

Effectiveness of Artificial Intelligence in the Detection and Prevention of Violent Crimes in Niger State, Nigeria

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Abstract

This study examined the effectiveness of artificial intelligence (AI) in the detection and prevention of violent crimes in Niger State, Nigeria, with emphasis on evaluating operational outcomes and identifying strategies for strengthening AI integration in the state's security architecture. A quantitative descriptive survey design was adopted. The population comprised operational and intelligence personnel of the Nigeria Police Force (NPF), Nigeria Security and Civil Defence Corps (NSCDC), and Nigerian Vigilante Group (NVG) in Niger State, totalling 1,623 personnel. Using Yamane's formula, a sample of 321 was determined; 350 respondents were targeted to account for attrition, and 327 valid responses were analysed using frequency distribution, mean, and standard deviation. The instrument demonstrated strong internal consistency (overall $\alpha = 0.85$; sub-scales: 0.82 and 0.88). Findings revealed that AI-driven approaches are currently of limited effectiveness (grand mean = 2.88, below the 3.00 agreement threshold), constrained by minimal deployment, inadequate infrastructure, insufficient training, and weak institutional support. Conversely, respondents strongly endorsed a comprehensive set of enhancement strategies (grand mean = 4.25), prioritising infrastructure investment, institutionalised training, dedicated policy frameworks, inter-agency data sharing, and research partnerships. It is recommended that government and relevant stakeholders urgently invest in AI-enabling infrastructure, develop context-specific AI adoption strategies, and build institutional capacity to support effective AI integration into Niger State's security operations.

Keywords: AI Effectiveness, Crime Detection, Crime Prevention, Violent Crimes, Niger State, Security Agencies, Nigeria.

Introduction

The application of artificial intelligence technologies in public safety and law enforcement has emerged as one of the most consequential and rapidly evolving domains at the intersection of technology, governance, and security policy. According to Brayne (2021) and Perry *et al.* (2013), across diverse national and institutional contexts, AI-powered tools are being deployed to enhance the detection, prediction, and prevention of criminal activity in ways that fundamentally extend the analytical capacity and operational reach of security

agencies beyond the limits of conventional human intelligence and physical surveillance. Predictive policing algorithms that anticipate crime hotspots, facial recognition systems that identify suspects from digital imagery, intelligent video surveillance networks that monitor public spaces in real time, and geospatial analytics platforms that integrate crime data with demographic and environmental indicators collectively represent a new and transformative technological architecture for crime management. The global evidence on the effectiveness of these tools, while varied and context-dependent, broadly affirms their potential to improve security outcomes when deployed within enabling institutional and infrastructural conditions (Ratcliffe *et al.*, 2021; Wirtz *et al.*, 2019).

In the Nigerian context, where violent crime has reached alarming levels in numerous states and where security agencies continue to operate predominantly within conventional, reactive frameworks, the question of AI effectiveness in crime detection and prevention is both timely and pressing. Alemika (2009 and Eke (2025) disclosed that the Nigeria Police Force (NPF), the Nigeria Security and Civil Defence Corps (NSCDC), and allied agencies face acute operational challenges including limited personnel, inadequate equipment, poor intelligence sharing, and chronic resource deficits that significantly constrain their ability to respond effectively to the dynamic and increasingly organised nature of violent criminality. Against this backdrop, AI technologies represent a potentially transformative supplement to existing security capacity, one that could meaningfully improve detection rates, reduce response times, and enable more proactive and intelligence-led approaches to crime prevention.

Niger State occupies a particularly important position in this discourse. As one of Nigeria's most insecurity-prone states, with documented escalations in armed robbery, banditry, kidnapping, homicide, and communal violence over the past five years, Niger State presents both an acute security challenge and a compelling case for evaluating the potential of AI-enabled responses (Niger State Ministry of Internal Affairs, 2024; Ojewale, 2024). Its security agencies operate in a demanding environment characterised by vast ungoverned territories, poor digital infrastructure, and limited institutional capacity for technology integration. Despite the growing global literature on AI in law enforcement, empirical research focused specifically on the effectiveness of AI-driven security approaches in Niger State and in Nigeria's north-central zone more broadly remains conspicuously limited (Hassan, 2023; Oloke *et al.*, 2024). This study fills that gap by evaluating the effectiveness of AI in crime detection and prevention from the perspective of frontline security personnel in Niger State and by generating evidence-based strategies for enhancing AI integration grounded in the specific institutional and structural realities of the state.

Statement of the Problem

Despite the escalating burden of violent crime in Niger State and the documented global effectiveness of AI technologies in crime detection and prevention, empirical evidence on whether and to what extent AI-driven approaches are delivering operational security outcomes in Niger State remains absent from the academic and policy literature. Security

agencies in the state continue to confront rapidly evolving criminal threats with predominantly conventional methods, and the few isolated deployments of digital security tools that have occurred have not been systematically evaluated for effectiveness (Eke, 2025; Niger State Ministry of Internal Affairs, 2024). Without such evaluation, it is impossible to determine whether current AI deployments are generating meaningful security value, or to make a credible evidence-based case for the expanded investment and institutional reform that enhanced AI integration would require.

Equally, the strategies most likely to be effective in accelerating AI integration and improving its operational impact in the specific context of Niger State have not been empirically identified. Policy discussions on AI in Nigerian security contexts tend to rely on generic frameworks derived from high-income country experiences that do not adequately account for the infrastructural, institutional, and human capacity realities of north-central Nigeria (Hassan, 2023; Perry *et al.*, 2013). This study addresses both dimensions of this problem by empirically evaluating the current effectiveness of AI-driven approaches in Niger State and by identifying the strategies that security personnel themselves regard as most promising for enhancing AI integration in the state's crime management architecture.

Research Objectives

The specific objectives of this study are to:

1. Evaluate the effectiveness of AI-driven approaches in the detection and prevention of violent crimes in Niger State, Nigeria.
2. Identify strategies for enhancing the integration of AI in the detection and prevention of violent crimes in Niger State, Nigeria.

Research Questions

This study is guided by the following research questions:

1. How effective are AI-driven approaches in the detection and prevention of violent crimes in Niger State, Nigeria?
2. What strategies can enhance the integration of AI in the detection and prevention of violent crimes in Niger State, Nigeria?

Theoretical Framework

Routine Activity Theory

Routine Activity Theory (RAT), originally propounded by Cohen and Felson (1979), provides a robust and widely applied theoretical framework for understanding both the occurrence of violent crime and the conditions under which security interventions are most likely to succeed. The theory posits that a criminal event is most likely to occur when three elements converge simultaneously in time and space: a motivated offender, a suitable target, and the absence of a capable guardian. This tripartite convergence model has generated an extensive and productive research literature on crime hotspot analysis, environmental design, and technology-supported guardianship, and it provides a coherent theoretical

basis for evaluating the effectiveness of AI technologies as mechanisms for extending and enhancing capable guardianship in crime-prone environments (Felson & Eckert, 2019; Eck & Weisburd, 1995).

In the Niger State context, RAT offers a compelling explanation for the persistence and escalation of violent crimes in terms of the chronic weakness of guardianship capacity across the state's vast, sparsely policed territory. AI technologies, from this theoretical perspective, function as mechanisms for dramatically extending guardianship capacity beyond the physical and temporal limits of human law enforcement, enabling real-time monitoring of large geographic areas, anticipatory identification of high-risk crime convergences, and faster, better-informed security responses that disrupt the conditions enabling crime (Brayne, 2021; Ratcliffe *et al.*, 2021). Extensions of RAT by Eck and Weisburd (1995) and Farrell and Pease (2017) further emphasise that crime prevention effectiveness is most pronounced when guardianship interventions are targeted precisely at the temporal and spatial convergences where motivated offenders encounter suitable targets. This study draws on RAT to provide a conceptual foundation for evaluating AI effectiveness in Niger State, interpreting security personnel's perceptions of AI operational outcomes through the theoretical lens of guardianship enhancement and crime convergence disruption.

Technology Acceptance Model (TAM)

The Technology Acceptance Model, developed by Davis (1989), provides a complementary theoretical framework for understanding the individual and organisational factors that mediate the relationship between AI deployment and operational effectiveness. TAM posits those two primary cognitive beliefs: perceived usefulness (PU) and perceived ease of use (PEOU) determine an individual's intention to adopt and use a technology, and that actual use behaviour is shaped by these adoption intentions. Where security personnel perceive AI tools as genuinely useful in improving crime detection and prevention outcomes, they are more likely to actively and consistently engage with these technologies, thereby maximising their operational contribution (Venkatesh *et al.*, 2016).

In the Niger State security context, TAM illuminates an important pathway through which structural conditions translate into effectiveness outcomes. Venkatesh *et al.*'s (2016) extension of TAM into the Unified Theory of Acceptance and Use of Technology (UTAUT) further incorporates facilitating conditions encompassing infrastructure, training, and institutional support as independent determinants of use behaviour, providing theoretical grounding for the study's identification of strategies that address these enabling conditions. This study draws on TAM and UTAUT to interpret the relationship between current AI deployment conditions and observed effectiveness levels in Niger State.

Conceptual Framework

Concept of AI Effectiveness in Crime Detection and Prevention

The effectiveness of AI in crime detection and prevention refers to the degree to which AI technologies contribute measurable and meaningful improvements to the operational

capacity of security agencies to identify, anticipate, respond to, and prevent criminal activity, relative to conventional, non-AI-assisted methods (Perry *et al.*, 2013; Brayne, 2021). Effectiveness in this context is a multidimensional construct that encompasses detection accuracy, response speed, prevention impact, and operational efficiency (Ratcliffe *et al.*, 2021; Wirtz *et al.*, 2019). The global evidence is broadly positive in contexts where enabling conditions are adequate, but highly variable in environments where infrastructural, institutional, and human capacity deficits constrain deployment quality (Hassan, 2023). Scholars have emphasised that AI effectiveness in crime management cannot be evaluated independently of the institutional context in which AI tools are deployed, and that effectiveness is therefore as much an institutional and governance challenge as a technological one (Brayne, 2021; Eke, 2025).

Strategies for Enhancing AI Integration in Security Operations

Strategies for enhancing AI integration in security operations refer to the deliberate, institutionally coordinated set of investments, policy measures, capacity development initiatives, and governance arrangements designed to improve the quality, breadth, and operational effectiveness of AI technology deployment within law enforcement and security agencies (Wirtz *et al.*, 2019; Hassan, 2023). In the global literature, these strategies cluster around infrastructure investment, training and capacity development, policy and governance frameworks, partnership and collaboration, and phased deployment approaches (Perry *et al.*, 2013; Ratcliffe *et al.*, 2021; Brayne, 2021). In the specific context of Niger State, where structural deficits are severe, effective AI integration strategies must be carefully sequenced and contextually tailored to the realities of north-central Nigeria's digital infrastructure, human capital, and institutional landscape.

Literature Review

The empirical literature on AI effectiveness in law enforcement is growing rapidly, though its geographic distribution remains heavily skewed toward high-income country contexts. This section synthesises the available evidence thematically, with particular attention to the sub-Saharan African literature most relevant to the Niger State context.

AI Effectiveness in Crime Detection and Prevention: Global Evidence

In high-income country contexts, the evidence on AI-powered predictive policing, facial recognition, and intelligent surveillance systems is broadly affirmative. Perry *et al.* (2013) documented significant improvements in crime detection rates, hotspot identification accuracy, and emergency response times attributable to AI-powered predictive policing in several United States jurisdictions. Ratcliffe *et al.* (2021) similarly reported that geospatial AI analytics tools meaningfully improved patrol allocation efficiency and contributed to measurable reductions in targeted crime categories in cities where adequate data infrastructure enabled consistent deployment. In the United Kingdom and Singapore, AI-enabled facial recognition and automated number-plate recognition systems have been

credited with improving suspect identification rates, though their deployment has also generated substantive legal and ethical debate around civil liberties and data governance (Brayne, 2021).

A consistent finding across this literature is that AI effectiveness is not a simple function of technical sophistication but of the enabling ecosystem within which tools are deployed. Wirtz *et al.* (2019) systematically reviewed AI applications across multiple public sector domains and concluded that the gap between technical AI capability and actual operational effectiveness is most pronounced in contexts where infrastructure, human capital, and institutional governance are inadequate. This finding has important implications for resource-constrained contexts such as Niger State, where enabling conditions diverge substantially from those documented in high-income country studies.

AI in Security in Sub-Saharan Africa

Empirical evidence on AI effectiveness in security settings across sub-Saharan Africa is more limited but growing. Hassan (2023), in a multi-country assessment of AI in public safety across Africa, documented that while targeted AI deployments in urban security contexts in Kenya, Rwanda, and South Africa generated measurable improvements in response times and crime detection rates, effectiveness was consistently constrained by infrastructural deficits, including unreliable electricity supply, limited broadband penetration, and inadequate hardware at field command levels. The author also highlighted significant capacity gaps: many frontline personnel lacked the digital literacy required to interpret AI-generated outputs effectively, and the absence of structured training programmes undermined adoption quality even where tools were physically deployed.

In the Nigerian context, eke (2025) examined AI-based predictive policing adoption within the Nigeria Police Force and noted that AI deployment remains largely confined to federal commands in Lagos and Abuja, with state commands — particularly in the north — exhibiting minimal deployment and correspondingly limited operational impact. Oloke *et al.* (2024) found that even in Lagos, where AI surveillance infrastructure is more developed relative to other Nigerian states, effectiveness was substantially constrained by power supply instability, maintenance deficits, and training gaps. These findings establish a trajectory of AI underdevelopment in Nigerian state-level security that the present study extends and empirically documents for the first time in the Niger State context.

Enabling Conditions and Adoption Barriers

Across the literature, several enabling conditions are consistently identified as necessary for AI to deliver meaningful operational effectiveness in law enforcement settings. Reliable digital infrastructure including stable electricity supply, high-speed internet connectivity, adequate computing hardware, and secure data storage constitutes the foundational technical prerequisite without which even well-designed AI tools cannot function consistently at the operational level (Perry *et al.*, 2013; Hassan, 2023). Human capital development through structured and context-specific training programmes is equally

critical, as Ratcliffe *et al.* (2021) documented in their analysis of predictive policing implementations across multiple jurisdictions. Institutional governance frameworks, including national and sub-national AI policies, data protection regulations, accountability mechanisms, and inter-agency coordination agreements, are identified by Brayne (2021) and Wirtz *et al.* (2019) as essential for ensuring that AI deployment is sustainable, accountable, and aligned with constitutional and operational priorities.

In the African context, Hassan (2023) additionally emphasise the importance of partnership strategies that engage technology developers, research institutions, and community stakeholders alongside security agencies, arguing that contextually appropriate AI solutions for African security environments require co-development approaches that cannot be adequately substituted by the direct importation of tools designed for high-income country conditions. This observation is particularly relevant for Niger State, where the structural distance from the conditions documented in global best-practice evidence is most pronounced.

Methodology

This study adopted a descriptive survey research design, which is well-suited for empirical studies that seek to systematically describe and document the characteristics of a phenomenon, a population, or a situation as it exists in a natural setting, without the manipulation of variables by the researcher (Creswell & Creswell, 2018). The descriptive survey design is particularly appropriate given that it sought to empirically evaluate perceptions of AI effectiveness in crime detection and prevention and to document the strategies that security personnel regard as most promising for enhancing AI integration. The study was conducted in Niger State, located in the north-central geopolitical zone of Nigeria.

The target population comprised operational and intelligence personnel of three security agencies in Niger State: the Nigeria Police Force (NPF), the Nigeria Security and Civil Defence Corps (NSCDC), and the Nigerian Vigilante Group (NVG). These agencies constituted the study population following the non-participation of the Nigerian Army and the Department of State Services (DSS), whose commands declined to grant access to their personnel for the purposes of this research. The NPF, NSCDC, and NVG were retained as the study population because they collectively represent the primary frontline security agencies responsible for daily crime detection and prevention operations in Niger State. The accessible population comprised 1,623 personnel: 940 NPF officers, 438 NSCDC staff, and 245 NVG members. Proportionate stratified random sampling was adopted as the sampling technique. The sample size was determined using Yamane's (1967) formula: $n = N / (1 + Ne^2)$, where $N = 1,623$ and $e = 0.05$. This yielded $n = 1,623 / (1 + 1,623 \times 0.0025) = 1,623 / 5.058 \approx 321$. A 9% attrition allowance was added for non-response, yielding a final target sample of 350 respondents. Proportionate allocation produced: NPF = 203 respondents, NSCDC = 95, NVG = 52. Individual respondents within each agency were selected using simple random sampling via a ballot approach.

The primary instrument for data collection was a structured questionnaire designed by the researchers. The questionnaire comprised two sections: Section A captured demographic information including agency affiliation, rank, years of service, and educational qualification. Section B contained sixteen (16) Likert-scale items rated on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree), with eight items assigned to each research objective. Content validity of the questionnaire was established through expert review by three academics specialising in criminology, security studies, and information systems at Ibrahim Badamasi Babangida University, Lapai. Their feedback informed revisions to item wording, structural alignment with the research objectives, and contextual relevance to the Niger State security environment.

Construct validity was assessed through exploratory factor analysis (EFA) conducted on the pilot data ($n = 35$) prior to main study deployment. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.76, exceeding the recommended threshold of 0.60 (Kaiser, 1974), and Bartlett's Test of Sphericity was significant ($\chi^2 = 412.6$, $df = 120$, $p < .001$), confirming the factorability of the correlation matrix. Principal component analysis with varimax rotation was applied to the 16 items. Two components with eigenvalues greater than 1.0 were extracted, accounting for 61.3% of total variance. Component 1 (AI effectiveness items 1–8) had loadings ranging from .61 to .79, and Component 2 (enhancement strategies items 9–16) had loadings ranging from .64 to .81. All items loaded substantially on their theoretically assigned components and showed negligible cross-loadings (all $< .35$), providing satisfactory evidence of construct validity for the two-subscale structure of the instrument.

Reliability was assessed through a pilot test conducted with 35 security personnel from Kogi State Command headquarters, who were excluded from the main study. Cronbach's alpha coefficients were computed using SPSS version 27. The overall reliability coefficient for all 16 items was $\alpha = 0.85$. The Objective 1 sub-scale (Items 1–8) yielded $\alpha = 0.82$, and the Objective 2 sub-scale (Items 9–16) yielded $\alpha = 0.88$. All coefficients exceed the widely accepted threshold of 0.70 (Nunnally & Bernstein, 1994), confirming adequate internal consistency across both sub-scales. The questionnaire was administered directly to respondents through field distribution with the assistance of trained research assistants. Data were analysed using descriptive statistics computed via SPSS version 27, including frequency distributions, percentages, item means, and standard deviations. A mean score of 3.00 (midpoint of the 5-point Likert scale) served as the decision rule: means ≥ 3.00 indicate agreement, while means < 3.00 indicate disagreement (Oloke et al., 2024).

Ethical Considerations

Ethical approval for this study was obtained from the Research Ethics Committee of the National Open University of Nigeria, Abuja (Approval Reference: NOUN/REC/2023/047). Prior to data collection, written permission was sought from and granted by the respective headquarters of the NPF, NSCDC, and NVG commands in Niger State. All participants were fully informed of the study's purpose, their right to withdraw at any point without

consequence, and the confidentiality of their responses. Participation was entirely voluntary, and no personal identifying information was collected. Data were stored securely and used solely for the purposes of this research, in accordance with the ethical standards of the National Open University of Nigeria.

Results and Discussion

Demographic Profile of Respondents

Of the 350 questionnaires administered, 327 were retrieved and found usable, representing a response rate of 93.4%. Males constituted 76.8% of respondents, consistent with the gender composition of Nigerian security agencies. By agency, the distribution was NPF (59.0%), NSCDC (28.4%), and NVG (12.5%). The majority of respondents (64.2%) had between 6 and 15 years of service, reflecting substantial operational experience. Educational qualifications ranged from SSCE/WAEC (13.8%) to first degree/HND (34.6%), with OND/NCE holders constituting the largest sub-group (33.0%).

Results

Research Question 1

How effective are AI-driven approaches in the detection and prevention of violent crimes in Niger State, Nigeria?

Table 1: Mean scores and standard deviations for respondents' perceptions of the effectiveness of AI-driven approaches in the detection and prevention of violent crimes in Niger State (n = 327)

Item	Statement	Mean	SD	Decision
1	AI-enabled surveillance technologies have improved the speed of crime detection in our operational area.	3.18	0.92	Agreed
2	Predictive policing tools powered by AI have helped in identifying crime hotspots before incidents occur.	2.89	0.97	Disagreed
3	AI-assisted facial recognition systems have enhanced the identification of criminal suspects.	2.74	0.99	Disagreed
4	AI-driven data analytics platforms have improved intelligence gathering and processing capabilities.	3.04	0.91	Agreed
5	The deployment of AI tools has contributed to a measurable reduction in violent crime incidents.	2.61	0.95	Disagreed
6	AI technologies have enhanced the capacity of security agencies to respond to violent crimes in real time.	3.11	0.88	Agreed
7	Security personnel have found AI-enabled tools effective in supporting crime prevention operations.	2.78	0.93	Disagreed
8	Overall, AI-driven approaches have demonstrated effectiveness in detecting and preventing violent crimes in Niger State.	2.67	0.96	Disagreed
	Grand Mean	2.88	0.94	Disagreed

Table 1 shows the mean scores and standard deviations of respondents' perceptions regarding the effectiveness of AI-driven approaches in the detection and prevention of violent crimes in Niger State. The mean values ranged from 2.61 to 3.18, while the standard deviation values ranged from 0.88 to 0.99. The grand mean of 2.88 (SD = 0.94) falls below the 3.00 decision threshold, indicating that respondents disagreed overall with the proposition that AI-driven approaches are currently effective in crime detection and prevention in Niger State. Items 1, 4, and 6 relating to the speed of crime detection, data analytics for intelligence gathering, and real-time response capacity attracted agreement, reflecting pockets of perceived utility in specific operational dimensions. However, items relating to predictive policing deployment, facial recognition use, measurable crime reduction, overall effectiveness in prevention operations, and general effectiveness judgements all attracted disagreement, indicating that the current level of AI deployment is insufficient to generate broad and consistent operational effectiveness across the security agencies of Niger State.

Research Question 2

What strategies can enhance the integration of AI in the detection and prevention of violent crimes in Niger State, Nigeria?

Table 2: Mean scores and standard deviations for respondents' perceptions of strategies for enhancing the integration of AI in the detection and prevention of violent crimes in Niger State (n = 327)

Item	Statement	Mean	SD	Decision
9	Sustained investment in AI-enabling digital infrastructure including power supply and internet connectivity is essential for enhancing AI integration in crime management.	4.43	0.55	Agreed
10	A dedicated and institutionalised AI training curriculum for security personnel would significantly improve the effectiveness of AI deployment in crime detection.	4.37	0.58	Agreed
11	Developing a clear national and state-level AI policy framework for the security sector would enhance coordinated AI integration.	4.31	0.62	Agreed
12	Establishing inter-agency data sharing and AI-powered crime analytics platforms would improve the collective effectiveness of security agencies.	4.19	0.68	Agreed
13	Partnering with universities, research institutions, and technology firms would strengthen AI development and deployment in security operations.	4.24	0.65	Agreed
14	Increasing budgetary allocations specifically earmarked for AI technology procurement and maintenance would accelerate AI integration.	4.38	0.57	Agreed

Item	Statement	Mean	SD	Decision
15	Community engagement and public trust-building strategies are necessary to enhance the legitimacy and effectiveness of AI-enabled security responses.	3.96	0.74	Agreed
16	Phased and pilot-based AI deployment strategies that allow agencies to test and adapt tools before full-scale rollout would improve integration outcomes.	4.12	0.71	Agreed
	Grand Mean	4.25	0.64	Agreed

Table 2 shows the mean scores and standard deviations of respondents' perceptions of strategies for enhancing AI integration in crime detection and prevention in Niger State. The mean values ranged from 3.96 to 4.43, while the standard deviation values ranged from 0.55 to 0.74. The grand mean of 4.25 (SD = 0.64) indicates that respondents agreed strongly and consistently with all proposed strategies. Investment in AI-enabling digital infrastructure recorded the highest mean (4.43), closely followed by increased budgetary allocations for AI procurement (4.38), institutionalised AI training (4.37), and the development of clear policy frameworks (4.31), with community engagement and phased deployment strategies recording comparatively lower but still strongly agreed means.

Findings

The following findings emerged from the study:

1. AI-driven approaches to the detection and prevention of violent crimes are currently of limited overall effectiveness in Niger State, as evidenced by a grand mean of 2.88 — below the 3.00 agreement threshold — with only selective agreement on items relating to crime detection speed, data analytics, and real-time response, and consistent disagreement on items relating to predictive policing deployment, facial recognition use, measurable crime reduction, and overall prevention effectiveness.
2. Security personnel in Niger State identified a comprehensive and strongly endorsed set of strategies for enhancing AI integration in crime detection and prevention (grand mean = 4.25), prioritising sustained digital infrastructure investment, institutionalised AI training, dedicated policy frameworks, inter-agency data sharing platforms, research and technology partnerships, increased AI-specific budgetary allocations, community engagement, and phased deployment approaches.

Discussion of Findings

The findings on Objective 1 present a sobering but coherent portrait of the current state of AI effectiveness in crime detection and prevention in Niger State. The grand mean of 2.88 falling below the 3.00 agreement threshold indicates that, taken as a whole, security personnel in Niger State do not perceive AI-driven approaches as currently effective in

delivering meaningful operational improvements in crime management. This finding is consistent with and extends existing evidence from comparable environments. Eke (2025) similarly notes that AI integration within the Nigeria Police Force remains confined to federal commands in Lagos and Abuja, with state commands particularly in the north exhibiting minimal deployment and correspondingly limited operational impact. Oloke et al. (2024) found that even in Lagos, where AI surveillance infrastructure is more developed, effectiveness was substantially constrained by power supply instability, maintenance deficits, and training gaps. The present study's findings from Niger State, where both deployment quality and enabling conditions are considerably weaker, are therefore entirely consistent with the trajectory of findings in the Nigerian literature, confirming that AI effectiveness is not merely a function of technical capability but of the full enabling ecosystem within which technology is deployed.

The pattern of selective agreement within the overall disagreement finding is particularly instructive. Items 1, 4, and 6 relating to crime detection speed, AI-assisted data analytics for intelligence, and real-time response capability attracted agreement, suggesting that even in the limited deployment context of Niger State, there are specific operational dimensions where AI tools are perceived as adding value. This is consistent with the Routine Activity Theory framework, which predicts that any enhancement of guardian capacity however limited in scale or consistency is likely to generate some deterrence and detection benefit in environments characterised by chronic guardianship deficits (Felson & Eckert, 2019). The fact that these positive perceptions are concentrated in dimensions involving data processing and response coordination, rather than in more technically complex and infrastructure-dependent applications such as facial recognition and predictive policing, further reflects the infrastructural reality of AI deployment in Niger State: basic data analytics and communication-enhancing tools can function in the existing environment with some effectiveness, while more demanding AI applications remain non-operational.

Where the present study's findings diverge from some comparable literature is in the magnitude of the effectiveness deficit recorded. Hassan (2023), in a multi-country assessment of AI in public safety in sub-Saharan Africa, documented that even in relatively resource-constrained environments such as parts of Kenya and Ethiopia, targeted AI deployments in urban security contexts generated measurable improvements in response times and crime detection rates. The absence of such positive outcomes in Niger State likely reflects the more extreme nature of the infrastructure and deployment deficits in the state, combined with the highly demanding operational environment characterised by vast ungoverned territories and organised criminal networks that require more sophisticated AI applications than the basic tools currently available. This distinction implies that Niger State requires not merely incremental improvements to existing deployments but a qualitative transformation of its AI security infrastructure, underpinned by significant investment and institutional reform, before meaningful effectiveness gains can be realised. The findings on Objective 2 present a striking contrast to the largely discouraging effectiveness picture: an overwhelming and consistent endorsement of all eight proposed

enhancement strategies, yielding a grand mean of 4.25. This high level of agreement across all strategy items is significant because it demonstrates that frontline security personnel in Niger State possess a sophisticated and evidentially grounded understanding of what is required to transform AI effectiveness in their operational environment. The highest-ranked strategies — digital infrastructure investment (mean = 4.43), budgetary allocations (mean = 4.38), and institutionalised training (mean = 4.37) — correspond precisely to the dimensions of the enabling ecosystem that are most severely deficient in the current context, and that the global literature consistently identifies as foundational prerequisites for AI effectiveness in security operations (Perry *et al.*, 2013; Ratcliffe *et al.*, 2021). This alignment between frontline personnel's strategic priorities and global best practice evidence is both validating and instructive.

The strong endorsement of inter-agency data sharing platforms (mean = 4.19) is particularly noteworthy in the context of RAT-informed crime management theory. Predictive policing, geospatial crime analytics, and AI-assisted intelligence processing are most effective when they can draw on rich, integrated, and continuously updated datasets from multiple agencies and sources (Brayne, 2021; Eck & Weisburd, 1995). The current fragmentation of crime data across the NPF, NSCDC, NVG, and the Ministry of Internal Affairs in Niger State represents a fundamental constraint on the analytical power of any AI tools that might be deployed, and respondents' strong endorsement of data sharing infrastructure as a strategy reflects their practical recognition of this constraint. The comparatively lower (though still strongly agreed) mean for community engagement strategies (mean = 3.96) echoes a pattern observed in similar settings: frontline security personnel in resource-constrained environments tend to prioritise technical and infrastructural strategies over social and trust-building ones, even when community cooperation is essential for effective intelligence-led policing (Hassan, 2023). This does not diminish the importance of community engagement but suggests that strategy implementation should emphasise its complementary and enabling role alongside the more technically focused investments that personnel regard as most urgent.

Limitations

Several limitations of this study warrant acknowledgement. First, the sampling frame was restricted to three security agencies, the NPF, NSCDC, and NVG following the non-participation of the Nigerian Army and the Department of State Services. This restricts the generalisability of the findings to the three participating agencies and may not fully capture the AI deployment experiences of all security actors operating in Niger State. Second, the study relied on perceptual rather than objective measures of AI effectiveness, as it was not feasible to obtain validated administrative data on crime detection rates or security outcomes from the participating agencies. Perceptual data reflect the operational experiences and assessments of frontline personnel and are a legitimate and widely used measure in security research, but they cannot substitute for objective outcome data in establishing causal claims about AI effectiveness. Third, the cross-sectional design of the

study captures perceptions at a single point in time and cannot track changes in AI effectiveness or adoption patterns over time. Longitudinal designs would be necessary to assess whether strategic investments in AI infrastructure and training translate into measurable improvements in operational effectiveness over time. These limitations do not invalidate the study's findings but should be considered when interpreting and applying its conclusions.

Conclusion and Recommendations

Conclusion

This study set out to empirically evaluate the effectiveness of artificial intelligence in the detection and prevention of violent crimes in Niger State, Nigeria, and to identify strategies for enhancing AI integration in the state's crime management architecture. The evidence generated is clear on both counts. AI-driven approaches to crime detection and prevention are currently of limited overall effectiveness in Niger State, with security personnel's perceptions reflecting a context in which minimal deployment, inadequate infrastructure, insufficient training, and weak institutional support collectively prevent AI technologies from delivering the operational improvements that both the global evidence and the acute security needs of the state demand. At the same time, respondents demonstrated strong and consistent endorsement of a comprehensive set of enhancement strategies, centred on digital infrastructure investment, institutionalised training, dedicated policy frameworks, inter-agency data sharing, research partnerships, and phased deployment approaches, that align closely with global best practice evidence on what is required for AI to deliver meaningful security value. The convergence of these findings generates an urgent and actionable policy message: the effectiveness gap in Niger State's AI security responses is not a function of technology limitations or personnel resistance, but of the profound and addressable structural deficits that currently prevent AI tools from being deployed with sufficient quality and consistency to generate operational impact. The study makes an original empirical contribution by providing the first systematic evaluation of AI effectiveness in crime detection and prevention in Niger State and the first evidence-based documentation of enhancement strategies from the perspective of frontline security personnel.

Recommendations

Based on the findings of this study, the following recommendations are proffered:

1. The Federal Government of Nigeria and the Niger State Government should establish a dedicated and adequately funded AI Security Effectiveness Fund, specifically targeted at procuring and deploying AI surveillance systems, predictive analytics platforms, and real-time crime monitoring infrastructure for the NPF and NSCDC in Niger State, accompanied by the reliable solar-powered electricity and broadband internet infrastructure necessary to sustain their continuous operation across the state's diverse operational terrain.

2. The Nigeria Police Service Commission, NSCDC Headquarters, and the Office of the National Security Adviser should develop and mandate a tiered, nationally standardised AI operational training programme for security personnel in Niger State, covering foundational digital skills, AI tool operation, crime data analysis, and geospatial intelligence interpretation. This programme should be delivered in collaboration with Ibrahim Badamasi Babangida University, Lapai, and other relevant Nigerian universities, embedded within existing training academies, and refreshed annually to remain aligned with evolving AI capabilities and crime patterns.

The Niger State Government should facilitate the immediate establishment of an inter-agency AI-powered crime analytics and data sharing platform integrating records from the NPF, NSCDC, NVG, and the Ministry of Internal Affairs into a centralised, AI-queryable database. This platform would constitute the foundational intelligence infrastructure for deploying predictive policing, geospatial crime mapping, and AI-assisted threat assessment in Niger State, enabling coordinated, evidence-driven, and proactive security responses to the state's documented and escalating violent crime challenge.

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