

**ADOPTION OF ELECTRONIC POLICING SERVICES IN CRIME  
CONTROL IN NAIROBI COUNTY**

**BY**

**PETER KARAKE**

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REQUIREMENTS OF THE DEGREE OF MASTER OF BUSINESS  
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**NOVEMBER, 2014**

**DECLARATION**

This project is my original work and has not been presented for an award in any other university.

Signature ..... Date .....

Reg. No: D61/72168/2011

This project has been submitted for examination with my approval as the University Supervisor.

Signature ..... Date .....

**Mr. Joel K. Lelei**  
**Department of Management Science**  
**School of Business**  
**University of Nairobi**

## **DEDICATION**

I hereby dedicate this research project to my family, colleagues and friends who have continuously been a source of encouragement and offered their endless support during the entire time I was writing this research project and even when at times I felt defeated and all hope seemed lost.

## **ACKNOWLEDGEMENT**

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## **ABSTRACT**

Electronic policing refers to the use of the Internet to deliver police services to the public. It is the use of the computer (including digital telephony) technologies to deliver police services. Police agencies can be mentioned as among groups that have high usage rates of information technology systems. The main objective of the study was to investigate the factors affecting adoption of electronic policing in crime control and citizen services. This research problem was studied through the use of a descriptive survey design. Questionnaires were used to collect data from the OCS and OCPD of all the 17 police units in Nairobi County. The data collected was edited, coded and classified as per each objective so as to present the results of the data analysis in a systematic and clear way. Data was then subjected to analysis and presented by means of frequency tables and charts. The study concluded that the police adopted electronic identification; police-public interface; centralized information storehouse; radio frequency identification (RFID) and electronic transport (E-Transport) systems. The police further adopted online verification and fingerprints reader; real-time Information access; closed circuit television (CCTV) and intelligent sensors systems in crime control in Nairobi County. The study recommends that the government should provide new information technologies promoting better performance in law enforcement agencies. The study also recommends that the government should look at the structure of police organizations, the characteristics of policing, and the demand of maintaining efficient information processing to enable police to use information technology effectively like in business community. The study further recommends that the government should introduce community policing policy which is perhaps the most familiar term in modern policing which should be variously associated with community policing based on the idea that police should work closely with citizens to cultivate public trust in the police and to better address citizens' public safety concerns.

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## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background of the Study**

ICT is an umbrella that includes any electronic tool or communication device comprising of; radio, television, cellular phones, video camera, calculator, computer network, hardware and software, satellite systems and so on, as well as the various services and applications are linked with them, such as videoconferencing, online lectures and distance learning. With the increasing access of ICT technology, a major change has taken place from readiness to practice of ICT for different purposes. These revolutionary technologies have a greatest potential to achieve good governance goals in any country. Each and everything from business to governance is changing. Today, the police officials are also bound to face increasing heavy pressure from all the stakeholders, not only from the public and media for detection, investigation and prevention of crime but also from its employees, for the efficient working and service conditions. So, ICT is the only solution for bringing the effectiveness in the police working (Maina et al, 2004).

Electronic policing refers to the use of the Internet to deliver police services to the public. It is the use of the computer (including digital telephony) technologies to deliver police services (Lincolnshire Police, 2003). A web site, e-mail and fax are contact methods that the public can use in addition to the telephone and face-to-face channels. The idea is to provide consistent citizen access irrespective of the access channel that is being used (Sussex Police, 2003).

In E-policing, the focus is on the needs of the frontline police officer and the public. The exploitation of new technology is expected to support the provision of an infrastructure and communications network to facilitate getting information and services to the right person at the

right time in the right place, whether to a citizen or police officer, as well as providing choice for the public (Spicer & Mines, 2002). Further, it improves effectiveness and efficiency, support frontline officers and assist in local problem-solving initiatives to reduce crime and reassure the public (Woods, 2001).

Specifically in electronic policing, the police can use computer software, hardware and networking to: share information among police services (this requires IT compatibility), information sharing and networking among police officers (this requires system access and enforceable standards for security and accountability), delivery of real time information (similar to the Automated Fingerprint Identification System) (Sussex police, 2003).

Police agencies can be mentioned as among groups that have high usage rates of information technology systems (Nunn & Quinet, 2002). Information technology is now used for Operations and service delivery related to intelligence gathering, surveillance, traffic control, monitoring (Closed circuit television), Training and development including online learning and training; Corporate management such as video conferencing, performance monitoring, etc.

This use is extremely crucial for these agencies in terms of the negative consequences from wrong or inappropriate implementations. Thus, most police agencies offer information technology as support for their police officers (Gottschalk, 2006). In fact, Maltz, Freidman, and Gordon (1991) maintain that “information is the lifeblood of the police”. The amount of information that the police receive during enforcing the law is overwhelming (Gottschalk, 2006).

E-policing does not replace conventional communications such as telephone or face-to-face contact. As the UK case illustrates the majority of services will continue to be delivered by front-line police officers face-to-face with the public (The Devon & Cornwall Constabulary, 2009). However, many services and initial public contact can be handled electronically.

### **1.1.1 Crime Control**

The police force face a number of problems in the maintenance of law and order such as: Lack of adequate and proper techniques in policing, lack of integrated information systems for the smooth functioning of the police, inability to share information with other related state level and national level agencies and multiple entries of the same data and limited ability to analyze information because of different locations and analytical skills.

The fight against crime requires a cohesive and coordinated approach supported by strong ICT security system. Fortunately, police use information technology tools at almost every stage, including allocation of resources, patrolling, crime prevention, crime tracking, hot pursuits, and crime solving. In addition the security agencies require support in the form of strong legal framework, strong base of cyber security experts with expertise in system administration, network administration, penetration testing, security audit, forensic investigation, information security and software development to deal with the future challenges of both conventional and cybercrime (Boondao, 2007).

The introduction of Geographical information Systems (GIS) has made integration of spatial data with other law enforcement data possible (Radoff, 1993). A better and comprehensive technical

approach for crime analysis is done by the applications developed in GIS. GIS is a tool available and user friendly software which makes it easier for law enforcement agencies to pin point the geographical location of crime incidents and to analyze the crime spot precisely and accurately.

The use of technology integrates traditional systems as Reno (1999) points out, traditional statistical information used in crime analysis is made available in a map format that shows specific crime patterns and geographical relationships among multiple factors associated with crime events.

The developments in technology have created opportunities for the development of optimal crime information systems and the improvement of existing ones. Law enforcement agencies, have to adapt to the new challenges of the environment they are in.

### **1.1.3 Kenya Police**

The Kenyan law enforcement network is split into several sectors all comprising the police force. Since the last major reorganization in 1953, the Kenyan Police Force, under the direction of the Inspector General, is comprised of the Regular Police, General Service Unit, Criminal Investigative Department and the Administrative Police. Each with specific goals and functions, the Swahili phrase Utamishi Kwa Wote (service to all) acts as the guiding motto for officers' nationwide (Maina et al, 2004). The Regular Police conduct day-to-day street operations and act as the visible face for all Kenyans to see.

The General Service Unit (the main firearm carrying division of the police) takes part in major uprisings and events. The Criminal Investigative Department (CID) performs many undercover

operations and acts as a very close liaison to the International criminal Organization (INTERPOL-ICPO).

INTERPOL Nairobi known as National Central Bureau (NCB) is connected to INTERPOL global police communication system known as I-24/7 that links 193 countries worldwide. With 1-24/7 member countries can access and update 14 databases with vital criminal information any time. The Administrative Police is given the task of securing the borders of Kenya, work in many rural areas on the outskirts of the country, with a larger concentration to the north. Following the 1998 attacks on the U.S. Embassies in Nairobi and Dar es Salaam (Tanzania), the anti-terrorism units were created. This unit acts as an intelligence gathering service and does not have any significant face-to-face contact with the Kenyan people.

The above divisions of the Kenyan Police Force all face numerous challenges when dealing with crime in Kenya. The challenges faced by police force if fighting crime are attributed to lack of training, poor equipment, and general incompetence (Maina et al, 2004). What is required is an improved electronic policing System, which will allow information on crime to be integrated, viewed and analyzed in combination with socio-demographic statistics such as income level, poverty and unemployment. The system should be able to: support crime analysis, support police operations such as resource allocation, analyzes crime, location and demographic data and better exploit Information, Communication and Technology (ICT) capabilities.

The current functions and structure of the Kenya Police Service in the Ministry of Internal Security present a highly centralized system with all authority vested in the Inspector General of Police who is at Police headquarters. The structure was set up like this so as to exercise control

on all other police units and that the Inspector General is accountable to all police actions. As a result, information within the police takes long to process as it has to pass through a lot of offices.

ICT is identified in Vision 2030 as a way to halt crime by expanding coverage and installing more sophisticated ICT systems and monitoring techniques in security and police installations. This infrastructure investment, together with the enhanced economic opportunities created for the youth, is expected to have a considerable impact on crime rates. There is comparatively limited formal engagement with ICTs among large segments of the National Police Service. Interviews with police officers in several of Nairobi's informal settlements and at the city's central police station revealed that the incorporation of new technologies is limited and sporadic (Masese, 2007).

A study by Amnesty International (2009) also found that street level patrols are not issued with mobile phones or airtime for work. Some officers are issued with a VHF radio, although they are frequently in poor condition and seldom used. The study also found out that Kenyan police officers at all levels have personal mobile phones though most police respondents claimed they were for personal use and rarely used for official purposes. When prompted, the majority of interviewed police officers said they sometimes use their phones to communicate with colleagues and some said that they had shared their numbers with local business people. Furthermore, 12% of the community members that participated in the survey indicated that they communicate with police officers via mobile phone.



E-Policing is an umbrella that includes any electronic tool or communication device comprising of; radio, television, cellular phones, video camera, calculator, computer network, hardware and software, Databases, satellite systems and so on, as well as the various services and applications are linked with them, such as videoconferencing, online training. With the increasing access of ICT technology, a major change has taken place from readiness to practice of ICT for different purposes. These revolutionary technologies have a greatest potential for Kenya Police to be efficient and effective.

## **1.2 Statement of the Problem**

There exists a positive correlation between the quality of information and the quality of decision-making (Paresi, 2000). E-policing is the transaction of services and information between the police and citizens via the Internet. Use of the Internet to report calls for service is an emerging trend as a means of enhancing police work and access to police services by the public (Woods, Berry, 2001).

The communication channel and information flow in the Kenya Police Service is static and rigid based on the Standing orders which are laid down regulations for the organization (GRZ, 1994). By regulation, all information before being passed on to the next level of policing, the in charge of the police formation in question must approve of it and confirm that it is correct. The process is purely analogue and this result in delays in the processing and analysis of data because of the large amounts of data which the police handle (Mukinda, 2010). Information sharing among departments within the police is not easy, extension of communication systems with access to criminal database on border control post is yet to be installed all border controls. It is hampered

by the bureaucracy of writing formal requests to the Heads of department seeking authority to access data required (Amnesty International, 2009).

The crime rate in Kenya is on the increase. For instance, five cases of theft of motor vehicle are recorded per week, a case of theft from motor vehicle is recorded daily, and five assault cases are reported daily in the city centre of Nairobi County alone. The Kenya Police Service is overwhelmed by the rise and has to contain the situation with its meagre resources. The efficiency and effectiveness of the police response to crime has in the recent past been condemned by the citizens, institutions and government alike. These complaints have had an important implication for the policing of the country. Resource (both human and non-human) allocation to police stations is done according to some fuzzy criteria depending on the figures of crime recorded. No crime analysis is done to further understand the socio-demography of the environment and its inhabitants and correlate it with the types of crime committed to effectively analyze the crime and decide on which resource will effectively combat that crime (Mukinda, 2010). E-policing could help alleviate these problems.

Studies focusing on understanding user technology acceptance in law enforcement settings may contribute to the use of information technology more effectively by law enforcement personnel (Lin, Hu, & Chen, 2004). Similarly, Colvina and Goh (2005) assert that knowing the factors that influence the police officer's adoption of information technology identifies and predicts how information technology contributes to police organizations or the social organization of policing in terms of effectiveness and efficiency gain.

Moreover, allocating any new information technology and embedding it to the present structure may have also some unintended consequences unpredicted by policy makers as a result of the resistance of users (Manning, 2003). If both the number of police officers using information technology in police organizations and the amount of investment for the establishment and development of this technology are taken into account, it becomes clear that police executives and policy makers should pay special attention to identifying the optimum usage of these systems (Gottschalk & Holgersson, 2006).

Locally, Kumbuti (2013) carried out a study on the level of application of technology as a strategy by Kenya police to detect crimes in Nairobi County . The key finding was that Kenya police use personal mobile phones and walkie-talkies as the main communication equipment in crime prevention. Nyumba (2013) did a study on the factors affecting the adoption of information and communication technology by the department of refugee affairs. The study revealed that the factors that have affected the adoption of ICT by the department of refugee affairs were lack of awareness of the government policy on ICT adoption by its employees.

Yohanis (2011) undertook a study on the effectiveness of strategic approaches adopted by university of Nairobi ICT units in maintenance of information communication technology equipment. The study concluded that the University recognizes the important role of the Maintenance in providing quality services to its users, by ensuring that their equipment are well maintained and repaired in good time.

Based on this review, it is clear that E-policing aspect in Crime Control and Citizen Services in Nairobi has not been examined. As such, this study attempts to fill the research gap by examining the adoption of electronic policing in crime control in Nairobi County. The following research questions were addressed; what is the level of adoption of Electronic Policing, what are the challenges of implementation of Electronic Policing and what is the extent to which adoption of Electronic Policing affects Crime Control in Nairobi County? What are the benefits of e-policing in controlling crime and Citizen Service in Nairobi County?

### **1.3 Research Objectives**

The objectives of this study were:

1. To determine the level of adoption of Electronic Policing in Crime Control in Nairobi County.
2. To establish the extent to which adoption of Electronic Policing has affected Crime Control in Nairobi County.
3. To establish the challenges of implementation of Electronic Policing in Crime Control in Nairobi County.

### **1.4 Value of the Study**

The findings of the study would assist the government in developing the most appropriate e-policing framework, based on best practice, to ensure the provision of efficient police services through telephone, Internet, postal services and broadband to its citizens in all parts of the country including rural areas.

These study findings are important to the management of police in Kenya by acting as a management reference point for adoption of E-policing needed to be put in place both in the

present and future. The findings would offer insight into the influence of adoption of electronic policing in crime control and citizen services in Nairobi County thus, allowing them to learn how to advance their capacities in service delivery, efficient resource allocation and competence building. It would provides the police force with advanced ideas and instructive resource to enhance their insights concerning E-Policing as a tool for effective crime control and citizen services.

To researchers, scholars and academicians this study would acts as a useful reference point. This study would provide foundation for future studies to be done on the factors affecting adoption of electronic policing in crime control in Nairobi County. Thus, the research filled the academic gap by carrying out a research on the factors affecting adoption of electronic policing in crime control and citizen services.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

Literature review chapter summarizes the background and context for the research problem. Works and results from other researchers who have carried out their research in the same field of study are presented here. The specific areas covered in this chapter are; the theoretical framework, concept of electronic policing, the level of adoption of electronic policing, the challenges of implementation of electronic policing in crime control and the extent to which adoption of electronic policing in crime control and citizen services in Nairobi County .

### **2.2 Theoretical framework**

Many theories of technological acceptance have been proposed and expanded for the past decades in contemporary information system research literature. In this context, most of the studies inspiring these theories have generated adoption metrics that can be used to determine the likelihood of information technology usage and they all attempt to explain what factors influence the acceptance or rejection of technology by its potential users. The relevant paradigms will be presented in a chronological discussion.

#### **2.2.1 Technology Acceptance Model**

The Technology Acceptance Model developed by Fred Davis in 1986 is an information system that illustrates how users come to acknowledge and adapt the technology. The TAM addressed why users accepted or rejected information technology.

The TAM holds that users' behavioral intention to use technology is affected by the perceived usefulness and perceived ease of use of the technology (Vankatesh & Davis, 2000).

Davis (1989) claimed that perceived usefulness, “a belief that using the new system will increase the performance”, and perceived ease of use or “the degree to which a person believes that using a particular system would be effortless” are the main two parameters that impact the usage of these systems. Both perceived usefulness and perceived ease of use predict attitude, the user’s interest or desire to use the system. Attitude and perceived usefulness, together, are then predictive of an individual’s behavioral intention to use the system. In addition, perceived usefulness is also affected by perceived ease of use which escalates the usefulness (as cited in Vankatesh & Davis 2000).

Davis, Bagozzi, and Warshaw, (1989) stated that TAM’s capability to explain individuals’ attitudes and behaviors toward information technology system depends on the external variables. These external factors both affect perceived ease of use and perceived usefulness simultaneously. Specifically, what these external variables constitute depends on the environments that the research is conducted. Thus, many researchers have used different variables for these external factors. In this model, there is a direct causal link between the behavioral intentions and actual behavior and this mentality is theoretically explained by many researchers in a variety of studies (Lin et al., 2004; Money, 2004; Ma & Liu, 2004).

Prior research studies have suggested that technology acceptance is suitable for finding the factors influencing acceptance. The technology acceptance model is thus suitable in this study for using modeling tools including predictions, attitudes, satisfaction, and usage based on beliefs and external variables. The study will focus on the factors influencing implementation of electronic policing in crime control and citizen services.

### **2.2.2 Theory of Planned Behavior (TPB)**

The Theory of Planned Behavior (TPB), the theory states that attitude toward behavior, subjective norms, and perceived control, together shape an individual's behavioral intentions and behaviors, TPB extends the theory of reasoned action (TRA) by adding perceived behavioral controls to the model, including attitude, subjective norms, behavioral intention, and actual behavior (Madden, Ellen, & Ajzen, 1992; Yi et al., 2005). TRA is a model for the prediction of behavioral intention, spanning predictions of attitude and predictions of behavior.

TPB and TRA are relevant to this study because they will assist in prediction of individual behavioral intentions to the acceptance and usage of e-policing technologies in the Kenyan police force.

### **2.3 Application of Electronic Policing Services in Crime Control**

Policing is a very complex and sensitive activity which requires the integration of multiple data sources in a short time period. ICT tools help the police force for better and timely service delivery with the economy, effectiveness and efficiency. These benefits can be discussed in detail according to Spicer and Mines (2002).

Through the ICT identification of a person becomes very easy. Police can use number of methods to trace a person to control the crime and maintain the law and order. Whatever method of electronic communication is used by a person it becomes important means of electronic identification. Digital signature of a person, Bank account number, Telephone/mobile number, Driving license number, Passport number and Permanent Account Number (PAN). Police can find any person quickly to maintain security in the society with above mentioned sources. These sources provide the detail information about the person (Spicer & Mines, 2002).



The major activities related with the transport system can be handled easily with the electronic devices. E-Transport aspect covers number of activities such as: registration of all types of motor vehicles, Issue of driving licenses, Issue of Permits for the light and heavy vehicles, Tax and fee collection through cash and bank challans and control of pollution through checking etc. Thus, electronically saved data will be useful for the effective traffic management (Spicer & Mines, 2002).

Biometric technologies and fingerprint reader are also helping in law enforcement and to improve the operations of the police. Biometric technology helps in online verification and recognition of people across different geographical locations. It provides accurate information of the suspected person and provides a scope for quick decision-making on related security issues (Spicer & Mines, 2002).

Recently automatic identification procedures have become popular in providing the number of services. These can provide information about people, goods and products. It is a technology which uses radio waves to transfer data from an electronic tag or label, attached to an object, through a reader for the purpose of identifying and tracking the movement of material across the country. This technology is used by the police authorities so that transportation systems can be verified to prevent movement of unauthorized materials which can affect the public safety. The tag's information is stored electronically. The exact location of every police officer can be most effective for the delivery of police services. Such a system proves as an important tool for the collection and providing information of the location of the officers (Spicer & Mines, 2002).

When the environment is not suitable for human beings for gathering of information then CCTV systems can continuously do this work. This equipment can be used to see and observe different parts of a process from a central control room; it can be placed at public places that enable the police to collect large volumes of video for the analysis of a particular event of any incident. Collected information from the video can be transmitted to the mobiles of police officers so that they can control the every situation and arrest the suspected persons from locations of large population gatherings (Spicer & Mines, 2002).

Human Resource Management is very important activity to manage the available human resources for the achievement of goals. The strength of a police force is distributed, according to requirements of the department, divisions, sub-divisions, districts (Bunyard, 1978). ICT has the full potential to bring economy in the police recruitment, selection, training, promotions and to make the records of personnel, their salaries and allowances. In the recruitment process of the police, use of ICT starts from the advertisement, forms filling, written test information, date of interview of the eligible candidates and finally selected candidates etc. With this, police department should ensure that personnel are properly trained in working with the latest technology (Spicer & Mines, 2002).

E-Police will help to build citizen confidence. The first step to using ICTs would be in the interface of police with the public. Police is the body to secure the life and property of the public. Through ICT public will be able to view information regarding status of their complaints and the police will be able to provide feedback on the same. The major activities can be performed

online such as: online foreigner registration, stolen vehicle database, passport verification and live updates and alternative routes to control the traffic etc. This will bring reduction in paper work and reduce the duplication in the working of police. With this, transparency will be increased and services will be provided between the limited time periods (Spicer & Mines, 2002).

In a large geographical area which is very hard to check and administer the Global Positioning System (GPS) and Geographical Information System (GIS) are used to track the information about a particular area and movement of suspected and terrorists etc. with the available data and video. The available information provides the ability to coordinate all the activities for better tracking, reporting, and taking action. Thus the technology enables the police personnel to take action proactively. GPS is very useful to track a suspect vehicle, enable decision making regarding traffic routing and minimizing overcrowding and it provides information to know that whether the patrol units are near to respond to an emergency (Spicer & Mines, 2002).

With the increasing population and urbanization the numbers of vehicle on the roads are also increasing, the main purposes of the traffic police are: to decrease in road accidents, provide easy traffic flow and enforce traffic rules and regulations. Intelligent sensors provide real time information to for better traffic management. Camera system in cars has become an important instrument to record video of events which is improving and becoming more cost effective to control the crimes (Spicer & Mines, 2002).

Police holds and maintain a large volume of data in a standardized manner for the efficient retrieval and analysis of the data. There could be several databases, for police personnel, resources management databases and others for criminals. Personnel database hold records of their current and previous postings, service record, family background, posting and promotion etc. which can be accessed within a second. For the criminals, police personnel analyze the data and identify important information by just typing the name of a criminal, it can be very useful for the maintenance of law & order. Such type of analysis may help in identifying and forecasting crime, decision making for the future and to prevent the society from the further attacks and manmade calamities. Today, policing requires greater analytical skills to use information in an effective way (Spicer & Mines, 2002).

#### **2.4 Factors that Influence Adoption of Electronic Policing Services in Crime Control**

Implementing an e-policing initiative requires police services to: develop strategic vision and direction, take legislation into account, evaluate technology solutions, evaluate costs associated with planning, implementation and operation and address such barriers as lack of strategy, resistance, delays in requirements, etc (Policing Bureaucracy Task Force, 2005).

According to Ajzen and Fishbein (1975), intention has significant effects on behavior. Similarly, TPB postulates that behavior is a result of behavioral intention (Ajzen, 1991). In this cross sectional study, selecting intention instead of system usage prevents the potential problem of retrospective analysis. The intension to use a system can be determined by three thing: Attitude, perceived control and norms, if the intentions to adopt e-policing are predicted to be weak in the study, then this would be a challenge to implement E-policing.

Attitude refers to the police officers' positive or negative attitudinal beliefs about the use of E-Policing technology (Hu et al., 2005; Huang & Chuang, 2007). According to the TAM model, attitude is a determinant of perceived usefulness and perceived ease of use (Zain, Rose, Abdullah, & Masrom, 2005). However, in technology acceptance literature, attitude has always been discussed relevant to its effect on intention or technology usage. If the study reveals that there is a negative attitude on the use of E-policing then this can be perceived as a challenge to implement E-policing.

Davis (1989), the creator of TAM, defined the variable, Ease of Use, as "the degree to which an individual believes that using a particular system is free of effort". This easiness includes mental and physical effort, especially in the learning phase (Yanga & Yoo, 2004). In this study, this variable can be defined as police officers' perceptions that their usage of the electronic policing system is effort-free. Consistent with TAM and later TAM2, perceived ease of use has an effect on both intention to use and perceived usefulness.

Davis (1989) defined perceived usefulness as "a belief that using a new system increases the performance". It is related to effectiveness on the job, to more productivity at work, such as consuming less time or money, and to relative motivation for usage of that particular technology (Yanga & Yoo, 2004). In this study, perceived usefulness refers to the concept that police officers perceive electronic policing as useful. Usefulness has been tested relative to the system's ability to increase performance, productivity, and effectiveness. Many empirical studies have found that perceived usefulness is an important determinant of intention to use and also of attitude (Colvin & Goh, 2005; Hong, Thong, & Tam, 2006; Hu et al., 2005).

In many studies, the Subjective Norm has been found to be an important factor for intention to use information technology (Chau & Hu, 2002; Hu et al, 2005; Yi et al. 2006). It refers to individuals' perceptions affected by important others' opinions about information technology adoption. Lee et al. (in press) categorize the subjective norm in two parts: peer pressure and effects of supervisors. When considering the organizational culture and subculture of police officers working in a hierarchical environment, social norms and interpersonal communications between police officers and with their supervisors have significant effects on intention behavior. In addition, as a sub-cultural value, the police officers' commitment and attachments to their jobs and peers also show the influence of opinions of significant others on police officers. Unlike in a business setting where competition between workers can be observed, police officers bond to their agency and peers easily because of the nonprofit nature of policing (Hu et al., 2005).

## **2.5 Electronic Policing in crime control**

Colvin and Goh (2005) assert that information technology has substantial impact on police practices. In addition, any increased acceptance of information technology by police officers improves the quality of policing and performance of law enforcement agencies (Gottschalk & Holgersson, 2006). Therefore, it is important to know how well information technology is working for a police force.

Overall, the usage of information technology is affected by the characteristics of police work and organization, types of information, the form of police intelligence and various operational strategies (Flanagin, 2002). Although new information technologies promoting better performance are implemented often in law enforcement agencies, the expected improvements

may not be observed every time (Nunn & Quinet, 2002). Generally, in law enforcement agencies with paramilitary organizations, deploying new information technology may not stem from the needs of that particular police agency; rather, it may be a general implementation of new policy decided earlier by the police executives or policy makers (Nunn & Quinet, 2002).

There is no difference between policing and business either commercial or nonprofit in terms of usage of information technology. Organizational response of police organizations to the information technology consists of several stages including familiarity, adoption, resistance, and reformation. These stages include several dynamics similar to the ones observed in organizational change process in business setting. Technological capacities, such as memory capacity, software capabilities, and fittingness for demanding job also play critical role in these stages (Manning, 2003).

However, comparing to business sector, law enforcement agencies have fallen behind the business sector in utilizing new information technologies. Although there seems to be significant improvements in using computers, commitment to paper based traditional policing needs to be replaced totally in this pre-digital era (Chu, 2001). Flanagin (2002) claimed that law enforcement agencies have some obstacles when compared to other agencies in terms of obtaining benefits from information technology. The structure of police organizations, the characteristics of policing, and the demand of maintaining efficient information processing are some of these obstacles that prevent police officers from using information technology as effectively as users in other settings, such as business. Generally, law enforcement agencies have a traditional hierarchical bureaucracy in which the orders are assigned and dictated. As Manning (1992)

mentioned, the information flow in the law enforcement agencies is asymmetrical as there is always an authoritative figure who designs the communication system (as cited in Flanagin, 2002). Collier (2006) indicated that in the policing, the main problem is not if the information is available, but rather to access the information when it is necessary. Police officers spend a considerable amount of time and energy to collect and store the data, but if the information technology tools are not used properly in law enforcement, then information retrieval and optimum usage of stored information cannot be obtained (Gottschalk, 2006).

Police agencies are, traditionally, reactive in nature rather than proactive in controlling crime within their jurisdictions. Police officers usually go to crime scenes after the crime is committed. Because of the uncertain and unpredictable environment at the crime scene, the officers attempt to take into account even very small amounts of data before they go to the crime scene, because unprepared action may cause fatal results (Flanagin, 2002). Colvin and Goh (2005) insisted that the two factors of information quality and timeliness for law enforcement agencies are important in terms of the general acceptance of information technology.

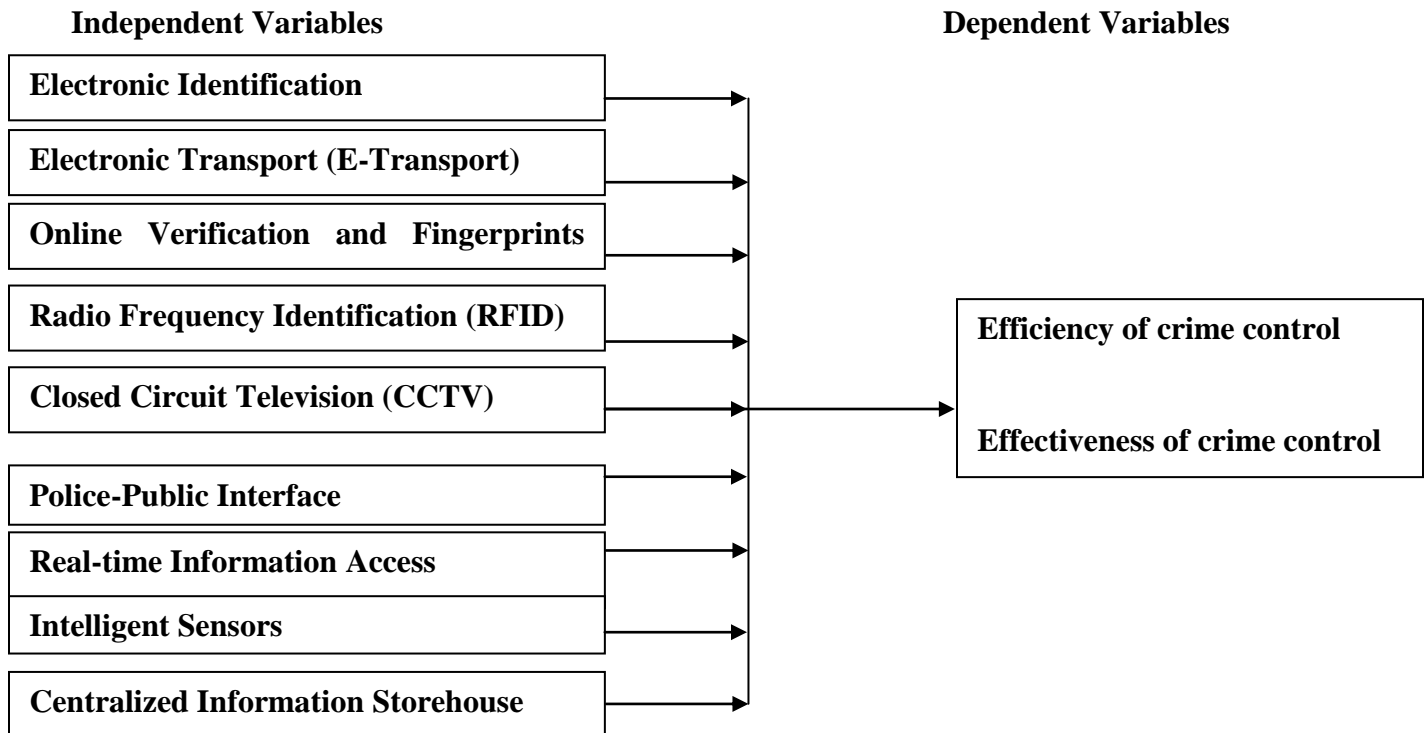
## **2.6 Conceptual framework**

A conceptual framework is a research tool intended to assist a researcher to develop awareness and understanding of the situation under scrutiny and to communicate this. According to Bogdan and Biklen (2003) a conceptual framework is a basic structure that consists of certain abstract blocks which represent the observational, the experiential and the analytical/synthetical aspects of a process or system being conceived.



An independent variable is that variable which is presumed to affect or determine a dependent variable. It can be changed as required, and its values do not represent a problem requiring explanation in an analysis, but are taken simply as given (Bogdan & Biklen, 2003). The independent variables in this study are; Electronic identification systems, Electronic transport (E-transport), Online verification and fingerprints, Radio frequency identification (RFID), Closed Circuit Television (CCTV), Police public interface, Real-time information access, Intelligent sensors and Centralized information storehouse. A dependent variable is what is measured in the experiment and what is affected during the experiment. The dependent variable responds to the independent variable (Everett, 2002). The dependent variable in this study is effectiveness and efficiency of electronic policing services. The conceptual framework of this study (see Fig. 2.1) demonstrates the combined direct effects of the Electronic Policing practices on the effectiveness and efficiency of electronic policing services in Nairobi County.

**Figure 2.1 Conceptual Model**



(Author, 2014)

### 2.7 Summary

Service delivery involves a comparison of expectations with performance. Service is perceived as a set of activities performed by an organization that aims at creating value, which includes specific services or economic activities, acts or performance to customers as well as other organizational activities that are part of the value creation process such as leadership and management styles, structure of operations, customer relationship initiatives, etc and not services as market offerings only.

In 2009, the government appointed a taskforce as an important step towards drawing a road map for the Police Reforms. The Commissioner of Police is committed to a Police Service whose members are motivated, people friendly, open, relaxed and honest with one another and; know their role and mandate and be proud of their job; appreciated by the public etc.

The just concluded Constitutional review holds a promise for the establishment of an emancipated Police Service that will operate in conformity with democratic transformation from the current practice of Regime Policing to Democratic Policing (Community and electronic Policing).

These measures augur well with the Police Reforms as well as the goodwill of citizens. The importance of information technology for police agencies reveals that policymakers and administrators continue to invest in this sector by considering usability factors which directly influence the effectiveness of the information technology.

To examine usability characteristics of police officers, technology acceptance theories offering different models can be employed by considering task characteristics of policing and police officers' usability features. Thus, a research model was presented based on different technology acceptance models, TAM and TPB, to test the Kenyan police officers' adoption of information technology to contribute to Kenyan information management practices. Police agencies in many countries have developed many projects for better electronic policing systems in their organizations.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter sets out various stages and phases that were followed in completing the study. It identified the procedures and techniques that were used in the collection, processing and analysis of data. Specifically the following subsections included; research design, target population, data collection procedures and finally data analysis.

### **3.2 Research Design**

Research design refers to the method used to carry out a research. Orodho (2003) defines a research design as the scheme, outline or plan that is used to generate answers to research problems. This research used a descriptive survey design. According to Cooper and Schindler (2003), a descriptive study is concerned with finding out the what, where and how of a phenomenon. Descriptive survey design was chosen because it would enable the researcher to generalise the findings to a larger population.

### **3.3 Population**

Borg and Crall (2009) described target population as a universal set of study of all members of real or hypothetical set of people, events or objects to which an investigator wishes to generalize the result. Target population was all the 17 police units in Nairobi County (Republic of Kenya, 2011).

### **3.4 Sampling Design**

The study used a combination of stratified and purposive sampling technique. Stratification introduces an element of control as a means of increasing the precision and representativeness.

Purposive sampling technique targets a particular group of people and does not produce a sample that is representative of a larger population, but it can be exactly what is needed in some cases - study of organization, community, or some other clearly defined and relatively limited group (Patton, 2009). The study divided the sample into 2 strata, OCS and OCPD, while purposive sampling was used in identifying the actual respondents; one respondent in each area.

**Table 3.4 : Sample Size**

<b>Category</b>	<b>Sample Size</b>
OCS	17
OCPD	17
Total	34

### **3.5 Data Collection**

Questionnaires were used to collect data. These were structured questionnaires. The questionnaires contained 5 sections. Section A addressed general issues on respondents' characteristics. Section B addressed the Level of Adoption of Electronic Policing in Crime Control in Nairobi County; Section C addressed the extent to which adoption of Electronic Policing has affected Crime Control in Nairobi County whereas Section D addressed the challenges of Implementation of Electronic Policing in Crime Control in Nairobi County. The questionnaires were addressed to the officers of each of the selected units and were administered using "drop and pick later" method. These were then collected and sorted ready for analysis.

### **3.6 Data Analysis and Presentation**

Upon return from the field, the data collected was edited, coded and classified as per each objective so as to present the results of the data analysis in a systematic and clear way. Data was then subjected to analysis using SPSS (Statistical Package for Social Sciences) and

presented by means of frequency tables and charts. Data relating to Section A of the questionnaire was analyzed using frequencies and percentages. As for data relating to Section B of the questionnaire analysis was done using means and standard deviation while data relating to Section C of the questionnaire was analyzed using means, standard deviation and regression analysis. Analysis of data relating to Section D of the questionnaire was done using means and standard deviation. The regression model used was ( $Y = \beta_0 + \beta_1 X_1 \dots \dots \dots \beta_9 X_9 + \epsilon$ ):

Whereby  $Y =$  Effectiveness of Electronic Policing Services

$X_1$  = Efficiency of Electronic Policing Services

$X_1$  = Electronic Identification

$X_2$  = Electronic Transport (E-Transport)

$X_3$  = Online Verification and Fingerprints

$X_4$  = Radio Frequency Identification (RFID)

$X_5$  = Closed Circuit Television (CCTV)

$X_6$  = Police-Public Interface

$X_7$  = Real-time Information Access

$X_8$  = Intelligent Sensors

$X_9$  = Centralized Information Storehouse

$\epsilon$  = error term and  $\beta_0$   $\beta_1$   $\beta_2$   $\beta_3$  and  $\beta_4$  are the regression equation coefficients for each of the variables discussed.

Multiple regression analysis was also conducted as to determine the relationship between Effectiveness and Efficiency of Electronic Policing Services and the nine variables.

**CHAPTER FOUR:  
DATA ANALYSIS, RESULTS AND DISCUSSION**

**4.1 Introduction**

This chapter presents analysis and findings of the study as set out in the research methodology. The results were presented on the adoption of electronic policing services in crime control in Nairobi County. The study targeted 34 respondents out of which 30 responded and returned their questionnaires contributing to the response rate of 88.2%. This response rates were sufficient and representative and conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. This commendable response rate was due to extra efforts that were made via personal calls and visits to remind the respondent to fill-in and return the questionnaires. The chapter covers the demographic information, and the findings are based on the objectives.

**4.2 Demographic Information**

**4.2.1 Gender Distribution of Respondents**

The study sought to establish the respondent's gender distribution. Data in this respect were collected and analyzed giving the results as shown in Table 4.2.1.

**Table 4.2.1 Gender Distribution of Respondents**

	<b>Frequency</b>	<b>Percent</b>
Male	25	83.3%
Female	5	16.7%
Total	30	100

**(Source: Research Data, 2014)**

From the findings shown in Table 4.1 the majority of the respondents (83.3%) were males while the rest (16.7%) were females. This illustrates that both males and females were reached for responses even though there was gender disparity.

#### 4.2.2 Ages of the Respondents

The study also sought to establish the age distribution of the respondents. Data relating to ages were collected and analyzed and the results are as shown in Table 4.2.2.

**Table 4.2.2 Ages of the Respondents**

	<b>Frequency</b>	<b>Percentage (%)</b>
26-30	3	10
31-35	8	26.7
36-40	7	23.3
41-45	1	3.3
46-50	9	30.0
51-55	1	3.3
More than 56	1	3.3
<b>Total</b>	<b>30</b>	<b>100</b>

**(Source: Research Data, 2014)**

According to the findings, most of the respondents (30%) were 46-50 years of age, 26.7% were 31-35 years while 23.3% were aged 36-40 years. This depicts that the respondents are highly experienced owing to the accumulation of knowledge and skills throughout the working life, majority of who were over 40 years.

#### 4.2.3 Work Experience

The research sought to establish respondents' working experience based on the number of years they have worked. The findings are as stipulated in Table 4.2.3.



**Table 4.2.3: Work Experience**

	<b>Frequency</b>	<b>Percentage (%)</b>
5 years and below	4	13
6-10 years	11	37
11-15 years	5	17
16-20 years	7	23
21 years and above	3	10
<b>Total</b>	<b>30</b>	<b>100</b>

**(Source: Research Data, 2014)**

Table 4.2.3 shows that most of the respondents (37%) had worked in the police unit for 6-10 years, 23% for 16-20 years while 17%, 13% and 10% had worked in the police unit for 11-15 years, 5 and below years and 21 and above years respectively. This illustrates that the respondents had worked in the police unit for a long period to give credible information on the adoption of electronic policing services in crime control. It also depicts that the respondents were highly experienced owing to the many years they had worked in the police unit.

#### **4.2.4 Highest level of Education**

The research sought to establish respondents' highest level of Education. The findings are as tabulated in Table 4.2.4.

**Table 4.2.4: Highest Level of Education**

	<b>Frequency</b>	<b>Percentage (%)</b>
High school		13
College		47
University		33
Master degree		7
<b>Total</b>	<b>30</b>	<b>100</b>

**(Source: Research Data, 2014)**

Table 4.2.4 indicates that most of the police (47%) had college level of education, 33% were university degree holders and 13% had high school level of education while 7% were master's degree holders. This illustrates that majority of the respondents were highly trained in their profession as they had very high academic qualifications.

#### **4.2.5 Extent to Which the Organization Uses E-Policing**

The research further sought to establish the extent to which organization uses E-policing. The findings are as presented in Table 4.2.5.

**Table 4.2.5: Extent to which the organization uses E-policing**

	<b>Frequency</b>	<b>Percentage (%)</b>
Little extent	3	10
Moderate extent	5	17
Great extent	15	50
Very great extent	7	23
<b>Total</b>	<b>30</b>	<b>100</b>

**(Source: Research Data, 2014)**

From the findings above, majority of the respondents agreed that their organization uses E-policing to a great extent, 23% to a very great extent while 17% agreed that their organization uses E-policing to a moderate extent. This implies that the police unit uses E-policing to a great extent.

#### **4.2.6 Experience of Using E-Policing in Crime Control**

The research also sought to establish respondents' Experience of using E-policing in crime control. The findings are as stipulated in Table 4.2.6.

**Table 4.2.6 Experience of Using E-Policing in Crime Control**

	<b>Frequency</b>	<b>Percentage (%)</b>
1 year		7
2 years		10
3 years		17
4 years		43
5 years		23
<b>Total</b>	<b>30</b>	<b>100</b>

**(Source: Research Data, 2014)**

Table 4.2.6 shows that most of the respondents (43%) had experience of using E-policing in crime control for 4 years, 23% for 5 years while 17%, 10% and 7% experience of using E-policing in crime control for 3 years, 2 years and 1 year respectively. This illustrates that the respondents had experience of using E-policing in crime control for 4 years to give credible information on the adoption of electronic policing services in crime control.

#### **4.3 The Level of Adoption of Electronic Policing in Crime Control in Nairobi County**

The study sought to establish the extent to which Electronic policing systems been adopted by your police units. The responses were rated on a five point Likert scale indicating to what extent respondents agree to the statements, where: 1- To no extent, 2- To a little extent, 3- To a moderate extent, 4- To a great extent and 5-To a very great extent. The mean and standard deviations were generated from SPSS and are as illustrated in Table 4.3 below.

**Table 3. Extent of Adoption of Electronic Policing Systems**

<b>Statements on Adoption of Electronic Policing in Crime Control in Nairobi County</b>	<b>Mean</b>	<b>Std Dev</b>
Electronic Identification	4.29	0.469
Electronic Transport (E-Transport)	4.00	0.500
Online Verification and Fingerprints Reader	3.88	1.576
Radio Frequency Identification (RFID)	4.10	1.224
Closed Circuit Television (CCTV)	3.76	1.521
Police-Public Interface	4.27	0.834
Real-time Information Access	3.83	0.649
Intelligent Sensors	3.75	0.231
Centralized Information Storehouse	4.22	0.695

**(Source: Research Data, 2014)**

From the study findings in Table 4.3, majority of the respondents agreed to a great extent that electronic Identification; police-Public Interface; Centralized Information Storehouse; Radio Frequency Identification (RFID) and Electronic Transport (E-Transport) were the Electronic policing systems adopted by police units as shown by the mean scores of 4.29, 4.27, 4.2, 4.10 and 4.00 respectively. On the other hand, most of the respondents agreed to a moderate extent that Online Verification and Fingerprints Reader; Real-time Information Access; Closed Circuit Television (CCTV) and Intelligent Sensors were the Electronic policing systems adopted by police units as shown by the mean scores of 3.88, 3.83, 3.76 and 3.75 respectively.

This illustrates that electronic Identification; police-Public Interface; Centralized Information Storehouse; Radio Frequency Identification (RFID) and Electronic Transport (E-Transport) were the Electronic policing systems adopted by police. This agrees with Colvin and Goh (2005) who assert that information technology has substantial impact on police practices. In addition, any

increased acceptance of information technology by police officers improves the quality of policing and performance of law enforcement agencies. Flanagin (2002) also claimed that law enforcement agencies have some obstacles when compared to other agencies in terms of obtaining benefits from information technology. The structure of police organizations, the characteristics of policing, and the demand of maintaining efficient information processing are some of these obstacles that prevent police officers from using information technology as effectively as users in other settings, such as business. Generally, law enforcement agencies have a traditional hierarchical bureaucracy in which the orders are assigned and dictated. Manning (1992) further mentioned that the information flow in the law enforcement agencies is asymmetrical as there is always an authoritative figure who designs the communication system.

#### **4.4 Extent to Which Adoption of Electronic Policing has Affected Crime Control in Nairobi County.**

##### **4.4.1 Adoption of Electronic Policing Systems and Effectiveness of Crime Control in Nairobi County**

The study sought to establish the extent to which Adoption of Electronic policing systems has contributed to effectiveness of Crime Control in Nairobi County. The responses were rated on a five point Likert scale indicating to what extent respondents agree to the statements, where: 1- To no extent, 2- To a little extent, 3- To a moderate extent, 4- To a great extent and 5-To a very great extent. The mean and standard deviations were generated from SPSS and are as illustrated in Table 4.4.1 below.

**Table 4.4.1 Adoption of Electronic Policing Systems and Effectiveness of Crime Control in Nairobi County**

<b>Adoption of Electronic policing systems and crime control in Nairobi County</b>	Mean	Std dev
Electronic Identification	4.23	0.694
Electronic Transport (E-Transport)	3.95	0.739
Online Verification and Fingerprints Reader	4.21	4.251
Radio Frequency Identification (RFID)	4.17	0.724
Closed Circuit Television (CCTV)	4.36	0.733
Police-Public Interface	4.02	0.342
Real-time Information Access	3.48	0.948
Intelligent Sensors	3.84	0.746
Centralized Information Storehouse	4.63	0.971

**(Source: Research Data, 2014)**

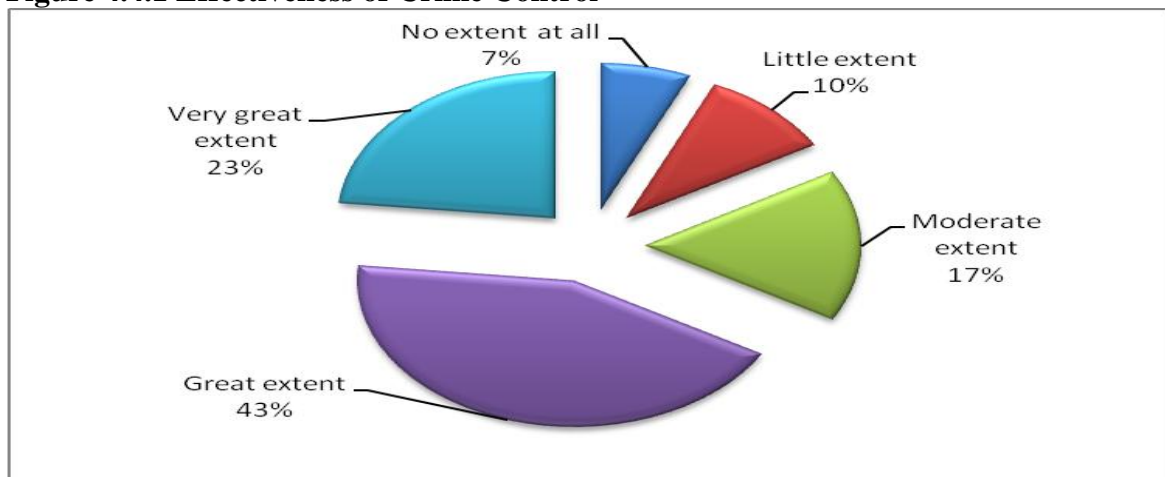
From the study findings in Table 4.4.1, majority of the respondents agreed to a great extent that Centralized Information Storehouse; Closed Circuit Television (CCTV); Electronic Identification; Online Verification and Fingerprints Reader; Radio Frequency Identification (RFID) and Police-Public Interface were the electronic policing systems that has contributed to effectiveness of Crime Control in Nairobi County as shown by the mean scores of 4.63, 4.23, 4.21, 4.17 and 4.02 respectively. On the other hand, most of the respondents agreed to a moderate extent that Electronic Transport (E-Transport); Intelligent Sensors and Real-time Information Access were the electronic policing systems that has contributed to effectiveness of Crime Control in Nairobi County as shown by the mean scores of 3.95, 3.84 and 3.48 respectively.

This illustrates that Centralized Information Storehouse; Closed Circuit Television (CCTV); Electronic Identification; Online Verification and Fingerprints Reader; Radio Frequency

Identification (RFID) and Police-Public Interface were the electronic policing system that has contributed to effectiveness and efficiency of Crime Control in Nairobi County. This agrees with Collier (2006) who observed that in the policing, the main problem is not if the information is available, but rather to access the information when it is necessary. Police officers spend a considerable amount of time and energy to collect and store the data, but if the information technology tools are not used properly in law enforcement, then information retrieval and optimum usage of stored information cannot be obtained. Further, Colvin and Goh (2005) insisted that the two factors of information quality and timeliness for law enforcement agencies are important in terms of the general acceptance of information technology.

The research further sought to establish the extent to which adoption of Electronic policing systems has affected effectiveness of Crime Control. The findings are as stipulated in Figure 4.4.1.

**Figure 4.4.1 Effectiveness of Crime Control**



(Source: Research Data, 2014)

From the findings above, most (43%) of the respondents agreed that adoption of Electronic policing systems has affected effectiveness of Crime Control to a great extent, 23% to a very great extent while 17% agreed that adoption of Electronic policing systems has affected effectiveness of Crime Control to a moderate extent. This implies that adoption of Electronic policing systems has affected effectiveness of Crime Control to a great extent.

#### 4.4.2 Regression Coefficient

**Table 4.4.2 Regression Coefficients**

<b>Model</b>	<b>Unstandardized</b>		<b>Standardized</b>		
	<b>Coefficients</b>		<b>Coefficients</b>		
	<b>B</b>	<b>Std. Error</b>	<b>Beta</b>	<b>t</b>	<b>Sig.</b>
(Constant)	1.308	0.142		9.190	0.00
<b>Electronic Identification</b>	0.558	0.310	0.172	4.342	.0276
<b>Electronic Transport</b>	0.731	0.156	0.210	3.592	.0285
<b>Radio Frequency Identification</b>	0.785	0.322	0.097	3.542	.0202
<b>Closed Circuit Television</b>	0.620	0.285	0.148	3.458	.0249
<b>Police-Public Interface</b>	0.731	0.310	0.172	4.342	.0276
<b>Intelligent Sensors</b>	0.568	0.156	0.210	3.532	.0285
<b>Centralized Information Storehouse</b>	0.795	0.322	0.067	3.542	.0202
<b>Online Verification and Fingerprints Reader</b>	0.626	0.275	0.148	4.458	.0246
<b>Real-time Information Access</b>	0.791	0.245	0.138	3.438	.0229

(Source: Research Data, 2014)



Multiple regression analysis was conducted as to determine the relationship between Effectiveness of Electronic Policing Services and the nine variables. As per the SPSS generated table 4.4.8, the equation

$(Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon)$  becomes:

$$Y = 1.308 + 0.558X_1 + 0.785X_2 + 0.620X_3 + 0.731X_4 + 0.568X_5 + 0.795X_6 + 0.6260X_7 + 0.791X_8 + 0.725X_9$$

The regression equation above has established that taking all factors into account (Electronic Identification, Electronic Transport (E-Transport), Radio Frequency Identification (RFID), Closed Circuit Television (CCTV), Police-Public Interface, Intelligent Sensors and Centralized Information Storehouse) constant at zero, Effectiveness of Electronic Policing Services will be 1.308. The findings presented also shows that taking all other independent variables at zero, a unit increase in Electronic Identification will lead to a 0.558 increase in Effectiveness of Electronic Policing Services; a unit increase in Electronic Transport (E-Transport) will lead to a 0.731 increase in Effectiveness of Electronic Policing Services; a unit increase in Radio Frequency Identification (RFID) will lead to a 0.785 increase in Effectiveness of Electronic Policing Services; a unit increase in Closed Circuit Television (CCTV) will lead to a 0.620 increase in Effectiveness of Electronic Policing Services; a unit increase in Police-Public Interface will lead to a 0.731 increase in Effectiveness of Electronic Policing Services; a unit increase in Intelligent Sensors will lead to a 0.795 increase in Effectiveness of Electronic Policing Services and a unit increase Centralized Information Storehouse will lead to a 0.791 increase in Effectiveness of Electronic Policing Services. This infers that use of Closed Circuit Television (CCTV) most to Effectiveness of Electronic Policing Services followed by Radio

Frequency Identification (RFID) then Police-Public Interface, Electronic Identification, Electronic Transport (E-Transport), Intelligent Sensors while Centralized Information Storehouse, Real-time Information Access and Online Verification and Fingerprints Reader contributed the little to Effectiveness of Electronic Policing Services.

#### **4.4.3 Extent to Which Adoption of Electronic Policing Systems Contributed to Efficiency of Crime Control**

The study sought to establish the extent to which Adoption of Electronic policing systems has contributed to efficiency of Crime Control in Nairobi County. The responses were rated on a five point Likert scale indicating to what extent respondents agree to the statements, where: 1- To no extent, 2- To a little extent, 3- To a moderate extent, 4- To a great extent and 5-To a very great extent. The mean and standard deviations were generated from SPSS and are as illustrated in table below.

**Table 4.4.3 Extent to Which Adoption of Electronic Policing Systems Contributed to Efficiency of Crime Control**

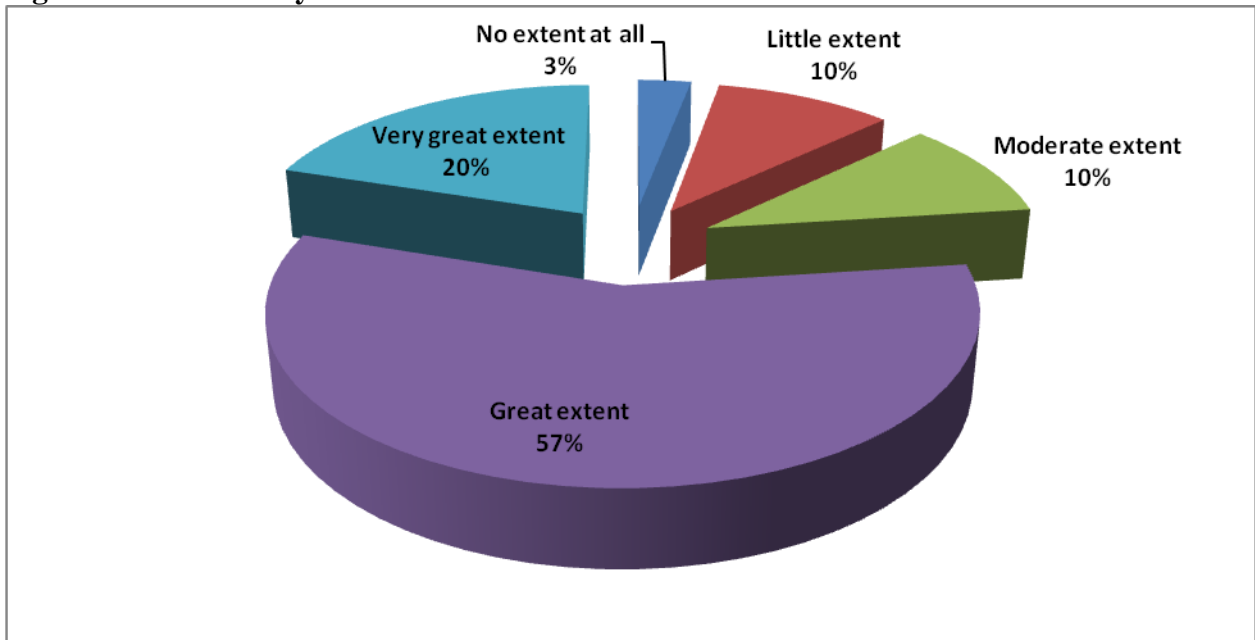
	<b>Mean</b>	<b>STDev</b>
Electronic Identification	4.65	0.482
Electronic Transport (E-Transport)	4.44	0.524
Online Verification and Fingerprints Reader	4.53	0.621
Radio Frequency Identification (RFID)	4.66	0.542
Closed Circuit Television (CCTV)	4.11	0.057
Police-Public Interface	4.48	0.626
Real-time Information Access	4.45	0.162
Intelligent Sensors	3.89	1.015
Centralized Information Storehouse	3.40	0.223

**(Source: Research Data, 2014)**

From the study findings in Table 4.4.3, majority of the respondents agreed to a great extent that Radio Frequency Identification (RFID); Electronic Identification; Online Verification and Fingerprints Reader; Police-Public Interface; Real-time Information Access; Electronic Transport (E-Transport) and Closed Circuit Television (CCTV) were Electronic policing systems has contributed to efficiency of Crime Control in Nairobi County as shown by the mean scores of 4.66, 4.65, 4.53, 4.48, 4.45, 4.44 and 4.11 respectively. Further, most of the respondents agreed to a moderate extent that Intelligent Sensors and Centralized Information Storehouse were Electronic policing systems has contributed to efficiency of Crime Control in Nairobi County as shown by the mean scores of 3.89 and 3.40 respectively. This agrees with Manning, (2003) who noted that there was no difference between policing and business either commercial or nonprofit in terms of usage of information technology.

Organizational response of police organizations to the information technology consists of several stages including familiarity, adoption, resistance, and reformation. These stages include several dynamics similar to the ones observed in organizational change process in business setting. Technological capacities, such as memory capacity, software capabilities, and fittingness for demanding job also play critical role in these stages. Nunn & Quinet, (2002) also cited that in law enforcement agencies with paramilitary organizations, deploying new information technology may not stem from the needs of that particular police agency; rather, it may be a general implementation of new policy decided earlier by the police executives or policy makers. The research further sought to establish the extent to which adoption of Electronic policing systems has affected Efficiency of Crime Control. The findings are as stipulated in Figure 4.4.2.

**Figure 4.4.2 Efficiency of Crime Control**



**(Source: Research Data, 2014)**

From the findings above, majority (57%) of the respondents agreed that adoption of Electronic policing systems has affected efficiency of Crime Control to a great extent, 20% to a very great extent while 10% agreed that adoption of Electronic policing systems has affected efficiency of Crime Control to a moderate extent and to a little extent respectively. This implies that adoption of Electronic policing systems has affected Efficiency of Crime Control to a great extent.

#### 4.4.4 Regression Coefficient

**Table 4.4.7 Regression Coefficients**

Model	Unstandardized		Standardized		
	B	Std. Error	Beta	T	Sig.
(Constant)	1.466	0.102		9.220	0.00
<b>Electronic Identification</b>	0.614	0.310	0.172	4.342	.0276
<b>Electronic Transport</b>	0.589	0.156	0.210	3.592	.0285
<b>Radio Frequency Identification</b>	0.711	0.322	0.097	3.542	.0202
<b>Closed Circuit Television</b>	0.638	0.285	0.148	3.458	.0249
<b>Police-Public Interface</b>	0.727	0.310	0.172	4.342	.0276
<b>Intelligent Sensors</b>	0.596	0.156	0.210	3.532	.0285
<b>Centralized Information Storehouse</b>	0.793	0.322	0.067	3.542	.0202
<b>Online Verification and Fingerprints Reader</b>	0.634	0.275	0.148	4.458	.0246
<b>Real-time Information Access</b>	0.798	0.245	0.138	3.438	.0229

(Source: Research Data, 2014)

Multiple regression analysis was conducted as to determine the relationship between Efficiency of Electronic Policing Services and the nine variables. As per the SPSS generated Table 4.4.4, the equation

( $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon$ ) becomes:

$$Y = 1.466 + 0.614X_1 + 0.823X_2 + 0.711X_3 + 0.638X_4 + 0.727X_5 + 0.596X_6 + 0.798X_7 + 0.634X_8 + 0.793X_9$$

The regression equation above has established that taking all factors into account (Electronic Identification, Electronic Transport (E-Transport), Radio Frequency Identification (RFID), Closed Circuit Television (CCTV), Police-Public Interface, Intelligent Sensors and Centralized Information Storehouse) constant at zero, Efficiency of Electronic Policing Services will be 1.466. The findings presented also shows that taking all other independent variables at zero, a unit increase in Electronic Identification will lead to a 0.614 increase in Efficiency of Electronic Policing Services; a unit increase in Electronic Transport (E-Transport) will lead to a 0.589 increase in Efficiency of Electronic Policing Services; a unit increase in Radio Frequency Identification (RFID) will lead to a 0.711 increase in Efficiency of Electronic Policing Services; a unit increase in Closed Circuit Television (CCTV) will lead to a 0.638 increase in Efficiency of Electronic Policing Services; a unit increase in Police-Public Interface will lead to a 0.727 increase in Efficiency of Electronic Policing Services; a unit increase in Intelligent Sensors will lead to a 0.596 increase in Effectiveness & Efficiency of Electronic Policing Services and a unit increase Centralized Information Storehouse will lead to a 0.793 increase in Efficiency of Electronic Policing Services, a unit increase in Online Verification and Fingerprints Reader will lead to a 0.634 increase in Efficiency of Electronic Policing Services and a unit increase in Real-time Information Access will lead to a 0.798 increase in Efficiency of Electronic Policing Services.

This infers that use of Real-time Information Access contributes most to Efficiency of Electronic Policing Services followed by Centralized Information Storehouse, Police-Public Interface,

Radio Frequency Identification (RFID), Closed Circuit Television, Online Verification and Fingerprints Reader, Electronic Identification, Intelligent Sensors while Electronic Transport contributed least to Efficiency of Electronic Policing Services.

#### 4.5 Regression Analysis

Further the researcher conducted a multiple regression analysis so as to analyze determinants of electronic policing in crime control in Nairobi County. The researcher applied the statistical package for social sciences (SPSS) to code, enter and compute the measurements of the multiple regressions for the study.

**Table 4.5. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.913	0.834	0.751	0.4538

**(Source: Research Data, 2014)**

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (Effectiveness & Efficiency of Electronic Policing Services) that is explained by all the nine independent variables (Electronic Identification, Electronic Transport, Radio Frequency Identification, Closed Circuit Television, Police-Public Interface, Intelligent Sensors Real-time Information Access and Online Verification and Centralized Information Storehouse).

The nine independent variables that were studied, explain only 83.4% of the Effectiveness & Efficiency of Electronic Policing Services as represented by the adjusted  $R^2$ . This therefore

means that other factors not studied in this research contribute 16.6% of Effectiveness & Efficiency of Electronic Policing Services. Therefore, further research should be conducted to investigate the other factors (16.6%) of Effectiveness & Efficiency of Electronic Policing Services.

#### 4.6 ANOVA

**Table 4.6: ANOVA (Analysis of Variance)**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.424	9	.208	3.23	.000
	Residual	5.375	21	.232		
	Total	6.799	30			

a. Predictors: (Constant), Electronic Identification, Electronic Transport, Radio Frequency Identification, Closed Circuit Television, Police-Public Interface, Intelligent Sensors Real-time Information Access and Online Verification and Centralized Information Storehouse.

b. Dependent Variable: Effectiveness & Efficiency of Electronic Policing Services

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. The "F" column provides a statistic for testing the hypothesis that all  $\beta \neq 0$  against the null hypothesis that  $\beta = 0$  (Weisberg, 2005). From the findings the significance value is .000 which is less than 0.05 thus the model is statistically significant in predicting how Electronic Identification, Electronic Transport, Radio Frequency Identification, Closed Circuit Television, Police-Public Interface, Intelligent Sensors Real-time Information Access and Online Verification and Centralized Information Storehouse affect Effectiveness & Efficiency of Electronic Policing Services.



#### 4.7 Challenges of Implementation of Electronic Policing in Crime Control in Nairobi County

The study sought to establish the extent to which each of the following challenges is faced in implementation of Electronic Policing in Crime Control in Nairobi County. The responses were rated on a five point Likert scale indicating to what extent respondents agree to the statements, where: 1- To no extent, 2- To a little extent, 3- To a moderate extent, 4- To a great extent and 5- To a very great extent. The mean and standard deviations were generated from SPSS and are as illustrated in Table 4.7 below.

**Table 4.7. Challenges of Implementation of Electronic Policing in Crime Control in Nairobi County.**

	Mean	STDs
Difficulties in access to the Electronic Policing systems.	3.67	1.131
Difficulties to integrate existing systems with electronic policing systems	3.56	0.913
The fear consequences of using the Electronic Policing systems	3.48	0.948
Lack of control when using electronic policing systems.	3.84	0.746
Lack of enough resources and necessary documents.	4.63	0.971
Insufficient availability of IT resources in the workplace	4.23	0.308
Inadequate training in the use of IT in the police force	3.63	0.808
Time constraint at the police's field or workplace	3.62	1.133
Cost of utilization of IT resources is too high for the police force	3.27	0.834
Obsolete equipment in the workstations	3.83	0.649
Space constraint to accommodate E-policing equipment	4.05	0.731
Epileptic power supply for running the E-policing equipment	4.16	0.721
Systems' failure of the E-policing equipment	4.06	0.747
Failure to recruit and retain IT skilled police officers	4.27	0.834
High demand and better remuneration for IT skilled in other labor markets	3.89	0.649

From the study findings in Table 4.7, majority of the respondents agreed to a great extent that Lack of enough resources and necessary documents; failure to recruit and retain IT skilled police

officers; insufficient availability of IT resources in the workplace; epileptic power supply for running the E-policing equipment; Systems' failure of the E-policing equipment and Space constraint to accommodate E-policing equipment were following challenges faced in implementation of Electronic Policing in Crime Control in Nairobi County as shown by the mean scores of 4.63,4.27, 4.23, 4.17, 4.06 and 4.05 respectively.

Further, most of the respondents agreed to a moderate extent that high demand and better remuneration for IT skilled in other labor markets; Lack of control when using electronic policing systems; Obsolete equipment in the workstations; Difficulties in access to the Electronic Policing systems; Inadequate training in the use of IT in the police force; Time constraint at the police's field or workplace; Difficulties to integrate existing systems with electronic policing systems; The fear consequences of using the Electronic Policing systems and Cost of utilization of IT resources is too high for the police force were challenges faced in implementation of Electronic Policing in Crime Control in Nairobi County as shown by the mean scores of 3.89, 3.84, 3.83, 3.67, 3.63, 3.62, 3.56, 3.48 and 3.27 respectively.

This illustrates that Lack of enough resources and necessary documents; failure to recruit and retain IT skilled police officers; insufficient availability of IT resources in the workplace; epileptic power supply for running the E-policing equipment; Systems' failure of the E-policing equipment and Space constraint to accommodate E-policing equipment were following challenges faced in implementation of Electronic Policing in Crime Control in Nairobi County. This agrees with Flanagan (2002) who claimed that law enforcement agencies have some obstacles when compared to other agencies in terms of obtaining benefits from information

technology. The structure of police organizations, the characteristics of policing, and the demand of maintaining efficient information processing are some of these obstacles that prevent police officers from using information technology as effectively as users in other settings, such as business. Generally, law enforcement agencies have a traditional hierarchical bureaucracy in which the orders are assigned and dictated.

## **CHAPTER FIVE:**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presents the summary of the study findings, conclusion and recommendations drawn from the study findings. The chapter is based on the study objectives, which were to determine the level of adoption of Electronic Policing in Crime Control in Nairobi County; to establish the extent to which adoption of Electronic Policing has affected Crime Control in Nairobi County and to establish the challenges of implementation of Electronic Policing in Crime Control in Nairobi County.

#### **5.2 Summary of findings**

The study established that electronic Identification; police-Public Interface; Centralized Information Storehouse; Radio Frequency Identification (RFID) and Electronic Transport (E-Transport) were the Electronic policing systems adopted by police. Further, the study found out that online Verification and Fingerprints Reader; Real-time Information Access; Closed Circuit Television (CCTV) and Intelligent Sensors were the Electronic policing systems adopted by police units.

The study established that Centralized Information Storehouse; Closed Circuit Television (CCTV); Electronic Identification; Online Verification and Fingerprints Reader; Radio Frequency Identification (RFID) and Police-Public Interface were the electronic policing system that has contributed to effectiveness of Crime Control in Nairobi County. The study also established that the adoption of Electronic policing systems has affected effectiveness of Crime Control to a great extent. On the other hand, the study found out that Radio Frequency

Identification (RFID); Electronic Identification; Online Verification and Fingerprints Reader; Police-Public Interface; Real-time Information Access; Electronic Transport (E-Transport) and Closed Circuit Television (CCTV) were Electronic policing systems has contributed to efficiency of Crime Control in Nairobi County. The study further established that the adoption of Electronic policing systems has affected Efficiency of Crime Control to a great extent.

On Challenges of Implementation of Electronic Policing in Crime Control in Nairobi County, the study established that high demand and better remuneration for IT skilled in other labor markets; Lack of control when using electronic policing systems; Time constraint at the police's field or workplace; Difficulties to integrate existing systems with electronic policing systems; The fear consequences of using the Electronic Policing systems and Cost of utilization of IT resources is too high for the police force were challenges faced in implementation of Electronic Policing in Crime Control in Nairobi County.

### **5.3 Conclusion**

The study concludes that the respondents were highly experienced owing to the accumulation of knowledge and skills throughout the working life, majority of whom were over 40 years; had worked in the police unit for 6-10 years and majority had had college level of education. The study also concludes that police units uses E-policing to a great extent and had experience of using E-policing in crime control for 4 years. The study concluded that the police adopted electronic Identification; police-public interface; centralized information storehouse; radio frequency identification (RFID) and electronic transport (E-Transport) systems. The police further adopted online verification and fingerprints reader; real-time Information access; closed circuit television (CCTV) and intelligent sensors systems in crime control in Nairobi County.

The study also concluded that the police adopted centralized information storehouse; closed circuit television (CCTV); electronic identification; online verification and fingerprints reader; radio frequency identification (RFID) and police-public interface electronic policing system that has contributed to effectiveness of crime control in Nairobi County. The study also concluded that Radio Frequency Identification (RFID); Electronic Identification; Online Verification and Fingerprints Reader; Police-Public Interface; Real-time Information Access; Electronic Transport (E-Transport) and Closed Circuit Television (CCTV) were Electronic policing systems has contributed to efficiency of Crime Control in Nairobi County to a great extent.

Lastly, the study concluded that high demand and better remuneration for IT skilled in other labor markets; Lack of control when using electronic policing systems; Obsolete equipment in the workstations; Difficulties in access to the Electronic Policing systems; Inadequate training in the use of IT in the police force; Time constraint at the police's field or workplace; Difficulties to integrate existing systems with electronic policing systems; The fear consequences of using the Electronic Policing systems and Cost of utilization of IT resources is too high for the police force were challenges faced in implementation of Electronic Policing in Crime Control in Nairobi County.

#### **5.4 Recommendations of the study**

The usage of information technology is affected by the characteristics of police work and organization, types of information, the form of police intelligence and various operational strategies. The study recommends that the government should provide new information technologies promoting better performance in law enforcement agencies. The study also recommends that the government should look at the structure of police organizations, the

characteristics of policing, and the demand of maintaining efficient information processing to enable police to use information technology effectively like in business community.

The study recommends that the Commissioner of Police should be committed to a Police Service whose members are motivated, people friendly, open, relaxed and honest with one another and; know their role and mandate and be proud of their job and are appreciated by the public. Further, Constitutional review on police reforms should holds a promise for the establishment of an emancipated Police Service that will operate in conformity with democratic transformation from the current practice of Regime Policing to Democratic Policing (Community and electronic Policing).

The study further recommends that the government should introduce community policing policy which is perhaps the most familiar term in modern policing which should be variously associated with community policing based on the idea that police should work closely with citizens to cultivate public trust in the police and to better address citizens' public safety concerns. Further, the police department should employ techniques to manage its workload in order to make blocks of time available for police officers to address identified problems. The police response to an emerging problem typically involves significant input and participation from outside the department. The department should routinely use a range of tactics other than responding to individual incidents, such as: targeted saturation patrol, bicycle and foot patrol, undercover/plainclothes/decoy/surveillance operations, educational presentations, coordination of efforts with other government or human service agencies, support to volunteer efforts, initiation of legislative proposals, and so forth.

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# APPENDIX I: LETTER OF INTRODUCTION



**UNIVERSITY OF NAIROBI**  
**SCHOOL OF BUSINESS**  
**MBA PROGRAMME**

Telephone: 020-2059162  
Telegrams: "Varsity", Nairobi  
Telex: 22095 Varsity

P.O. Box 30197  
Nairobi, Kenya

DATE 31/07/2014

**TO WHOM IT MAY CONCERN**

The bearer of this letter PETER KARAKE

Registration No. DB1/72168/2011


is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.



  
**PATRICK NYABUTO**  
**MBA ADMINISTRATOR**  
**SCHOOL OF BUSINESS**

## APPENDIX II:QUESTIONNAIRE

The purpose of this study is to adoption of electronic policing in crime control in Nairobi County

### SECTION A: DEMOGRAPHIC INFORMATION

1. Which department do you work in?

.....

2. Gender

Male                       Female

3. Age in years

18-25.....

26-30.....

31-35.....

36-40.....

41-45.....

46-50.....

51-55.....

>55.....

4. Work experience? (in years)

5 years and below.....

6-10 .....

11-15 years .....

16 -20 years .....

21 and above years.....

5. Highest level of Education

High School.....

College.....

University.....

Master Degree.....

Other, specify.....

6. To what extent is your organization using E-policing?

No extent at all.....

Little extent.....

Moderate extent.....

Great extent.....

Very great extent.....

7. Experience of using E-policing in crime control (in years):

- 1..... [ ]
- 2..... [ ]
- 3..... [ ]
- 4..... [ ]
- 5..... [ ]
- >5..... [ ]

**SECTION B: THE LEVEL OF ADOPTION OF ELECTRONIC POLICING IN CRIME CONTROL IN NAIROBI COUNTY**

To what extent has each of the following Electronic policing systems been adopted by your organization? (Tick to indicate using the scale) (5-To a very great extent; 4-To a great extent; 3-To a moderate extent; 2-To a little extent and 1-To no extent.)

<b>Electronic policing systems</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Electronic Identification					
Electronic Transport (E-Transport)					
Online Verification and Fingerprints Reader					
Radio Frequency Identification (RFID)					
Closed Circuit Television (CCTV)					
Police-Public Interface					
Real-time Information Access					
Intelligent Sensors					
Centralized Information Storehouse					
Others, specify and rate accordingly					

**SECTION C: EXTENT TO WHICH ADOPTION OF ELECTRONIC POLICING HAS AFFECTED CRIME CONTROL IN NAIROBI COUNTY**

1. To what extent has the adoption of each of the following Electronic policing systems contributed to effectiveness of Crime Control? (Tick to indicate using the scale). 5-To a very great extent; 4-To a great extent; 3-To a moderate extent; 2-To a little extent and 1-To no extent.)

<b>Statements</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Electronic Identification					
Electronic Transport (E-Transport)					
Online Verification and Fingerprints Reader					
Radio Frequency Identification (RFID)					
Closed Circuit Television (CCTV)					
Police-Public Interface					
Real-time Information Access					
Intelligent Sensors					
Centralized Information Storehouse					
Others, specify and rate accordingly					

2. Overall, to what extent has the adoption Electronic policing systems affected effectiveness of Crime Control? (Tick to indicate using the scale)

- No extent at all..... [ ]
- Little extent..... [ ]
- Moderate extent..... [ ]
- Great extent..... [ ]
- Very great extent..... [ ]

3. To what extent has the adoption of each of the Electronic policing systems contributed to efficiency of Crime Control? (Tick to indicate using the scale 1-5) where 5- To a very great extent; 4-To a great extent; 3-To a moderate extent; 2-To a little extent and 1-To no extent.)

<b>Statements</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Electronic Identification					
Electronic Transport (E-Transport)					
Online Verification and Fingerprints Reader					
Radio Frequency Identification (RFID)					
Closed Circuit Television (CCTV)					
Police-Public Interface					
Real-time Information Access					
Intelligent Sensors					
Centralized Information Storehouse					
Other, specify and rate accordingly					

4. Overall to what extent has the adoption Electronic policing systems contributed to efficiency of Crime Control? (Tick to indicate)

- No extent at all.....
- Little extent.....
- Moderate extent.....
- Great extent.....
- Very great extent.....



**SECTION D - THE CHALLENGES OF IMPLEMENTATION OF ELECTRONIC POLICING IN CRIME CONTROL IN NAIROBI COUNTY**

Indicate the extent to which each of the following challenges are faced in implementation of Electronic Policing in Crime Control? (Tick to indicate using the scale) Use a scale of 1-5 where 5-To a very great extent; 4-To a great extent; 3-To a moderate extent; 2-To a little extent

<b><u>Statements</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	<b><u>5</u></b>
Difficulties in access to the Electronic Policing systems.					
Difficulties to integrate existing systems with electronic policing systems					
The fear consequences of using the Electronic Policing systems					
Lack of control when using electronic policing systems.					
Lack of enough resources and necessary documents.					
Insufficient availability of IT resources in the workplace					
Inadequate training in the use of IT in the police force					
Time constraint at the police’s field or workplace					
Cost of utilization of IT resources is too high for the police force					
Obsolete equipment in the workstations					
Space constraint to accommodate E-policing equipment					
Epileptic power supply for running the E-policing equipment					
Systems’ failure of the E-policing equipment					
Failure to recruit and retain IT skilled police officers					
High demand and better remuneration for IT skilled in other labor markets					
Others, specify and rate accordingly					

and 1-To no extent;

### APPENDIX III: POLICE UNITS IN NAIROBI

<b>Police units in Nairobi</b>
1. Westlands
2. Dagoretti North
3. Dagoretti South
4. Langata
5. Kibra
6. Roysambu
7. Kasarani
8. Ruaraka
9. Embakasi South
10. Embakasi North
11. Embakasi Central
12. Embakasi East
13. Embakasi West
14. Makadara
15. Kamukunji
16. Starehe
17. Mathare