



THE ROLE OF MOBILE PHONE TRACKING TECHNOLOGY IN CRIME PREVENTION IN KENYA: A CASE OF NAIROBI CITY COUNTY

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Abstract: Technology today has greatly advanced and police officers can now, through mobile tracking technology, locate all calls received at the ICT command center, in turn know the exact location where there is distress, and respond as required. The study sought to the role of Mobile Phone Tracking Technology in crime prevention and how if embraced it can help the national police service in the prevention of all crimes in Nairobi City County. The study design was descriptive incorporating both qualitative and quantitative techniques. From the target population of 694 police officers serving in Langata and Embakasi divisions; the researcher targeted 208 respondents from all the cadres of regular police. Questionnaires were utilized in collecting the Primary data. Quantitative and qualitative methods were used to analyze the data and presented in form of tables and charts. The study found that respondents used mobile phone tracking technology largely in crime prevention. Majority of the police had received training on mobile phone technology crime mapping techniques. However, crime-mapping analysis was conducted as needed though some factors affected respondent's ability to use mobile phone technology in crime mapping effectively. The study concludes that cell phones applications contributed extensively in compacting crime activities as it contributed to drop in major crimes. The study recommends that in order to help law enforcement officers to have a deep understanding and proper attitude in regards to usage of IT, as policing tools, there needs to be an awareness program put in place. This would give details on the optimistic features of utilizing computers for policing purposes.

Key words: Mobile phones, tracking, crime prevention, Perceived Usefulness, Perceived Ease of Use, prosecution

Introduction

A mobile phone is a portable device used for communication, which does not require the use of a landline. According to Custers (2012), a mobile phone is fitted with software that enables people to track other cell phone user's location without them knowing. The mobile phone tracking technology includes applications such as WhatsApp, snap chart, Instagram, SMS text messages, Facebook ,call logs, multimedia file access among others (Walnycky, Baggili, Marrington, Moore & Breiting, 2015). Many organizations around the world including the police use mobile phone tracking to prevent crime because it is cheap and available in the market. Many countries in the world including Kenya, the law requires that individuals register their mobile phone SIM cards immediately on purchase. The registration will enable the law enforcement and service providers to track the owner more easily in case of need (GoK, 2014).

In Kenya Mobile, phone technology has been underutilized in crime prevention. According to Koper, Lum, Willis, Woods & Hibdon, (2015), Mobile phone technology can be used to track criminals withdrawing money from bank accounts as a way of crime prevention. To overcome insecurity cases in Kenya, Quarshie (2014) indicated the agencies of law enforcement could maximize on the use of mobile phone tracking technology in various areas. Custers (2012) for instance observed that police agencies might use the technology to track criminals who abduct or kidnap victims. This also largely may minimize the use of police resources, which would have been otherwise incurred in travelling to bond the attendance of witnesses. Mobile phone tracking may also be used to link suspects to a crime and secure conviction meaning it can be used to collect evidential materials from the applications on the mobile phone for example Facebook, WhatsApp, call logs, videos, pictures just to name a few (criminal case 15 of 2010) however little is known and hence the need for the study to understand how mobile phone tracking can be helpful to police in gathering evidence for prosecution in Nairobi City County. There have been many cases of insecurity in Kenya hence this study sought to investigate whether mobile technology has been effectively applied to detect and deter crime in Nairobi City County.

Statement of the Problem

Police officers in Kenya have used mobile phone tracking technology for more than a decade. The common emergency numbers used by the members of public in distress are 112 and 999. Police officers too also issue out their mobile phone contacts to the members of public to contact them in case of distress. Few studies have been done on the influence of mobile phone tracking technology in prevention of crime such as; Brown (2015) who looked at innovations in technology in preventing crime and policing. Klick, MacDonald & Stratmann (2012) also did a study on the prevention of crime as a relationship that has not been acknowledged. Evidently, research remains limited on the role of mobile phone tracking technology in crime prevention in Nairobi City County. There have been many cases of insecurity in Kenya hence this study sought to investigate whether mobile technology has been effectively applied to detect and deter crime in Nairobi. This study specifically sought to establish the role of mobile tracking in crime prevention and aims to bridge this gap in Nairobi City County.

Literature Survey

According to Koper, Lum & Hibdon (2015), Information and communications technology (IT) has transformed the way people live, work, learn, and interact with each other. At a time when criminal dealings have become more sophisticated and modern aspects in crime activities have developed, equipment's and technological aspects being utilized by law enforcement agencies in compacting such activities have also been enhanced. Therefore, the study objective was to determine the level at which mobile phone tracking technology is being applied as a strategy by Kenya police in compacting crimes activities in Nairobi City County.

Crime Pattern Theory

Crime pattern theory was founded and published in *Environmental Criminology* book by two Environmental criminologists Patricia and Paul Brantingham in 1981. This theory aims to establish how criminals target and execute criminal acts during their day-to-day dealings. This theory mainly links crime mapping as from the insurgent pattern and law enforcement officers are in a position to map areas of crime out and strategize how to go about containing the mapped hot spots. This is referred to as scripting, and thus one of the key objectives of countering criminals should involve rewriting criminal's script through introduction of failure into their operations.

Information systems success model

After reviewing previous studies conducted, DeLone & McLean (1992) presented a comprehensive grouping of factors leading to proper performance of information systems.. This implies that the variables have been linked in order to adopt and utilize the mobile technology to prevent crime. These influences must cater for the individual influences such as the traffic police officer and therefore achieve an organizational influence of preventing crime.

Perceived Usefulness of Mobile Phones by Police Officers

Cazzulino, Burke, Muller, Arbogast and Upperman, (2014) conducted a study on mobile phone in policing and established that the application of mobile phone agencies mandated with enforcing law was on the rise. The study concluded that mobile phones offered police units with proper ways of getting to know what their citizens say about the crime and other events. George (2015) suggested that police officers should make use of all information technologies resources available when setting up portals to merge their decentralized databases given the fact that the police department might strongly demand a database that makes it possible for them to share crime records organizations in the judicial area. However, it is interesting to note that criminals are also IT professionals where they utilize their knowledge to commit more crimes while at the same time establishing more targets..

Mobile Phone Tracking Techniques and Mapping Crime

Bazzell (2016) conducted a study on mapping and detecting crime prone areas based on improved attribute oriented induce clustering and established that majority of classification techniques established to predict crime prone areas are indeed more accurate. The outcome of the study model provides for the improvement of spatial and temporal crime data aimed at creating dependable crime forecasting. Saunders, Hunt and Hollywood (2016) in their survey analyzed the domestic burglaries in (District 4 of the Police Department) Shreveport, La, and United States. Based on the data obtained from January 1998, 58 burglaries were reported. Their study revealed that, the analysis of the crime was essential in order to ensure proper deployment of law enforcement officers, which is a significant plan, aimed at reducing burglary activity.

Mobile Phone tracking to gather evidence for prosecution

Lotterhos & Whitlock (2015) in their study established a detailed technique of addressing the problem associated with collecting full forensic images for large drives through selective imaging in terms of resources and related costs by selecting data to image at the collection phase. For not undertaking analysis of a full forensic image, normally the legal standards of relevance and reasonableness are raised to address these concerns. However, it could be contended that since the arising variance relates to days or hours both in civil or criminal perspective, it could be considered reasonable to fully take bit-for-bit image and then undertake the analysis utilizing every available and possibly significant data. Taylor (2016) argues that since mobile devices especially smart phones are currently an important part of majority of individuals' day-to-day lives, such devices are therefore likely to be used in facilitating crimes activities as well being used when crimes are being perpetrated. Given the fact that mobile phone is the most personal computing device one has, it therefore provides a computer in one's pocket that can be effectively be used (Hendricks, 2013).

Problem Definition

According to Manning, (2013), federal, local and state policing units seems to have been transformed by various changes involving soft and hard technology of policing in various significant ways. However, some researchers are not fully convinced as they raise questions on the need to understand what and by how much has changed. Paterson & Glass (2015) performed two key study reviews of technology and the police and in their recommendation they described this change process, reviewed the evidence of its influence on police practices and results, and discussed the consequences of technological alterations in policing for the public.

Methodology and Design Approach

The study employed a descriptive research design. The study adopted the cross-sectional survey design. The study was carried out in two divisions in Nairobi City County. These are Langata and Embakasi as they are densely populated and the rate of crime is high. The population of interest comprised of 38,921 police officers serving within Nairobi City County (Vigilance House, July 2016). The cadre of the officer was used to form the strata while performing the stratified random sampling. A sample picked randomly from each stratum was considered in a number proportional to the stratum's size when compared to the population. Random sample was then formed by pooling together the subsets of these strata. From the target population of 694 police officers serving in Langata and Embakasi divisions; the researcher targeted 30% respondents from all the cadres of regular police, contributing to 208 respondents. Questionnaires were utilized in collecting the Primary data. The questionnaire was administered on a drop and pick basis. The data analysis output was presented in graphs, tables, descriptive statistics and inferential statistics.

Research Findings

Findings show that 156 out of the targeted 208 police officers responded to the questionnaires representing an overall response rate of 75%.

Inferential Statistics

Pearson's product moment correlation analysis was used to assess the relationship between the independent variables while multiple regression $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$ was used to determine the predictive power of the role of mobile phone tracking technology in crime prevention.

Correlation Analysis

In this study, Pearson Product moment correlation was used to determine the relationship between independent variables and the dependent variable. The table below indicates the correlation matrix between independent variables and dependent variable.

Table 1: Correlation Matrix

		Crime Prevention	Perceived usefulness	Ease of Use	Tracking Techniques	Prosecution
Crime Prevention	Pearson	1				
	Correlation					
	Sig. (2-tailed)					
Perceived usefulness	N	156				
	Pearson	.611**	1			
	Correlation					
Ease of Use	Sig. (2-tailed)	.000				
	N	156	156			
	Pearson	-.144	.251	1		
Tracking Techniques	Correlation					
	Sig. (2-tailed)	.317	.079			
	N	156	156	156		
Prosecution	Pearson	.581**	.306*	-.234	1	
	Correlation					
	Sig. (2-tailed)	.000	.031	.102		
	N	156	156	156	156	
	Pearson	.144	.012	.115	-.061	1
	Correlation					
	Sig. (2-tailed)	.318	.934	.427	.676	
	N	156	156	156	156	156

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

* . Correlation is significant at the 0.05 level (2-tailed).

Source: Researcher, 2018

The Table above indicates the correlation matrix between the independent variables and dependent variables. According to Table 1, there is a very high positive relationship between crime prevention and perceived usefulness, ease of use and tracking techniques of magnitude 0.611, 0.144 and 0.518 respectively. The positive relationship indicates that there is a correlation between the independent variables and dependent variables with perceived usefulness having the highest value and tracking techniques having the lowest correlation value. The results also reveal that there is a weak negative correlation between prosecution and the crime prevention as shown by a correlation of magnitude -0.144. This notwithstanding, two of the factors had a significant p-value ($p < 0.005$) at 95% confidence level. The significance values for relationship between crime prevention and perceived usefulness and tracking techniques $p < 0.005$. This implies that all the independent variables were significantly correlated with crime prevention.

Regression Analysis

Regression analysis is a statistical process for estimating the relationships among variables. With this analysis, one is able to understand how the typical values of the dependent variable change when one of the independent variable is varied, while the other variables are held constant/fixed. For this study, a multiple regression model was applied to identify the impact of perceived usefulness; ease of use; tracking techniques and prosecution on crime prevention and how if embraced it can help the national police service in the prevention of all crimes. The model summary provides information about the regression line's ability to account for the total variation in the dependent variable.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.781 ^a	.610	.575	5.88308

a. Predictors: (Constant), perceived usefulness; ease of use; tracking techniques and prosecution

Source: Researcher, 2018

The findings show that the independent variables had a qualified influence on the dependent variable as shown by an Adjusted R Square =0.575. The output indicates that the strength of association between the variables is relatively high (Adjusted R Square = 0.575). The four independent variables (perceived usefulness; ease of use; tracking techniques and prosecution that were collectively studied, explain only 57.5% of the variation on crime prevention as represented by the Adjusted R Square. This therefore means that other factors not studied in this research contribute 42.5% of the variation in the crime prevention and how if embraced it can help the national police service in the prevention of all crimes.

ANOVA

Analysis of Variance (ANOVA) consists of calculations that provide information about levels of variability within a regression model and form a basis for tests of significance of the model.

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2436.325	4	609.081	17.598	.000 ^b
	Residual	1557.476	152	34.611		
	Total	3993.801	156			

a. Dependent Variable: Crime Prevention

b. Predictors: (Constant), perceived usefulness; ease of use; tracking techniques and prosecution

Source: Researcher, 2018

In view of the results in table 3 above the significance value is 0.000 (which is less than <0.05) indicates that the overall model is statistically significant in predicting the role of mobile phone tracking technology in crime prevention. A P-value < 0.05, shows that the overall model was a good fit. A regression coefficient is a key output of regression analysis. It is interpreted as the proportion of the variance in the dependent variable that is predictable from the independent variable. The results are as shown in the Table 4 below;

Table 4: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-14.572	11.655		-1.250	.218
	Perceived usefulness	.119	.023	.548	5.258	.000
	Ease of Use	-.260	.124	-.216	-2.100	.041
	Tracking Techniques	.413	.115	.374	3.600	.001
	Prosecution	.732	.371	.185	1.971	.055

a. Dependent Variable: Crime Prevention

Source: Researcher, 2018

The regression function extracted using the unstandardized betas is as follows

$$(Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon) :$$

$$Y = -14.572 + 0.119X_1 - 0.260X_2 + 0.413X_3 + 0.732X_4$$

According to the regression function, holding all factors constant at zero, the coefficient for Crime Prevention was -14.572. Perceived usefulness, Ease of Use and Tracking Techniques Tracking Techniques were found to have a significant influence on Crime Prevention ($\beta = -0.119$, P-value $(0.000 < 0.05)$), ($\beta = -0.260$, P-value $(0.001 < 0.041)$), ($\beta = -0.236$, P-value $(0.07 > 0.00)$) respectively. Prosecution values, ($\beta = 0.732$, P-value $(0.07 > 0.055)$) was determined not to significantly influence the role of mobile phones in crime prevention and how if embraced it can help the national police service in the prevention of all crimes.

Summary, Conclusion and Recommendation

Summary of the Findings

The study found that respondents used mobile phone technology in crime prevention. These findings are in line with other studies who indicated that various agencies mandated with enforcing law and order were in agreement that cell phones applications contributed extensively in compacting crime activities. The study further found out that police officers had functional free emergency phone numbers known to the public and which the police often received calls from the public. These findings correspond with other studies who contends that delays by citizens to report crimes on time made it impossible for police to make arrest at the scene of crime. The study also found out that mobile phone tracking was used to gather evidence for prosecution. These findings are in line with other studies that argued that the key issue hampering crime detection as well as reporting is in appropriate communication platform between the police and the members of the public.

Conclusions

From the findings of this study, we conclude that the mobile phone applications have revolutionized the crime prevention unit of the police to an extent though it still requires to be implemented fully. The use of the mobile phone in crime has been propelled by invention of various applications such as the Facebook, twitter, emails, short text messages and the WhatsApp social media platforms. This approach has eased the police officers tasks of crime prevention largely but still there is more that needs to be done pertaining the police officers usage of phones, personal norms (cognitive acceptance), effortlessness and the police organization management style to effectively enhance the crime prevention via this platform. Police effort to use mobile technology was found to have significant effects on crime prevention.

Recommendations

Police officers need to be equipped with smart phones, in-serviced and training on the mobile applications usage to enhance efficiency in crime prevention deliberations. The police organization management ought to create a database integrating all police stations or develop a mobile application for the police personnel and a specific crime unit domain in that the retrieval of reports and access of the reported cases can be easily and securely shared in a secure platform. The police organization management needs to provide technical and financial support to the police officers to motivate them in an effort of improving their productivity and accountability.

Areas of Further Study

Further research efforts are needed to examine these factors in all the other counties since much emphasis was placed in Nairobi in order to compare findings. A replica of this study should be carried out but this time using a larger sample, more time should be allocated to the same and a combination of focus group discussions, these will help to counter check the information provided and provide in-depth contextual data that could further deepen understanding of the role of mobile phone tracking technology in crime prevention and how if embraced it can help the national police service in the prevention of all crimes.

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