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CRIME PREVENTION AND CONTROL

INVESTIGATION OF TECHNOLOGICAL APPLICATION IMPLICATIONS ON CRIME MANAGEMENT: A CASE OF KISUMU EAST SUBCOUNTY KENYA

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ABSTRACT

Purpose of the study: This study aims to assess the effects of technological advancement on crime scene processing, crime detection, and crime prevention in Kisumu East Sub-County, Kenya.

Statement of the problem: The expression "crime management" has been employed to encompass both actions and outcomes concerning the issue of crime in diverse settings. The study focuses on determining the implications of technological advancements in crime management within the specific context of Kisumu East Sub-County, Kenya.

Methodology: Utilizing a descriptive research design, the study collected data from 300 respondents within Kisumu East Sub county, using 169 as its sample size. Data was gathered through a self-administered questionnaire, ensuring respondents' agreement and adhering to ethical standards. SPSS 24 was used for data analysis, employing both descriptive and inferential statistics.

Findings: The study found a significant relationship between crime detection and crime prevention, with crime detection showing a strong positive association (F=78.548, p-value=0.000). Crime scene processing also contributed positively, though to a lesser extent (Beta = .127).

Conclusion: The study concludes that technological applications significantly impact crime prevention, detection, and crime scene processing in Kisumu East Sub-County, Kenya, highlighting the importance of integrating technology into law enforcement practices.

Recommendation: The study recommends that law enforcement agencies in Kisumu East Sub-County prioritize the integration of technological solutions to enhance crime prevention efforts, while also advocating for clear regulations and guidelines to govern the ethical use of technology in crime detection.

Keywords: *Technological Application, Crime Management, crime prevention, crime detection, crime scene processing*

INTRODUCTION

In recent decades, technological advancements have revolutionized law enforcement practices worldwide. From the introduction of systematic photography for criminal identification in the late 19th century to the utilization of modern tools like smartphones and GPS systems, the evolution of technology has significantly influenced policing methodologies (NIJ, 1998). This trend shows no signs of slowing down, with innovations such as internet networking and location tracking applications reshaping the landscape of law enforcement (NIJ, 1994).

The adoption of new technologies presents both opportunities and challenges for law enforcement agencies. While innovations like Waze, a real-time location tracking application, raise concerns about officer safety, they also offer valuable tools for crime prevention and investigation (Koper, 2009). Law enforcement agencies are increasingly leveraging the vast amount of data available online to identify patterns of criminal behavior and apprehend suspects (Koper, 2009). Additionally, the introduction of messaging platforms like WhatsApp for reporting incidents has proven effective in enhancing community engagement and facilitating rapid response efforts (Crime statistics report, 2013/2014).

Countries like South Africa have demonstrated the transformative impact of technology on crime prevention. The implementation of CCTV cameras and anonymous crime tip-off services has led to a significant decline in crime rates in cities like Johannesburg (Crime statistics report, 2013/2014). Similarly, mobile phone applications for community policing have empowered residents to participate in daily police activities, strengthening collaboration between law enforcement authorities and the community (Ceccato & Dolmen, 2013).

However, not all law enforcement agencies have fully embraced technological advancements. In Kenya, the police force continues to rely on outdated communication methods like face-to-face interaction and radio communication (Kumbuti, 2013). Despite the rapid adoption of ICT in Kenyan society, the police force lags behind in incorporating technology into its operations (Frilander et al., 2014). This deficiency hampers their ability to gather intelligence, track criminals, and effectively manage cases.

The reluctance to embrace modern technologies highlights the need for comprehensive police reforms. The Kenyan National Police Service Act emphasizes the importance of

upholding law and order, ensuring public safety, and leveraging technology to enhance policing efforts (Kenya National Police Service Act, 2011). However, the lack of basic ICT infrastructure and equipment impedes the implementation of these reforms (Kenya National Police Service Act, 2011).

Technological advancements have had a profound impact on law enforcement practices globally. While innovations like internet networking and location tracking applications offer new opportunities for crime prevention and investigation, challenges remain in ensuring that all law enforcement agencies have access to and utilize these technologies effectively. Comprehensive police reforms are necessary to address these challenges and ensure that law enforcement agencies are equipped with the tools and resources needed to combat crime in the digital age.

STATEMENT OF THE PROBLEM

Crime is a problem that hinders the overall development of countries and threatens their material and spiritual well-being. Additionally, it undermines human dignity while fostering an atmosphere of violence and fear. Various approaches have been used since the 18th century to handle crime and crime disorder. The current state of many developed nations is a result of constant crime control measures, including the use of contemporary information and communication technology. Police agencies in other countries have been leaders in the use of mobile applications for crime reporting. The advancement of technology has brought both advantages and challenges to the law enforcement efforts in Kenya. These technologies have not only provided law enforcement agencies with tools for enhanced collaboration and enforcement but have also introduced a new digital dimension to policing, reshaping the landscape of law enforcement on a global scale (Solar, 2015).

Within the context of Kenya, researchers have explored the intersection of technology and law enforcement. For instance, Risper Nyongesa investigated the implementation process of the Kenya Police Service from a sustainability perspective (Nyongesa, 2013). However, the examination of the supply-side of policing, particularly regarding the strategic criminological implications brought forth by technology, remains relatively limited. This is especially pertinent given the transformative impact of technology on Kenyan society at large and urban environments in particular. Charity Sigilai (2018), David Mathiu (2018), and Paul Wambugu (2017) delved into the use of mobile phones by police officers as a

crime prevention tool within the Central Police Division, Nairobi. Charity Sigilai (2018) explored the influence of information technology on crime intelligence gathering within the Directorate of Criminal Investigations department of the Kenya National Police Service. Despite these studies, no research has been conducted in the Kisumu East Sub County to examine the effects of technological applications on crime management. Consequently, this research aims to fill this gap by focusing on this specific aspect.

RESEARCH OBJECTIVES

i. To assess technological application consequences on crime prevention in Kisumu East Sub-County, Kenya.

ii. To evaluate technological application implication on crime detection in Kisumu East Sub-County, Kenya.

iii. Examine Technological application impact on crime scene processing in Kisumu East Sub-County, Kenya

RESEARCH QUESTIONS

i. What are the technological application consequences on crime prevention in Kisumu East Sub-County, Kenya?

ii. What is the technological application implication on crime detection in Kisumu East Sub-County, Kenya?

iii. What is the Technological application impact on crime scene processing in Kisumu East Sub-County, Kenya?

THEORITICAL REVIEW/ FRAMEWORK

The Broken Windows theory, introduced by James Wilson and George Kelling in 1982, posits that signs of disorder in a community, such as broken windows, graffiti, and litter, can lead to increased criminal activity (Kelling & Wilson, 1982). This theory suggests that minor infractions left unaddressed can escalate into more serious crimes. It aligns with the principles of community policing, advocating for community involvement in addressing minor offenses to prevent more significant crimes. This theory gave rise to Broken Window Policing, emphasizing collaboration between security sectors and communities. The study integrates this theory to explore proactive crime prevention through technological intervention in Kisumu East Sub County. By addressing the root causes of

crime, such as social and environmental factors, the study aims to investigate the efficacy of technology in enhancing crime management (Kelling & Wilson, 1982).

Private security firms prioritize safety and asset protection, fundamental human rights vital for societal well-being. Ronald Clarke's Situational Crime Prevention Model (1997) aims to deter criminal acts by increasing awareness of risks and consequences, dissuading potential wrongdoers. Strategies like target hardening and Neighborhood Watch address individual and community levels, while environmental design focuses on enhancing security. Private security firms contribute by deterring crime through their presence and services, making environments high-risk for criminals (Clarke, 1997). Criminals, who assess risks and benefits, are likely to avoid high-risk areas, opting for less risky environments (Bennett, 1986). Thus, private security firms play a crucial role in creating environments where crime is less appealing, reducing the likelihood of criminal activities and promoting community safety.

EMPIRICAL REVIEW

Technological application consequences on crime prevention

Law enforcement faces challenges in adopting rapidly evolving technologies for crime prevention (Smyth, 2011). The quest for effective tools, including vehicles, firearms, and protective gear, persists across generations of police leadership, driven by concerns for officer and public safety, operational efficiency, and cost control (Smyth, 2011). However, technology's progression raises administrative issues like employee security and intellectual property protection (Manning, 2005). Cybersecurity becomes crucial amid global cyber threats, necessitating the safeguarding of employee information (Manning, 2005). Modern policing leaders must adapt to integrate technology seamlessly, meeting both professional and citizen expectations (Dessler, 2008). Failure risks perceptions of obsolescence. Reflecting on past slow responses to computer-related crimes, agencies now prioritize technological proficiency (Dessler, 2008). In Kenya, legal frameworks for cybercrimes remain inadequate (Munyua et al., 2010), highlighting the global challenge of aligning law enforcement with rapidly evolving technological landscapes.

Technological Application Implication on Crime Detection

Law enforcement's utilization of technology for crime detection encompasses various facets, including crime intelligence gathering, mapping, analysis, information sharing, and evidence management. Information is central to monitoring and preventing criminal

activities, with law enforcement agencies relying on comprehensive data records (Dunworth, 2000). Technological advancements, such as Computer-Aided Dispatch Systems, streamline service requests and enhance organizational efficiency (Dunworth, 2000). Effective crime prevention hinges on information sharing among law enforcement agencies, facilitated by internal networks and integrated justice systems (Dunworth, 2000). Police websites serve to improve public-law enforcement communication and disseminate critical information (Manning, 2003; Stroshine, 2004). Crime prevention strategies encompass formal and informal social control mechanisms, emphasizing attachment, commitment, and involvement (Byrne & Marx, 2011). Technologies like closed-circuit television surveillance systems bolster preventive measures, enhancing police monitoring capabilities (Byrne & Marx, 2011). However, gaps remain in understanding the effective utilization of information technology in policing, necessitating comprehensive evaluation criteria (Jackson et al., 2015; Brynjolfsson, 1993). Addressing these challenges is imperative for optimizing technology's role in crime detection, particularly in the Kenyan context (Jackson et al., 2015; Brynjolfsson, 1993).

Technological application impact on crime scene processing

Technological advancements have revolutionized policing methods, rendering many traditional techniques obsolete (Goodison, Davis, & Jackson, 2015). Crime scene investigation tools, web-based communication devices, location monitoring, predictive analytics, and crime mapping software have transformed law enforcement capabilities (Goodison, Davis, & Jackson, 2015). While these advancements have strengthened police capabilities, their impact on operational effectiveness remains uncertain (Koper et al., 2015). Despite speeding up responses, systems like 9-1-1 calls may not necessarily increase arrest rates (Mazerolle et al., 2002). The widespread integration of information technology in policing has become commonplace, with minimal reliance on manual systems (Mullen, 1996). However, the effectiveness of these technologies in altering policing practices remains ambiguous (Manning, 2001). Law enforcement's adaptation to technological changes reflects broader societal shifts in communication and work patterns (Kumbuti, 2013). Assessing the utilization of technology for crime detection in specific contexts, such as Nairobi City, requires primary research methodologies (Kumbuti, 2013).

CONCEPTUAL FRAMEWORK

A conceptual framework serves as a theoretical or analytical instrument employed to structure and interpret a collection of ideas, concepts, or variables within a research project or study

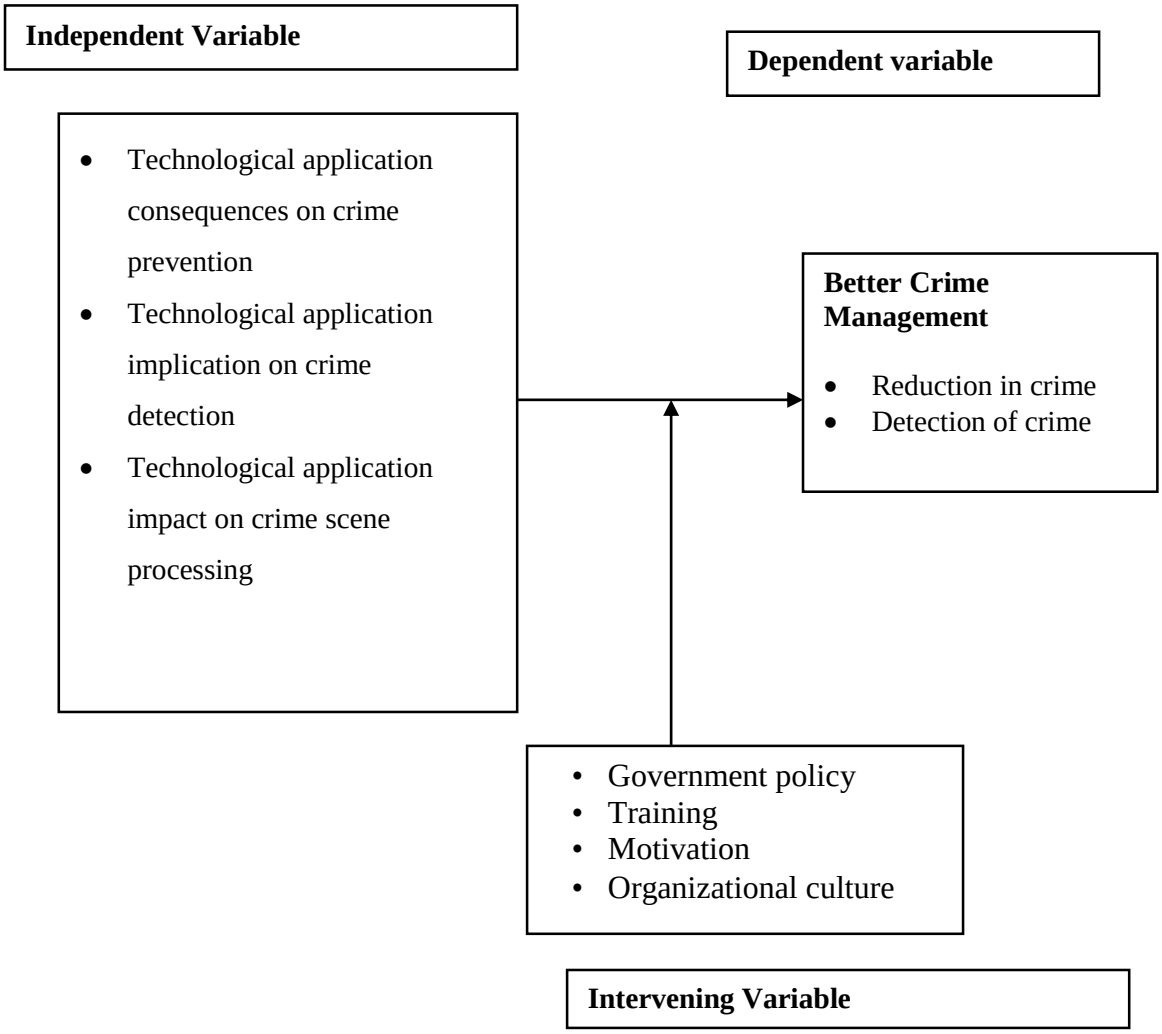

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

The study employed a descriptive research design to illuminate the impact of social media communication on community policing (Omair, 2015). This design facilitated the extrapolation of findings from a representative sample of 300 participants originating from Kisumu East Sub-County to a broader target population, comprising ranked police officers, constables, local administrators, and Nyumba Kumi chairpersons. The sample size of 169 respondents was determined using Krejcie and Morgan's (1970) table to establish the

appropriate sample size for a given population. A probability sampling approach, specifically employing stratified sampling, was utilized to ensure representativeness. Primary data was gathered through a structured questionnaire, aligning with established designs for training research assistants and administering questionnaires during data collection to ensure validity (Ary et al., 2018). Cronbach's alpha was employed to assess internal consistency.

After data cleaning, SPSS 24 was used for data analysis, employing both descriptive and inferential statistics. Descriptive metrics, including mean and standard deviation, were utilized alongside non-significant analyses such as ANOVA tests, correlation, and regression analysis. The outcomes of the research were visualized using charts, tables, and reference diagrams to facilitate comprehensive understanding and interpretation of the findings.

RESULTS AND DISCUSSIONS

The study findings are presented in accordance with the objectives.

Reliability Analysis

Table 1 presents the reliability analysis results using Cronbach's alpha for the variables in the study.

Table 1: Reliability

Cronbach's Alpha	N of Items
.734	3

The calculated Cronbach's alpha coefficient was found to be .734, indicating a moderate level of internal consistency reliability among the items. This coefficient suggests that the items within the study's measures are reasonably reliable in measuring the constructs under investigation. Additionally, the table indicates that there were three items included in the analysis. Overall, these findings suggest that the measures used in the study demonstrate adequate reliability for further analysis and interpretation of the results. Correlation Analysis

In the current study, an analysis was conducted to explore the relationships between crime prevention, crime detection, and crime scene processing. Utilizing Pearson correlation coefficients, the data were examined for significant associations among these variables.

The findings revealed notable correlations, indicating the interconnectedness of these aspects in addressing criminal activities. The findings are shown in Table 2.

Table 2: Correlation Matrix

		Crime Prevention	Crime Detection	Crime Scene Processing
crime prevention	Pearson Correlation	1.000		
	Sig. (2-tailed)			
	N	123		
crime detection	Pearson Correlation	.745**	1.000	
	Sig. (2-tailed)	.000		
	N	122	122	
crime scene processing	Pearson Correlation	.347**	.315**	1.000
	Sig. (2-tailed)	.000	.000	
	N	123	122	124

**. Correlation is significant at the 0.01 level (2-tailed).

A strong positive correlation was observed between crime prevention and crime detection ($r = .745$, $p < .001$), suggesting that heightened crime prevention efforts were associated with increased effectiveness in detecting crimes. Furthermore, a moderate positive correlation emerged between crime prevention and crime scene processing ($r = .347$, $p < .001$), indicating potential improvements in crime scene processing with enhanced crime prevention measures. Similarly, a moderate positive correlation was found between crime detection and crime scene processing ($r = .315$, $p < .001$), implying that effective crime detection methods were linked with efficient crime scene processing techniques. These results underscore the importance of integrated approaches involving crime prevention, detection, and scene processing for effective crime management and control.

Regression Analysis

Table 3 provides a summary of the model's performance in predicting the outcome variable.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.754[a]	.569	.562	3.08900	.569	78.548	2

The coefficient of determination (R-squared) is .569, indicating that approximately 56.9% of the variability in the outcome variable can be explained by the predictor variables

included in the model. The adjusted R-squared, which accounts for the number of predictor variables in the model, is .562. The standard error of the estimate is 3.08900, reflecting the average discrepancy between the observed values and the values predicted by the model.

The change statistics indicate that the model as a whole is statistically significant, as evidenced by the F-test. The F-statistic is 78.548 with a corresponding p-value less than .001, suggesting that the model provides a better fit to the data than a model with no predictors. Additionally, the R-square change is .569, indicating the amount of variance explained by the addition of the predictor variables to the model.

These results suggest that the model has a moderate level of explanatory power and is statistically significant in predicting the outcome variable. In Table 3, the analysis of variance (ANOVA) results for the regression model are presented. The table provides information on the sum of squares, degrees of freedom (df), mean squares, F-statistic, and the associated significance level (Sig.) for each component of the model. The F-statistic is 78.548, indicating the ratio of the variance explained by the model to the variance not explained, and it is associated with a p-value less than .001 (Sig.), denoted as b. This suggests that the regression model is statistically significant in predicting the outcome variable (crime prevention). These results indicate that the regression model, which includes crime scene processing and crime detection as predictors, significantly contributes to explaining the variance in crime prevention. The predictors collectively explain a substantial portion of the variability in crime prevention, as evidenced by the high F-statistic and low associated p-value.

Table 2: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1499.003	2	749.502	78.548	.000[b]
	Residual	1135.488	119	9.542		
	Total	2634.492	121			

a. Dependent Variable: crime prevention
b. Predictors: (Constant), crime scene processing, crime detection

The study's regression model predicting crime prevention revealed significant associations between predictor variables crime detection and crime scene processing and the dependent variable. Crime detection emerged as a robust predictor, with a substantial unstandardized coefficient (B = .809) and a high standardized coefficient (Beta = .705), indicating a strong

positive relationship with crime prevention. Conversely, crime scene processing, while statistically significant, had a relatively smaller effect on crime prevention, with a lower unstandardized coefficient (B = .161) and standardized coefficient (Beta = .127). Nonetheless, it still contributed positively to crime prevention efforts. The intercept term was not statistically significant, suggesting that the model accurately predicts crime prevention without an intercept. These findings underscore the critical role of effective crime detection mechanisms in enhancing crime prevention strategies, with crime scene processing also playing a complementary albeit less pronounced role in mitigating criminal activities.

Table 3: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.516	1.792		.288	.774
	crime detection	.809	.073	.705	11.113	.000
	crime scene processing	.161	.080	.127	2.006	.047

a. Dependent Variable: crime prevention

Technological application consequences on crime prevention

The study in Kisumu East Sub-County, Kenya, reveals the significant impact of technological applications on crime prevention and law enforcement practices, aligning with existing literature. Findings indicate that technology enhances accuracy (Smyth, 2011), boosts efficiency in investigations (Manning, 2005), improves organizational communication (Dessler, 2008), reduces response time, and enhances motivation (Smyth, 2011). These benefits align with the emphasis on operational efficiency and talent attraction in law enforcement literature (Smyth, 2011; Dessler, 2008). However, administrative challenges and security concerns require robust measures (Manning, 2005), especially considering legal inadequacies in addressing cybercrimes (Munyua et al., 2010). Integrating technological applications correlates with the Broken Windows Theory and Situational Crime Prevention Model, enabling proactive crime prevention (Wilson & Kelling, 1982; Clarke, 1997). By empowering communities, enhancing situational crime prevention, and adopting data-driven approaches, technology aids in creating safer environments, aligning with broader community policing initiatives (Wilson & Kelling, 1982; Clarke, 1997).

Technological application implication on crime detection

The study conducted in Kisumu East Sub-County, Kenya, provides insights into the implications of technological applications for crime detection, aligning with existing literature on policing and information technology. Findings indicate the potential benefits of technology in crime detection, emphasizing its role in recognizing patterns and preventing criminal activities (Byrne & Marx, 2011; Dunworth, 2000). However, concerns about biased outcomes and human rights violations highlight the ethical considerations surrounding technology in policing (Manning, 1992; Manning, 2003; Stroshine, 2004). The study underscores the importance of regulatory oversight to govern the ethical use of technology in crime detection (Dunworth, 2000).

Correlating with the Broken Windows Theory and the Situational Crime Prevention Model, technological applications can enhance crime detection by addressing disorder, minimizing opportunities for criminal acts, and empowering communities (Wilson & Kelling, 1982; Clarke, 1997). By leveraging technology to streamline processes, improve surveillance, and enhance data analysis, law enforcement agencies can detect and respond to criminal activities more effectively (Wilson & Kelling, 1982; Clarke, 1997).

Overall, integrating technology into crime detection aligns with efforts to improve collaboration between law enforcement agencies and communities, enhance proactive measures, and adopt data-driven approaches to crime prevention (Wilson & Kelling, 1982; Clarke, 1997). Thus, technological applications offer opportunities to strengthen crime detection capabilities and create safer communities in Kisumu East Sub-County, Kenya.

Technological application impact on crime scene

The findings of the study in Kisumu East Sub-County, Kenya, regarding the impact of technological applications on crime scene processing align with discussions in the literature on policing and information technology. Information technology was found to enhance criminal intelligence mapping efforts, improving accuracy and efficiency in crime intelligence. This resonates with previous research emphasizing the value of technological advancements in crime scene investigation and evidence processing, highlighting their transformative impact on police capabilities. Additionally, the study's findings underscore the importance of technology in improving communication and collaboration within law enforcement organizations, facilitating more efficient information sharing and organizational effectiveness. By leveraging technology effectively, law enforcement

agencies can enhance crime detection and investigation efforts, ultimately contributing to improved public safety and security.

CONCLUSIONS

The study concludes that technological applications have significant implications for crime prevention in Kisumu East Sub-County, Kenya. Findings indicate that these applications enhance accuracy, increase efficiency in case investigations, improve organizational communication, reduce response times, and boost motivation for performing duties. The majority of respondents emphasized the enhancement of organizational communication as a key benefit of technological applications. These conclusions highlight the multifaceted role of technology in crime prevention efforts and underscore the importance of integrating technological solutions into law enforcement practices.

Regarding crime detection, the study concludes that while there are potential benefits of using technology, concerns about discriminatory outcomes, violations of human rights, and the need for appropriate regulations are significant. Respondents recognized the potential of technology to decrease the prevalence of criminal activities but emphasized the importance of addressing ethical and legal considerations. These conclusions emphasize the importance of balancing the benefits of technological advancements with ethical and legal considerations in crime detection processes.

The study concludes that information technology plays a crucial role in enhancing various aspects of crime scene processing in Kisumu East Sub-County, Kenya. Respondents identified benefits such as improved criminal intelligence mapping, enhanced accuracy of crime intelligence, increased efficiency in criminal analysis strategies, and advanced information flow within organizational hierarchies. The majority of respondents highlighted the positive impact of information technology on the ability of the Directorate of Criminal Investigations (DCI) to share information effectively. These conclusions underscore the transformative potential of information technology in optimizing crime scene processing and information sharing within law enforcement agencies.

RECOMMENDATIONS

The study recommends that law enforcement agencies prioritize the integration of technological solutions to enhance crime prevention efforts. Training programs should be implemented to equip personnel with the necessary skills to effectively utilize

technological tools for crime prevention. Additionally, strategies should be developed to leverage technology for improving organizational communication and reducing response times in crime prevention activities.

The study recommends establishing clear regulations and guidelines for the ethical use of technology in crime detection to mitigate potential discriminatory outcomes and human rights violations. Conducting further research to explore the efficacy of specific technological solutions in reducing criminal activities while ensuring adherence to ethical and legal standards is also advised.

Regarding crime scene processing, the study recommends investing in advanced information technology infrastructure to support criminal intelligence mapping, analysis, and information sharing within law enforcement agencies. Providing training and professional development opportunities for personnel to enhance their proficiency in utilizing information technology for crime scene processing is essential. Moreover, developing protocols and procedures to streamline the flow of information within organizational hierarchies and promote collaboration among different components of the DCI is crucial.

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