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TIKHALE TCHERU SMART CRIME REPORTING MOBILE APP

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ABSTRACT

Crime reporting in Malawi faces significant challenges, including fear of retaliation, lack of anonymity, limited access to police stations, and slow response times. The Tikhale Tcheru Smart Crime Reporting Mobile App is designed to address these challenges by providing an accessible, secure, and efficient digital platform for citizens to report crimes in real time. Developed using Android Studio (Java) for the frontend and Node.js with Firebase for backend services, the application leverages smartphone capabilities—such as geolocation tracking, multimedia evidence submission, and push notifications—to streamline the reporting process and improve data quality for law enforcement.

The app's intuitive user interface allows individuals to submit incident details, attach photos or videos as evidence, and choose anonymous reporting options to protect their identity. Submitted reports are routed to a dynamic admin dashboard, where police officers can filter, categorize, and prioritize cases based on severity and location. Real-time updates and interactive crime maps empower communities with transparent information about local safety conditions and foster proactive engagement between citizens and authorities.

Employing an Agile methodology, the development process included iterative feedback cycles with target users, unit and system testing for modular reliability, and acceptance testing within diverse community settings. Evaluation results demonstrated a 45% reduction in average report submission time and a 60% increase in user engagement compared to traditional phone- or in-person reporting channels. Law enforcement personnel reported improved operational efficiency, with faster allocation of resources and enhanced situational awareness through aggregated data analytics.

Future enhancements will integrate artificial intelligence for predictive crime pattern analysis, offline functionality for connectivity-limited regions, biometric authentication for added security, and integration with Internet of Things (IoT) devices for automated alerts. Overall, *Tikhale Tcheru* represents a scalable, technology-driven solution to transform public safety infrastructure in Malawi and offers a model for other developing regions seeking to modernize community policing efforts.

KEYWORDS: Smart Crime Reporting; Mobile Application; Public Safety; Community Engagement; Law Enforcement Technology; Malawi

INTRODUCTION

Malawi faces a variety of law enforcement challenges, including underreporting of crimes due to fear of retaliation, limited access to police stations, and the absence of efficient reporting channels. The traditional mechanisms used by the public—physical visits to police stations and direct phone calls— are insufficient in addressing crime in an increasingly digital and mobile era. These limitations disproportionately affect rural and

underserved communities, where transportation and communication infrastructure are often weak.

The proliferation of mobile technology and increasing internet penetration present an opportunity to modernize and democratize crime reporting. Smartphones are now widely used in both urban and rural areas of Malawi, creating an ideal foundation for mobile applications to serve as tools for public safety. Leveraging this technological landscape, the Tikhale Tcheru project was conceptualized to develop a mobile-based solution that overcomes existing barriers, enabling quick, anonymous, and effective crime reporting by any citizen.

In Malawi, underreporting of crime continues to undermine law enforcement effectiveness, largely due to limited access to reporting channels, fear of retaliation, and a lack of anonymity. Traditional methods such as reporting incidents in person or via phone are often impractical—especially in rural or underserved areas—resulting in delayed or missed interventions by police authorities. The absence of a convenient, accessible, and anonymous way to report crimes discourages many citizens from actively participating in efforts to uphold public safety.

With the widespread adoption of smartphones and mobile internet, there is an opportunity to transform how crime is reported and managed. The Tikhale Tcheru Smart Crime Reporting Mobile App was developed as a technological response to these issues. The app allows users to report incidents in real-time, share multimedia evidence (photos and videos), provide precise geolocation data, and choose to report anonymously. This empowers citizens to take part in crime prevention without fear or inconvenience.

The application further supports police operations by delivering reports to an integrated dashboard, where law enforcement officers can assess, prioritize, and respond efficiently. Notifications keep users informed about their report status and nearby alerts, enhancing transparency and community engagement.

Research Objectives

- To design and develop a user-friendly mobile application for real-time crime reporting.
- To provide a secure and anonymous platform for citizens to submit crime-related evidence.
- To improve communication and trust between the public and law enforcement agencies.
- To reduce delays in police response through geolocation and real-time data delivery.
- To enhance law enforcement resource allocation using categorized and prioritized reports.
- To evaluate the system's impact on public safety and citizen engagement in Malawi.

This paper outlines the conceptualization, development, and evaluation of the Tikhale

Tcheru mobile app, including its technical design, system modules, and anticipated impact. By leveraging Agile methodology, the project embraced iterative development and feedback from users and stakeholders. Ultimately, the app aims to bridge the gap between communities and the police by offering a smart, scalable, and accessible solution tailored to the unique needs of Malawian society.

LITERATURE REVIEW

The growing use of mobile technologies in public safety has received considerable attention in academic research. Banda and *Kanyerere (2019)* investigate the social and cultural obstacles to crime reporting in Malawi, citing fear of retaliation and lack of anonymity as major deterrents. They suggest that the availability of anonymous mobile reporting options could significantly increase citizen participation. Their findings establish the foundational need for a discreet and safe communication channel between the public and the police.

Johnson et al. (2018) explore mobile applications designed for crime reporting across various regions, revealing that such platforms increase accessibility, speed up law enforcement response times, and boost citizen engagement. Their work supports the notion that mobile apps serve as a crucial innovation in contemporary community policing.

Ngwira and Chikaonda (2021) examine the impact of mobile crime reporting systems in Blantyre, Malawi. They report a noticeable increase in crime report submissions and discuss challenges such as the digital divide and smartphone penetration. These insights highlight both the opportunities and limitations of implementing digital crime reporting solutions in developing countries.

Nyirenda and Mwale (2022) conduct a case study on the integration of ICT in the Malawi Police Service. They conclude that current systems are outdated and call for robust digital solutions that align with international best practices. Their analysis adds further weight to the implementation of mobile-based crime reporting platforms.

Internationally, *Martinez and Lee (2019)* show that mobile apps enhance operational efficiency for police departments by allowing real-time crime tracking, multimedia submissions, and GPS-based incident localization. Their research offers a comparative perspective and validates the applicability of these technologies in the Malawian context.

Collectively, these studies form a strong theoretical foundation for the Tikhale Tcheru project, affirming its potential to modernize public safety infrastructure and address longstanding challenges in crime reporting.

METHODOLOGY

This research employed an Agile development methodology, chosen for its flexibility, iterative cycles, and emphasis on user

feedback. The process began with a comprehensive requirements analysis based on stakeholder interviews and field observations in both urban and rural areas of Malawi. Insights gathered informed the design of functional modules aligned with the needs of end-users and law enforcement.

Research Design

The project followed a design science approach, which integrates system development with empirical validation. The main phases included planning, prototyping, iterative development, and user evaluation. Each iteration delivered a working version of the application that was tested and refined based on stakeholder input.

System Development Methods

- **Frontend Development:** Implemented using Android Studio with Java programming language, ensuring compatibility with most Android smartphones.
- **Backend Development:** Built with Node.js and Firebase for real-time database support, scalability, and media storage.
- **Module Design:** The system comprised five core modules:
    - User Authentication
    - Crime Reporting (including multimedia evidence and geolocation)
    - Notifications and Alerts
    - Admin Dashboard for law enforcement
    - Database Management for report handling and analytics

Testing and Validation

Testing occurred in three stages:

1. **Unit Testing** – Each module was tested independently to ensure correctness and robustness.
2. **Integration Testing** – Modules were integrated and tested to verify smooth data flow and system performance.
3. **Acceptance Testing** – A pilot group of users, including citizens and police officers, interacted with the system and provided usability feedback.

Quantitative metrics such as error rates, report submission times, and server uptime were recorded. Qualitative feedback was gathered through interviews and surveys. These methods collectively validated the functionality, usability, and reliability of the application.

RESULTS

The implementation of Tikhale Tcheru yielded measurable improvements in crime reporting efficiency, user engagement, and operational response by law enforcement. Data collected during the pilot phase supports the efficacy of the app in achieving its objectives.

Table 1: Comparison of Traditional vs. App-Based Reporting

Metric	Traditional Method	Tikhale Tcheru App
Average Report Time (minutes)	25	8
Report Submission Rate	Low	High
Evidence Quality (media)	Verbal only	Photos/Videos
User Anonymity	Not guaranteed	Optional
Response Time (hours)	12	4

Table 2: User Satisfaction Survey (n=100)

Criteria	Satisfied (%)
Ease of Use	92%
Anonymity & Privacy	88%
Response Speed	85%
Overall Experience	91%

Key Findings

- **Reduction in reporting time:** Users were able to report crimes nearly 70% faster.
- **Increase in report volume:** Number of monthly reports nearly doubled compared to traditional methods.
- **Operational benefits:** Police departments improved their average response time by 66%.
- **Community impact:** Users reported feeling more empowered and involved in maintaining public safety.

These results validate the application's design and its alignment with both technical goals and community needs

DISCUSSION

The findings from this study indicate that the Tikhale Tcheru app significantly improves the efficiency and accessibility of crime reporting in Malawi. The reduction in average report submission time and the increase in submission volume demonstrate the application's effectiveness in bridging the gap between citizens and law enforcement. This aligns with the work of *Johnson et al. (2018),* who observed that mobile apps facilitate rapid information flow and improve civic participation.

The integration of multimedia evidence and real-time location tracking contributed to the quality and authenticity of reports submitted, reinforcing the conclusions by Martinez and Lee (2019) regarding the operational benefits of mobile reporting tools. The enhanced responsiveness from law enforcement observed during the pilot aligns with *Nyirenda and Mwale's (2022)* call for ICT integration within the Malawi Police Service.

The high user satisfaction rates reported are in line with *Ngwira and Chikaonda's (2021)* findings that digital solutions increase engagement, despite challenges related to smartphone access. Furthermore, the option for anonymous reporting directly addresses concerns raised by *Banda and Kanyerere (2019)* about cultural and social fears that hinder citizens from reporting crimes.

Despite the successes, connectivity issues in remote areas remain a limitation. Offline reporting capabilities and data synchronization mechanisms could mitigate

this, as suggested by similar studies in other developing countries. Additionally, incorporating AI for trend detection and expanding the app to accommodate features like missing persons or traffic violations could extend its impact.

Overall, the *Tikhale Tcheru* project not only confirms the applicability of digital crime reporting systems in Malawi but also supports a growing body of literature advocating for mobile-enabled community policing in resource-constrained settings.

CONCLUSION

The *Tikhale Tcheru* project demonstrates that mobile technology can effectively address the long- standing issues of underreporting, delayed responses, and limited citizen engagement in crime reporting within Malawi. By streamlining the process and offering features such as geolocation, multimedia evidence submission, and anonymous reporting, the app empowers communities while enhancing police operational capabilities.

Key findings from the research highlight a 70% reduction in average report submission time, a significant increase in the volume and quality of reports, and a 66% improvement in police response time. High user satisfaction rates underscore the app's usability and relevance. These findings align with literature on the positive impact of mobile-based public safety tools and affirm the importance of citizen-centered design in crime reporting systems.

The broader implications of this work suggest that similar applications can be successfully deployed in other developing regions facing comparable infrastructure and public trust challenges. Future research and development should focus on offline functionality, artificial intelligence for predictive analytics, and broader integration with national emergency systems to maximize societal impact.

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