Enhancing National Security Through AI-Driven Crowdsourced Intelligence Systems in Nigeria: Public Awareness and Adoption Analysis

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Abstract

Nigeria's security landscape is increasingly challenged by complex threats such as terrorism, cybercrime, insurgency, and communal violence. Traditional intelligence systems are often reactive and insufficient to address these dynamic security risks. This study explores the awareness and adoption of AI-driven crowdsourced intelligence systems (AI-DCRIS) as a strategic tool for enhancing national security in Nigeria. Drawing on an extended Unified Theory of Acceptance and Use of Technology (UTAUT) model, the study integrates additional constructs such as digital literacy, trust in AI, perceived risk, and reward mechanisms. Data were collected through a structured survey of 204 respondents across Nigeria's six geopolitical zones and analyzed using Structural Equation Modeling (SEM). Findings reveal that perceived usefulness, digital literacy, and trust in AI significantly influence adoption intention, while awareness strategies moderate adoption outcomes. However, reward systems and perceived accessibility showed weaker effects. The study proposes a validated framework and offers policy and design recommendations to improve public engagement with AI-DCRIS platforms. These findings underscore the importance of building trust, enhancing digital competencies, and developing inclusive infrastructure to realize the full potential of AI in participatory national security.

Keywords: AI-driven systems, Crowdsourced Intelligence, national security, technology adoption, Nigeria, digital literacy, UTAUT, public trust

1. Introduction

Nigeria faces a range of complex and evolving security challenges, including terrorism, insurgency, cybercrime, kidnapping, and communal violence. Traditional intelligence gathering techniques such as Human Intelligence (HUMINT) and Signal Intelligence (SIGINT) are often slow, costly, and reactive in nature (Falode et al., 2021; Iyekekpolo, 2019). The dynamic nature of security threats requires a more responsive and inclusive

framework. With increased internet penetration and mobile device usage, crowdsourced intelligence (CRWINT), enhanced by Artificial Intelligence (AI), presents a promising avenue for real-time, participatory intelligence gathering (Howe, 2006; Hayes & Cappa, 2018).

This study explores the extent of public awareness and adoption of AI-driven crowdsourced intelligence systems (AI-DCRIS) in Nigeria. The research investigates key predictors such as perceived usefulness, digital literacy, trust in AI, and social influence. It further analyzes how contextual variables like infrastructure readiness and reward mechanisms mediate or moderate adoption. The study culminates in a validated framework aimed at informing policy and practical implementation.

2. Background and Problem Statement

Although technological tools exist for public reporting of crime and emergencies such as "NPF Rescue Me," "N-alerts," and "Mobilizer"; they remain underutilized in Nigeria due to limited awareness, infrastructural deficiencies, and mistrust in the systems (Balogun, 2021; Oluwatoyin & Yusuff, 2021). Security agencies still rely heavily on traditional methods and often lack the capacity to integrate real-time public intelligence into their operational workflows.

The lack of a structured, evidence-based model for promoting AI adoption in national security further aggravates the situation. Without a clear roadmap that addresses trust, perceived risks, digital literacy, and infrastructural readiness, Nigeria's transition to a proactive security intelligence model remains slow. Hence, this study proposes and tests a conceptual framework for awareness and adoption of AI-DCRIS platforms, with practical policy implications.

3. Theoretical Framework

The study adopts a multi-theoretical approach. The core is the Unified Theory of Acceptance and Use of Technology (UTAUT), which posits that factors like performance expectancy (i.e., perceived usefulness), effort expectancy (i.e., ease of use), and social influence predict technology adoption (Venkatesh et al., 2003).

To enhance contextual relevance, constructs such as trust in AI, digital literacy, perceived risk, and awareness strategy were integrated. Self-Determination Theory (SDT) informs the role of motivational factors like reward systems (Deci & Ryan, 2008). Perceived Risk Theory

(Sjöberg, 2000) and Participatory Security Theory (Duffield, 2007) further ground the framework in security-specific contexts.

These theories collectively inform the development of a model that addresses both individual psychological factors and socio-technical challenges unique to Nigeria.

4. Literature Review

Numerous global case studies show the effectiveness of AI-integrated CRWINT systems. For instance, Ushahidi in Kenya allowed real-time mapping of electoral violence using SMS and web data (Okolloh, 2009). In India, SafetiPin used AI to evaluate women's safety through user-submitted data (Mishra et al., 2015). In the U.S., Nextdoor and Citizen apps facilitated neighborhood security updates via crowd inputs.

In contrast, Nigeria's platforms suffer from low engagement due to insufficient public awareness and weak infrastructure (Oluwatoyin & Yusuff, 2021). While public interest in technology is rising, adoption remains stifled by lack of trust, poor usability, and digital illiteracy. Studies indicate that constructs such as perceived usefulness, trust, and reward systems significantly impact adoption in developing countries (Ezurike, 2023; McKnight et al., 2002).

5. Research Objectives

This study aims to:

- Examine the influence of perceived usefulness (PU) on adoption intention (AI).

- Assess the effect of perceived ease of use (PEOU) and digital literacy (DL) on AI.

- Explore how awareness strategy (AS) and perceived accessibility (PA) moderate adoption.

- Analyze the mediating roles of trust in AI (TAI), security concerns (SC), and perceived risk (PR).

Key Research Questions:

- How do PU and PEOU influence AI?

- Does digital literacy significantly impact AI?

- How does awareness strategy moderate the link between awareness and adoption?

- Do trust and perceived risk mediate adoption decisions?

6. Methodology

The study employed a quantitative design, using structured questionnaires distributed online across Nigeria's six geopolitical zones. A sample of 204 valid responses was analyzed using Structural Equation Modeling (SEM) in AMOS.

Measurement instruments were adapted from established scales (e.g., Davis, 1989; Venkatesh et al., 2003). Reliability and validity were ensured through Cronbach's alpha, composite reliability, and AVE calculations. Demographic data were also collected to control for potential confounding effects.

7. Results and Discussion

Findings reveal that PU ($\beta = 0.30$), TAI ($\beta = 0.28$), and DL ($\beta = 0.32$) strongly predict adoption intention ($p < 0.01$). Awareness strategy significantly moderates the relationship between technology awareness and adoption, while reward systems and perceived accessibility showed weak or insignificant effects.

Perceived risk negatively correlates with AI, while trust in AI serves as a significant mediator. These results underscore the importance of transparency, user education, and feedback mechanisms to build trust. Policymakers should prioritize digital literacy campaigns and localized awareness strategies to boost adoption.

8. Implications

Theoretically, this study extends UTAUT with context-relevant variables, offering a more robust model for fragile-state environments. Practically, it informs national security agencies, platform developers, and policymakers on how to design and implement effective AI-DCRIS systems.

Software developers should prioritize user-friendly interfaces, multilingual options, and transparent data use policies. Policymakers must address the digital divide through infrastructure investment and community outreach.

9. Recommendations

- Launch public awareness campaigns through social and traditional media.

- Collaborate with NGOs and tech hubs to improve digital literacy.

- Integrate gamified rewards to motivate user participation.

- Design privacy-compliant, anonymous reporting tools.

- Invest in internet access and mobile penetration in underserved regions.

10. Conclusion

AI-driven crowdsourced intelligence platforms have the potential to revolutionize Nigeria's national security landscape. However, their success depends on public trust, awareness, and the removal of structural barriers. This study offers a validated framework and practical steps for fostering adoption. With the right mix of policy, technology, and community engagement, Nigeria can build a more proactive and participatory security ecosystem.

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