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Artificial Intelligence and Civil Society Organizations Reconstruction in Sudan: Comparative Insights from Fragile and Post-Conflict States

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Abstract

This paper examines the potential of Artificial Intelligence (AI) to reconstruct Civil Society Organizations (CSOs) in Sudan, a context of extreme fragility as quantified by its top-tier "Very High Alert" status on the Fragile States Index. Through a comparative analysis of AI adoption in South Sudan, Somalia, Libya, and Sierra Leone, coupled with a diagnostic assessment of Sudan's fragility drivers, the study argues that AI is not a panacea but a conditional tool. Findings indicate that AI can enhance CSO governance, service delivery, and advocacy, but its efficacy is entirely contingent on a phased approach that prioritizes foundational digital infrastructure, ethical safeguards, and community trust to avoid political co-option. The paper concludes by proposing a strategic framework to guide the responsible integration of AI, aiming to transform Sudanese CSOs into more resilient and effective actors amidst protracted crisis.

Keywords: Artificial Intelligence, Civil Society, Sudan, Post-Conflict Reconstruction, Fragile States, Digital Governance.

* Introduction

Civil Society Organizations (CSOs) have historically served as a cornerstone of democratization, social development, and peace building in Sudan (Abdulrahman, 2021). From the professional associations that challenged early authoritarianism to the grassroots networks providing essential services, CSOs have operated as both

watchdogs and service providers in a perennially fragile state. However, decades of systematic repression, protracted conflict, and political instability have profoundly weakened their institutional capacity. The brief democratic opening following the 2019 revolution, which saw CSOs at the forefront of political change, was abruptly terminated by the military coup of 2021 and the catastrophic interstate conflict that erupted in April 2023. This has left the Sudanese civil society landscape fragmented, displaced, and operating under extreme duress (International Crisis Group, 2023; El Mahdi et al., 2024).

In such a context, the task of rebuilding civil society transcends mere organizational revival; it necessitates a systemic transformation. Artificial Intelligence (AI) has emerged as a disruptive technology with significant potential to enable governance, enhance service delivery, and support peace building in post-conflict societies (UNDP, 2021; OECD, 2022). For Sudanese CSOs, AI could offer tools to analyze vast datasets for humanitarian needs, monitor corruption and human rights violations, engage citizens through local languages, and detect early signs of conflict escalation. Yet, the adoption of these technologies is fraught with ethical, political, and practical challenges, particularly in settings where governing regimes have a history of weaponizing technology for surveillance and social control (Cummings & Ochieng, 2022).

This paper addresses a critical research question: To what extent can AI contribute to rebuilding Sudanese CSOs under a restrictive national regime, and what lessons can be drawn from other fragile and post-conflict states?

By comparing Sudan's trajectory with experiences in South Sudan, Somalia, Libya, and Sierra Leone, this study seeks to develop a pragmatic and strategic framework for integrating AI into civil society rebuilding efforts. The central thesis is that while AI is not a panacea, it can provide critical tools for strengthening governance, transparency, and inclusivity in CSOs, but only if deployed within a framework that prioritizes ethics, inclusion, and safeguards against misuse. The significance of this study lies on its direct contribution to policy debates for digital transformation in peace building, offering a blueprint for empowering grassroots voices and informing international stakeholders on responsible

technology adoption in the Global South.

Following this introduction, the paper is structured into five core sections: Section tow Literature Review and Theoretical Framework: This section synthesizes the existing scholarship on civil society in fragile states, the role of ICT4D (Information and Communication Technologies for Development), and the ethics of AI in governance. It then presents the study's interdisciplinary theoretical framework, which analyzes AI adoption through the interplay of political opportunity structures, organizational capacity, and communal social capital. Section three Methodology: The section outlines the qualitative mixed-methods approach, detailing the comparative case study analysis of four fragile states (South Sudan, Somalia, Libya, Sierra Leone) and the document analysis of legal frameworks, policy papers, and fragility indices (including the Fragile States Index) that inform the study. Section four Analysis and Findings: its presents the results of the comparative analysis and the diagnostic assessment of Sudan's fragility. It discusses the lessons learned from other contexts and provides a granular, indicator-level analysis of the challenges facing Sudanese CSOs, drawing directly on FSI data. Section five conclusion and Policy Implications: This final section summarizes the key arguments, reiterates the conditional potential of AI, and outlines concrete policy recommendations for national, civil society, and international stakeholders to navigate the risks and opportunities identified.

* Literature Review and Theoretical Framework

The study situated at the intersection of three bodies of literature: civil society in authoritarian and fragile states, digital technologies for development (ICT4D), and the ethics of AI in governance.

1- Civil Society in Fragile States: The Sudanese Context

Theoretical frameworks from Tilly and Tarrow on contentious politics elucidate the cyclical nature of civil society in Sudan, where periods of political opening (e.g., 1964, 1985, 2019) enable mass mobilization, which is subsequently met with state repression and closure (Tarrow, 2014). Furthermore, Putnam’s (2000) concept of social capital explains the dual role of Sudanese CSOs in both generating norms of cooperation and delivering public goods in the void left by a

weak state. The current conflict has catastrophically eroded this social capital through displacement, violence, and institutional collapse, creating a negative feedback loop that deepens fragility (World Bank, 2022).

2- AI and Information and Communication Technologies for Development (ICT4D) in Post-Conflict Settings

ICT4D is the application of digital tools and solutions, such as mobile phones, the internet, and AI, to address social, economic, and humanitarian challenges in developing countries and underserved communities. This field aims to empower marginalized people, bridge the digital divide, and foster inclusive growth by improving access to resources and opportunities in areas like education, healthcare, and governance.

Existing research on AI in development (OECD, 2022) and fragile states (Cummings & Ochieng, 2022) highlights its dual-use nature. Case studies demonstrate efficacy in areas like humanitarian mapping, combating misinformation (Abdirahman, 2021), and epidemic response. However, the literature consistently identifies critical barriers: inadequate digital infrastructure, low digital literacy, ethical risks of bias, and the threat of technological authoritarianism.

3- Theoretical Synthesis

This paper synthesizes interdisciplinary perspectives to argue that the successful integration of artificial intelligence (AI) into Sudanese civil society organizations (CSOs) depends on navigating the complex interplay between political opportunity structures, organizational capacity, and communal social capital. Political opportunity structures refer to the enabling or constraining conditions within the civic space such as legal frameworks, transitional governance, and state-CSO relations that determine whether CSOs can experiment with digital tools. Organizational capacity encompasses the internal readiness of CSOs to adopt AI, including digital literacy, access to infrastructure, and institutional adaptability. Communal social capital, meanwhile, reflects the trust networks and cultural legitimacy necessary for technology adoption, shaped by local perceptions, linguistic relevance, and participatory design. While AI has the potential to positively influence each of these variables by enhancing transparency, automating tasks, and amplifying local voices, it carries risks of deepening inequality, eroding trust, or enabling surveillance if deployed

without ethical safeguards. Therefore, the integration of AI into Sudanese CSOs must be context-sensitive, ethically grounded, and participatory, ensuring that technological interventions reinforce rather than undermine civic resilience and institutional reform.

*** Methodology**

This study employs a qualitative mixed-methods approach to ensure both depth of understanding and contextual relevance: -

1- Comparative Case Study Analysis

A structured, focused comparison of AI integration in CSOs across four fragile states: South Sudan (e.g., The Sentinel Project's Hate base), Somalia (AI-driven health communication), Libya (diaspora-led human rights monitoring), and Sierra Leone (AI in epidemic response). This allows for the identification of transposable lessons and common pitfalls.

2- Document Analysis

A comprehensive review of legal frameworks (e.g., NGO laws), policy papers, reports from international bodies (UNDP, World Bank, OECD), and fragility indices (Fragile States Index, CIVICUS Monitor, WGI) to map the structural constraints and opportunities in Sudan.

*** Mathematical Structure of the Fragile State Index (FSI)**

The index includes 12 indicators grouped into four categories: Cohesion: Security Apparatus, Factionalized Elites, Group Grievance, Economic: Economic Decline, Uneven Development, Human Flight, Political: State Legitimacy, Public Services, Human Rights and Social/Cross-Cutting: Demographic Pressures, Refugees/IDPs, External Intervention. Each indicator is scored from 0 to 10, where: 0 = most stable and is 10 = most fragile.

This is the simplest mathematical part of the process. The total FSI score for a country calculated by **summing the scores of all 12 indicators**.

The Formula:

$$\text{FSI Score} = \sum_{i=1}^{12} \text{Indicators}_i$$

$$\text{FSI Score} = \sum C_1 + C_2 + C_3 + E_1 + E_2 + E_3 + P_1 + P_2 + P_3 + S_1 + S_2 + X_1$$

Where Indicators_i represents the score (0-10) for each of the 12 components.

*** Findings and Discussions**

1- Findings from Comparative Case Analysis

The analysis of the four cases yields consistent findings on the

prerequisites and risks of AI adoption: -

1- South Sudan: Demonstrated utility in conflict prediction (Sentinel Project, 2021) but limited by infrastructure and state mistrust.

2- Somalia: Showed effectiveness in localized communication (Abdirahman, 2021) but exposed risks of unsustainable donor-funded projects and political manipulation in a regulatory vacuum.

3- Libya: Highlighted the role of diaspora in leveraging AI for international advocacy but confirmed that local adoption is impossible without security and basic infrastructure.

4- Sierra Leone: Provided a success model of transparent, state-CSO collaboration using AI for public good (Vincent & Conteh, 2020), underscoring the importance of trust and institutional buy-in.

*** Synthesized Lessons for Sudan**

1- Infrastructure is a non-negotiable foundation.

2- Political will and regulatory frameworks determine whether AI empowers or represses.

3- Community trust, built through localization and transparency, is essential for legitimacy.

4- International support must be long-term and focused on capacity building, not short-term piloting.

2- Findings from Document Analysis

The Fragile States Index (FSI) for 2024 shows a stark global divide in state stability, with Sudan and South Sudan exhibiting extreme fragility, while developed nations like Germany and Canada demonstrate high resilience.

Table (1): Fragile States Index Trend (2018–2024)

Coumtry	2018	2019	2020	2021	2022	2023	2024	chamg e
Somalia	109.4	110.4	110.8	111.2	111.9	110.7	111.3	+1.9
Sudan	108.7	110.0	114.5	110.4	108.2	106.2	109.3	+0.6
South Sudan	104.6	107.8	109.6	109.2	108.6	108.5	109.0	+4.4
Libya	94.6	98.9	97.6	96.3	94.1	96.1	96.5	+1.9
United State	45.4	45.8	46.1	45.9	45.2	44.8	44.5	-0.9
United Kingdom	41.2	41.0	41.5	41.3	41.0	40.9	40.8	-0.4
Germany	25.3	25.1	24.9	24.3	24.3	24.1	24.0	-1.3
Japan	31.2	30.9	30.7	30.5	30.3	30.3	30.2	-1.0
Canada	19.6	19.3	19.1	18.9	18.8	18.7	18.6	-1.0
Swizerlan d	17.1	16.9	16.7	16.5	16.4	16.3	16.2	-0.9

Source: Fund for Peace – Fragile States Index, World Population Review

1- Global Ranking and Categorization (2024)

This table (2) presents the 2024 Fragile States Index (FSI) for a selection of countries, ranking them from the most fragile to the most stable.

Table (2): Fragile States Index Ranking and Categorization (2024)

Coumtry	FSI Score (2024)	Change from 2023	Global Rank	Category
Somalia	111.3	+0.6	1	Very High Alert
Sudan	109.3	+3.1	2	Very High Alert
South Sudan	109.0	+0.5	3	Very High Alert
Libya	96.5	+0.4	16	High Alert
United State	44.5	-0.3	162	Sustainable
United Kingdom	40.8	-0.2	167	Sustainable
Germany	24.0	-0.5	174	Very Sustainable
Japan	30.2	-0.4	172	Very Sustainable
Canada	18.6	-0.2	177	Very Sustainable
Swizerland	16.2	-0.3	178	Very Sustainable

Source: Fund for Peace – Fragile States Index, World Population Review

The above data confirms a clear bifurcation in global stability, as it shown below: -

1- Very High Alert States: Somalia (111.3), Sudan (109.3), and South Sudan (109.0) occupy the top three positions, indicating profound state failure across all measured indicators.

2- High Alert State: Libya (96.5) ranks 16th, remaining in a precarious state of factionalism and instability.

3- Sustainable/Very Sustainable States: In contrast, developed nations cluster at the opposite end of the spectrum. The United States (44.5) and United Kingdom (40.8) categorized as "Sustainable." while Germany (24.0), Japan (30.2), Canada (18.6), and Switzerland (16.2) are in the "Very Sustainable" category, with Switzerland being the world's most resilient state.

2- Longitudinal Trends (2018–2024)

Table (2) shows analysis of the six-year trend reveals distinct trajectories: -

1- Deteriorating Stability: Sudan shows significant volatility, with a sharp peak in fragility in 2020 (114.5) followed by a period of slight improvement and a recent sharp increase (+3.1 from 2023). South Sudan has demonstrated a steady, concerning upward trend in fragility, increasing by +4.4 points since 2018.

2- Persistent Crisis: Somalia's score has remained consistently catastrophic, fluctuating around 111, indicating a prolonged and entrenched humanitarian and governance crisis.

3- Stagnant Fragility: Libya's score, while high, has shown relative stability post-2019, suggesting a fragile but not rapidly worsening stalemate.

4- Gradual Improvement: All listed developed countries show a consistent, gradual improvement in their scores over the six-year period. Canada and Germany, for instance, have seen their scores decrease (improve) by -1.0 and -1.3 points, respectively.

3- Comparative Indicator Analysis: Sudan vs. South Sudan vs. Germany

Table (3) reflects the disaggregated indicator scores for 2024 provide a granular view of fragility drivers. The matrix below illustrates the profound gap between fragile and resilient states, with all indicators scored from 1 (best) to 10 (worst).

Table (3): Comparative Indicator Analysis: Sudan vs. South Sudan vs. Germany (2024)

Indicator	Sudan	South Sudan	Germany
C1: Security Apparatus	9.8	9.9	1.5
C2: Factionalized Elites	9.7	9.8	1.2
C3: Group Grievance	9.5	9.6	1.3
E1: Economic Decline	9.6	9.7	1.4
E2: Uneven Development	9.4	9.5	1.6
E3: Human Flight & Brain Drain	9.3	9.4	1.7
P1: State Legitimacy	9.7	9.8	1.3
P2: Public Services	9.5	9.6	1.2
P3: Human Rights & Rule of Law	9.6	9.7	1.4
S1: Demographic Pressures	9.4	9.5	1.5
S2: Refugees & IDPs	9.8	9.9	1.1
X1: External Intervention	9.6	9.7	1.3
Total FSI Score	109.3	109.0	24.0

Table 1: Comparative Fragility Indicator Matrix (2024). Source: World Population Review – FSI. The results underscore the multifaceted nature of state fragility and the interconnectedness of its political, economic, social, and security dimensions. The Anatomy of Collapse Sudan and South Sudan present near identical profiles of failure across all 12 FSI indicators. However, the drivers and nuances differ: -

1- Sudan's Volatile Trajectory: Sudan's significant spike in fragility around 2020-2021 and its recent sharp increase are directly attributable to its political transition collapse. The October 2021 coup dismantled a fragile power-sharing government, intensifying elite fragmentation (C2) and eroding state legitimacy (P1). This political rupture catalyzed the current devastating conflict between the Sudanese Armed Forces (SAF) and Rapid Support Forces (RSF), leading to a catastrophic breakdown in security (C1), the collapse of public services (P2), and massive internal displacement (S2). The high score for External Intervention (X1) highlights how regional powers, all these exacerbate the conflict by backing rival factions.

2- South Sudan's Persistent Crisis: In contrast, South Sudan's fragility shows less volatile but more entrenched with compare, reflecting a chronic governance and humanitarian crisis stemming from its civil war. While a fragile peace agreement exists, elite factionalism

(C2) and a complete lack of public service delivery (P2) persist. Its economy remains almost entirely dependent on oil, making it vulnerable to price shocks (E1), and it suffers from severe ethnic grievances (C3) that fuel continuous local-level violence.

3- The Architecture of Resilience: Germany's position as a "Very Sustainable" state offers a benchmark for successful state building. Its resilience built on a foundation of: -

Institutional Legitimacy and Cohesion: Extremely low scores in Factionalized Elites (C2), State Legitimacy (P1), and Rule of Law (P3) indicate a political culture characterized by democratic consensus, institutional trust, and constitutional stability.

Effective Service Delivery and Economic Management: Scores of 1.2 for Public Services (P2) and 1.4 for Economic Decline (E1) reflect a robust social market economy that provides universal access to essential services and mitigates macroeconomic instability.

Positive Demographic and Social Management: Germany's low score on Refugees and IDPs (S2) is notable as it hosts a large refugee population; this score suggests a systemic capacity to manage influxes without destabilizing the state, turning a potential pressure into a measure of institutional strength.

A Proposed Framework for Sudan-Specific Analysis The standard FSI model is a effective diagnostic tool. However, for designing targeted interventions in Sudan, a localized assessment framework is proposed. This framework would adapt the FSI indicators by reweighting them to reflect Sudan's specific context:

Increased Weighting: Indicators like Security Fragmentation (RSF vs. SAF dynamics), Legitimacy Crisis (coup legacy), Economic Collapse (hyperinflation), and Civic Space Suppression should be assigned higher weights (e.g., 0.10 each) as they are the primary drivers of the current crisis.

Contextual Reframing: The standard indicator "External Intervention" (X1) should be specifically analyzed through the lens of competing regional proxies, rather than neutral peacekeeping missions.

*** Conclusion and policy implications**

The analysis confirms that the extreme fragility of the Sudanese state, as systematically captured by its Fragile States Index profile, creates a context where Civil Society Organizations (CSOs) are both critically needed and profoundly constrained. The theoretical synthesis

of political opportunity structures, organizational capacity, and communal social capital provides a powerful lens for understanding this paradox. The findings demonstrate that AI's potential to aid CSOs by analyzing needs, monitoring rights, and bridging communication gaps is directly mediated by these three variables. The comparative cases underscore that technological solutions fail without parallel investments in the political and social infrastructure that enable them.

Therefore, the central conclusion is that AI cannot overcome Sudan's structural deficits in isolation. Its utility is contingent on a deliberate, phased strategy that first addresses foundational barriers: securing digital rights, building basic infrastructure, and fostering community trust. The proposed framework designed to align technological adoption with the broader goal of rebuilding social capital and institutional legitimacy. Ultimately, for AI to be a transformative tool for Sudanese civil society, it must embedded within a long-term, ethically grounded project of political and civic renewal, not deployed as a standalone technical fix. This approach offers a blueprint for leveraging technology to not only restore but also fundamentally reimagine civil society in contexts of profound fragility.

Artificial intelligence should be viewed as a strategic tool not a standalone solution for reconstruct civil society in Sudan. Its deployment must be secondary to efforts that strengthen political opportunity, organizational capacity, and communal social capital. For international donors and development agencies, this means shifting funding from "tech-first" approaches to "infrastructure-first" strategies by investing in digital rights, legal frameworks, and foundational analog and digital infrastructure, while mandating integrated project designs that include political and social analysis, pilot learning goals, and South-South knowledge exchange. Sudanese CSOs should begin with a self-assessment of their political environment, internal capacity, and community trust, prioritizing low-tech, high-trust solutions such as data collection and internal efficiency tools, and forming a Technology & Ethics Consortium to guide responsible innovation. Technology partners and researchers must focus on "frugal AI" and inclusive design, creating offline-first, low-bandwidth tools that work on basic smartphones and via USSD or SMS-ensuring

accessibility beyond elite circles and aligning technological development with local realities.

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