by India, MOSIP has been marketed, through the success of Aadhaar, as a developmental digital platform for running a national identity system and avoiding vendor lock-in. Seen as a one-stop validation and government services platform (termed MESOB (Modern Ethiopian Service for Organised Benefits)), Fayda uses MOSIP technology with local adaptations for its digital identification (Nkosi, 2025). In the Organisation for Economic Co-operation and Development (OECD) definitional distinction between digital public goods and DPI, MOSIP is a prime example of a digital public good (OECD, 2021).

An examination of the power dynamics in the implementation of Ethiopia's identity system, and between it and the payments system, shows that Ethiopia should be classified as an authentication-led digital identity system. Identity management remains firmly under public control and is regulated at a whole-of-government scale. The Fayda identification scheme is part of a modernisation project launched in 2021 and

5 Identification Act 68 of 1997, section 21. https://www.gov.za/sites/default/files/gcis_document/201409/a68-97.pdf
6 Parliamentary Monitoring Group (2025). *Department of Home Affairs & BMA 2024/25 Annual Reports; DHA ICT rollout of self-service kiosks; One-Stop Border Post Bill; with Minister*. https://pmg.org.za/committee-meeting/41734/?utm_campaign=minute-alert&utm_medium=email&utm_source=transactional

backed by national authorities and international donors (Beny, 2025, p. 166). The adoption was motivated in part by what was seen as Ethiopia's lagging position in the uptake of digital payments services (Alemu et al., 2021). In contrast with South Africa, the digital technology of the Ethiopian system's authentication function is crucial to the implementation of the system; it is central to the system's design and drives its rollout. In July 2025, it was claimed that Fayda had "become the authentication backbone of Ethiopia's digital transformation, serving 55 service providers while cutting service delivery time by 60 percent" (Nkosi, 2025). This configuration of identity systems functions and the relationship to the payments system is acquiesced to by the relatively nascent private financial sector. Fayda's real-time verification function is endorsed by the national banks as part of the National ID Program (Radier, 2023).

Ghana: A plural system

Ghana's national identification scheme is coupled with a working electronic authentication function and linked to a digital national payments system. Beyond the state-issued Ghana Card, which is held by only a minority of Ghanaians, Ghana uses several functional ID credentials (Thiel, 2020). These include election registration, tax administration, a driver's licence, a SIM card, health insurance, and government payroll credentials (Debrah et al., 2019; Effah & Owusu-Oware, 2021). With respect to authentication, various forms of verifiable identity have been provided by the civil registration agency and by other state institutions, often in alliance with a private firm. From 2001 to 2017, identity verification was fragmented and significantly outsourced, although the state maintained some degree of control over civil registration (Thiel, 2020, pp. 121–130). In recent years, the National Identification Authority's (NIA's) official Identity Verification System Platform (IVSP) has begun to authenticate holders of the Ghana Card. The e-zwich card, a biometrically regulated smartcard that operates through the national payments system, arose out of the failure of a national identity card programme initiated through and driven by the NIA from 2001 (Breckenridge, 2010). A digital wallet (payment) functionality was integrated with the Ghana Card from April 2026 (Africa News Agency, 2026).

Turning to the power dynamics in the implementation of Ghana's identity system as well as between it and the payments system, Ghana's dispensation is best seen as plural, without dominance by either the identification or authentication functions and without a clear driving influence from the payments system. The Ghana Card began using fingerprint biometrics in 2019. In 2023, a digital version of the Ghana Card and the development of a mobile authentication app were introduced, in recognition of the incomplete coverage of the authentication platform, the IVSP, across the country (Macdonald, 2023b). Biometric authentication of the holder of a Ghana Card is promoted by the banking and payments systems, though the payments system does not supplant or dominate the national identity system (Macdonald, 2025a). The e-zwich biometric payment card is used for government payments, and the Ghanaian real-time clearance system enables operation of the card, demonstrating that the identity system is not directly influenced by the payments system (Thiel, 2020).

Kenya: A payments-led system

Kenya is, at the time of writing in mid-2026, in the process of rolling out digital national identification that is coupled with a working electronic authentication function and linked to a digital national payments system. The current official system of identity numbers is the Maisha Namba, launched in October 2023 alongside amendments to the Registration of Persons Regulations in order to provide for both an electronic identification card and an electronic civil register (Ombati, 2023). Maisha Namba replaced an earlier failed scheme of identity numbers, Huduma Namba, which suffered several technical and legal setbacks (Kabata, 2024; Mutung'u & Rutenberg, 2020; Mutung'u et al., 2026). The official authentication function for Kenya's digital identity system is provided by the National Integrated Identity Management System (NIIMS), Kenya's initial large public sector technology project (Caribou Digital, 2019, p. 30; Mutung'u & Rutenberg, 2020). Kenya's payments system has, since the 2010s, been dominated by telecommunications firm Safaricom's mobile money platform M-PESA (Bloomberg, 2020; Tyce, 2020).

The power dynamics in the development, design, and operation of the Kenyan identity system, and between it and the payments system, show that Kenya's digital identity system is best characterised as a payments-led. Indeed, Kenya is the globally paradigmatic case of a dominant firm in the telecommunications sector—in this instance, Safaricom—providing authenticated and verifiable identity in the form of a functional identity (Donovan & Martin, 2017; Martin, 2019). Safaricom has leveraged its dominant market power in telecommunications to expand into banking and credit (Breckenridge, 2019a; Robb & Vilakazi, 2016).

Through creating a distinctive and hugely popular system of mobile money in the 2010s, Safaricom triumphed over the Kenyan banks in a contest for dominance over the national fast-payments system, including through contesting and influencing the legal and institutional arrangements for credit information-sharing (Breckenridge, 2019a; Dafe & Upadhyaya, 2026). As a result of Safaricom's dominance and the state's difficulties in implementing Huduma Namba, there is only a minimal degree of foundational identity function and regulation with respect to the use of identity in the payments system (Upadhyaya et al., 2025). The state's identity authentication service, NIIMS, does nonetheless continue to operate while Maisha Namba is being established.

In Kenya, as distinct from the Nigerian case (see next sub-section), the issuance, authentication, and use of identity within the national payments system is firmly in private hands, rather than in those of a state agency, and is not tightly linked to foundational identity.

Nigeria: A payments-led system

Nigeria's national identification scheme is coupled with a working electronic authentication function and linked to a digital national payments system. Established in 2007, Nigeria's National Identity Management Commission (NIMC) had, by July 2021, enrolled 60 million persons in the country's foundational digital identity scheme (Okunoye, 2022). By March 2025, 118 million persons had identity numbers. The scheme operates with a National Identity Number (NIN) format, but aims to link to other identity systems rather than provide dedicated smart ID cards. It is a harmonisation and linkage programme. As of 2022, the NIN enrolment was roughly equivalent to that of the Bank Verification Number (BVN) population, but less than the populations associated with voter registration (84 million) and SIM card registration (190 million) (Okunoye, 2022). Since 2020, NIN holders have been required to link their NINs with their SIM cards, a requirement that led to an 8% decrease in internet subscriptions (Okunoye, 2022). A fast-payments system, the Nigerian Inter-Bank Settlement System (NIBSS) Instant Payment (NIP) was introduced in 2011 through the efforts of the Central Bank of Nigeria (Okunoye, 2025). The authentication system is an app that individual NIN holders can download from the Google Play Store or Apple App Store (Macdonald, 2025b).

Similar to the dynamics in Kenya—though not demonstrating the dominant power, seen in Kenya in the position of Safaricom, of a single private sector payments firm—the power dynamics in the implementation of Nigeria's digital identity system, and between it and the payments system, show that the Nigerian digital identity system is payments-led. The driving force for the increasing degree of linkage and interoperability within and across the identification and payments systems is the payment functionality.

In the 2010s, this functionality ould be seen in the process of enrolment to the NIN, where the BVN served as a feeder document for the NIN (Monye & de Koker, 2022, p. 5). In the 2020s, the dynamics can be seen through the role of the fast-payments system. By 2025, the NIP had become "the dominant channel for payments in Nigeria, accounting for 70% of all NIBSS payments processing" (Okunoye, 2025, p. 6). The driving role of the payments system with respect to identity is demonstrated by the description of the new general multipurpose ID card rolled out by the NIMC since 2024. According to the NIMC, the card has "multiple use cases: Payments/financial, government intervention/services, travel, etc" and the NIMC is "working with the Central Bank of Nigeria and the Nigerian Interbank Settlement System to deliver the payment and financial use cases" (NIMC, 2024).

6. Towards an explanatory account of African digital identity systems and DPI

The above review of selected African nations' development of digital identity systems and DPI stands to be complemented with an explanatory account of why countries have developed along their different trajectories and to the different end-states identified. Questions of interests, incentives, power, and governance should be central to understanding DPI (Shaffer, forthcoming). Who are the principal actors promoting particular configurations of identity and payments systems? Which coalitions, public agencies, private firms, international organisations, and development partners shape these outcomes? How are competing interests negotiated, and who stands to benefit from particular institutional arrangements? While a full account is beyond the scope of this article,[7] this section provides an initial analysis of the sources of variation among the examples provided in the previous section of the four identified types African digital identity systems—with emphasis on the political, institutional, economic, and historical factors that account for divergent patterns of digital identity system development.

Fitting within a relatively long-standing trend in global public discourse, contemporary calls for investment in, and building of, DPI often take practical form as public or public–private initiatives to change (modernise) existing African public identity systems. From around 2005, mobile-money intellectuals began to draw on Kenya's experience with Safaricom and M-PESA to promote the potential for financial and payments systems to synergise with digital identification schemes operating through mobile phones. This promotion was intended to promote financial inclusion and ultimately address global poverty (Maurer, 2012, p. 301). Centred in the world of finance, the narrative later aligned with the narratives of influential figures in the development sector who came to the position that the digital and biometric identification revolution embodied in India's Aadhaar system could have a significant impact on sustainable development in African national jurisdictions (Gelb & Metz, 2018; Thiel, 2020).

An African perspective would identify at least three sets of actors as promoting a DPI narrative: multilateral institutions, philanthropic foundations, and technology vendor firms (Burke, 2026). These actors are operating within what can be understood as a transnational legal order (Shaffer, forthcoming), and their actions include the sort of G20 agenda-setting action noted above. The African Union has been among the leading actors encouraging African states to develop and adopt mutually recognised digital identity systems, with a particular focus on mutual recognition among states in order to foster intra-African trade (AU, 2022). As Burke (2026) notes: "Large private foundations, especially the Gates Foundation and Omidyar Network, have also been highly influential. They have funded both the technology itself, such as the open-source identity system MOSIP, and the organisations that promote DPI globally […]". As for the technology vendors, Debos (2025) points to the dominance of European companies that sell biometric identification technology to African states—particularly French companies operating in the states of the former French colonial empire—and finds that African states have become increasingly dependent on corporate actors for both election management and citizen identification.

Given that much of the significant action by these actors within the legal order takes place at the national level, how then does one explain the emergence of a particular type of national identity system? A few factors, which also shape the relationship between national identity systems and payment infrastructures, may be provisionally identified. The primary factor appears to be the degree to which the African national state has been able to build and retain power over citizen identification—a strength of the South African state and its DHA. In the South African case, the retention of this power appears to be linked to the continuing power of the DHA over the civil registration function, also housed in the DHA.

7 Such an account should embark upon a comparative study beyond South Africa. In doing so, it might well parallel Breckenridge's *Biometric State: The Global Politics of Identification and Surveillance in South Africa, 1850 to the Present* (Breckenridge, 2014a). For work along similar lines exploring the modern history of the state and its identification systems and politics, see Weitzberg (2015; 2020) (Kenya) and Banégas and Cutolo (2024) (Ivory Coast), as well as Sriraman (2018) (India) and Hashmi (2021) (Pakistan). Such an account would align with Frederick Cooper rather than James Scott—seeing the understaffed, underfunded, and often under-interested colonial African state as a consequential gatekeeper rather than as a more powerful classifier (Thornberry, 2015; Weitzberg, 2015, pp. 411, 413, 425–426).

Where such state power does not exist, a further factor explaining variation is the relative power of the telecommunications and banking industries. Specifically, the Kenyan telecommunications sector is more powerful relative to its banking sector than is the case in Nigeria, Meanwhile, in South Africa, the banking actors are more powerful than the telecoms actors with respect to civil identification. Thus, in the trio of South Africa, Kenya and Nigeria, the factors just cited may help to explain the divergent paths taken towards identification-led (South Africa) and payments-led (Kenya and Nigeria) approaches to development of a national digital identity system.

Ghana provides a case where neither the state nor the private sector appears able to achieve dominance in the digital identity environment, thus resulting in a plural system. In Ethiopia, an authentication-led digital identity system is apparently emerging because the citizen identification function is historically, and still is today, firmly state-controlled. The localised and paper-based character of the existing Kebele civil registration system has allowed for, and contributed to, the state's dominance of the authentication function. The state's ambition to digitally link different domains is central to the emergent Fayda system.

7. Conclusions

This study has offered three contributions to the debates around digital national identity systems and DPI in Africa. It has differentiated the general analysis of the digitalisation of government by specifying the distinctive digitising dynamic associated with the authentication function of identity systems. This takes the study of identity systems beyond the distinction between foundational and functional identity. The study has also deepened the study of DPI by problematising the relationship between a country's national identity system and its national payments system, arguing that the nature of this relationship is a crucial feature of the implementation of both these systems. Third, the study has proposed, and partially tested, a four-category typology of digital national identity systems, finding the typology applicable to eight of the 11 African jurisdictions selected for review.

Further research should explore more fully some of the policy implications, including competition economics, of the above analysis of DPI from the perspective of identity systems. It is clear that there can be no one-size-fits-all approach to addressing the policy questions with respect to DPI that are being posed with urgency in national jurisdictions across Africa, including questions around use of public and private resources to build DPI (Eaves et al., 2024; 2025). Other significant policy and regulatory dimensions—including the importance of pursuing privacy rights and data protection principles in an integrated fashion across the digital identity and financial payments sectors, and the fit of particular regulatory strategies to the problematics of digital identity systems— also require further exploration (McCallum & Aziakpono, 2023).

Of particular urgency is the question of public value. Mapping of the sort presented in this article can assist in evaluating the costs and benefits of investments in DPI. Across Africa, nations are compelled to consider whether—and, if yes, how—to use public resources to build a DPI. The issue is, broadly speaking, part of "the policy challenge posed by the rising digital platform economy", and may be approached from "an industrial policy perspective into which competition policy is integrated as a way of refocusing the policy discussion" (Andreoni & Roberts, 2022, p. 1444).

In many African national contexts, infrastructures are inadequate to respond to all the needs of the citizens and residents of the country's various jurisdictions. In the South African case, this stems from both under-investment and lack of maintenance (Watermeyer & Phillips, 2020). The provision of verifiable legal identity deserves both public policy and financial support (Andreoni & Roberts, 2022). Citizen access to verifiable legal identity is fundamental to, inter alia, participation in the formal economy and maintenance of the rule of law, and should be a core DPI provision—with due attention to the risks of error and human-rights harms (Manby, 2021; Roberts & Mare, 2025; Silva et al., 2023). Concerns around panoptic surveillance, privacy violations, and the expansion of state monitoring capabilities must not be downplayed.

The mapping of digital national identity systems, as conducted in this study, has overlaps with, and implications for, questions of belonging, recognition, citizenship, and politics across the continent (Breckenridge, 2014a; Dalberto & Banégas, 2021; Manby, 2013). Of central importance for the continent are the questions related

to the processes and mechanisms of digitalisation that are raised here. What are the politics and incentives driving the adoption and continuation of one or another of the four types of identity systems set out in this article, and what is the true nature of the systems' relationships with national payments systems? More fundamentally, who, in reality, are the actors constructing and negotiating the power dynamics within African national identity systems as they go digital?

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Data availability
Data used to generate the findings set out in the submission is available at dpimap.org and https://osf.io/86xdw/overview.

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The author has no competing interests to declare.

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Instability absorption by tertiary educators: Technology adoption under conditions of fragility in the Liberian higher education sector

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Abstract
Digital transformation in higher education is frequently framed in terms of access and adoption. Such framings generally failed to consider how digital higher education systems function under conditions of persistent infrastructural instability and constrained institutional capacity. This study examines Liberian educators' experiences of digital provision under conditions of fragility in the country's higher education sector. Based on data from interviews and a survey with 22 educators across 11 Liberian tertiary institutions, the research found that continuity is sustained to a great extent not through the provision of technological systems and user acceptance of those systems, but rather through educators' adaptations to the unstable state of the technological infrastructure. The educators' responses fall into four main instability absorption categories—responsibility displacement; non-institutional and informal communication infrastructures; communicative labour; and uneven digital labour—and the study proposes the instability absorption model (IAM) to explain how these absorption practices sustain digital education delivery. The model frames technology adoption under conditions of fragility as a process of sustained operationalisation, where systems continue functioning through continuous human absorption of infrastructure disruption.

Keywords
digital transformation, higher education, Liberia, technology adoption, resource-constrained environments, responsibility displacement, communication infrastructures, communicative labour, digital labour, instability absorption model (IAM)

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1. Introduction

Higher education institutions across Sub-Saharan Africa are increasingly reliant on digital technologies for expanding access, improving teaching quality, strengthening research capacity, and supporting national development agendas. Global and continental policy frameworks emphasise digital transformation as central to educational inclusion (UNESCO, 2023; World Bank, 2023). However, in specific African national contexts, the implementation of digital initiatives in higher education settings unfolds under material and institutional conditions characterised by fragility. This study focuses on Liberian higher education as a context in which fragility is pronounced.

The Liberian higher education sector is overseen by the National Commission on Higher Education (NCHE), which recognises 81 higher education institutions: 13 public, 33 private, and 35 faith-based (NCHE, n.d.). The

system is anchored by the University of Liberia, alongside private institutions such as Cuttington University and the African Methodist Episcopal University. Collectively, the 81 institutions serve a student population estimated at over 50,000 individuals (World Bank, 2017, 2023). Meanwhile, the broader Liberian operating environment is characterised by constrained electricity access, uneven internet connectivity, and limited technical support capacity, all of which directly affect the feasibility of sustained digital provision in tertiary education (Government of Liberia, 2022; NCHE, n.d.; World Bank, 2017, 2023).

Studies of higher education in fragile and post-conflict contexts have found that resource constraints, infrastructural disruption, and limited institutional support shape teaching quality, digital provision, and staff development needs (Abdulkerim et al., 2022; Barikzai et al., 2025). As one of its efforts to address such challenges, Liberia participates in the West and Central African Research and Education Network (WACREN)—through the Liberia Research and Education Network (LRREN). WACREN and LRREN aim, inter alia, to improve institutional digital connectivity and to enable research collaboration through shared digital services. Liberian national policy initiatives, such as the National Digital Transformation Strategy (Government of Liberia, 2022), emphasise connectivity expansion and digital skills development. At the institutional level, universities have introduced learning management systems such as Moodle, used within the ULOnline platform, alongside tools such as Google Classroom and mobile-orientated systems including mElimu. However, platforms are often inconsistently maintained.

This context raises important questions about (1) how digital provision is sustained at Liberian higher education institutions in the absence of stable infrastructure, and (2) how responsibility for that provision is distributed across actors at the institutions. This study sought answers to these questions by interviewing and surveying 22 educators from across 11 Liberian higher education institutions.

Research questions

This study was guided by the following questions:

- How do educators in Liberia's higher education institutions describe the usefulness and usability of digital technologies in their institutional contexts?
- What institutional, infrastructural, and governance conditions shape educators' ability to adopt and sustain digital teaching practices?
- How does educators' use of non-institutional communication platforms support or compensate for gaps in institutional provision?
- How do educators negotiate responsibility, workload, and support in sustaining digital practices in their environments?

2. Conceptual framing

For the purposes of this study, educational technology adoption was conceptualised as a socially embedded and institutionally mediated process rather than an individual behavioural decision. To arrive at this conceptual framing, we engaged selectively with established technology adoption frameworks, including the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989), the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003, 2012), and diffusion of innovation (DOI) (Rogers, 2003). These frameworks provide widely used constructs such as perceived usefulness, ease of use, facilitating conditions, social influence, and diffusion processes. However, such models often privilege individual cognition and behavioural intention, while treating organisational structures, infrastructural reliability, and governance arrangements as secondary or background conditions (Avgerou, 2008; Selwyn, 2016; Straub, 2009). In resource-constrained higher education contexts, such analytical orientations are insufficient.

Accordingly, we were drawn to perspectives in the social shaping of technology (SST) tradition, in which technologies are conceptualised as socially constructed and institutionally embedded (MacKenzie & Wajcman, 1999; Orlikowski, 2000). The SST approach emphasises the reciprocal relationship between technological artefacts and social structures, highlighting how organisational norms, power relations, and institutional arrangements shape technological outcomes. However, while SST explains how technologies and institutions co-evolve, it does not fully account for the ongoing work required to stabilise technological systems in contexts where formal infrastructures are unreliable. We addressed this limitation by shifting analytical attention from co-construction to maintenance. Specifically, we examined how educators'

communication practices can function as a form of infrastructural labour—labour through which digital systems are actively sustained, repaired, and made workable in everyday institutional contexts.

The study was further informed by information and communication technology for development (ICT4D) scholarship, which foregrounds the roles of context, governance, and institutional capacity in shaping technological trajectories (Avgerou, 2008; Heeks, 2010; Unwin, 2009). ICT4D research has consistently shown that digital initiatives introduced without coherent support structures tend to produce uneven outcomes and depend on local adaptation. However, while ICT4D scholarship effectively identifies structural constraints, it tends to emphasise gaps, deficits, and inequalities without fully explaining how digital provision continues to function despite these limitations. Thus, the present study drew on insights from information infrastructure scholarship, which conceptualises infrastructure as relational, embedded, and sustained through practice (Bowker & Star, 1999; Bowker et al., 2010; Star & Ruhleder, 1996).

In summary, the aforementioned theoretical resources guided the conceptual framing of the study in the following ways. TAM, UTAUT, and DOI sensitised the analysis to educators' accounts of usefulness, usability, social influence, facilitating conditions, and adoption processes. SST directed attention to the institutional and organisational arrangements that shape technologies in practice. ICT4D scholarship drew focus to resource constraints, governance, infrastructure, and institutional capacity. And information-infrastructure scholarship ensured attention to the communicative and coordinative work required of educators to keep digital systems functioning when system-functioning is fragile.

3. Research design

Participant sample

The study participants were 22 educators from across 11 Liberian higher education institutions, with the 11 entities represented comprising public (n = 4), private (n = 2), and faith-based institutions (n = 5). Selected participants were all educators with direct experience of educational-technology use, support, and/or coordination. A purposive, stratified sampling strategy (Patton, 2015) was used to ensure representation across the 11 institutions. Within each institutional category, maximum-variation principles guided selection, with attention to role, disciplinary background, experience, and digital engagement. Participants were recruited through institutional contact points, professional networks, and direct invitations where appropriate. Table 1 provides an overview of the sample's characteristics.

Table 1: Sample's characteristics

Total no. of participants	22
Institutional coverage	11 accredited degree-awarding higher education institutions in Liberia
Institution types	Public, private, and faith-based institutions
Institutional distribution	Public: n = 4 institutions; private: n = 2 institutions; faith-based: n = 5 institutions
Participant responsibilities	Direct involvement in using, supporting, or coordinating digital technology use for teaching, assessment, academic administration, and/or student support
Participant roles	Lecturers, course tutors, senior academic staff; programme or departmental leads; academic administrators; student support staff; educators with informal digital support or technology champion responsibilities
Participant experience profiles	Early career, mid-career, established
Participant disciplinary backgrounds	Education, humanities and social sciences, business and management, health and natural sciences, computing and information technology, and other professional or applied fields represented across the sampled institutions
Participants' digital engagement	Learning management systems, messaging platforms, online teaching tools, blended learning, digital assessment and student communication channels

Note: Participant characteristics are reported in aggregate form to protect confidentiality. Role, experience, and disciplinary categories are deliberately broad because the higher education sector under study is relatively small, and detailed reporting could increase the risk of deductive identification.

Data collection
Semi-structured interviews were conducted with the 22 participants. The interviews focused on participants' experiences with the use of digital platforms; infrastructural disruption; institutional support; use of non-institutional communication channels; peer support; student coordination; and additional labour involved in sustaining digital provision. With participants' consent, interview data was recorded and documented for analysis, with identifying details removed during transcription and preparation of the dataset.

In addition, a short descriptive survey was used to capture contextual information on access, connectivity, platform use, and sources of technical support. The survey provided contextual information that supported interpretation of the interview findings and helped to situate participants' accounts within their institutional and infrastructural conditions.

Data analysis
The interview data was analysed using reflexive thematic analysis (Braun & Clarke, 2022). The first stage comprised familiarisation with the interview transcripts, field notes, and contextual survey responses. Transcripts were read repeatedly to develop a close understanding of participants' descriptions. During familiarisation, preliminary analytic notes were made on recurring issues such as unreliable electricity, unstable internet access, platform-switching, WhatsApp-based coordination, peer support, student troubleshooting, additional workload, and repeated adaptation to system failure.

The second stage was the initial coding of the interview data. Codes were generated inductively from participants' accounts, with cognisance of the study's concern with educators' experiences of adoption, institutional capacity, communication channels, and performance of infrastructural labour. Coding captured both descriptive content and more interpretative meanings. Descriptive codes included electricity disruption, connectivity failure, platform breakdown, use of WhatsApp, peer assistance, lack of training, and limited technical support. Interpretative codes included responsibility-shifting, hidden labour, accountability without authority, non-institutional infrastructure, normalised disruption, anticipatory adjustment, and adaptive containment. The coding process was recursive, meaning that earlier transcripts were revisited as later transcripts revealed new patterns or sharpened the interpretation of existing codes.

The third stage consisted of grouping related codes into broader analytical categories. The fourth stage comprised developing candidate themes and reviewing them against the full dataset. The themes were refined through repeated movement between coded extracts, the wider dataset, and the research questions. This process resulted in five final themes:

- infrastructural fragility as a structuring condition of educators' technology adoption;
- institutional support gaps resulting in responsibility displacement to educators;
- educators' use of non-institutional and informal communication infrastructures as compensatory systems;
- uneven digital labour and structural dependency on educators; and
- educators' adaptive stabilisation without institutional learning.

The final stage of analysis moved from thematic description to conceptual synthesis, with the five themes examined in relation to one another.

Reflexivity and ethics
Field notes documented analytical decisions and emerging interpretations. Ethical approval was obtained from the University of Liberia Institutional Review Board (ULIRB) prior to data collection, under approval reference UL-IRB/JCT-CH/196/26. Participants were assured of anonymity and confidentiality, and provided informed consent. Identifying details were removed from the data to protect anonymity.

4. Findings and analysis

Theme 1: Infrastructural fragility as a structuring condition of educators' technology adoption

In the interview data, infrastructural fragility emerges not as an occasional disruption but as a structuring condition that reorganises the operational foundations of digital teaching across the 11 Liberian higher education institutions. Infrastructure does not simply fail intermittently; it functions as a baseline condition of uncertainty. Electricity supply, internet connectivity, and access to functional digital systems are experienced as unstable variables in terms of which academic work has to be continually recalibrated. Although participant responses consistently identified electricity and connectivity as major constraints, their accounts also showed variation in how these constraints are experienced. Some described disruption as a routine inconvenience to be worked around, while others framed it as a deeper institutional condition that undermines planning, credibility, and confidence in digital provision.

Electricity and connectivity as baseline constraints

Educator 2 stated: "You can plan a whole online session, but if the power goes, everything stops. It is not a surprise anymore." Planning therefore becomes short-term and defensive, with digital sessions structured around fallback options rather than assumed continuity. As educator 11 explained: "Sometimes the internet is there in the morning and gone by afternoon. You cannot rely on it." Under these conditions, reliability becomes the decisive variable. When connectivity fluctuates within a single day, synchronous engagement becomes precarious, deadlines become negotiable, and sequences of learning activity remain provisional.

Adoption as infrastructural contingency

Technology adoption was typically described by the educators as conditional and reversible rather than linear or cumulative. Educator 8 stated: "I use the platform when it works. When it does not, we move on." This reflects a pattern of contingent engagement in which digital systems are used pragmatically, based on immediate functionality; they are not embedded as stable institutional tools. Educator 16 captured the tension between institutional expectation and material reality as follows: "The institution expects online submission, but the infrastructure does not support it consistently." Technology adoption is therefore suspended between institutional policy mandate and infrastructural feasibility.

Anticipating breakdown as institutionalised precaution

A defining feature of the environment described by the educators is the routinisation of anticipatory labour. The educators do not simply respond to breakdown; they plan for it as a structural inevitability. As educator 4 stated: "You always have a backup plan. That is how you survive." Backup strategies function as primary planning mechanisms rather than secondary safeguards. Materials are duplicated, instructions are sent in advance, and alternative communication channels are prepared. Educator 21 highlighted the reputational implications of this environment: "Students think we are disorganised, but they do not see what we are dealing with."

This finding contains an important tension. On one level, backup strategies demonstrate resilience, professional commitment, and adaptive competence. On another level, they show that infrastructural failure has become normalised within everyday teaching design. Digital continuity is being produced not by infrastructural reliability but by precautionary practice.

Theme 2: Institutional support gaps resulting in responsibility displacement to educators

The educator responses showed that support gaps at their institutions do not simply constrain their technology adoption; they redistribute responsibility for sustaining the adoption. While expectations to integrate digital tools remain institutionally articulated, the organisational structures required to support these expectations are partial, inconsistent, or fragile. This produces a pattern of responsibility displacement, in which the burden of stabilising digital practice shifts from institutional systems to individual educators. Educators' accounts showed variation in how this displacement is experienced. Some regard limited support as an unavoidable feature of working in a constrained environment, while others interpret it as a deeper institutional failure to match digital expectations with operational capacity.

Episodic training and fragile capacity-building
Training was described by the educators as irregular and event-based, typically organised around the introduction of new platforms rather than embedded as continuous professional development. As educator 9 stated: "We get training when a new system comes [...] and then you are on your own." Educator 17 echoed this point, stating: "They assume once you attend the training, you are fine. But the real problems start after." It was said that these "real problems" emerge during routine use, when platforms malfunction or students encounter access barriers.

Responsibility displacement in everyday practice
It was found that in the absence of reliable institutional support, educators absorb the tasks of troubleshooting and student technical guidance as routine components of their work. As educator 6 stated: "If students cannot access the system, they come to you. You have to find a solution, even if it is not your job." Responsibility shifts downwards by default, because refusing to engage would disrupt teaching continuity. Over time, this displacement becomes normalised. Educator 13 stated: "You do not complain anymore. You just fix what you can and move on." This statement captures an important tension—that educators' willingness to intervene sustains digital provision—but it also reduces the visibility of institutional gaps by making individual problem-solving appear routine.

Accountability without authority
A further dimension of responsibility displacement identified in the data is misalignment between accountability and authority. The educators are expected to deliver digital teaching outcomes yet have limited influence over the systems through which these outcomes are achieved. As educator 10 stated: "We are expected to deliver online, but we have no say in the system itself." Educator 18 observed: "Most of the work is explaining to students why things are not working." These practices show how educators absorb the visible consequences of infrastructural and organisational shortcomings. This produces accountability without authority, where individuals are held responsible for outcomes that they lack the structural capacity to control.

Theme 3: *Educators' use of non-institutional and informal communication infrastructures as compensatory systems*
The educators' responses also pointed to the fact that where institutional systems prove unreliable, non-institutional and informal communication channels become the operational infrastructure of teaching. Non-institutional messaging platforms and informal peer networks do not merely supplement institutional systems; they function as compensatory systems that sustain academic activity. Participants' accounts carried the following tension: non-institutional and informal communication channels are often valued because they are immediate, familiar, and accessible, yet the same practices also reveal the weakness of institutional systems.

WhatsApp as infrastructural substitution
Participants consistently described WhatsApp as the most dependable medium for academic coordination because of its accessibility, low data requirements, and widespread familiarity among both educators and students. As educator 7 explained: "If the [university] platform is down, we do not even wait anymore. We just move to WhatsApp." The phrase "we do not even wait anymore" indicates that this shift is no longer merely reactive but has become anticipatory and routine. In the words of educator 12: "We use WhatsApp for everything now. Timetables, announcements [...] even assessments sometimes." The platform that remains consistently functional, WhatsApp, assumes institutional-infrastructure status in practice, performing essential functions such as distributing materials, coordinating communication, and maintaining the sequencing of academic activity.

Informal peer networks as distributed technical capacity
Participant responses also pointed to informal communication practices for technical support. It was stated that rather than relying on institutional IT structures, educators typically turn to colleagues for troubleshooting and problem-solving. As educator 3 stated: "You ask a colleague [...] That is how we learn." This indicates that technical knowledge is embedded within everyday interaction rather than in institutional training structures. Educator 19 stated: "The person helping you is not trained officially. They just know because they struggled before." While this distributed capacity stabilises practice in the short-term, it also introduces structural vulnerability. Continuity becomes dependent on the availability, willingness, and prior experience of specific individuals rather than on consistent institutional support.

Non-institutional communication as responsibility buffer
Non-institutional communication also functioned as a buffer that protected the student experience from the visible effects of institutional instability. When systems failed, educators absorbed the burden of explanation, mediation, and reassurance. As educator 5 explained: "When it fails, students come to us [...] So we explain and calm things down." Educator 14 captured the central contradiction: "It helps us survive, but it also hides the problem."

Linguistic layering and sociolinguistic negotiation in non-institutional communication
The non-institutional communication modalities described by the educators also reflect Liberia's multilingual context. While English remains the formal language of instruction, Liberian English and Indigenous languages such as Kpelle, Bassa, Gio, Kru, and Mano are actively used in relational and situational exchanges. Liberian English frequently appears in WhatsApp communication to clarify meaning, soften directives, and facilitate immediacy during moments of uncertainty or disruption. Indigenous languages tend to surface in more localised interactions, particularly among individuals who share linguistic and cultural backgrounds. These linguistic shifts are not incidental but functional, enabling more effective coordination and mutual understanding where technical systems are unstable.

This theme therefore presents non-institutional and informal communication as both enabling and problematic. On one level, WhatsApp groups, peer networks, and multilingual exchanges demonstrate practical agency, responsiveness, and locally grounded coordination. On another level, they show how institutional systems are being bypassed, substituted, or stabilised through non-institutionalised labour.

Theme 4: Uneven digital labour and structural dependency on educators
It was found that technology adoption is being sustained through an uneven distribution of labour, with responsibility concentrated around particular educators. Rather than being evenly distributed or formally organised, the work required to stabilise digital systems accumulates around those perceived as capable, available, or willing to assist. Continuity therefore becomes dependent on discretionary effort rather than institutional capacity. Participants' accounts also reveal variations in how this labour was understood. Some frame it as collegial support and localised expertise, while others describe it as an unrecognised burden that intensifies existing inequalities within institutional hierarchies.

Informal technology champions and labour concentration
Across institutions, a small number of educators have emerged as informal technology champions, becoming default points of contact for troubleshooting and system support. As educator 15 stated: "Once people know you can handle the system, everything comes to you." What begins as occasional collegial assistance gradually becomes a sustained expectation, embedding technical support within routine academic responsibilities. These roles are neither formally recognised nor contractually defined. The absence of formal acknowledgement or workload adjustment means that this labour remains unstructured and uncompensated.

Contractual exposure and other asymmetries
Uneven labour distribution is further shaped by employment status and organisational hierarchy. Junior staff and those on short-term or part-time contracts reported limited capacity to refuse additional coordination and support tasks. In the words of educator 20: "As a junior lecturer, you cannot say no." This highlights the manner in which precarity increases exposure to unassigned responsibilities. Variations across academic disciplines also contribute to this asymmetry. Educator 12 stated: "Some departments are expected to run a hybrid [mix of online and offline] delivery model, but the support is the same for everyone."

Normalisation and invisibility of digital labour
Tasks such as troubleshooting system failures, managing communication channels, and maintaining informal coordination structures have been absorbed into educators' workloads. As educator 6 explained: "You do not think of it as extra work anymore." In the words of educator 18: "When things work, nobody asks how much effort it took to make them work." Successful continuity therefore conceals much of the educators' work that produces it, rendering the labour required to sustain digital systems largely invisible.

Theme 5: Educators' adaptive stabilisation without institutional learning
It was found that educators' continuous adaptation prevents system collapse but does not translate into systemic strengthening or institutional learning. While digital education is sustained through educators' ongoing adjustment, these adjustments remain institutionally localised and non-cumulative. Resilience in this context is compensatory rather than transformative, enabling systems to function without resolving the structural conditions that produce instability. The educators' adaptive practices demonstrate professional resourcefulness and commitment, but the same practices also allow institutional fragility to remain manageable enough so that the institution can avoid deep reform.

Micro-adaptation as system survival
When electricity fails or platforms malfunction, educators deploy alternative materials, switch communication channels, or reconfigure teaching activities in real time. As educator 4 stated: "We just adjust and continue. There is no other option." This indicates that adaptation is driven by necessity rather than strategic choice. These micro-adaptations enable teaching to proceed but do not alter the structural conditions that generate disruption. These responses are enacted at the level of practice rather than embedded within institutional systems.

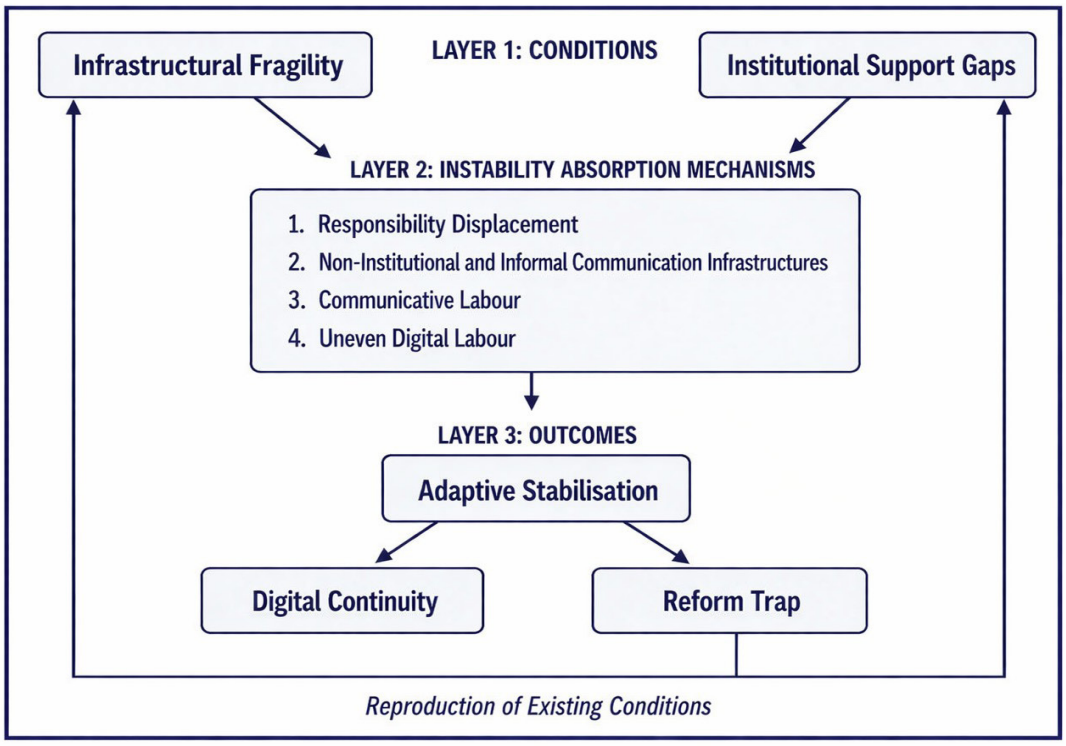
Normalisation of fragility
Over time, fragility has become normalised as an expected feature of institutional life. Rather than being experienced as exceptional, breakdown is integrated into routine anticipation. As educator 13 stated: "You expect problems. That is just how it is." This reflects the internalisation of instability as a baseline condition. The system continues to function because educators absorb volatility as a permanent feature of their working environment, allowing fragility to persist without triggering sustained institutional response.

Resilience as containment: A reform trap
On one level, the educators' resilience can be read as evidence of their commitment, creativity, and practical agency. On another level, the findings suggest that resilience also operates as containment, because the pressure that might otherwise expose systemic weakness is absorbed through continuous adjustment at the level of practice. This dynamic can be understood as a reform trap. The more effectively that educators manage disruption through adaptive practices, the less visible the need for structural change becomes.

5. Analytical synthesis: Instability absorption model (IAM)

Figure 1 brings the five themes together into a single conceptual representation of how digital-education continuity is being sustained by educators under conditions of institutional fragility at the 11 Liberian higher education institutions from which participants were drawn.

Figure 1: Instability absorption model (IAM)



Source: Authors

As seen in Figure 1, the model is grounded in Layer 1's two interacting *conditions*:

- *infrastructural fragility*; and
- *institutional support gaps*.

In response to these conditions, the educators participate, as seen in Layer 2, in four core instability absorption mechanisms:

- *responsibility displacement*;
- *non-institutional and informal communication infrastructures*;
- *communicative labour*; and
- *uneven digital labour*.

The three outcomes, as seen in Layer 3, are:

- *adaptive stabilisation*;
- *digital continuity*; and
- *reform trap*.

The ultimate outcome, as seen at the bottom of Figure 1, is *reproduction of existing conditions*.

The IAM thus captures both the enabling and problematic dimensions of the findings. For example, educators' reliance on non-institutional and informal communication infrastructures—i.e., the use of WhatsApp functionalities and the use of peer-support channels—demonstrates educator agency, professional

commitment, and practical resilience. But, at the same time, these communication infrastructures reveal how institutional fragility becomes normalised when digital-education continuity depends on non-institutional and informal communication as an instability absorption mechanism—along with the other three instability absorption mechanisms set out in the model: responsibility displacement, communicative labour, and uneven digital labour. The model therefore frames technology adoption under conditions of fragility not as a linear process of implementation or acceptance, but rather as a system of interdependent infrastructural and communicative dynamics activated under constraint.

The IAM also speaks directly to the literature reviewed earlier. While technology acceptance and diffusion models remain useful for identifying perceived usefulness, usability, facilitating conditions, and adoption processes, the findings of this study, as mapped in the IAM, show that acceptance and diffusion constructs do not fully explain how digital provision remains operational when the enabling conditions for use are unstable. As seen in the model, sustained technology adoption and use under conditions of fragility depend not only on acceptance and diffusion, but also on instability absorption elements such as responsibility displacement, non-institutional and informal communication infrastructures, communicative labour, and uneven digital labour. Arguably, the most crucial of the four instability absorption mechanisms that our study identified is communicative labour. The communicative labour makes the other three instability absorption mechanisms possible.

6. Conclusion

This study examined how educational-technology adoption is sustained within Liberian higher education institutions operating under conditions of infrastructural instability and constrained institutional capacity. We found that, in this context, digital continuity is not achieved through technological provision, adoption, and use alone. Rather, as set out in the IAM, digital operationalisation is sustained to a great extent through instability absorption mechanisms driven by educators, specifically responsibility displacement, non-institutional and informal communication infrastructures, communicative labour, and uneven digital labour.

The findings of this study have clarified that technology adoption in conditions of fragility is a complex process of sustained operationalisation rather than one of discrete uptake. Accordingly, the IAM that we propose captures how this sustained operationalisation is achieved when instability is absorbed to a great extent by communicative labour, which in turn animates three other instability absorption mechanisms: responsibility displacement, non-institutional and informal communication infrastructures, and uneven digital labour.

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Data availability statement
The data generated and analysed during this study are not publicly available because they contain confidential qualitative interview material and contextual information that could compromise participant and institutional anonymity. Anonymised excerpts relevant to the findings are included in the article. Further enquiries may be directed to Agnes Reeves-Taylor, at agnes.taylor@ul.edu.lr, and will be considered subject to ethical approval, confidentiality requirements and institutional data protection restrictions.

AI declaration
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Competing interests declaration
The authors have no competing interests to declare.

Author contributions declaration
Both authors contributed jointly to conceptualisation, data collection and analysis, data curation, writing revisions, project leadership, and project management. Writing of the initial draft was undertaken by Olajide Jolugbo. Validation, student supervision, and funding acquisition were not applicable to this study.

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Negotiating and navigating colourism in Cuba and Ghana: Perspectives represented in the work of Cuban poet Nicolás Guillén and in Ghanaian TikTok and YouTube content

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Abstract
There is a strong body of literature on colourism—discrimination among people of colour on the basis of darkness or lightness of skin tone—as it has manifested, and continues to manifest, among Black communities in the Americas and Africa. The phenomenon, with its roots in colonialism, is sufficiently powerful to produce a wide range of social, cultural, and economic effects and a wide range of responses, including skin-bleaching practices that can have severe health consequences. This study explores the dynamics of colourism in two national contexts, Cuba and Ghana, which are highly distinct from each other and at the same time both strongly marked by the sociocultural legacies of colonialism, including the phenomenon of colourism. The study examines Cuban colourism as it is explored and combatted in the 1930s poetry of Cuban writer Nicolás Guillén, and Ghanaian colourism as it is both promoted and critiqued in contemporary TikTok and YouTube social-media content.

Keywords
mixed-race people, colourism, skin-whitening, bleaching, Cuba, Ghana, poetry, social media, Nicolás Guillén, TikTok, YouTube

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1. Introduction

According to Frierson (2019), the term "colourism" was originally introduced by American writer and activist Alice Walker, who was pointing to system of discrimination among people of colour based on skin tone. Walker (1983) wrote of "prejudicial or preferential treatment of same-race people based solely on their color" (1983, p. 290). In the words of Hunter (2005, p. 68), colourism "is the process of discrimination that privileges light-skinned people of colour over their dark-skinned counterparts".

The strongest tradition of scholarly engagement with colourism and its manifestations is in the US. American scholar Hunter (2007) highlights that colourism is directly related to racism in the US and around the world, wherein "African Americans, Latinos, Asian Americans, and other people of colour are routinely denied access to resources and fair competition for jobs and schooling" (2007, p. 237). Findings from various studies carried out in the US point to the fact that "lighter-skinned people of color enjoy substantial privileges that are still unattainable to their darker-skinned brothers and sisters" (Hunter, 2007, p. 237). These studies stress that light-skinned people may earn more money, be able to complete more years of education, live in well-planned and better neighbourhoods, and may marry higher-status people than darker-skinned people

of the same race or ethnicity (Arce et al., 1987; Espino & Franz, 2002; Hill, 2000; Hughes & Hertel, 1990; Hunter, 1998, 2005; Keith & Herring, 1991; Murguia & Telles, 1996; Rondilla & Spickard, 2007).

Arce et al. (1987) emphasise how the phenotypes of people of "*chicano*" background (people of Mexican descent in the US) affect their life choices whilst Espino and Franz (2002) highlight the impact of skin colour on occupational status. Keith and Herring (1991) underline skin tone and stratification in the Black community in the US. Cosbert et al. (2021, p. 3) explore the origins of colourism and suggest that "although the roots of these ideations originated during slavery, the concept of colourism continues to be relevant in many cultural aspects". Cosbert et al. (2021, p. 4) suggest that "companies such as Johnson and Johnson and Dove helped reinforce the sentiment that African Americans should feel dissatisfied with their skin color to encourage them to bleach their skin despite the negative effects to their health (eg. skin cancer)".

Colourism is, thus, a pervasive form of discrimination that privileges lighter-skinned people of colour over their darker-skinned counterparts. It is a global phenomenon, is deeply intertwined with broader systems of racism, and operates within existing racial hierarchies by reinforcing the idea that proximity to whiteness carries greater social, economic, and cultural value. Colourism thus perpetuates and sustains the same power structures established through racial discrimination. In this study, we examine how colourism manifests in national contexts beyond the US—Cuba and Ghana—and specifically in the work of 20th century Cuban poet and journalist Nicolás Guillén (1902–1989) and in contemporary content posted by Ghanaian social-media personalities on TikTok and YouTube.

2. Cuban and Ghanaian contexts

Cuba

Spanish colonialism in Latin America, including Cuba, established rigid social hierarchies through modalities such as the caste system, which ranked individuals based on their racial ancestry and gave priority to those of Spanish (European) descent (Mörner, 1967). These structures, backed by military conquest and reinforced through political and economic control, institutionalised inequalities that linked power, wealth, and social status to whiteness. This situation in turn, laid the foundation for enduring forms of racial and skin-colour-based discrimination (Wade, 2010). Colourism in Latin America therefore stems from the social stratification that determines social power and influence. Traditionally, the social stratification pyramid had at its peak the "*criollos*" (people of full or predominant Spanish descent born in the Spanish-American colonies). The *criollos* were the highest symbols of authority and affluence since their white/light skin was associated with authority, affluence, modernity, and civility. The "*mulattos*" (people born from a union between a *criollo* parent and a non-*criollo* parent) were next highest in this classification. Then came the Indigenous people who occupied the land prior to the arrival of the Spaniards. The lowest group in the pyramid were the Black African slaves and the descendants of these slaves.

During the 19th and early 20th centuries in Latin American countries, including Cuba, there were pushes for increased *blanqueamiento* ("whitening"). Novieto (2020, p. 46) writes that: "towards the end of the 20th century, in response to a constant restiveness in many Whites about the possibility of free Blacks becoming a threat to society, Latin American countries developed an approach of gradually 'whitening' their populations through interbreeding"—encouraged through, inter alia, imposing restrictions on marriages between Black people. González-Sobrino and Hughey (2014, p. 172) describe this approach as "the ideological and material process and practice of whitening or distancing Latin Americans from blackness, in other words, of 'becoming white'". Guerra (2005, p. 34) frames whitening as "the process through which individuals and families had adopted the religious practices of Catholicism and the speech styles and cultural mores of the educated and wealthier classes in order to improve their social standing by becoming culturally more acceptable to white society and therefore racially whiter".

Historian and critic Swanger (2015, p. 58) explains that "to Cuba's white rulers, the association of their country with blackness was troubling and the arrogance of the Platt Amendment[1] was angering", and, in accordance with the adoption of the policy of blanqueamiento, they "sought to tip the racial balance in favour of whites

1 The Platt Amendment was a 1901 law that outlined the conditions for the withdrawal of US troops from Cuba after the Spanish-American War. It allowed the US to directly intervene in Cuban affairs and established a naval base at Guantanamo Bay, thus significantly limiting Cuba's sovereignty.

by offering land grants to attract white immigrants from Spain". The concept of blanqueamiento was rife in Cuba at the beginning of the 20th century. According to De la Torre (2003, p. 104):

> [...] Cuban racism manifested itself in two distinct forms during the early twentieth century. The most influential form was based on a theory of racial evolution that advocated the inferiority of Cubans who were not "pure" descendants of the evolved white Spaniards. The second, advocated by intellectuals like Martí and Ortiz, maintained that blacks had the potential of being equal to whites but were 'stuck' in an earlier stage of cultural development.

Meanwhile, the Cuban context has also been characterised, from the early 19th century onwards, by strong Afro-Cuban social movements linked to struggles against racial exclusion, political marginalisation, and the enduring legacies of slavery. During slavery, resistance emerged through *cabildos de nación*, ethnically organised mutual aid societies that preserved African religious, linguistic, and cultural practices (Howard, 1998). As early as 1812, *cabildos* also functioned as venues for anti-colonial resistance, alongside armed rebellions such as the Aponte Conspiracy (1812) and the La Escalera uprising (1843–44), both of which challenged the plantation order (Childs, 2006; Finch, 2015). Afro-Cuban activism intensified after the abolition of slavery in the country in 1886.

During the 1920s and 1930s, Black resistance coalesced in the Afrocubanismo movement, which challenged celebrating African cultural contributions and sought to redefine Cuban national identity. During this period, scholars such as Ortiz sought to reposition Blackness as the centre of Cuban culture (Brock & Castañeda Fuertes, 1998).

The theme of colourism was also present in the Cuban intellectual and cultural discourses of the 1900s, including in the work of the writer whose work we focus on in this study: the journalist and poet Nicolás Guillén. One of the notable intellectuals and leaders of the Black Negrista movement, Guillén was a *mulatto* who advocated for equal opportunities for both Black and white Cubans. Designated as the Cuban national poet, Guillén's writings included poems that advocated for Black people to be proud of their Blackness, including their physical features, and to work towards challenging social structures that devalued forms of Blackness.

Ghana

Adu-Gyamfi et al. (2018) trace colourism in Ghana back to the colonial era, during which the lighter-skinned *mulattos*—children of mixed European–African parentages—were "considered as white" by Africans "who witnessed the special education and privileges given to them by their European heritage" (2018, p. 105). This preferential treatment for *mulatto*s was also tied to their intermediary role in the colonial administration, where proximity to Europeans translated into greater access to education, employment, and spatial privilege along coastal enclaves such as Elmina, Cape Coast, and other Euro-African settlements where colonial administrative and commercial activities were concentrated. This dynamic reinforced a racialised social order in which whiteness—and approximation to it—became a marker of modernity and authority, thereby embedding colour-based hierarchies into Ghanaian society in ways that persisted beyond formal colonialism and continued to shape post-independence social relations (Adu-Gyamfi et al., 2018). Buah (1998) explains that mixed-race children often became successful merchants and businessmen, because they had little difficulty dealing with British merchants due to their light-skinned appearance and privileged status.

In Ghana, as in many other parts of the world, lighter skin also became closely associated with beauty. One of the strongest manifestations of this reality, in Ghana and numerous other African countries, is the practice of skin-bleaching. In Ghana the practice has been traced back to the late 1940s, when women used bleaching-soap products such as Asepso and Neko (Adu-Gyamfi & Gyasi, 2017; Arthur, 2002; Dorkenoo, 1990). The soaps were gradually replaced by bleaching creams, which, by the end of the 20th century,

had turned skin-bleaching into a large and profitable sector (Adu-Gyamfi & Gyasi, 2017). In a study by Teddy (2002) in Greater Accra, many interviewees described bleaching as a "bad practice" (40%) and "not beautiful" (78%), with 86% refusing to encourage it. However, at the same time, 54% of interviewees viewed lighter skin as more attractive, and 82% believed that it is socially more valued (Teddy, 2002). Around 52% of the participants agreed that Ghanaian culture promotes this preference, especially among women.

The World Health Organisation (WHO) has found that nearly 40% of Ghanaian people engage in skin-bleaching (WHO, 2023). The WHO has also reported on the adverse effects of skin-bleaching, identifying harmful consequences such as dermatitis, steroid acne, discolouration, changes in skin thickness, inflammatory disorders, and severe conditions like mercury poisoning, nephrotic syndrome, and exogenous ochronosis (WHO, 2023). In a study by La-Anyane et al. (2022), Ghanaian health professionals spoke of patients who engaged in skin-bleaching experiencing difficulties with the healing of wounds. Adetoogun et al. (2023) situate skin-bleaching in African countries within a global capitalist framework, emphasising the scale and profitability of the skinlightening industry. It is common to see light-skinned Ghanaian celebrities featured in advertisements for skin creams and other beauty products, reinforcing the notion that lighter skin equates to desirability and success. Such choices by advertisers, which are found at a global level, can "subtly contribute to discriminatory beauty standards that re-inscribe social inequalities" (Butkowski et al., 2024, p. 290).

3. Cuban colourism as explored and combatted in Guillén's poetry

In this section, we analyse the content of six Guillén works that address elements of colourism in Cuba.

Negro Bembón (Guillén, 1930)

In the poem "Negro Bembón" ("Thick-lipped Black man"), the speaker, who is presumably an elderly lower-class Black Cuban who understands the politics of *blanqueamiento* and its negative effects on society, addresses a young Black man who is not happy with his physiognomic traits:

> *poqué te pone tan brabo,*
> *cuando te dicen negro bembón,*
> *si tiene la boca santa,*
> *negro bembón?*
>
> ("why do you get so angry
> when they call you thick-lipped Black man,
> if your mouth is a holy thing,
> thick-lipped Black man?")

The poem asserts that the Black boy should be content with his physical traits, as a harmonious unification of the physical and the spiritual. Rather than rejecting the term *bembón*, which is often used as an insult to mock fuller lips, the poem embraces it. Calling the mouth *santa* ("holy") redefines Blackness as a spiritual being that should not be devalued. The older speaker teaches the younger man that self-rejection serves the logic of *blanqueamiento*. Accepting one's African features is to refuse that logic. In this way, the poem transforms shame into resistance.

Mulata (Guillén, 1930)

In the poem "Mulata" ("Mixed-race female"), a Black male speaker delivers a monologue in which he confronts a *mulata* who denigrates his African features while celebrating her own lighter complexion. The poem exposes colourism as an internalised colonial pathology linked to Black-on-Black racism, where proximity to whiteness is considered socially valuable. The *mulata*'s disdain for a dark-skinned appearance mirrors broader skin tone hierarchies in Cuban society, and by extension in contemporary societies such as Ghana, where skin bleaching reflects a similar form of internalised anti-Blackness. The Black speaker's confrontation with the *mulata* represents, as Arnedo-Gómez (2006, p. 70) suggests, a conscious affirmation of Black physiognomy and a rejection of the societal pressure to appear more European.

Mi chiquita (Guillén, 1930)
In the poem "Mi chiquita" ("My little girl"), a Black male speaker expresses his unconditional devotion to his dark-skinned partner. Through the speaker's emphatic declaration, "tan negra como e" ("as black as she is"), his partner's Blackness is positioned as the primary source of her desirability and worth, rather than a deficiency to be overcome. Using possessive language such as "mi" ("my") and "yo tengo" ("I have"), Guillén creates a narrative of Black pride, ownership, and dignity. As White (1993, p. 91) notes, these sentiments reflect broader affirmations of Black womanhood. The speaker's refusal to pursue social mobility by having a lighter-skinned partner highlights the Cuban colourism hierarchy.

Mujer nueva (Guillén, 1931)
In "Mujer nueva" ("New woman"), the Black woman is portrayed not as having been damaged by history, but, rather, as a sovereign force within it. Scholars have rightly described the poem as a manifesto of Black beauty (González, 2005; Luis, 1993; Smart, 1982). In a society where lighter-skinned women dominate Cuban visual culture, Guillén's depiction of the dark-skinned Black woman as the equator, the centre of the world, constitutes an act of aesthetic rebellion. He replaces a hierarchy of colour with a hierarchy of power and places the Black woman at its summit.

Madrigal poems (Guillén, 1931)
In the "Madrigal" poems published in 1931—"Tres madrigales negros" ("Three black madrigals"), "Madrigal" [first], and "Madrigal" [second]—dark skin is dignified and desired. These poems place Blackness within the domain of Cuban colonial aesthetics that was almost exclusively reserved for whiteness. By restoring Blackness and redefining it, Guillén challenges the belief that whiteness is aspirational and Blackness merely tolerable.

La canción del bongó (Guillén, 1932)
In "La canción del bongó" ("The bongo's song"), Guillén speaks through a drum that calls Cubans of every shade to dance. The drum is presented as a human who refuses to alter their Black identity. The drum does not imitate another instrument, and neither does it soften its timbre to be appreciated. The lines "*ya me darás la razón, / ya me golpearás el cuero, / ya bailarás a mi voz*" ("you will admit I'm right, / you will beat my drum, / you will dance to my voice") proclaim that anti-Blackness sentiments will not prevail. The drum's inclusive call—*"convoca al negro y al blanco, / que bailan el mismo hijo, / cueripardos y almiprietos"* ("summons the black and the white, / who dance the same dance, / brown-skinned and dark-skinned")—challenges the social divisions that marginalise people with darker skin. Guillén ultimately asserts that authenticity and cultural unity do not emerge from denying Blackness, but rather from embracing it as central and unifying—thus positioning colourism as both artificial and unjust.

4. Ghanaian colourism as promoted and critiqued in TikTok and YouTube content

In recent years, several social media personalities in Ghana have openly discussed colourism and its impact on their decisions. One example is Aba Dope, a TikTok star who shared her experiences in a YouTube interview with Delay, a well-known Ghanaian social media figure.[2] During the interview, Aba Dope touched on the discrimination that she faced in senior high school due to her dark skin, which motivated her to pursue skin-lightening. Another social media celebrity, socialite Queen Farcadi, shared her journey with skin-bleaching in a YouTube interview with Delay, touching on issues surrounding desirability, the male gaze, and the economic benefits of having a lighter skin. Thus, we can see that social media is a critical forum for Ghanaians' explorations of colourism.

In this section, we analyse the content of 19 examples of Ghanaian social media content—nine TikTok videos and 10 YouTube music videos—that engage with matters of colourism. It is important to note here that the videos were selected based on explicit references to skin colour and measurable levels of engagement, in terms of both views and comments. While the sample provides examples of trends, it does not claim to represent all Ghanaian TikTok and YouTube content linked to colourism.

2 Delay TV. (2023). https://youtu.be/XcwISDvU1HI?feature=shared

TikTok videos

The nine TikTok videos (cases) were selected through purposive sampling based on relevance, engagement, and explicit references to skin tone and beauty or status. Six of the cases (cases 1–6) perpetuate colourism and three of the cases (cases 7–9) challenge it.[3]

In case 1, a TikTok marketer explicitly promotes a bleaching product using phrases such as "Light your skin", "Tone your skin a little bit", and "If you seek to whiten your skin, go with this one". These are reinforced with aspirational messaging such as "People will see you and say wow" and "Wow you are looking good". Such statements directly construct lighter skin as a source of social admiration and desirability. User engagement with the video supports the normalisation of these ideals, with comments such as "Vry [sic] effective, am using the product", "Faster white all the way", and "Please recommend kids cream for me".

In case 2, an aesthetic clinic advertises a "Skin whitening Cocktail" administered via an IV drip and described as "a blend of skin whitening minerals, multivitamin and other elements beneficial for skin rejuvenation and wellness". Engagement with the video is dominated by users asking questions such as "How long will it last and how many sessions do I need and price". This case is critical because it shows how colourism is being branded as a health and wellness practice.

Case 3, another product promotion, includes the statement "*Wun p3 s3 wo beye korkor a*, Don't touch" ("If you do not want to become fair, do not use it"), and clearly positions the product as a tool for becoming lighter-skinned. Reactions to the post include "Wow beautiful", with users from Ghana, the UK, and the US expressing interest.

Case 4, also a product promotion, speaks of a "Brightening set for chocolate and caramel skin", and invites those who want a "brighter or lighter shade" to use the product. User responses such as "How long will I see results" indicate a positive response and demand for rapid transformation of skin colour.

In case 5, a promotion of "Whitening Molato soap" taps into the valorisation of "mulatto" ("mixed-race") people with lighter skin that we also saw above in the Cuban context.

In case 6, a dark-skinned male seller promotes whitening products with the statement "If you want to whiten up your skin in peace, guys get this lotion". This is an example of an individual who does not embody the light-skin aesthetic still participating in its commercialisation. One user comments as follows: "Please I'm fair but I want to be whitening a little bit can I try one". This user's desire to increase the lightness of their already-"fair" skin "a little bit" shows that there is no clear endpoint and perpetuates the idea of repeated product use.

Cases 7–9 provide examples of counter-narratives. Case 7 is a video emphasising the health risks of skin-lightening, with the creator warning against bleaching and receiving supportive comments such as "Avoid bleaching. Black is beautiful" and "Charlie, I like the way you are creating awareness". Yet resistance to this messaging is also evident, with one user stating that "people have been bleaching for so many years, and there is no scientific proof [that it is harmful]".

Case 8 is a video that uses humour to critique colourism, asking: "What crime at all did your black skin commit to warrant this punishment?"

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3 The nine TikTok cases are:
Case 1 – Queenscode gh (2025). https://www.tiktok.com/@queenscodegh/video/7581047638217280824
Case 2 – Plush_aesthetics_medspa (2024). https://www.tiktok.com/@plush_aesthetics_medspa/video/7430319607044443397
Case 3 – Queen Afia Kande Schwar (2026). https://www.tiktok.com/@queenschwar/video/7617095373600984341
Case 4 – Jennyposhbodysecrete (2025). https://www.tiktok.com/@jennyposhbodysecrete/video/7549974148722789688
Case 5 – Jannat_beauty_essentials (2026). https://www.tiktok.com/@jannat_beauty_essentials/video/7602363000875470101
Case 6 – Movement_cosmetics (2026). https://www.tiktok.com/@movement_cosmetics/video/7615034184674987277
Case 7 – Yeboah_4hl (2026). https://www.tiktok.com/@yeboah_4hl/video/7591127283910413580
Case 8 – The Saito Show (2025). https://www.tiktok.com/@thesaitoshow/video/7586936000123849996
Case 9 – Britneydolphine_ (2025). https://www.tiktok.com/@britneydolphine_/video/7557863381684866360

In case 9, the poster of the video explains that she used to bleach her skin but made a U-turn and decided to embrace her dark skin. She shares her transformation journey. Her video receives comments such as "You look amazing with that chocolatey skin", "The best decision girl", and "Welcome back sister". These responses indicate the presence of a supportive community that values natural skin tones. At the same time, however, another user says: "I want to stop too but thinking of what people will say [so] I will continue", demonstrating the power of social pressure in sustaining bleaching practices and colourism.

YouTube music videos

Music plays a vital role in the everyday life of Ghanaians, serving as a background for both joyous occasions—such as festivals, weddings, and parties—and sombre events like funerals. In this section, we analyse 10 Ghanaian YouTube music videos, all with strong online popularity, that demonstrate some of the dynamics of colourism.[4]

In case 1, the music video for Ambition's Akan-language song "Bibini Broni" (which, in this context, translates as "Black White Girl"), the musician is referring to his lover, who is fair-skinned.

The term *bibini broni* also appears in the lyrics in case 2, which features musician Samini's popular hit, "My Own". Samini sings as follows:

> *Eeh me bibini broni ee*
> ("Eeh my black white girl")
> Golden tree chocolate *ee*

The term can also be found in case 3, the song "Anadwo" by Sarkodie featuring King Promise. The lyrics include the following:

> *Ama me bibini broni, ofi me ho a, meyare (ah)*
> ("Ama, my black white girl, if you leave me I will fall sick")

Another Ghanaian expresssion extolling the virtues of light-skinned women is the Akan phrase "*mi tumtum broni*" ("my dark-skinned white/fair girl"). The term *tumtum broni* appears in case 4 (the song "Tumtum Broni" by Alpha Bankz featuring Fameye), and in case 5 ("Melanin" by Y Kerk).

Case 6 is a music video for the song "Plantain Chips" by R2Bees. The song's chorus is as follows:

> Last night I had a plantain chips
> *Mbaa kokoo* plantain chicks
> Plantain chips
> *Mbaa kokoo* plantain chicks
> Last night I had a plantain chips
> *Mbaa kokoo*
> Plantain chicks

The Akan-language term "*mbaa kokoo*" means "plantain women" and implicitly extols the desirability of light-skinned women (with their skin colour being compared to the golden colour of plantain).

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4 The 10 YouTube cases are:
Case 1 – Ambition Music Vevo (2021). https://youtu.be/tUMhJHrC06M?feature=shared
Case 2 – Samini (2017). https://youtu.be/C0jF8519TTQ?feature=shared
Case 3 – Sarkodie & King Promise (2019). https://youtu.be/wnLUgubom_M?feature=shared
Case 4 – Alpha Bankz ft. Fameye (2020). https://youtu.be/nosyupc62nI
Case 5 – Y Kerk (2026). https://youtu.be/7DwlIoYs3LM
Case 6 – R2Bees (2017). https://youtu.be/4fuTy94xb8g
Case 7 – Sidney, N (2007). https://youtu.be/amCfd61-9bE
Case 8 – R2Bees (2013). https://youtu.be/XEQYQQiEsVU
Case 9 – Shatta Wale (2016). https://youtu.be/If22MICiXWg
Case 10 – Wanlov the Kubolor (2008). https://youtu.be/PPeECums1UA

Case 7 is the music video for the song "Obaa kokoo" ("Light-skinned woman") by Nananom Sidney. The lyrics, in Akan, include the following:

> *Obaa korkor dier neho y3 fe*
> ("As for the light-skinned woman, she is very beautiful")

In contrast, cases 8 to 10 challenge colourism and its manifestations.

Case 8 is the video for the song "Slow Down" by R2Bees featuring Wizkid. The lyrics explicitly praise the natural skin of a Black woman and criticise the practice of bleaching:

> Black woman, skin smooth
> *Wey* she no bleach, she no burn up
> Make we take it back to the root

Similarly, case 9—the video for the song "Too Much Chemical" by Shatta Wale—critiques the widespread practice of skin-bleaching with the following lyrics:

> Every woman *ah* bleach *dem* skin with chemical cream
> Too much chemical
> Too much chemical
> What kind of world are we living in

Case 10—the song "My Skin" by Wanlov the Kubolor—provides a nuanced exploration of colourism through personal experience. As a biracial individual, Wanlov describes being labelled, in derogatory fashion, "mulatto" in Ghana, while simultaneously feeling excluded when in Romania for not being "white enough". His lyrics include the following:

> If I tell you what I go through for my life inside
> you no love to *dey* ("be") in my skin

In this song, we see that while being a light-skinned Black person may be desired by many, this desire does not extend as far as wanting to be of mixed-race. This song highlights the fact that colourism operates not as a binary, but as a complex spectrum affecting those who exist in and between categorisations.

5. Conclusions

Colourism is a societal issue that continues to manifest in diverse ways across Black communities around the world. Based on our examination of how colourism is represented (1) in the 20th century poetry of Cuban poet Nicolás Guillén, and (2) in contemporary Ghanaian TikTok and YouTube content, it is evident that this phenomenon is complex and deeply rooted in colonialism, slavery, and their aftermath.

Colourism's manifestations in both Cuba and Ghana are far-reaching, as they shape perceptions, in Black communities, of the very essence of identity, self-worth, and belonging. Guillén's poetry from the 1930s in Cuba critiques racial inequality by portraying the lived experiences of Black people while affirming Afro-Cuban identity through the use of vernacular language and rhythm. His poetry encourages Black pride and urges people to embrace their Blackness and not be drawn towards whiteness. Colourism in Ghana also reflects inherited hierarchies from the colonial era, when lighter skin was valorised. These two national contexts reveal a shared transatlantic history in which colonial values influence notions of identity, beauty standards, and social belonging long after the end of the colonial era.

Also seen in this study is the fact that social media platforms such of TikTok and YouTube are playing a dual role in the negotiation of colourism in Ghana. On the one hand, these platforms act as powerful amplifiers of colourist ideologies, via content often driven by commercial ventures seeking to promote and profit from a desire among some Black Ghanaians for lighter skin. Through marketing systems, influencer culture, and popular music, these platforms contribute to the normalisation and commercialisation of colourism. In this sense, colourism is not merely an individual preference but a collectively reinforced and economically driven system.

On the other hand, social media also provides spaces for resistance and counter-narratives, where messages celebrating dark and unbleached skin can challenge colourism's beauty standards. However, in the case of TikTok, these positive interventions are often overshadowed by, inter alia, commercial content promoting skin-bleaching products and procedures. In the TikTok content that we examined, the commercial content tended to have stronger audience engagement and endorsement than the non-commercial content.

Combatting the negative effects of colourism requires holistic and multidimensional approaches that critically evaluate (social) media representation and cultural practices that sustain colourism's constructs. Among other things, regulation is needed to combat commercial social media content that promotes skin-bleaching products and procedures that have proven detrimental health consequences.

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Bridging global and local influences: Kenya's emerging approach to AI governance

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Abstract
The rapid adoption of artificial intelligence (AI) has intensified demand for national AI governance frameworks that balance innovation with ethical, legal, and societal safeguards. Emerging economies such as Kenya face the dual challenge of seeking to foster AI-driven growth while at the same time managing numerous risks. This study explores Kenya's emerging approach to AI governance, as represented by its Artificial Intelligence Strategy 2025–2030 and Artificial Intelligence Bill of 2026. Through policy–legislative content analysis, the study examines the degree to which Kenya's approach is both transplanting and localising the orientation and provisions of the EU's influential AI governance instrument, the Artificial Intelligence Act of 2024. The research also applies a contextual-adaptation analysis to examine the extent to which Kenya's AI governance approach is geared towards its particular national needs.

Keywords
artificial intelligence (AI), AI governance, Kenya AI Strategy 2025–2030, Kenya Artificial Intelligence Bill, 2026, EU AI Act of 2024, policy–legislative content analysis, contextual-adaptation analysis, policy–legislative transplantation, policy–legislative localisation

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1. Introduction

Kenya is widely recognised as a digital innovation leader in East Africa, a status reflected in indicators such as mobile money adoption rates; active regulatory experimentation, including sandbox frameworks; and the emergence of artificial intelligence (AI)-enabled platforms spanning agriculture, fintech, and public services (World Bank, 2019). While earlier discourse often centred on the 2007 launch of the mobile money platform M-PESA, contemporary Kenyan innovation has evolved into more sophisticated AI-driven digital ecosystems (M-PESA, n.d.). Today, for example, platforms such as M-KOPA employ data-driven and AI-enabled predictive analytics to assess creditworthiness for, inter alia, solar energy systems and smartphone financing among unbanked and underbanked populations (Emanuel-Burns, 2025; M-KOPA, n.d.). Similarly, M-PESA increasingly relies on machine learning techniques for fraud detection, risk monitoring, and service optimisation (The Kenyan Wall Street, 2025).

As AI applications continue to permeate Kenya's critical sectors such as finance, energy, and digital credit markets, the demand for a robust and contextualised governance framework has become increasingly urgent—so as to ensure ethical, inclusive, and accountable innovation (Government of Kenya, 2025). This trajectory aligns with Kenya Vision 2030, which positions technology and innovation at the core of national development, with the objective of accelerating economic growth and addressing persistent challenges, including food insecurity and inequitable access to healthcare (Government of Kenya, 2007). However, while the Kenyan government acknowledges the transformative potential of AI, the country currently lacks a dedicated, legally binding AI framework. Existing legal instruments, most notably the Data Protection Act (Republic of Kenya, 2019), provide important safeguards against harmful automated decision-making

and misuse of personal data, but they were not designed to govern the full spectrum of AI-specific risks, including algorithmic bias, opacity, accountability gaps, and post-deployment monitoring.

Significant recent AI policy–legislative moments in Kenya have been the 2025 release of the Kenya Artificial Intelligence Strategy 2025–2030 (Government of Kenya, 2025) and the 2026 tabling in Senate of the Artificial Intelligence Bill (Republic of Kenya, 2026a). Together, these two documents signal Kenya's ambition to position itself as a continental leader in responsible and ethical AI adoption. The EU, meanwhile, has taken a pioneering stance in AI governance through its 2024 Artificial Intelligence Act, a landmark law that has set a globally influential precedent for the governance of AI systems (EU, 2024). The central matters that this study explored were: the extent to which Kenya's emerging AI governance trajectory is moving towards direct transplantation of European regulatory norms, and the extent to which the trajectory is adapting to the contextual particularities of the country's digital ecosystem.

The distinction between policy–legislative transplantation and localisation adopted in this study is as follows: transplantation refers to the adoption of a foreign governance model's structural architecture, definitions, and compliance mechanisms with minimal adaptation; localisation, by contrast, involves selectively drawing on a foreign model's underlying principles while recalibrating specific obligations, definitions, institutional arrangements, and enforcement mechanisms to reflect the receiving jurisdiction's legal traditions, institutional capacity, and socioeconomic realities.

2. Methodology

The study adopted a blended methodological approach, combining a policy–legislative content analysis with a contextual-adaptation analysis.

Policy–legislative content analysis

The policy–legislative analysis drew on two sets of documents. The first set comprised the 2024 EU AI Act and interpretations of its compliance architecture. The second set comprised Kenya's 2019 Data Protection Act, the 2025 AI Strategy, and the 2026 AI Bill, which together constitute the current direction of AI governance in Kenya (Government of Kenya, 2025; Republic of Kenya, 2019; 2026a). Policy–legislative content analysis was undertaken to identify equivalents and divergences between the EU and Kenyan AI governance directions.

Contextual-adaptation analysis

The contextual-adaptation analysis was based on a lens that I conceived of for this study. The lens, based on insights from comparative AI governance scholarship (Floridi et al., 2018; Jobin et al., 2019) and literature on responsible AI for development (Gwagwa et al., 2021; Plantinga et al., 2024), is premised on three core propositions:

- that global AI governance norms are not universally applicable and require adaptation to a national digital ecosystem through localised contextual calibration;
- that effective AI governance adaptation requires explicit engagement with a national digital ecosystem's socioeconomic realities, cultural complexities, and institutional capacity; and
- that the goal of adaptation is not rejection of global standards but rather their re-articulation in forms that are operationally feasible and locally legitimate.

The contextual-adaptation analysis explored the extent to which Kenya's emergent AI governance approach is orientated towards the specific needs of the country's digital ecosystem.

3. Findings from the policy–legislative content analysis

EU

The EU AI Act arguably represents the world's most comprehensive and influential AI governance legislative intervention to date. The Act introduces a structured, risk-based classification of AI systems, distinguishing between unacceptable, high, limited, and minimal risk applications (EU, 2024). For high-risk AI systems deployed in sensitive domains—such as critical infrastructure, employment and human resource management, creditworthiness assessment, healthcare, and the administration of justice—the Act mandates extensive pre-market conformity assessments, quality management systems, and detailed technical documentation (EU, 2024). The broader European regulatory philosophy is anchored in

accountability, traceability, transparency, and meaningful human oversight, positioning the EU AI Act as a global benchmark for responsible AI governance (Jobin et al., 2019). Recent guidance to firms by Szeliga et al. (2025) illustrates how the EU embeds privacy-by-design and security-by-design into the AI lifecycle, including adversarial robustness-testing and continuous post-deployment monitoring.

Kenya

At the time of writing in mid-2026, Kenya's Data Protection Act of 2019 still constitutes the primary legal safeguard against harmful automated decision-making, requiring transparency in automated data-processing and granting individuals the right not to be subject to decisions based solely on automated systems where such decisions produce significant legal or social effects (Republic of Kenya, 2019). The Act's role as Kenya's de facto AI governance instrument reflects a common pattern in jurisdictions where the development of AI-specific legislation has lagged behind the pace of AI deployment: In the absence of a purpose-built AI statute, a data protection law becomes the primary legal safeguard (Plantinga et al., 2024).

Kenyan- and African-focused scholarly analysis has found that data protection law alone is insufficient to address the full spectrum of AI-related risks, particularly those relating to algorithmic accountability, sector-specific harms, and lifecycle governance (Gwagwa et al., 2021; Plantinga et al., 2024; Tacheva & Ramasubramanian, 2023). The 2025 introduction of the AI Strategy 2025–2030, and the tabling in early 2026 of the AI Bill (Senate Bills No. 4 of 2025, under Senate deliberation at the time of writing), marked significant steps in the emergence of Kenya's AI governance approach.

Content comparison between the EU and Kenyan policy–legislative frameworks

Table 1 provides an overview of the similarities and differences between the EU AI Act and Kenya's emerging AI governance framework as represented by the 2025 AI Strategy and the 2026 AI Bill.

Table 1: AI governance modalities in the EU and Kenyan frameworks

Dimension	EU AI Act (2024)	Kenya AI Strategy (2025)	Kenya AI Bill (2026)
Legal status	Legally binding regulation with direct applicability across EU Member States	Policy anchored in strategy documents	Proposed binding legislation, currently under Senate deliberation. If enacted, it would constitute Kenya's first dedicated AI-specific legal statute
Core principles	Accountability, transparency, traceability, fairness, human oversight, robustness, and cybersecurity	Fairness, inclusivity, human-centred design, accountability, and contextual relevance emphasised	Transparency, accountability, ethical governance, human oversight, data protection, and public welfare, with obligations for user notification when interacting with AI systems
Risk classification	Explicit four-tier risk classification system—unacceptable, high, limited, and minimal risk (Arts. 5–6 and Annex III)	Implicit risk awareness: high-risk sectors identified (healthcare, justice, finance) (sect. 1.3.1)	The same explicit four-tier risk classification system (sect. 25)—unacceptable, high, limited, and minimal risk—as in the EU AI Act
Controls for high-risk AI systems	Mandatory pre-market conformity assessments, quality management systems, technical documentation, and post-market surveillance (Arts. 9–15)	Proposed ethical impact assessments and accountability mechanisms; implementation largely advisory	Mandatory human rights impact assessments, operational log retention for at least five years, conformity audits, and continuous oversight by the AI Commissioner for high-risk systems in healthcare, finance, education, and security (sect. 26)

Dimension	EU AI Act (2024)	Kenya AI Strategy (2025)	Kenya AI Bill (2026)
Human oversight	Human oversight mandatory for high-risk AI systems, with clear requirements for human-in-the-loop or human-on-the-loop controls (Art. 14)	Human oversight strongly encouraged, particularly in healthcare and justice (sect. 3.5)	Human oversight mandatory for high-risk systems, with qualified individuals required to review or override critical AI-generated decisions (sect. 26)
Bias and fairness	Requires representative datasets, bias mitigation measures, and documentation of data governance practices	Recognises heightened bias risks due to unrepresentative local datasets; fairness framed as a development and equity concern	Empowers AI Commissioner to investigate and address algorithmic bias and discrimination; complaints mechanisms established for bias-related harms
Data governance	Closely integrated with the EU General Data Protection Regulation (GDPR); strong requirements for data quality, documentation, and protection	Anchored in the Data Protection Act (2019), which has limited scope for broader AI lifecycle governance	Builds upon the Data Protection Act (2019); introduces additional AI-specific obligations for data quality, documentation, and record-keeping by developers and deployers
Institutional capacity	Well-resourced supervisory authorities support strong regulatory capacity	Acknowledges capacity constraints, including limited AI expertise and uneven enforcement infrastructure	Establishes the Office of the AI Commissioner as the primary regulatory authority, supported by an AI Advisory Council; critics note the risk of overlap with existing bodies such as the Office of the Data Protection Commissioner (ODPC) and the Communications Authority of Kenya (CA)
Contextual orientation	Designed for mature digital markets with strong institutional and technical capacity	Explicitly contextualised for a Global South digital economy marked by digital divides and uneven connectivity	Designed to address Kenya's developing digital economy, with provisions for regulatory sandboxes to allow controlled innovation under the AI Commissioner's supervision

As seen in Table 1, analysis of the EU's 2024 AI Act alongside Kenya's 2025 AI Strategy and 2026 AI Bill suggests that Kenya's AI governance trajectory is neither a straightforward regulatory transplantation of the EU model nor a fully localised, independent Indigenous framework. The trajectory is one of adoption of the EU's structural logic, particularly its risk-based classification architecture, combined with a recalibration of obligations, institutions, and enforcement mechanisms to reflect Kenya's socioeconomic realities, institutional capacity, and development priorities.

The EU AI Act institutes a four-tier risk classification system—unacceptable, high, limited, and minimal risk (Arts. 5–6 and Annex III)—and imposes rigorous compliance obligations for high-risk applications. In Kenya, the AI Strategy of 2025 signals an intent to adopt a risk-sensitive approach, but these remain aspirational rather than legally enforceable, leaving high-impact sectors such as healthcare, education, and digital finance without formal oversight. The Kenyan AI Bill of 2026 marks a significant step towards translating these policy aspirations into binding legal obligations. The Bill introduces an explicit four-tier risk classification framework—categorising AI systems as unacceptable, high, limited, or minimal risk (sect. 25)—which is closely aligned with the EU AI Act's model and thus represents an example of policy–legislative transplantation.

However, as seen in Table 1, the 2026 Kenyan Bill's provisions for controls on high-risk systems differ from the EU AI Act's provisions, thus representing an example of policy–legislative localisation. In terms of section 26 of the 2026 Bill, high-risk systems, including those deployed in healthcare, finance, education, and security, are to be subject to mandatory human rights impact assessments, detailed operational

logging, and conformity audits conducted under the authority of the proposed Office of the Artificial Intelligence Commissioner. In the EU AI Act's Articles 9–15, high-risk systems are subject to mandatory pre-market conformity assessments, quality management systems, technical documentation, and post-market surveillance.

Additional examples of Kenyan policy–legislative localisation are discussed below.

4. Findings from the contextual-adaptation analysis

The contextual-adaptation analysis found that, in general terms, Kenya's AI Strategy selectively draws from EU norms while advocating Kenyan-centred implementation, and Kenya's AI Bill is modelled on the EU AI Act's risk-based classification structure while seeking to adapt obligations to Kenya's institutional and socioeconomic context—thus, as stated above, there is a mix of policy–legislative transplantation and localisation. Kenya can thus be said to be drawing conceptual inspiration from the EU while simultaneously advocating for localised governance approaches that prioritise, inter alia, data sovereignty, cultural relevance, inclusive innovation, and environmentally sensitive implementation grounded in national development priorities—all necessary to ensure that AI governance measures remain consistent with Kenya's constitutional commitments to social justice and equity. The promotion of digital inclusion and supporting AI innovation in local languages such as Kiswahili seem clearly to fall among the localisation necessities.

Whereas the EU Act's risk priorities are focused on public security and biometric surveillance, the Kenyan AI Strategy's high-risk concerns include a focus on automated credit-scoring and decision-support systems within the informal economy, where unmitigated algorithmic bias may exacerbate financial exclusion (EU, 2024; Government of Kenya, 2025). Key risk-management elements articulated in section 1.3.1 of the Kenyan Strategy include mandatory ethical impact assessments for high-risk AI systems, alongside clearly defined accountability and oversight mechanisms (Government of Kenya, 2025). Kenya's requirement for AI-readiness assessment (section 3.5 of the Strategy) further underscores the centrality of human-centred design, particularly in high-risk sectors such as healthcare and justice. Notably, the Strategy's emphasis on fairness and bias mitigation responds directly to the heightened vulnerability of Global South environments, where unrepresentative datasets and structural inequalities can amplify algorithmic harm (Gwagwa et al., 2021; Tacheva & Ramasubramanian, 2023).

Kenya's approach to human oversight also shows alignment in principle with the EU approach, but there are differences in practice. The EU requires mandatory human-in-the-loop controls for high-risk systems, whereas Kenya strongly encourages human-centred design, particularly for critical applications in healthcare and justice. Meanwhile, it must be remembered that, compared to most EU nations, Kenya's pool of AI specialists is limited, and its institutional capacity is limited—thus presenting challenges to effective human oversight in Kenya (Government of Kenya, 2025; Plantinga et al., 2024). Implementation challenges of this sort highlight why EU-style accountability mechanisms cannot simply be transplanted into the Kenyan context—and must instead be localised. The EU AI Act's provision for pre-market conformity assessments presupposes qualified technical auditors, established testing infrastructure, and well-resourced supervisory bodies—none of which is currently present to a sufficient degree in Kenya.

The findings also suggest that Kenya's emerging approach seeks to balance the need for innovation with ethical and socioeconomic priorities. Regulatory sandboxes, sector-specific guidelines, and contextualised definitions of high-risk AI have the potential to allow Kenya to experiment responsibly with localisation and contextual adaptation while gradually building the legal, technical, and institutional foundations required for full implementation.

5. Discussion

If enacted, Kenya's 2026 AI Bill would represent the country's first legally enforceable, AI-specific governance framework, moving the country from aspirational strategy towards a regulated-compliance environment. Structurally, the framework envisioned by the 2026 Bill closely mirrors the EU AI Act's risk-based architecture, suggesting policy–legislative transplantation at the level of design. However, the Bill's specific obligations, including its emphasis on human rights impact assessments, five-year operational logs, and the establishment of a dedicated AI Commissioner rather than reliance on existing sector regulators, reflect policy–legislative localisation, via contextual adaptations calibrated to the particularities of the Kenyan digital ecosystem.

Sequencing

The findings highlight that Kenya is at a critical juncture in the evolution of its AI governance approach, moving from a reactive stance grounded in data protection (the Data Protection Act of 2019) towards a proactive and strategically guided framework through the 2025 AI Strategy and the 2026 AI Bill. This transition will be further shaped by two additional policy instruments currently under development: the National Data Governance Policy (Republic of Kenya, 2026b) and the Kenya AI and Emerging Technologies Policy (Indeje, 2026). These instruments, once finalised, will be critical to the evolution of Kenya's AI governance approach, as they are expected to clarify treatment of data ownership, treatment of cross-sectoral data-sharing arrangements, and the broader policy context within which AI-specific legislation must operate. The sequencing of these two policy instruments relative to enactment of the Senate's 2026 AI Bill therefore deserves careful attention from policymakers and legislators.

Premature legislation could entrench governance structures before the foundational policy architecture on which they depend has been consolidated. This concern does not diminish the value of the AI Bill of 2026. Rather, the concern supports the need for a coherently phased approach in which policy finalisation and legislative development proceed in a coordinated fashion.

Operationalisation

Kenya faces notable AI governance operational challenges that are, for the most part, not present in Europe. Uneven digital connectivity, scarcity of high-quality localised datasets, and gaps in secure domestic data infrastructure constrain Kenya's ability to operationalise the technical standards that underpin safe AI deployment (Government of Kenya, 2025; Plantinga et al., 2024). It is important to note, however, that the goal is not for Kenya to replicate the EU's specific technical compliance architecture wholesale. The EU AI Act was designed for a multinational regional bloc with mature institutional infrastructure, deep regulatory capacity, and well-resourced supervisory authorities—conditions that differ substantially from Kenya's context as a developing, single-country jurisdiction. Rather than treating EU technical standards as a direct transplantation target, Kenya can selectively draw on the EU AI Act's underlying rationale, ensuring data quality, system security, and deployment accountability while calibrating specific requirements to its own institutional capabilities, sectoral priorities, and resource constraints.

In addition, commentators have raised concerns that the 2026 Kenyan Bill's definitions of key concepts such as "AI system" and "harm" remain insufficiently precise, and that the enforcement model concentrates broad supervisory powers without providing the technical standards or interpretative guidance necessary for consistent application (MMS Advocates, 2026; The Kenyan Wall Street, 2026). AI-specific liability frameworks and robust enforcement mechanisms are therefore still developing in Kenya and will likely require supplementary regulatory guidance and significant institutional capacity to be effective in practice.

Technical robustness

Kenya's technical robustness presents a significant implementation gap. Kenya's digital infrastructure faces limitations, particularly outside urban centres, and local datasets are often incomplete or unrepresentative, which can exacerbate bias and inequities (Government of Kenya, 2025; Gwagwa et al., 2021; Plantinga et al., 2024). This highlights the importance of investing in secure domestic data ecosystems, digital infrastructure, and localised AI capacity building to ensure that systems are both reliable and contextually appropriate.

Institutional oversight

Kenya's AI governance currently lacks a dedicated institutional authority responsible for AI oversight, coordination, and enforcement (Gwagwa et al., 2021; KICTANet, 2026; Plantinga et al., 2024). Kenya's regulatory landscape for AI is, at the time of writing in mid-2026, fragmented across several bodies with adjacent but non-AI-specific mandates: the Office of the Data Protection Commissioner (ODPC) governs personal data processing, the Communications Authority of Kenya (CA) regulates electronic communications and broadcasting, and the Competition Authority of Kenya (CAK) addresses market conduct. While each of these bodies possesses relevant institutional expertise, none is designed to address the full lifecycle of AI systems, including pre-deployment risk classification, algorithmic auditing, sector-specific compliance monitoring, and post-deployment surveillance. This structural gap has meant that AI systems deployed in high-impact sectors such as digital finance, healthcare, and agriculture have operated in a regulatory vacuum with respect to AI-specific oversight obligations.

The AI Bill of 2026 directly addresses this by proposing the establishment of the Office of the Artificial Intelligence Commissioner as the primary regulatory body, supported by an Advisory Committee on Artificial Intelligence comprising representatives from government, industry, and civil society (Republic of Kenya, 2026a). The Commissioner's proposed mandate is broad, encompassing risk classification, conformity audits, management of regulatory sandboxes, complaint handling, and research on emerging AI trends. While existing bodies such as the ODPC provide an important foundation, their mandates do not extend to the full lifecycle of AI systems. Commentators have nonetheless raised concerns that the proposed institutional architecture, with its provision for both an Office of the AI Commissioner and an Advisory Committee on AI, risks creating regulatory fragmentation and mandate overlap with existing bodies such as the ODPC and the CA, potentially increasing compliance costs for local innovators (KICTANet, 2026; The Kenyan Wall Street, 2026).

These concerns about regulatory fragmentation and compliance costs deserve serious engagement. The case for relying on existing institutions rather than creating a new AI Commissioner rests on legitimate grounds: the ODPC has established operational infrastructure and enforcement experience in data-related matters; the CA has technical expertise in platform regulation and digital services; and the CAK is well-positioned to address algorithmic market-power concerns. A coordinated, multi-agency model, in which AI governance responsibilities are distributed across these bodies under a shared statutory framework, could theoretically reduce duplication and avoid the resource demands of establishing an entirely new regulatory institution.

However, I am of the view that the institutional framework set out in the 2026 Bill—a dedicated Office of the AI Commissioner supported by the Advisory Committee on AI—is the more appropriate institutional response for Kenya at this juncture. In the AI Bill, the proposed Commissioner is not conceived of as a stand-alone enforcer but rather as a coordinating authority operating alongside the ODPC and the CA, which has the potential to reduce rather than multiply duplication. To address resource concerns, institutional design should nonetheless reflect Kenya's capacity constraints by adopting a phased model: initially concentrating the Commissioner's operational mandate on high-impact domains such as digital finance, healthcare, and public sector decision-support systems, while progressively expanding scope as institutional capacity matures.

6. Conclusions

The Kenya AI Strategy 2025–2030, supported by the Data Protection Act (2019) and the provisions proposed in the AI Bill of 2026—along with still-in-development National Data Governance Policy (Republic of Kenya, 2026b) and the Kenya AI and Emerging Technologies Policy—have the potential to establish a substantive foundation for ethical, inclusive, and accountable AI adoption (Republic of Kenya, 2019; 2026a; 2026b; Government of Kenya, 2025).

One of the most important current dimensions of the emergence of Kenya's AI governance approach is sequencing. Enacting the AI Bill before the National Data Governance Policy and the Kenya AI and Emerging Technologies Policy are finalised risks creating a legislative framework that is structurally sophisticated but

contextually underdetermined. It is therefore recommended that the AI Bill's refinement and enactment be coordinated with the finalisation of these policy instruments.

There is also the matter of regulation. For the AI Bill of 2026, if enacted, to function as genuinely contextually tailored legislation it will need to be accompanied by supplementary regulations that address Kenya's specific sectoral risks, provide precise definitional guidance, and establish implementation timelines calibrated to the capacity of local institutions and innovators (see KICTANet, 2026). Sectors of Kenya's AI ecosystem are at varying stages of readiness. High-risk domains such as digital finance, healthcare, and public-sector decision-support may justify early, targeted regulatory intervention, whereas the broader AI landscape may benefit from slower regulatory implementation.

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Integration of AI tools into management and governance of humanitarian projects in conflict-affected North-West Nigeria

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Abstract
Humanitarian projects in conflict zones face extreme complexity caused by, inter alia, volatility, fragmentation, and accountability pressures. Such complexity often renders conventional project implementation approaches inadequate. This study, focused on the conflict zone of North-West Nigeria, investigated the extent to which artificial intelligence (AI) tools can enhance the effectiveness of management governance and governance of humanitarian projects. Grounded in sociotechnical systems (STS) theory, the study surveyed 300 project personnel across Kebbi, Katsina, and Jigawa States, and conducted interviews with 25 of the personnel. Statistical analysis of the quantitative data from the survey found that the adoption of AI tools had a statistically significant correlation with project management effectiveness ($\beta = .46$, $p < .001$), with organisational readiness and ethical governance found to serve as significant partial mediators. The qualitative findings from the interview data identified AI tools' positive roles in project management and governance—through support for (human-led) decision support, transparency, and anticipatory governance—but also revealed tensions around equity, attentional displacement, and the marginalisation of national actors.

Keywords
artificial intelligence (AI), AI tools, humanitarian projects, project management, project governance, conflict zones, sociotechnical systems (STS) theory, North-West Nigeria, Kebbi, Katsina, Jigawa

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1. Introduction

Humanitarian-project implementation in conflict-affected regions constitutes a challenge of paramount importance, requiring the simultaneous navigation of uncertainty, operational insecurity, and intensified donor accountability pressures. In North-West Nigeria, specifically Kebbi, Katsina, and Jigawa States, a complex mix of armed banditry, farmer–herder conflicts and cross-border criminality has created a humanitarian crisis with severe access constraints (UNHCR, 2023). Within this volatile environment, project managers are tasked with delivering humanitarian assistance while also ensuring robust governance, adaptive risk management, and verifiable transparency.

Artificial intelligence (AI) tools have proven to be transformative in mainstream project management and governance, offering predictive analytics, real-time monitoring, and automated reporting. However, the application and empirical examination of AI use for project management and governance in conflict-affected

contexts remain nascent, particularly in Sub-Saharan Africa (Vinuesa et al., 2020). Critical questions persist regarding AI tools' potential roles in environments where institutional fragility, ethical risks, and digital divides are pronounced (Meier, 2015).

This study examined AI use for project management and governance by humanitarian projects operating in conflict-affected states of North-West Nigeria. The data collection and analysis focused on empirically investigating how AI adoption functions in such projects not merely as a technical tool, but also as a project management and governance mechanism that shapes effectiveness, accountability, and risk resilience.

2. Literature review

Use of AI tools in project management and governance

An important evolution in scholarship on AI in project management and governance is the reconceptualisation of AI tools from being automation engines to being partners to human decision-makers. Marnewick and Marnewick (2020) explain how AI applications can enhance project management and governance by fostering improvements in data integrity, in auditability, and in strategic oversight, particularly in complex projects. Other literature emphasises AI's potential for dynamic resource reallocation in response to changing project conditions, a capability that is particularly valuable in unstable environments (KPMG, 2020; Müller et al., 2022). Such studies shift the focus from replacing human judgment to augmenting it within structured frameworks. In the management and governance of humanitarian projects, the AI tools used typically include applications supporting the following four functions: predictive analytics; monitoring and evaluation (M&E); reporting and accountability; and decision support.

Predictive-analytics tools

These tools process multidimensional data, including conflict-incident reports, weather patterns, market prices, and population-displacement metrics, to forecast risks before they materialise. For instance, in North-West Nigeria, organisations use machine learning models trained on historical banditry patterns to predict high-risk periods for staff movements and supply convoys (Meier, 2015).

Monitoring and evaluation (M&E) systems

These systems employ computer vision and natural language processing (NLP) to analyse satellite imagery, social media, and field reports, enabling real-time tracking of project implementation. The UN's use of AI-augmented damage assessment in conflict zones demonstrates how these tools can enhance situational awareness while reducing the exposure of personnel to security risks (UN OCHA, 2022).

Reporting and accountability platforms

These platforms automate data aggregation from disparate field sources into standardised donor dashboards, creating auditable trails of resource allocation and expenditure. These systems address the intensified accountability pressures that humanitarian actors face while potentially introducing new tensions around data simplification.

Decision-support systems

These systems integrate these capabilities to present actionable recommendations to human decision-makers, such as optimal resource reallocation when security incidents disrupt planned distributions.

Particularities of humanitarian-project management and governance in conflict settings

Project management and governance in humanitarian projects in conflict settings are often fundamentally distinct from what is required in commercial projects. Humanitarian projects are much more likely to be characterised by, inter alia, dynamic ethical imperatives, highly politicised operating environments, and acute security risks (Betts et al., 2015). In conflict zones, information asymmetries and rapid contextual shifts render traditional, linear project tools inadequate (UN OCHA, 2022). Scholars increasingly advocate for adaptive, data-informed project management and governance mechanisms that prioritise resilience and stakeholder accountability over rigid plan adherence (Maxwell et al., 2022; Sandvik et al., 2014). Barnett (2023) highlights the tension between the need for rapid adaptation in conflict settings and the requirements

for accountability and transparency demanded by donors and affected communities. The value proposition of AI in humanitarian project management and governance is AI tools' ability to assist human decision-makers in addressing the above-mentioned challenges in the following ways:

- *Information asymmetry*: Humanitarian actors often lack real-time visibility of rapidly changing conditions, and AI-enabled sensing and analysis can reduce this asymmetry.
- *Anticipatory capacity*: Traditional project tools are retrospective, while AI tools' predictive capabilities enable proactive rather than reactive management and governance.
- *Accountability and transparency*: Donors and affected communities demand frequent and clear evidence of resource use, and AI-enabled traceability systems can help to provide this (while, as seen in the next sub-section, potentially introducing new forms of surveillance that require careful ethical navigation).

Ethical complexities of AI use in project management and governance

As stated above, AI-enabled systems can strengthen project accountability and transparency. Among other things, AI tools support enhanced data accuracy, real-time compliance-tracking, and traceable decision logs (Bannister & Connolly, 2020; Müller et al., 2022). However, this integration can introduce ethical risks, including risks of algorithmic bias, data protection vulnerabilities, and the potential for "accountability washing", where human responsibility is obscured (Stahl et al., 2016). These risks necessitate robust, context-specific governance safeguards—a concern reflected strongly in African digital ethics discourse (Bah et al., 2024; Eke et al., 2023). Recent scholarship emphasises the importance of contextually appropriate AI that respects local knowledge systems and addresses power imbalances in humanitarian settings (Fayehun et al., 2023; Mulder, 2023). Mulder (2023) highlights how externally driven localisation can create legitimacy paradoxes, where local actors must navigate contradictory demands—a dynamic that risks being amplified when AI tools are introduced without adequate attention to local ownership and ethical safeguards.

Nigerian empirical context: Adoption amidst structural constraints

Emerging Nigerian empirical studies document a growing, yet uneven, adoption of AI tools in project management and governance. Some studies highlight persistent constraints, including critical infrastructure gaps (e.g., unstable power, limited internet), skill deficits, and socio-cultural hesitancy (Adeleke et al., 2023; Akinola & Ogunbayo, 2024). Other studies, such as that by Lawal et al. (2024), demonstrate AI's positive impact on coordination in Nigerian projects. But there is a scarcity of focused research on its application within the country's humanitarian sector, particularly in conflict zones. This underscores the novelty and contribution of the present study, which builds on recent Nigerian scholarship examining digital innovation pathways in non-governmental sectors.

3. Theoretical lens and conceptual model

This study was guided by sociotechnical systems (STS) theory, which posits that organisational outcomes are optimised when social (human, organisational) and technical (technology, tools) subsystems are jointly designed and mutually adaptive (Trist, 1981). This theory, which places a strong emphasis on understanding the mediating roles of social and technical dimensions, offers a lens for exploring AI's impact on project effectiveness that is not direct but mediated by social subsystems: namely, organisational readiness (skills, infrastructure, culture) and ethical governance (policies, oversight, values). This framework moves beyond a technocentric view to analyse AI as an embedded element within a complex organisational and ethical landscape.

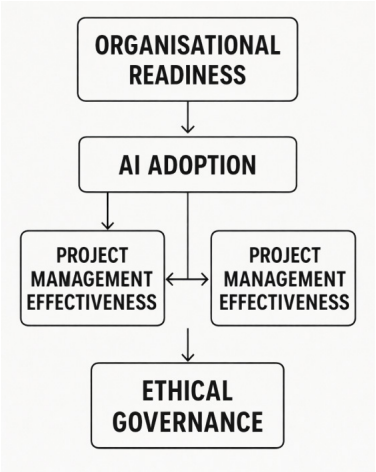
The conceptual model developed to guide the study, as illustrated in Figure 1, is grounded in STS theory and proposes that AI adoption influences project management and governance effectiveness, both (1) directly and (2) indirectly through two mediators (organisational readiness and ethical governance). The model thus posits three parallel pathways (one direct, two indirect) for the influence of AI adoption:

- *A direct pathway* from AI adoption to project management effectiveness, representing the pure technical contribution of AI tools, enhanced data analytics, predictive capabilities, and automated reporting that improve decision-making regardless of organisational context.
- *An indirect pathway through organisational readiness*, capturing how AI adoption prompts investments in staff training, technological infrastructure, and supportive organisational cultures, which are investments that independently enhance project outcomes.

- *An indirect pathway through ethical governance*, reflecting how AI adoption necessitates the development of data protection protocols, bias detection procedures, human oversight mechanisms, and accountability frameworks, which are safeguards that improve project effectiveness by preventing errors and ensuring responsible action.

This multi-pathway model reflects the core insight of STS theory: technology and social systems co-evolve, and optimal outcomes require joint optimisation of both subsystems. The model guides both the measurement strategy (identifying appropriate constructs for each pathway) and the analytical approach (testing mediation through bootstrapped confidence intervals).

Figure 1: Conceptual model



4. Methodology

Research design

A convergent parallel mixed-methods design was employed, where quantitative and qualitative data were collected concurrently, analysed independently, and integrated at the interpretation stage to provide comprehensive validation and richer insight (Biedenbach & Müller, 2023; Creswell & Clark, 2017). This design is particularly suited to exploring complex phenomena where numerical trends require contextual, narrative explanation.

Sample and data collection

Quantitative strand

A sample of 300 humanitarian project personnel (100 each from Kebbi, Katsina, and Jigawa) was obtained via stratified random sampling based on organisation type (UN agency, international NGO, national NGO) and project role (managerial, technical, field). Participants completed a structured survey questionnaire administered electronically and in-person. The response rate was 72%. The full questionnaire is provided in Appendix A.

Qualitative strand

Twenty-five key informant interviews were conducted with project managers (n = 12), donor representatives (n = 6), and ICT officers (n = 7), selected through purposive sampling to capture diverse, expertise-based perspectives. Interviews followed a semi-structured protocol (Appendix B) and lasted 45–75 minutes.

Measurement and variables

All constructs were measured using validated 5-point Likert scales (1 = Strongly Disagree, 5 = Strongly Agree). Instruments were pre-tested with 30 humanitarian workers who were not in the final sample, leading to minor wording adjustments.

Independent variable: AI adoption (8 items; α = .87)
AI adoption was measured as the extent to which organisations use AI tools for humanitarian project management functions. The scale assessed the use of AI for predictive analytics, real-time monitoring, automated reporting, and decision support. Sample items were: "Our organisation uses AI tools for predictive risk analysis" and "We utilise machine learning to anticipate supply chain disruptions".

Mediating variables
Organisational readiness (6 items; α = .82) was conceptualised as institutional capacity to absorb, integrate, and sustain AI technologies. The scale assessed four dimensions: human capital readiness (staff skills and training), technological infrastructure (hardware, software, connectivity), cultural readiness (openness to innovation), and resource commitment (budget and leadership support). A sample item was: "Our staff have adequate training to use AI tools effectively".

Ethical governance (6 items; α = .80) was defined as institutional mechanisms ensuring AI systems operate in accordance with humanitarian principles, data protection standards, and accountability requirements. The scale captured policy frameworks, data stewardship, algorithmic accountability, and human oversight. A sample item was: "We have clear protocols for ethical review of AI-driven decisions".

STS theory justifies these as mediators because AI's governance impact is hypothesised to operate through the social and structural conditions, readiness, and ethics that enable technology to translate into improved outcomes (Trist, 1981). Both scales demonstrated acceptable convergent and discriminant validity in confirmatory factor analysis.

Dependent variable: Project management effectiveness index (PMEI)
The dependent variable was a composite index calculated as the mean of three standardised sub-scales: risk management (5 items, α = .85), governance and accountability (6 items, α = .88), and transparency and donor confidence (4 items). With regard to validation, all items loaded > 0.70 on a single factor in principal component analysis, explaining 68% of variance, confirming the index's construct validity.

Data analysis strategy
Quantitative analysis
The quantitative analysis was conducted using SPSS/Stata. Descriptive statistics and scale reliability were computed. Common method bias (CMB) was assessed using Harmon's single-factor test, which showed the first factor explained 38.2% of variance (< 50% threshold), suggesting that CMB was not a severe threat (Podsakoff et al., 2003). Pearson correlation examined bivariate relationships. Hierarchical multiple regression tested the predictive model. Mediation analysis used the bootstrapping method (Preacher & Hayes, 2008) with 5,000 resamples to test indirect effects. One-way ANOVA explored inter-state differences.

Qualitative analysis
For the qualitative analysis, interviews were transcribed and subjected to thematic analysis following Braun and Clarke's (2006) six-phase approach using NVivo 14, employing a hybrid inductive-deductive approach to identify patterns related to AI's governance role.

Ethical considerations
The study received approval from the University of Uyo's Research Ethics Committee. Informed consent was obtained from all participants, with special measures to ensure confidentiality and security given the conflict-affected context. Data was anonymised and stored securely.

5. Findings and analysis

Descriptive statistics and scale reliability

Table 1 presents descriptive statistics for all study variables. All constructs demonstrated high internal consistency, with Cronbach's Alpha values well above the 0.70 threshold. The mean scores provide insight into the current state of AI adoption and related organisational factors in North-West Nigeria's humanitarian sector.

Table 1: Descriptive statistics and reliability (*n* = 300)

Variable	Mean (*M*)	*SD*	Cronbach's alpha	Skewness	Kurtosis
AI adoption	3.54	0.83	0.87	-0.32	-0.45
Risk management	3.75	0.78	0.85	-0.41	-0.38
Governance and accountability	3.75	0.77	0.88	-0.38	-0.41
Organisational readiness	3.42	0.81	0.82	-0.28	-0.52
Ethical governance	3.38	0.84	0.80	-0.25	-0.48

Significance of these statistics for humanitarian practice

- AI adoption (*M* = 3.54) indicates that, on average, respondents moderately agree that their organisations use AI tools. Adoption is underway but not yet universal. The standard deviation of 0.83 shows reasonable variation; some organisations are further ahead, others are behind.
- Risk management and governance and accountability (both *M* = 3.75) received the highest scores, suggesting that respondents generally agree that their organisations demonstrate competent risk management and robust governance practices. These traditional humanitarian competencies remain strong even as AI adoption progresses.
- Organisational readiness (*M* = 3.42) falls between "Neutral" and "Agree", suggesting that while organisations have made progress in building capacity for AI, significant gaps remain in skills, infrastructure, or cultural readiness. This aligns with qualitative findings about training needs and infrastructure constraints.
- Ethical governance (*M* = 3.38) is the lowest mean, indicating that ethical frameworks for AI, data protection protocols, bias mitigation procedures, and human oversight mechanisms are the least developed area. This finding is particularly significant given ethical governance's role as a mediator of AI's effectiveness.
- All skewness and kurtosis values fall within acceptable ranges (-1 to +1), confirming that the data are approximately normally distributed and suitable for parametric statistical tests.

Results from correlation analysis

Table 2: Pearson correlation matrix

Variable	1	2	3	4	5
AI adoption	1				
Risk management	.62**	1			
Governance and accountability	.58**	.71**	1		
Organisational readiness	.49**	.52**	.54**	1	
Ethical governance	.46**	.50**	.56**	.61**	1

**** p < .001. All correlations are significant at the 0.001 level.**

What these statistical relationships reveal about humanitarian practice

The correlation matrix shows that all five variables move together; organisations that are strong in one area tend to be strong in others. But the pattern of relationships tells a more nuanced story:

- AI adoption ↔ risk management (.62): Organisations using AI more extensively report a significantly stronger ability to anticipate and manage risks. This suggests that AI's predictive capabilities are translating into tangible risk management benefits. A project manager in Katsina explained: "The AI system analyses patterns from the past five years and gives us risk probabilities for each road each day. We now move from reaction to anticipation."
- AI adoption ↔ governance and accountability (.58): Higher AI adoption is associated with more robust governance practices. Organisations embracing AI tend to have stronger documentation, oversight, and accountability mechanisms, or perhaps the AI tools themselves enhance these governance functions.
- AI adoption ↔ organisational readiness (.49): Organisations with greater AI adoption have invested more in staff skills, infrastructure, and supportive cultures. This makes intuitive sense: you cannot use what you are not prepared to implement.
- AI adoption ↔ ethical governance (.46): The positive but slightly weaker correlation suggests that while AI-adopting organisations have developed some ethical frameworks, ethics may be lagging behind technology, which is a concern given the risks that AI poses in humanitarian contexts. A national NGO director observed: "Many organisations adopt AI without building readiness or ethics first. They get the technology because donors fund it, but they have not trained staff or established protocols."
- Risk management ↔ governance and accountability (.71): The strongest correlation reveals that organisations that are good at managing risks are also strong in governance. These capabilities reinforce each other: both require disciplined information flows and decision protocols.
- Organisational readiness ↔ ethical governance (.61): Organisations investing in technical capacity also tend to invest in ethical safeguards. This is encouraging: readiness and ethics appear to develop together rather than one developing at the expense of the other.

Results from hierarchical regression and mediation analysis

Table 3: Hierarchical regression predicting project management effectiveness

Model	Predictor	β	*t*	*p*	R^2	ΔR^2	*F change*
1	**A**I adoption	**0.46**	**9.12**	**< .001**	**0.28**	**0.28**	**81.4****
2	AI adoption	0.35	6.94	< .001	0.41	0.13	42.1**
2	Organisational readiness	0.29	5.87	< .001			
3	AI adoption	0.27	5.12	< .001	0.53	0.12	36.8**
3	Organisational readiness	0.22	4.45	< .001			
3	Ethical governance	0.21	4.26	< .001			

****Model 3: *F*(3, 296) = 111.4, *p* < .001**

What hierarchical-regression findings reveal

- Model 1 (AI adoption alone): AI adoption alone explains 28% of the differences in project management effectiveness between organisations. This is substantial, comparable to knowing that a student's study hours explain 28% of why some students get higher grades. The standardised coefficient (β = .46) means that when AI adoption increases meaningfully, project effectiveness increases by nearly half a standard deviation, a practically significant impact.
- Model 2 (adding organisational readiness): When organisational readiness enters the picture, AI's direct contribution drops from .46 to .35, while readiness itself contributes significantly (.29). Together, they explain 41% of effectiveness differences, a 13% improvement. This tells us the

following: Part of why AI improves effectiveness is because organisations that adopt AI tend to be more ready, and readiness itself matters. But AI still contributes beyond readiness.

- Model 3 (adding ethical governance): Adding ethical governance increases explained variance to 53%, meaning that these three variables together account for over half of why some organisations manage projects more effectively than others. AI's coefficient drops further to .27, while both mediators remain significant (.22 and .21). This reveals the following: AI's influence on effectiveness runs partly through strengthening organisational readiness and ethical governance. The technology does not simply work on its own; it enables and is enabled by these human and structural factors.

Table 4: Bootstrapped-mediation effects

Effect type	Path	β	Boot *SE*	95% *CI* lower	95% *CI* upper
Total effect	AI adoption → PMEI	0.46	0.05	0.37	0.55
Direct effect	AI adoption → PMEI	0.27	0.05	0.17	0.37
Indirect effect 1	AI adoption → organisational readiness → PMEI	0.08	0.03	0.03	0.14
Indirect effect 2	AI adoption → ethical governance → PMEI	0.06	0.02	0.02	0.11

What mediation-analysis findings reveal

The mediation analysis moves beyond asking "does AI work?" to answer the more important question: "How does AI actually improve humanitarian project management in conflict zones?" The core finding is as follows: AI's value flows through two distinct kinds of pathways, direct and indirect, and understanding this distinction matters profoundly for practice:

The direct pathway (β = .27): The technology itself helps: Consider a project manager in Katsina who receives an AI-generated alert predicting road closures based on recent bandit activity patterns. She reroutes a food convoy, avoiding a potential attack. This is AI working *directly*, since the technology's analytical capability produced actionable information that human judgment alone might have missed. The direct effect of .27 represents this pure technical contribution: better data, faster pattern recognition, and more accurate predictions. This pathway accounts for approximately 59% of AI's total observed impact.

The indirect pathway through organisational readiness (β = .08): AI forces capacity building: Before that project manager can act on the AI alert, her organisation had to invest in training staff to interpret AI outputs, upgrade internet connectivity, and create response protocols. These investments in readiness, prompted by AI adoption, independently enhance project management beyond the AI tools themselves. This pathway accounts for about 17% of AI's total effect. A national NGO programme manager described this dynamic: "When we first got the AI reporting system, we realised our staff did not know how to use it. We had to invest in training. We realised our internet in field offices was too slow, we had to upgrade. The AI adoption itself forced us to become more capable. And now that we have those capabilities, our whole operation runs better, not just the AI part."

The indirect pathway through ethical governance (β = .06): AI demands accountability: A different project manager receives an AI recommendation to prioritise certain villages for food distribution. Before acting, she consults an ethics protocol requiring human review. She notices that the model may be biased because it lacks data from communities beyond mobile network coverage. She overrides the recommendation and sends a field team to verify needs directly. This pathway, accounting for about 13% of AI's effect, represents how AI necessitates oversight mechanisms that themselves improve outcomes by preventing mistakes. A project manager explained: "We had an ethics protocol requiring human review of all AI recommendations. That protocol caught a major error: the AI recommended deprioritising a community because its data was incomplete, but our field staff knew displaced families had arrived there. Without the protocol, we would have followed the AI and created harm. The 13% mediation effect, that is what saved us."

The combined insight: Together, the indirect pathways account for 30% of AI's relationship with project effectiveness. This is not a statistical curiosity but a practical revelation: when a humanitarian organisation adopts AI, nearly one-third of the benefit comes not from algorithms alone but from how adopting AI transforms organisations, making them more capable, more disciplined, and more accountable.

Results from state-level comparison

One-way ANOVA revealed no statistically significant differences in AI adoption levels across the three states: Kebbi ($M = 3.48$, $SD = 0.79$), Katsina ($M = 3.57$, $SD = 0.85$), Jigawa ($M = 3.57$, $SD = 0.86$); $F(2, 297) = 0.56$, $p = .57$. However, understanding what "AI adoption" means in practice requires understanding each state's unique conflict dynamics.

Kebbi State (M = 3.48)

Kebbi's challenges are dominated by cross-border criminality along the Niger frontier and armed banditry affecting agricultural communities. Project managers use predictive analytics primarily to anticipate farming season violence and model safe corridors for cross-border supply chains. A logistics coordinator explained: "In Kebbi, our biggest risk is unpredictability during planting and harvest seasons. The AI tools analyse patterns from the past three years, which villages were attacked, when, and what the security response was, and give us probabilities we can plan around." The slightly lower mean may reflect more rural, harder-to-reach areas where connectivity for real-time AI applications remains inconsistent.

Katsina State (M = 3.57)

Katsina faces the most intense and sustained banditry activity. Project managers emphasise AI's role in real-time threat assessment and staff security. A project manager described this role as follows: "In Katsina, we cannot afford to be reactive. The AI system integrates data from security agencies, community networks, and social media to update risk scores for each operational area daily. When the risk score crosses our threshold, we do not move staff that day, regardless of planned activities."

Jigawa State (M = 3.57)

Jigawa's conflict dynamics include farmer–herder tensions and spillover violence, but with more predictable patterns. Project managers report using AI primarily for resource allocation efficiency and donor reporting, rather than acute security prediction. An ICT officer explained: "Our focus is making sure limited resources reach the maximum number of people. The AI helps us analyse needs assessment data across 200+ communities and optimise where we send mobile health teams. It also automatically generates donor reports, freeing staff for field monitoring."

What the statistical homogeneity means

The finding of no significant differences tells us something important: AI adoption is driven more by organisational factors than location-specific conditions. International NGOs and UN agencies deploy similar tools across their entire portfolios. However, this homogeneity masks profound inequities *within* states. A national NGO director in Katsina stated: "The average of 3.57 in Katsina combines international NGOs scoring 4.5 and national NGOs scoring 2.5. The mean is mathematically correct but practically misleading. The real story is not about states; it is about who has resources and who does not."

Integration of survey (quantitative) findings with interview (qualitative) findings

This section weaves together quantitative patterns with qualitative evidence to explore how AI functions as a project management and governance tool in the lived experience of humanitarian actors.

Understanding the AI adoption-effectiveness relationship ($\beta = .46$)

The quantitative analysis established that AI adoption significantly predicts project management effectiveness. But what does "more effective" mean in practice? Qualitative data reveals three concrete mechanisms.

Mechanism 1: Anticipation replaces reaction

In the words of a project manager in Katsina: "Before AI, we were always responding to crises after they happened. Now we receive risk forecasts that let us act before the crisis. Last month, the AI predicted a

65% probability of attack on the Funtua road based on patterns we had never noticed, attacks spike three days after full moons. We rerouted our convoy. Three days later, that road was attacked. The .46 effect size, that is us. That is supplies arriving safely because we anticipated." A logistics coordinator in Kebbi added: "Our AI flagged that heavy rains predicted for the following week, combined with increased bandit activity, would likely close our main supply route. We had three days' warning. We moved two weeks of food into our warehouses before the road became impassable. The statistics show AI predicts effectiveness; I can tell you exactly what that looks like: children eating because food arrived on time."

Mechanism 2: Decision quality improves
An ICT officer explained: "The AI does not make decisions; it gives us better information for decisions we must make anyway. When deciding which communities to prioritise for mobile health teams, the AI analyses needs data from 200+ locations and flags where malnutrition is rising fastest. We still make the final decision, but with information we could never assemble manually."

Mechanism 3: Accountability becomes auditable
In the words of a donor representative, addressing the relevance of AI to donor confidence: "When partners use AI, they can show us why they made decisions. They can say, 'We rerouted because our model showed X, Y, and Z factors converging.' This creates an audit trail for adaptive management. We trust partners more when we understand their logic."

Explaining the mediation pathways
The mediation analysis revealed that organisational readiness and ethical governance account for 30% of AI's effect. Qualitative data explains why.

The readiness pathway: AI forces capacity-building
A national NGO programme manager said: "We had to invest in training. We realised we needed someone who understood data, we hired a new staff member." An ICT officer confirmed: "Organisations cannot just buy AI software and expect magic. You need infrastructure. You need skills. You need leadership that supports innovation. The organisations in our survey with high readiness scores are the ones where AI actually works."

The ethics pathway: Trust requires safeguards
A project manager explained: "Early in our AI use, we had an incident. The system recommended prioritising certain villages based on malnutrition data. But the data was incomplete, it missed newly displaced families. Because we had an ethics protocol requiring human review, a staff member caught the error. The protocol saved us. Now we see ethical governance not as a constraint but as something that makes AI work better." A donor representative emphasised: "We will not fund AI projects without strong ethical frameworks. Why? Because when things go wrong, and they will, someone must be responsible. If an organisation cannot show us how they oversee AI, how they protect data, how they prevent bias, we cannot take the risk."

The central tensions: What the numbers cannot show
Across all interviews, the following tensions emerged that quantitative data alone cannot capture:

Empowerment and marginalisation: An international NGO programme manager celebrated AI's benefits, while a national NGO director stated: "Meanwhile, we cannot afford these tools. In coordination meetings, international partners bring AI-generated maps and forecasts. We bring our community knowledge. Guess whose information is treated as credible? The technology creates a hierarchy where those with AI are heard and those without are silenced, even when we know the context better."

Efficiency and burden: While a donor representative praised the AI dashboards, a field officer described the same dashboards differently: "I spend more time looking at my phone entering data than looking at the community. The system demands information, and I provide it, but I am not sure the community benefits from my attention being on the screen rather than on them."

Clarity and obfuscation: An ICT officer emphasised AI's transparency, while a programme manager cautioned as follows: "But the dashboard cannot show us whether people felt respected during distribution. It cannot show community tensions. We risk optimising for what the machine can measure while ignoring what matters."

The human-in-the-loop imperative: A field officer offered this reflection: "The algorithm can suggest where needs are greatest. It can calculate efficiency. It can optimise resources. But it cannot understand dignity. It cannot know that in this community, because of their history, distributing food in the morning rather than afternoon matters. It cannot feel the tension in a conversation and decide to pause. These are human things. The AI is a tool. But the work itself, the work of being with people in crisis, that is human work. It must remain human work."

6. Discussion

Theoretical contribution: AI as embedded governance infrastructure

The central theoretical contribution is support for the reconceptualisation of AI as not a stand-alone technical tool, but as an embedded project management and governance infrastructure whose effects are realised through organisational and ethical subsystems. First, it challenges technocentric narratives treating AI as a direct solution to management challenges. The finding that 30% of AI's effect operates through readiness and ethics demonstrates that technology alone is insufficient. Organisations investing in AI without concurrent investment in capabilities and safeguards capture only about 70% of AI's potential value. Second, it specifies mechanisms through which AI influences governance outcomes: anticipatory capacity (predictive analytics enabling proactive risk management), accountability infrastructure (automated reporting creating auditable decision trails), and decision support (AI augmenting rather than replacing human judgment). Third, it reveals the double-edged nature of AI-enabled governance. While informants affirmed AI's value, they also identified tensions: measurable outputs displacing meaningful outcomes; data entry burden on field staff; marginalisation of national actors; and risk that "human oversight" becomes performative. These qualifications complicate simplistic accounts of AI as unambiguously beneficial.

Analytical insights: How AI transforms governance in conflict contexts

Beyond confirming that AI matters, the findings reveal qualitatively distinct ways in which AI transforms governance, specifically in conflict-affected humanitarian operations:

Insight 1: AI enables governance under extreme uncertainty: In conventional project management, governance assumes relatively stable environments. In North-West Nigeria, volatility is the norm. AI's predictive capabilities allow organisations to govern not by following fixed plans but by continually sensing and responding to changing conditions.

Insight 2: AI creates auditable adaptation: Donors historically struggle to fund adaptive management because adaptation looks like deviation from plans. AI tools create audit trails documenting *why* adaptations occurred, risk forecasts, supply chain analyses, and needs assessments, transforming adaptation from unapproved change to evidence-based response.

Insight 3: AI redistributes epistemic authority: AI adoption shifts whose knowledge counts. International NGOs with AI produce maps and forecasts that are treated as authoritative. National NGOs without such tools bring experiential knowledge that is systematically devalued. This redistribution has profound implications for power dynamics in humanitarian partnerships.

Insight 4: AI makes visible the invisible, and invisible the visible: AI renders certain phenomena visible: malnutrition trends across 200 villages, or patterns in security incidents. But it risks rendering other phenomena invisible: community trust, dignity in aid delivery, or the quality of human relationships. The field officer who described spending "more time looking at my phone than looking at the community" captured this paradox.

Limitations and future research

First, cross-sectional design limits causal claims. Longitudinal research tracking of organisations as they mature in AI use would strengthen evidence of causal direction. Second, self-reported data on ethically sensitive topics may be subject to social desirability bias. Future research could incorporate organisational records, donor audits, or community perspectives. Third, the focus on organisational perspectives leaves the beneficiary viewpoint unexplored. How do the affected communities experience AI-influenced governance? This is a critical gap. Fourth, AI is treated as a composite construct rather than examining specific applications. Future research could disaggregate AI types, predictive analytics, computer vision, and natural language processing, to identify which one generates which effects. Fifth, the North-West Nigeria context limits direct generalisability. Comparative studies across conflict regions could illuminate how varying dynamics shape AI integration.

7. Conclusion

This research establishes that in conflict-affected North-West Nigeria, AI tools enhance humanitarian project effectiveness by functioning as an embedded management governance infrastructure. The study's central contribution is demonstrating that AI's value is to a great extent realised through organisational readiness and ethical governance. Approximately 30% of AI tools' total effect operates through these pathways, meaning that organisations investing in AI must concurrently invest in the human and structural capabilities that enable technology to translate into improved outcomes.

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Data availability statement

The quantitative dataset analysed during this study, including survey responses from 300 participants, is available from the corresponding author, Akaninyene O. Unaam, upon reasonable written request sent to unaamakan@gmail.com. Due to the sensitive nature of the research conducted in a conflict-affected region and to protect participant confidentiality and security, the full qualitative interview transcripts cannot be shared. Anonymised excerpts of qualitative data can be made available for academic, non-commercial purposes under a signed data confidentiality agreement.

AI declaration

The authors did not use any GenAI tools in the research or in preparation of this submission.

Competing-interests declaration

The authors have no competing interests to declare.

Author contributions declaration

A. O. U.: Conceptualisation; methodology; investigation; resources; data curation; formal analysis (qualitative); writing – original draft; writing – review and editing; project administration.

E. A. U.: Methodology (quantitative instruments); software; formal analysis (quantitative); data curation; writing – original draft (quantitative sections); writing – review and editing; visualisation (tables and figures)

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Appendix A: Survey questionnaire

SECTION A: DEMOGRAPHIC AND ORGANISATIONAL INFORMATION

A1. Organisation type:
- UN Agency
- International NGO
- National NGO
- Government Agency
- Red Cross/Red Crescent Movement
- Other (please specify): _____

A2. Your primary role:
- Senior Management (Director, Head of Office)
- Project Manager/Coordinator
- Technical Specialist (M&E, ICT, Logistics, Finance)
- Field Officer
- Advisor/Consultant
- Other (please specify): _____

A3. Years of experience in humanitarian sector:
- Less than 2 years
- 2–5 years
- 6–10 years
- 11–15 years
- More than 15 years

A4. State of primary operation:
- Kebbi
- Katsina
- Jigawa
- Multiple states (please specify): _____

A5. Size of your organisation in the North-West region:
- Small (under 50 staff)
- Medium (50–200 staff)
- Large (over 200 staff)

A6. Primary sector of your projects (select all that apply):
- Food Security and Livelihoods
- Health and Nutrition
- Protection
- Water, Sanitation, and Hygiene (WASH)
- Shelter and Non-Food Items
- Education
- Coordination and Common Services
- Other (please specify): _____

SECTION B: AI ADOPTION

Rating Scale:
1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

	Statement	1	2	3	4	5
B1	Our organisation uses AI-powered tools for predictive risk analysis in project planning					
B2	AI applications are integrated into our project monitoring and reporting systems					
B3	We utilise machine learning or predictive analytics to anticipate supply chain disruptions					
B4	Our organisation employs AI for real-time data analysis from field operations					
B5	AI tools support our decision-making processes for resource allocation					
B6	We use automated reporting systems powered by AI for donor communication					
B7	Our organisation has invested in AI technologies specifically for humanitarian programming					
B8	Staff in my organisation regularly interact with AI-based systems in their daily work					

B9. If your organisation uses AI tools, please briefly describe the main applications (e.g., security prediction, supply chain optimisation, automated reporting, needs assessment):

SECTION C: ORGANISATIONAL READINESS

	Statement	1	2	3	4	5
C1	Our staff have adequate training to use AI tools effectively					
C2	Our organisation has the necessary technological infrastructure (internet, hardware, software) to support AI adoption					
C3	There is strong leadership support for digital and AI innovation in our projects					
C4	Our organisational culture encourages experimentation with new technologies					
C5	We have dedicated budget allocation for technology and innovation					
C6	Our organisation partners with technology providers or consultants to enhance our AI capabilities					

C7. What are the biggest barriers to AI adoption in your organisation? (Select all that apply)

- Lack of staff skills/training
- Poor internet connectivity
- Insufficient funding
- Lack of leadership support
- Staff resistance to new technology
- Ethical concerns
- Lack of appropriate software/tools
- Security concerns
- Other (please specify): _____

SECTION D: ETHICAL GOVERNANCE

	Statement	1	2	3	4	5
D1	We have clear protocols for ethical review of AI-driven decisions					
D2	Our organisation has data protection and privacy policies that explicitly address AI systems					
D3	There are established procedures for addressing potential algorithmic bias					
D4	Beneficiary consent mechanisms are integrated into our data collection processes for AI systems					
D5	Our organisation maintains human oversight of all AI-generated recommendations					
D6	We have accountability mechanisms if AI-driven decisions cause harm					

D7. Does your organisation have a dedicated ethics committee or focal person for AI-related issues?

- Yes
- No
- In development
- Don't know

SECTION E: RISK MANAGEMENT

	Statement	1	2	3	4	5
E1	Our project risk identification processes are systematic and comprehensive					
E2	We effectively anticipate security threats to project implementation					
E3	Our organisation responds quickly to emerging risks in conflict-affected areas					
E4	Risk mitigation strategies are regularly updated based on new information					
E5	We have contingency plans that can be activated rapidly when risks materialise					

E6. In the past 12 months, how often has your organisation successfully anticipated and mitigated a major security or operational risk?

- Never
- Once
- 2–3 times
- 4–5 times
- More than 5 times

SECTION F: GOVERNANCE AND ACCOUNTABILITY

	Statement	1	2	3	4	5
F1	Our projects maintain clear documentation of all major decisions					
F2	There is transparent reporting on resource utilisation to stakeholders					
F3	Accountability mechanisms ensure responsible use of donor funds					
F4	Project governance structures include oversight from multiple organisational levels					
F5	We regularly engage with affected communities about project implementation					
F6	Decision-making processes are traceable and justifiable to external auditors					

SECTION G: TRANSPARENCY AND DONOR CONFIDENCE

	Statement	1	2	3	4	5
G1	Donors express confidence in our financial management systems					
G2	Our reporting meets or exceeds donor requirements for transparency					
G3	We proactively share project challenges as well as successes with donors					
G4	Technology has improved our ability to demonstrate accountability to stakeholders					

SECTION H: OPEN-ENDED REFLECTIONS

Please share any additional thoughts on the following questions.

- H1. In your view, what is the single biggest benefit of using AI in humanitarian project management in North-West Nigeria?
- H2. What is the single biggest risk or concern you have about AI use in this context?
- H3. Any other comments you would like to add?

Appendix B: Semi-structured interview guide

PART 1: OPENING AND CONTEXT-SETTING

Questions:

- Can you briefly describe your role and responsibilities in humanitarian programming in North-West Nigeria?
- *Probe: How long have you been in this role? What does a typical week look like?*
- How long have you worked in this region, and what do you see as the most significant challenges for project management in this conflict-affected context?
- *Probe: Security challenges? Coordination challenges? Accountability pressures?*
- [For ICT officers] What is your role in supporting technology for humanitarian operations?
- *Probe: What systems do you manage? What are the biggest tech challenges you face?*

PART 2: AI APPLICATIONS AND EXPERIENCES

Questions:

- Is your organisation currently using any AI or advanced analytics tools in project management? If yes, please describe:
- What specific tools or applications?
- What functions do they perform? (e.g., risk prediction, monitoring, reporting, needs assessment)
- How long have these tools been in use?
- *Probe: Can you show me an example or walk me through how it works?*
- [If not using AI] Has your organisation considered adopting AI tools? What factors have influenced this decision?
- *Probe: What would need to change for you to consider adoption?*
- Can you share a specific example where AI tools influenced a project management decision? What happened, and what was the outcome?
- *Probe: Walk me through that situation step by step. What information did the AI provide? What did you do with that information?*
- In your experience, how do AI tools compare to traditional approaches for:
- Risk identification and mitigation?
- Resource allocation?
- Monitoring and evaluation?
- Donor reporting?
- *Probe: What does AI do better? What do traditional approaches do better?*

PART 3: GOVERNANCE AND DECISION-MAKING

Questions:

- How do AI-generated insights or recommendations factor into your project governance processes?
- Are they advisory or determinative?
- Who reviews AI outputs before action is taken?
- *Probe: Is there a formal process for this?*
- What role does human judgment play alongside AI tools in your organisation? Can you describe a situation where human judgment overrode an AI recommendation?
- *Probe: What happened? Why did the human override? What was learned?*
- How have AI tools affected accountability relationships:
- With donors?
- With affected communities?
- Within your organisation?
- *Probe: Has accountability improved? Have new accountability challenges emerged?*

- What governance mechanisms does your organisation have in place to oversee AI use? (e.g., ethics committees, review protocols, oversight boards)
- *Probe: Are these formal or informal? How well do they work?*

PART 4: ORGANISATIONAL READINESS AND CONSTRAINTS

Questions:

- How would you assess your organisation's readiness for AI adoption in terms of:
- Staff skills and training?
- Technological infrastructure (internet, hardware, software)?
- Leadership support?
- Financial resources?
- *Probe: What is the biggest gap?*
- What have been the biggest challenges in implementing or using AI tools in this context?
- Infrastructure challenges?
- Skills/capacity challenges?
- Cost/funding challenges?
- Cultural resistance?
- Ethical concerns?
- Probe: Which challenge has been most difficult to overcome?
- What has enabled or facilitated AI adoption where it has been successful?
- *Probe: Was it leadership? Donor requirements? Partnerships? Staff champions?*
- How do you see the digital divide, between international and national NGOs, or between urban and field operations, affecting AI adoption in humanitarian work?
- *Probe: Are some actors being left behind? What are the consequences?*

PART 5: ETHICS, RISKS, AND SAFEGUARDS

Questions:

- What ethical concerns or risks related to AI use in humanitarian contexts concern you most?
- Data privacy and protection?
- Algorithmic bias or discrimination?
- Exclusion of vulnerable groups?
- Accountability gaps when things go wrong?
- Surveillance or misuse of data?
- *Probe: Which keeps you up at night?*
- How does your organisation address these concerns?
- What policies or practices are in place?
- Are these adequate, in your view?
- *Probe: Can you give me an example of a time these safeguards were used?*
- Have you encountered any unintended consequences of using AI in humanitarian operations? Please describe.
- *Probe: Something that surprised you, positive or negative?*
- How do you balance the efficiency gains from AI against potential risks to beneficiaries or staff?
- *Probe: Is there a tension? How do you navigate it?*

PART 6: FUTURE DIRECTIONS AND RECOMMENDATIONS

Questions:

- Looking ahead, how do you see AI evolving in humanitarian project management in North-West Nigeria over the next 3–5 years?
- *Probe: What will change? What will stay the same?*
- What recommendations would you offer to:
- Humanitarian organisations considering AI adoption?
- Donors funding technology in humanitarian contexts?
- Policymakers or regulators?
- *Probe: What do you wish someone had told you when you started?*
- If you could design the ideal AI tool for humanitarian work in this context, what would it do?
- *Probe: What problem would it solve?*
- Is there anything else you'd like to share about AI and humanitarian governance that we haven't discussed?
- *Probe: Any final thoughts, concerns, or hopes?*

Retraction: Gopal, A.D. (2025). How web-interface design impacts task performance, cognitive load, and user experience (UX): An exploration with a cohort of South African university students

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**

On 9 February 2026, *AJIC* retracted the following article, published in Issue 36 (2025), by author A.D. Gopal:

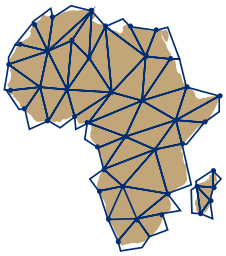
- How web-interface design impacts task performance, cognitive load, and user experience (UX): An exploration with a cohort of South African university students. https://doi.org/10.23962/ajic.i36.23095

The article was retracted at the request of the author following a determination by the University of the Witwatersrand that full ethical clearance had not been obtained prior to conducting the study. As the research involved human participants, prior ethics approval was required.

The editors of *AJIC* agreed to the retraction in line with journal policy and best practice. There is no evidence of data fabrication or falsification.

The article remains part of the permanent scholarly record and is clearly marked as retracted.

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