

**INFORMATION AND COMMUNICATION TECHNOLOGY APPLICATION  
AND CRIMINAL INVESTIGATIONS AT THE DIRECTORATE OF  
CRIMINAL INVESTIGATIONS IN MARSABIT COUNTY**

**BY**

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## DECLARATION


This research is my project and has not been submitted for any other award.

Signed:  ..... Date. 14<sup>th</sup> November 2019

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This research project has been submitted with my approval as the university supervisor.

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## **DEDICATION**

To the Kenyan people for the enhancement of justice, service and order.

## **ABSTRACT**

The focus of this study was the application of information and communication technology and criminal investigations at the directorate of criminal investigations in Marsabit County. The study objectives were: to establish the extent of ICT use and the drivers of ICT among police detectives while conducting criminal investigations. The study further sought to establish challenges faced in the application of ICT use during criminal investigations and whether there was a relationship between ICT use and success of criminal investigations in Marsabit County. Descriptive and inferential survey designs were adopted. Questionnaires were used to collect data. DCI officers in Marsabit County were the respondents where a census survey was conducted. Analysis was done using frequencies, means, standard deviation and factor analysis. Regression analysis was also used to establish whether a relationship between ICT use and success of criminal investigations existed. The study concluded that to a large extent, police detectives used mobile phones, internet and computers to conduct criminal investigations and that to a large extent, ICT was used in preparation of cases to be taken to court, identification of any additional evidence and analysis of existing leads. The study also concluded that to a large extent, drivers of ICT were to process case documents much faster, enable them profile suspects ,recover digital evidence and safely and securely store information. Major challenges that police detectives in Marsabit County had to contend with were lack of CCTV cameras in critical areas within their work jurisdiction, inadequate ICT technologies to store and preserve evidence, inadequate ICT technologies to gather sufficient evidence and lack of technical knowledge. Findings showed that there was no significant relationship between ICT use and success of criminal investigations in Marsabit County. The study recommends the prompt installation of CCTV cameras in critical areas based on private and public collaborative efforts, harnessing cloud computing and storage, improved policy on budgetary allocations to the investigative function of the police, general improvement of police working conditions and continuous training of staff on ICT use and emerging ICT techniques and technologies. The study further recommends further research on determining the other independent variables (exogenous variables) not considered in this study that affect success of criminal investigations as well as studies to develop a model to measure the success of criminal investigations.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

Criminal Investigations entails gathering of facts that answer raised queries pertaining to crime (Mauriello, 2015). Information and Information Systems are therefore key to the process. Criminal Investigations in Kenya faces many internal and external challenges. Despite these challenges, the Directorate of Criminal Investigations (DCI) is among the most revered government agencies of Kenya's security. In the National Police Service (NPS), it is a respected establishment being most instrumental in criminal investigations and law enforcement (Sang, 2013). Up until 2011, DCI was known as the Criminal Investigations Department (CID) (National Police Service Act, 2011).

Studies have been conducted on ICT application in front line police work (Kimutai, 2014; Karake, 2014; Okere, 2012;). These studies have shown that ICT led policing is effective (Kimutai, 2014; Karake, 2014; Okere, 2012;). However, majority of these studies have focused on front line policing, that is general police work such as conduction of patrols, crime reporting, crime detection and traffic control. Existing studies generally reveal positive contributions of information systems to police work (Quarshie, 2014; Kimutai, 2014; Karake, 2014; Okere, 2012; Stefanou, 2010; Nunn & Quinet, 2002).

Literature review reveals that majority of studies done in the area of ICT and police service, do not address or look into Kenyan border counties. These counties have

unique challenges when it comes to the type of crimes, for instance, Al Shabaab terrorism, cross border human trafficking, cattle rustling and cross-border insurgency-related violence (ANPPCAN, 2017 & Menkhaus, 2015); social economic activities for instance practicing pastoralism, substantial trade in arms and stolen livestock (Villiers et al., 2014 & Jarso, 2013) and limited access to ICT and other infrastructure (Revised Marsabit County Integrated Development Plan 2013-2017, 2013). The current study endeavored to fill this gap through the choice of a border county as its context. The study was conducted in Marsabit County, one of the border counties in Kenya.

Renowned criminal investigations outfits in the world today include the United States' Federal Bureau of Investigations (FBI) and the United Kingdom's Scotland Yard. Established between 1908 and 1925, the FBI coordinates with other security organs in and beyond the United States (U.S) to carry out criminal investigations on matters such as espionage, terrorism, cyber-crime and other major criminal threats. The FBI's operations are guided by law with an aim of securing prosecutions in court. The FBI also operates within a criminal investigations' procedure designed to ensure that all aspects of criminal cases are covered (History of the FBI, n.d. & FBI, CDC, Department of Justice 2011). "Today, the FBI is one of many federal investigative agencies that has made great strides in professionalizing the field of criminal investigations." (Turner, 2015).

The Scotland Yard on the other hand is one of the pioneer criminal investigations agencies in England. It was formed in the mid-nineteenth century (Turner, 2015).

Scotland Yard also works closely with British intelligence agencies such as MI5 and MI6 to effect arrests on persons of interest (Feldstein, 2008).

Few studies if any have addressed ICT application in criminal investigations. In addition, there is scarcity of information or few studies that target DCI specifically. The current study sought to fill this gap by focusing on ICT application and criminal investigations at the DCI.

### **1.1.1 ICT Application in General**

ICT involves the use of computers or any other process that enables the creation, change, management, storage, and conveyance of information and includes software, hardware, networks and databanks which are used to create information systems (Shaukat & Zafarullah, 2010). ICT is generally used in many spheres of life such as in governance, healthcare, education, engineering, trade, transport, logistics, agriculture, environmental conservation, research, development, media and in the provision of security services (Lim, 2016). Nunn and Quinnet (2012) indicate that police departments are among groups that frequently use ICT. ICT is used for operations and services such as intelligence gathering, surveillance, criminal investigations, traffic control, training and development and corporate management.

ICT is also used for the capture, processing and storage of information that the police receive as they enforce the law and therefore the need to effectively and efficiently manage the information to yield quality investigations (Gottschalk, 2006). Such information has always found use in the criminal investigation process to detect crime, gather and handle evidence, interview witnesses and document their feedback,

apprehend suspects, draft charges and take offenders to court (Cole, Gupta, Gurugubelli & Rogers, 2015). New, existing and developing technology therefore provides opportunities for criminal investigations, prosecution and transformation of police practice (Custers & Vergouw, 2015).

Tracking systems or GPS, wiretapping, fingerprints, databases, surveillance cameras or DNA, technologies are mostly applied among police forces by criminal investigators (Custers & Vergouw, 2015). The FBI in the United States maintains a database of deoxyribonucleic acid (DNA) samples of people they have dealt with and to help identify bodies. They used this database to carry out a DNA test that proved an assertion by Pakistan that Muhsin Musa Matwalli Atwah, an al Qaeda adherent wanted in connection to the 1998 U.S. Embassy bombing in Nairobi Kenya had been eliminated by Pakistani forces near Afghanistan (Bowman, 2007).

### **1.1.2 ICT Drivers**

In general, the use of ICT is driven by the need to change the way people make their living more sustainable (Lim,2016), effective attainment of Sustainable Development Goals (SDGs) (Ola,2018), uptake and application of related technologies (Ogunsola & Aboyade, as cited in Eludu, Sunny & Emeka, 2016), to manage risk and uncertainties (Sen & Choudhary, 2011), to cut costs (FAO, 2017), to enhance governance (DANIDA, 2012), the need for robust and stable strategic information reserves to facilitate expansion (Agbo,2015), growth and competitive advantage of organizations (Agbo,2015), to provide facilities and up to date information services for research and development(Ola, 2018), for efficient and effective data management (reliable storage, speed, safety, security, timely, quality information for decision

making)(Ola,2018), automation (Ola, 2018), e-readiness (Mogikoyo,2013), to spur rural development (Mukherjee,2011), to enhance education (Adebayo, 2013), to mainstream administration (TSC,2010), for strategy implementation (Doherty et al, as cited in Magutu, Lelei & Borura, 2010), to replace tedious paper-based documentation such as in civil registrations (Inter-American Development Bank & UNICEF, 2015) and for the integration of businesses into the global economy and making global markets more accessible (Nwizege, Chukwunonso, Kpabeb & Mmeah, 2011).

Generally, the use of ICT by police detectives is driven by the overwhelming volume of information that the police receive as they enforce the law and therefore the need to effectively and efficiently manage information and yield quality investigations (Gottschalk, 2006). The study sought to establish some of the specific drivers to ICT use in criminal investigations. There are numerous accounts of what inspires the ICT use in criminal investigations. A study undertaken in the Netherlands in 2012 on what leads the police to use technology revealed their need to carry out investigative processes more effectively and efficiently (Custers & Vergouw, 2015). Some of their desired technologies included those that would enable them process fingerprints, gather audio visual intelligence, perform DNA analysis, store and extract digital evidence, profile offenders, analyse offender communication, run facial recognition checks and locate and track suspects.

### **1.1.3 Challenges of ICT Application**

Previous studies indicate that challenges of ICT use generally range from human, operational, technical to financial issues. Human issues include lack of user skills, lack of awareness, resistance to change, inadequate staffing and poor project

management. Operational issues include process rework and business processes that keep changing. Technical issues include compatibility issues, customization requirements, aspects of ICT systems not working as expected and complying with strict industry standards. Financial issues include cost overruns due to poor planning or underestimation of resources required (Magutu, Lelei & Borura, 2010).

Just like in other spheres of life, the application of ICT to solve crime is not devoid of challenges. Identification of such challenges through the current study was key in addressing some of the issues that affect the outcome of criminal investigations and therefore the need to address such challenges. Stefanou (2010) identified challenges associated with the use of data bases to combat crime in the European Union (EU). Key among the challenges was resistance of EU member states due to lack of harmonization between criminal law and procedure. Other challenges included databases not always existing in digital format and some databases not existing in a format permitting data migration and cross tabulation. Cole et al. (2015) also highlighted challenges facing ICT use in criminal investigations including lack of standards and certifications, limited scope by courts in the use of ICT to extract evidence and conflict arising from varied knowledge among court users on investigative technologies and the law.

#### **1.1.4 Criminal Investigations**

Criminal investigations is the process of detecting crime, gathering and handling evidence, interviewing witnesses and documenting their feedback, apprehending suspects, drafting charges and taking offenders to court (Gottschalk, 2006). Goodrich and Shaffer (2013) describe criminal investigations as a 10 stage process namely;



initial response and evidence gathering, preliminary victim interview, identification of any additional evidence and analysis of existing leads, witness interviews, preliminary suspect identification and interviews, follow up on victim's interview, suspect interrogation, arrest of suspect, case preparation with prosecutor and finally trial.

Before the adoption criminal investigation technologies, criminal investigations were conducted using manual methods of analyzing physical evidence and conducting forensic examination (Hekim, Gul & Akcam, 2013). These were tedious and time consuming due to the large amount of data investigators handle (Faith & Bekir, 2015). In a study conducted by Chan (2001) a police detective indicated that 5-6 years ago it used to take 5-6 hours to type the outcome of an interview for a large investigation; It could now be done in half an hour through taping of interviews. In addition, forensic evidence was underutilized due to lack of tools for its examination (Hekim et al., 2013).

Police detectives can no longer ignore the use of ICT in criminal investigations because recent developments in ICT have changed the attitudes and perceptions of police agencies as well as criminals (Faith & Bekir, 2015). Further, ICT developments are providing police detectives with newer perspectives and considerations beyond traditional methods to utilize innovations in different scenarios (Faith & Bekir, 2015). As such, ICT improvements are continually providing opportunities for criminal investigation and prosecution (Custers & Vergouw, 2015). Further, ICT is creating change in the outlook of policing by enhancing openness and accountability such as in criminal investigations (Kazeem, 2018). In addition, ICT is allowing police detectives

enhance community interactions and relations in towards solving crimes (Kazeem, 2018).

### **1.1.5 Success of Criminal Investigations**

There is no laid down criterion for assessing the success of an investigation and several studies indicate different perceptions of this success by criminal investigators world over (Mauriello, 2015). In addition, the relationship between the application of ICT in criminal investigations and success of criminal investigations is not explicit (Gottschalk, 2006). The study sought to establish whether ICT makes a contribution to criminal investigations. An unsolved crime is not an indication of failure in investigations neither does the conviction of an accused person imply that investigations were intelligently conducted (Hekim et al., 2013).

An investigation may however be considered successful if; all accessible physical evidence has been gathered, all available physical evidence has been properly handled, all pertinent witnesses have been interviewed intelligently, the suspect effectively interrogated, every logical lead properly tied and developed and the case comprehensively compiled and disposed of by way of prosecution or otherwise as deemed necessary (Mauriello, 2015). This agrees with what the researcher observed in the field.

### **1.1.6 DCI and Criminal Investigations in Kenya**

The DCI draws its mandate from Article 247 of Kenya's Constitution and through the National Police Service Act of 2011 which establishes the DCI as a semi-autonomous arm of the NPS to provide specialized Criminal Investigations services (National

Police Service Act, 2011). The DCI is headed by a director of criminal investigations who is then answerable to the Inspector General (IG) of the NPS (Directorate of Criminal Investigations, n.d.). The DCI's goal is to conduct investigations into serious crimes such as murder, narcotics, trafficking of persons, computer related crimes, organized crime, piracy, economic crimes, terrorism and matters referred to it by the Independent Policing Oversight Authority (IPOA) or the Office of the Director of Public Prosecutions (ODPP) (National Police Service Standing Orders, 2017).

The DCI was established in 1926 to supplement the Kenya Police in carrying out undercover operations in surveillance, crime detection and investigation (Directorate of Criminal Investigations, n.d.). The DCI (formerly CID), which functions similarly to the United States' Federal Bureau of Investigation (FBI), has a training school in Nairobi (Ebbe, 1993). Information on the success or failure statistics of cases taken over by the DCI is scarce. Perhaps this then becomes another potential research area to further knowledge on the significance, relevance and effectiveness of the DCI.

Some of the problems that the DCI is currently facing include shortage of staff (Ombati, 2018), political interference with its work (Wambu, 2019), ill equipped with latest technology to handle modern crime such as cyber-crime or to analyse evidence (Leparmarai, 2016), insufficient training in for example collection of DNA samples from crime scenes (Mbaya , 2016),inadequate storage facilities to preserve physical evidence (Kenya Anti-Corruption Commission, 2008), lack of a fully equipped lab to operate at optimal capacity (Ombati, 2018), failure by citizens to volunteer information (Leparmarai, 2016),laxity among detectives(Mukinda , 2018),judgments

of the courts (Wambu, 2019), scene of crime management, transportation of evidence and storage of evidence (Nyanzwii, 2018).

The National Taskforce on Police Reforms (2009) established a number of factors on the need for ICT at the DCI and how ICT could help meet those needs. The task force identified a need for installation of CCTV cameras in major cities and on highways to enable the DCI effectively gather evidence when investigating crimes committed in such places. It also identified a need for trained ICT personnel with suitable ICT capabilities in areas such as DNA technology as well as to be able to effectively and efficiently run the central forensic laboratory now in place at the DCI headquarters. Majority of police officers lack basic ICT knowledge.

Further, it noted a need for ICT at the DCI to conduct criminal investigations in cases where ICT has been used to commit crimes such as fraud, child pornography, human trafficking, spreading of computer viruses, credit card scams and computer hacking. Such crimes have become common and therefore important to adopt ICT in order to understand how these crimes are committed as well as to counter them. In addition, the police generally lack suitable tools such as wiretapping equipment and listening devices to gather evidence on kidnappings and therefore needful of such equipment. The police further lack capacity to keep integrated records systems of motor vehicles suspected of being connected to various crimes as well as to deal with carjacking.

The task force also noted that there was a shortfall and therefore a need in forensic science and DNA technology in dealing with sexual offences. The task force found that the crime of illegal weapons and porous borders was being exacerbated by among

other factors poor radio communication. This then becomes another need for necessary ICT tools to smoothen up communication. Areas covered by cell phone are however rapidly expanding and thus making a major positive contribution to communication. The DCI 2015-2020 Strategic Plan (2015) also reveals a number of factors on the need for ICT at the DCI key among them being service delivery, professionalism and interagency cooperation in fighting crime.

Other factors include automation and modernization, feedback systems (such as on crime queries, lost or stolen motor vehicles, lost or recovered firearms, kidnappings, human trafficking and smuggling syndicates), institutional capacity, crime management, local and international cooperation (such as in liaison and sharing of information and intelligence between the DCI and other law enforcement agencies within Kenya including the Kenya Police Service (KPS), Administration Police Service (APS), Kenya Forest Service (KFS) , Kenya Wildlife Service (KWS), Kenya Defence Forces (KDF), National Youth Service (NYS), National Intelligence Service (NIS), National Agency for the Campaign against Drug Abuse (NACADA), the prisons department as well as those beyond Kenya such as Interpol (DCI 2015-2020 Strategic Plan, 2015).

According to the DCI 2015-2020 Strategic Plan (2015), there is also need for ICT at the DCI to execute the DCI's core functions of collection and provision of criminal intelligence, serious crimes investigations, maintaining law and order, crime detection and prevention, apprehending offenders, maintaining criminal records, conducting forensic analysis, executing directions given to the I.G by the ODPP, coordinating

county Interpol affairs, investigating matters referred to it by IPOA and executing other functions bestowed on it by any other written law.

### **1.1.7 Marsabit County**

According to Green Africa Foundation (2018), Marsabit County is situated at the farthest part of Northern Kenya and in Kenya's previous Eastern Province. The County consists of four administrative sub-counties namely Saku, Laisamis, North Horr and Moyale. Marsabit town is the County headquarters. The County has about 11 police stations, 6 police posts, 6 DCI offices that include an Anti-Terrorism Police Unit (ATPU) detachment at Moyale, a Crime Scene Support Services (CSSS) office, and a Criminal Intelligence Bureau (CIB) unit all with a total of about 60 police detectives serving in various ranks.

According to Saferworld (2015), Kenya's border counties, Marsabit included, have in the past lacked effectual state security services such as the police. This has often allowed tensions to turn into violence because of allowing communities to 'run' their own security including capitalizing on readily available light weapons (Saferworld, 2015). There is also a substantial trade in arms and stolen livestock (Villiers, Ondicho, Lubaale, Ndung'u, Kabala, & Oosterom, 2014). In addition, being aligned to political and administrative powers in the County appears to offer protection to those involved in crime such as gun-running and cattle rustling (Villiers et al., 2014).

The insecurity in Marsabit County is further compounded by the fact that majority of its population are pastoralists. Pastoralists place high value on livestock. Destocking thus ignites raiding of each other. In addition to scarcity of resources, area politicians

and business people incite the youth thus leaving these nomadic people constantly marked by inter-community and clan conflicts such as the Moyale clashes of 2011 to 2013 (Jarso, 2013). Further, Marsabit County is faced with human trafficking, drug trafficking (especially in cannabis sativa from Ethiopia), proliferation of illegal firearms and light weapons, homicide, violent robberies, Al Shabaab terrorism, Ethiopian government interference and insurgency-related violence in Kenya (NPS Annual crime report, 2016; Menkhaus, 2015).

These security challenges require special tactics or strategies to combat them. Literature review has shown that the use of ICT led policing has effectively been used to combat crime (Quarshie, 2014; Kimutai, 2014; Karake, 2014; Okere, 2012; Stefanou, 2010; Nunn & Quinet, 2002). Informed by these findings, the current study endeavored to establish the drivers of ICT use and the extent of ICT use among detectives in Marsabit County.

When it comes to ICT infrastructure, Marsabit County has 557 landline connections, mobile phone coverage extending to all major urban centers, a fiber optic network and 3G connectivity. These show great potential for growth in use of ICT for socio-economic growth and development (Revised Marsabit County Integrated Development Plan 2013-2017, 2013). Police detectives in Marsabit County have, albeit, limited access to computers, CCTV cameras, printers, photocopy machines, scanners, pocket phones, mobile phones, voice recorders, digital cameras, internet and social media (Berglund, Öberg & Slumpi, 2012).

However, there is inadequate research for further ICT advancement in the County hindering ICT led policing to solve the myriad of crimes that bedevil the County (Revised Marsabit County Integrated Development Plan 2013-2017, 2013). In line with this Integrated Development Plan, the current study sought to ascertain the extent of ICT use in Criminal Investigations in Marsabit County. The Revised Marsabit County Integrated Development Plan 2013-2017 (2013) surmised that ICT has not been well harnessed in Marsabit County to solve its problems, among them insecurity.

Most government departments in the County, including the police service, own computers but are mainly used for secretarial services as opposed to for instance, gathering of intelligence (Revised Marsabit County Integrated Development Plan 2013-2017, 2013). In addition, a lot still needs to be done especially on the development of reliable and dedicated internet facilities to enhance service effectiveness and efficiency, boost information sharing and expedite criminal investigations (Revised Marsabit County Integrated Development Plan 2013-2017, 2013). The current study aimed at determining the relationship between ICT use and success of criminal investigations in Marsabit County.

## **1.2 Research Problem**

The need for ICT use in criminal investigation is timely and has received a lot of attention (Faith & Bekir, 2015). Studies show that before the adoption of criminal investigation technologies, criminal investigations were conducted using manual methods of analyzing physical evidence and conducting forensic examination (Hekim, Gul & Akcam, 2013). These methods were tedious and time consuming due to the large amount of data investigators handle (Faith & Bekir, 2015). A few studies have



established a lack of a significant relationship between the use of ICT and criminal investigations (Hekim et al., 2013; Randal, 2018). Findings of most studies in ICT and Criminal investigations can however not be generalized to include the Kenya case because of contextual differences.

In Kenya, criminal investigations are majorly conducted by the DCI (National Police Service Standing Orders, 2017). The DCI in conducting criminal investigations faces a number of challenges ranging from operational, technical to financial issues such as shortage of staff (Ombati, 2018), political interference with its work (Wambu, 2019), outdated technology (Leparmarai, 2016) and insufficient training (Mbaya , 2016). The DCI conducts investigations into serious crimes such as murder, narcotics, trafficking of persons, computer related crimes, organized crime, piracy, economic crimes, and terrorism (National Police Service Standing Orders, 2017). These crimes are distributed across Kenya where certain crimes are predominant in some areas than others. These crime clusters are called crime zones (National Crime Research Center, 2016.) Border counties such as Marsabit for instance have unique challenges when it comes to crimes and experience a lot of Al Shabaab terrorism, cross border human trafficking, cattle rustling and cross-border insurgency-related violence (ANPPCAN, 2017 & Menkhaus, 2015). They also have unique social economic activities such as pastoralism, arms and stolen livestock trade (Villiers et al., 2014 & Jarso, 2013) and limited infrastructure such as ICT (Revised Marsabit County Integrated Development Plan 2013-2017, 2013). These security challenges require special tactics or strategies to combat them and there is therefore need for knowledge on the state of ICT use in these counties hence this study. Informed by these findings, the current study endeavored to establish the extent, drivers and

challenges of ICT use as well as the relationship between ICT use and success of criminal investigations at the DCI in Marsabit County.

Most studies conducted in Kenya on ICT and policing have majorly focused on front line police work, that is general police work such as patrolling, crime reporting, crime detection and traffic duties (Kimutai, 2014; Karake, 2014; Okere, 2012;) and have generally found that ICT led policing is effective (Kimutai, 2014; Karake, 2014; Okere, 2012). These studies have left out ICT application in criminal investigations. Further, there is dearth information on the DCI and as such, past studies have failed to address the extent, drivers and challenges of ICT use in criminal investigations and the relationship between ICT use and success of criminal investigations at the DCI in Marsabit County. The current study hence sought to fill this gap by addressing the following questions; what was the extent of ICT use among police detectives in Marsabit County in conducting criminal investigations? What were the drivers of ICT use among police detectives in Marsabit County to conduct criminal investigations? What challenges did police detectives in Marsabit County face in the application of ICT to conduct criminal investigations? What was the relationship between ICT use in conducting criminal investigations in Marsabit County and the success of those investigations?

### **1.3 Research Objectives**

The general objective of the study was to assess the state of ICT application in conducting criminal investigations at the DCI in Marsabit County while the specific objectives were;

- i. To establish the extent of ICT use among police detectives in Marsabit County in conducting criminal investigations.
- ii. To establish the drivers of ICT use among police detectives in Marsabit County to conduct criminal investigations.
- iii. To establish the challenges that police detectives in Marsabit County face in the application of ICT to conduct criminal investigations.
- iv. To determine the relationship between ICT use and success of criminal investigations in Marsabit County.

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

Findings of this study could be useful to the Kenya government. By knowing the extent to which ICT is used to conduct criminal investigations, the challenges faced in ICT use in conducting criminal investigations, drivers for its use and its contribution towards successful criminal investigations at the DCI in Marsabit County, the government can take measures towards faster investigations and increased case prosecutions and therefore greater deterrence of crime and improved security. This could reduce cost of doing business and endow Kenyans with a more secure life and work environment (Vision 2030, 2007).

To the courts and other court users such as the ODPP, findings of this study would be useful in ensuring timely and quality investigations. This would be achieved through harnessing of ICT to yield more prosecutions as well as to generate water tight evidence that would ensure more convictions as compared to what is commonly termed as “shoddy investigations”.

Findings of the study could be used by the DCI in the implementation of the DCI 2015-2020 strategic plan which seeks to leverage on ICT to improve the quality of investigations with which DCI is charged. This study would also demystify ICT tools to DCI personnel and create awareness of the use of basic tools such as mobile phones to collect and manage evidence and word processors on desktop computers to organize information. This may see more DCI personnel become more enthusiastic about harnessing ICT to solve crimes.

For researchers and the field of academia, the findings would open doors for further research such as in the area of digital forensics (Quarshire, 2014). This study could generate interest among scholars leading to further research being conducted in the area of ICT use in criminal investigations. Moreover, security consultants could gain from the study's findings in that the study contains an in depth overview of border counties, more specifically, Marsabit County and the viability and extent of ICT application in criminal investigations.

Findings of the study could support several theories. The findings could support the Adaptive Structuration Theory (AST) in that ICT use by the DCI in Marsabit County could help understand the function, value and ICT use in the DCI's operations. Findings could also support the Critical Social Theory by appreciating how ICT use has helped improve the work lives of police detectives in Marsabit County. Findings would also support the DeLone and McLean IS Success Model. Extent of ICT use is a function of quality of ICT systems, information drawn from the systems and quality of services the systems offer. Knowledge of these parameters would enable police detectives draw contentment and hence gain from ICT. Findings of the study would

also support the Diffusions of Innovations theory. The extent, drivers and challenges of ICT use in conducting criminal investigations and the relationship between ICT use and successful criminal investigations at the DCI in Marsabit County are outcomes of choice of what ICT innovations to adopt on the basis of technical compatibility and complexity and the advantage that can be drawn from ICT adoption. Findings could also support the Locard's Principle of criminal investigations. Understanding of the extent and drivers of ICT use in criminal investigations at the DCI in Marsabit County could inspire better measures of linking crime scenes and perpetrators. Findings could also support the criminal investigations theory of Expansile Significance. The extent and drivers of ICT use in criminal investigations at the DCI in Marsabit County reflect the need for quality investigations of crimes such as work place theft.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter goes through literature in ICT use and success in criminal investigations and especially the extent to which past studies attempted to provide answers to objectives of this study. The chapter is organized into nine sections that span introduction, theories, review of literature to conceptual framework, and a summary that also underscores the research gap. Most literature available is research done in developed and developing countries such as the U.S.A, Britain, Canada, Australia, the Netherlands, Sweden, Turkey, South Africa, India, Ghana, Nigeria and Kenya and has been reviewed mainly from the internet, national and international dailies, published journals, research papers and books.

#### **2.2 Theoretical Background**

To try and establish the relationship between ICT use and success of criminal investigations, the study attempted to explain criminal investigations and how relevant factors individually or interactively dictate its outcome. The study borrowed from Information Systems (I.S) theories namely, the Adaptive Structuration Theory (AST); Critical Social Theory (CST); DeLone and McLean IS Success Model; and Diffusion of Innovations Theory (DOI).The study also borrowed from criminal investigations theories namely the Locard's Exchange Theory (also known as Locard's Principle or the Evidence Transfer Theory) and the Principle of Expansile Significance.

### **2.2.1 Adaptive Structuration Theory**

The Adaptive Structuration Theory holds that entities that use IT in their operations dynamically generate discernments regarding the function and value of the technology and its applications to their endeavours (Larsen & Eargle, 2015). In a criminal investigations entity such as the DCI in Marsabit County, discernments about technology function and value can be used in understanding the extent to which ICT is used to conduct criminal investigations, drivers and challenges of ICT use in criminal investigations as well as the relationship between ICT use and criminal investigations. This is in line with what the current study sought to highlight hence making AST relevant to the study.

### **2.2.2 Critical Social Theory**

The critical social theorists believe that you look at technology and how it helps people. It is thus a humanist school of thought; that is, people who deal with the poor or oppressed. A project that does not improve people's lives is thus unimportant. The focus here is on people in relation to technology with a theme of emancipation (Larsen & Eargle, 2015). The Critical Social Theory is pertinent to the current study as it concerns how technology helps people. It thus makes a contribution to the extent and drivers of ICT application in conducting criminal investigations. By so doing the study would reveal how best to improve the work life conditions of police detectives in Marsabit County so that ICT use can improve the success rate of criminal investigations at the DCI in Marsabit County.

### **2.2.3 DeLone and McLean IS Success Model**

The DeLone and McLean IS Success Model consists of six interconnected ICT success aspects namely; quality of systems, information, quality of service, intent to use, contentment of users and overall gains. It postulates that a system can be assessed through quality of systems, information and quality of service. These attributes influence the consequent application or intent to apply and contentment of users. Out of utilising the system, some gains will be enjoyed. The overall gains will be positive or negative on contentment of users and additional application of the ICT system (Larsen & Eargle, 2015). The theory focuses on gains. It thus helps understand drivers of ICT use and the contribution ICT makes to the DCI in Marsabit County. The theory hence also helps understand the relationship between ICT use in conducting criminal investigations and performance of the DCI in Marsabit County.

### **2.2.4 Diffusion of Innovations Theory**

The Diffusion of Innovations Theory is also known as the Innovation Diffusion Theory (IDT). It holds that inventions are transmitted over particular avenues and in a certain people system where people are viewed as possessing varying degrees of adopting innovations (Rogers, 1995). Studies have persistently established that technical compatibility, technical complexity, and relative advantage (perceived need) are valuable to the adoption of inventions (Bradford and Florin, 2003; Crum et. al., 1996). IDT was relevant to the current study as it would enable the current study understand the extent to which the police detectives have adopted ICT inventions, their motivation towards such adoption (drivers of ICT use) , challenges facing use of ICT inventions and the contribution of ICT inventions to successful criminal investigations at the DCI in Marsabit County.



## **2.2.5 Locard's Exchange Theory /Locard's Principle/ Evidence**

### **Transfer Theory**

This theory holds that a person always leaves a trace of oneself at a scene of crime and takes away a trace of the crime scene with oneself on departure from a crime scene (Gehl & Plecas, 2018). Various ICT tools can be harnessed to solve crimes by linking traces of the crime scene and a perpetrator of a crime. This theory is relevant to the current study because it provides insight to the extent of ICT use to process crime scenes, analyzing the challenges faced in the process and working towards overcoming them, leveraging on the advantage of such technologies and enhancing their use (drivers) and all the while appreciating the contribution of ICT towards successful criminal investigations.

## **2.2.6 Principle of Expansile Significance**

Workplace theft investigations are often prompted by information that an employee is stealing. Once the matter is investigated; it becomes evident that the theft was of larger amounts and longer period than initially thought (Gunter & Hertig, 2005). ICT tools are useful in verifying information about an employee's involvement and the extent of the crime including magnitude and duration. This theory is pertinent to the current study as it elucidates the extent of ICT use to conduct investigations into work place theft, challenges faced in the process, the advantages of such technologies (drivers) and the contribution of ICT towards successful criminal investigations into work place theft by the DCI in Marsabit County.

### **2.3 Extent of ICT use**

Police agencies are among entities that frequently use ICT systems (Nunn & Quinet, 2002). ICT is used for services such as intelligence collection, surveillance, traffic management, criminal investigations, training and development and corporate management. Police outfits thus provide ICT to supplement their work (Gottschalk, 2006). Maltz, Freidman, and Gordon (1991) assert that “information is the lifeblood of the police”. The volume of information that police officers handle as they enforce order is immense (Gottschalk, 2006). A study by Berglund, Öberg and Slumpi (2012) enumerated that police detectives have access to the following basic ICT applications: computers, CCTV cameras, printers, photocopy machines, scanners, pocket phones, mobile phones, voice recorders, digital cameras, internet and social media.

Agrawal, Panjwani, Sharma and Sharma (2013) in their literature review on mobile forensics noted that mobile phones are now being transformed into smart phones and that the newer mobile phones come with numerous functionalities and therefore contain a plethora of information that can be obtained from them. These mobile phones contain pieces of data which act as potential evidence in criminal investigations. Mobile phones have thus become gold mines to forensic investigators. Agrawal et al. (2013) also established that the digital forensic field is very extensive and includes among others operating systems forensics, network forensics, web forensics and mobile forensics. They also noted that digital forensics is a valuable part of computer investigations that is harnessed for recovery of data. Mobile forensics involves extracting digital evidence from mobile phones. It is a necessity due to the growing number of mobile crimes committed yearly. Mobile forensics is exploited to bring justice on those liable of crime using smart phones.

According to Karake (2014) who conducted a study on the adoption of electronic policing services in crime control in Nairobi County in Kenya, it was established that Electronic Transport (E-Transport), Radio Frequency Identification (RFID), Centralized Information Storehouse, Police-Public Interface and Electronic Identification were the Electronic policing systems adopted by the police. The study further found out that Intelligent Sensors, Closed Circuit Television (CCTV), Real-time Information Access, Online Verification and Fingerprint Readers were the Electronic policing systems adopted by police units.

A study by Nyakako (2016) on the influence of capital resources on performance of police officers in Starehe division, Nairobi county in Kenya observed that among communication gadgets provided to police officers, mobile phones, Very High Frequency/ High Frequency (VHF/HF), hand set radios, police pocket phones, land line phones, vertex radios and whistles were the most common. The study also observed that these devices enable the officers to communicate among themselves and their bosses in and out of work, share information between departments and sections, disseminate information across police stations and across the whole country at large, send alerts, communicate with the public, track criminals, gather intelligence, real time reporting of security incidences, monitor security at all times and assist in getting the whereabouts of victims of crime and police officers on the ground.

A study on social media and threats on national security in Kenya conducted by Kimutai (2014) revealed that members of the military from Nairobi based military units believe that there are military officers whose role is monitoring security threats on social media. In addition, the study found that there are tools that help in the

analysis of social media threats to national security. It was also found from the study that the military utilises Open-source intelligence (OSINT) collected to analyse such threats.

Majority of studies conducted on areas of ICT application mostly reveal ICT use in police work in general. However, some of these applications are crosscutting to criminal investigations as well. These include Mobile forensics to recover digital evidence from mobile phones (Agrawal et al. ,2013), CCTV cameras to review scenes of crime (Karake,2014), centralised information store houses to safeguard information that can offer leads to solving crimes (Karake,2014), communication devices that link investigative units at different scenes of a crime that has happened in more than one scene (Nyakako,2016) and Open-source intelligence (OSINT) systems to analyse social media evidence (Kimutai, 2014).

ICT tools also find use in the criminal investigations process which is a 10 stage process namely; initial response and evidence gathering, preliminary victim interview, identification of any additional evidence and analysis of existing leads, witness interviews, preliminary suspect identification and interviews, follow up on victim's interview, suspect interrogation, arrest of suspect, case preparation with prosecutor and finally trial (Goodrich & Shaffer, 2013).

## **2.4 Drivers of ICT use**

Agrawal et al. (2013) in their literature review on mobile forensics observed that there has been a monumental increase in use of mobile phones over time. At the same time, there has also been a huge increase in use of mobile phones to commit crime. The

likelihood of the use of mobile phones to commit crime will continue to rise with the persistent growth of the mobile devices market. Agrawal et al. (2013) also established that there are many tools and techniques available to identify and investigate crimes committed through mobile phones and computers. It is therefore challenging for criminal investigators to select suitable forensic tools for extracting internal data from mobile devices. UNODC (2013) also noted that recent technological improvements of mobile phones had amplified use and reliance on mobile phones and that the upsurge of its use had led to problems such as identity theft, criminal use and fraud which led to the need for mobile phone forensic analysis.

According to Karake (2014) the study also 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 systems that have contributed to effectiveness of Crime Control in Nairobi County. Karake's study also established that Electronic policing systems adoption has to a great extent influenced Crime Control effectiveness. On the other hand, the study found out that Radio Frequency Identification (RFID); Electronic Identification; Fingerprint Readers and Online Verification; Real-time Information Access; Police-Public Interface; Electronic Transport (E-Transport) and Closed-Circuit Television (CCTV) were Electronic policing systems that have contributed to efficiency of Crime Control in Nairobi County. The study further established that to a great extent the taking up Electronic policing systems has affected Crime Control efficiency.

A study by Nyakako (2016) on the influence of capital resources on performance of police officers in Starehe division, Nairobi County in Kenya observed that among communication gadgets provided to police officers, mobile phones, VHF/HF, hand set radios, police pocket phones, land line phones, vertex radios and whistles were the most common. The study also observed that these devices enable the officers to communicate among themselves and their bosses in and out of work, share information between departments and sections, disseminate information across police stations and across the whole country at large, send alerts, communicate with the public, track criminals, gather intelligence, real time reporting of security incidences, monitor security at all times and assist in getting the whereabouts of victims of crime and police officers on the ground.

Majority of studies conducted on drivers of ICT mostly reveal ICT drivers in police work in general. However, some of these drivers are crosscutting to criminal investigations as well. These include to recover digital evidence from mobile phones (Agrawal et al., 2013), to review scenes of crime (Karake, 2014), to safeguard information (Karake, 2014), to effectively and efficiently communicate and liaise on matters communication (Nyakako, 2016) and to analyse social media evidence (Kimutai, 2014).

## **2.5 Challenges Faced in Application of ICT**

A study by Salifu (2008) established that the internet is an overwhelmingly powerful development tool. It also established that ironically, in as much as the internet is providing numerous opportunities for individuals and organizations to grow, it has also brought with it new opportunities to commit crime and has

therefore presented new challenges to law enforcement agencies. Developing nations suffer more from internet crime than developed countries because of inadequate technology, infrastructure and insufficient law enforcement expertise (Salifu, 2008).

Agrawal et al. (2013) in their literature review on mobile forensics observed that there has been a monumental increase in use of mobile phones over time. At the same time, there has also been a huge increase in use of mobile phones to commit crime. The likelihood of the use of mobile phones to commit crime will continue to rise with the persistent growth of the mobile devices market. Agrawal et al. (2013) also established that there are many tools and techniques available to identify and investigate crimes committed through mobile phones and computers. It is therefore challenging for criminal investigators to select suitable forensic tools for extracting internal data from mobile devices. UNODC. (2013) also noted that recent technological improvements of mobile phones had amplified use and reliance on mobile phones and that the upsurge of its use had led to problems such as identity theft, criminal use and fraud which led to the need for mobile phone forensic analysis.

Boateng et al (2011) who conducted a survey of Cybercrime and Criminality in Ghana found that cyber-crime was rapidly increasing in Ghana and that the outfits responsible for controlling, apprehending and investigating online criminals lacked the technical knowledge required to address the problem. The study also established that the perpetrators are young and possess technical ability to commit computer-related crimes. The study also found that most computer related cases go unreported for lack of confidence in the prosecution procedure. In addition the victims are afraid

of humiliation. At the time of the study Ghana lacked laws to tackle these forms of crime. Existing laws on fraud were outdated and defense lawyers would frequently win cases if the prosecution presented poor evidence.

On Challenges of Implementation of Electronic Policing in Crime Control in Nairobi County, Karake (2014) established that high demand and better remuneration for IT personnel 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 of consequences of using the Electronic Policing systems and Cost of utilization of IT resources being too high for the police force are the challenges faced in implementation of Electronic Policing in crime control in Nairobi County.

A study by Atinga (2016) to assess Police e-readiness using a case of five police stations in Kenya established that there have not been concrete plans to roll out digitization by the government. The study also established that junior members of staff feel that their seniors particularly those who joined NPS before introduction of minimum education levels for qualifying as a basic requirement to be recruited may derail the processes of adoption. In addition, it was found that there exists strong resistance to change within the ranks thus culminating in fears of slowing down e-policing agenda.

Okere (2012) carried out a study to evaluate CCTV cameras in Crime Management based on a case of Nairobi Central Business District (NCBD). The study found that property crimes are the most witnessed crime incidents in the NCBD as evidenced by



criminal activities committed therein which include robbery with violence (muggings), theft of motor vehicles, robberies, burglary, stealing (petty thefts), theft of motor vehicle parts and obtaining by pretenses. The study also established that a considerable number of offenders interviewed preferred certain locations to commit crime due to lack of CCTV cameras.

In addition, a study on social media and national security threats in Kenya conducted by Kimutai (2014) showed that terrorist organizations use social media as a tool for training of members, communication, recruitment and radicalization. It was noted from the study that community criminal organizations such as '*Sungusungu*', '*Mungiki*' and Mombasa Republican Council (MRC) also use social media to coordinate their activities. The study also showed that Kenya was still grappling with social media usage to spread hatred and that in fact, Al-Shabaab had been using social media to send messages to Kenya. Furthermore, the study noted that social media was not only contributing towards terrorist attacks but also to information warfare, tribal clashes and cattle rustling. The study also noted that in current years, cyber hate had increased with social and religious groups such as liberals, gays and lesbians, Islam and Jews being mainly targeted by online abuse.

Majority of studies conducted on challenges faced in ICT use mostly reveal ICT use challenges in police work in general. However, some of these challenges are crosscutting to criminal investigations as well. These include the increasing use of the internet to commit crimes (Salifu,2008) , use of mobile phones to commit crimes such as identify theft and fraud (Agrawal et al. ,2013), lack of technical knowledge among law enforcement agencies to tackle cyber-crime problems (Boateng et al ,2011), lack

of attractive remuneration for ICT experts (Karake, 2014), lack of control when using electronic policing systems (Karake, 2014), difficulties in integrating existing systems with electronic policing systems (Karake, 2014), the fear of consequences of using ICT systems (Karake, 2014), cost of utilization of ICT resources being too high for the police (Karake, 2014) , lack of concrete plans by governments to roll out digitization (Atinga, 2016), senior officers' fear of displacement by junior officers who are tech savvy (Atinga, 2016), resistance to change within the ranks (Atinga, 2016 ), lack of CCTV cameras in considerably busy parts of cities or major towns (Okere, 2012), social media use by terrorist groups and community criminal organizations to coordinate their activities (Kimutai, 2014) as well as to spread hatred (Kimutai, 2014).

## **2.6 Success Factors of Criminal Investigations**

There is no laid down standard for judging the failure or success of an investigation. An unsolved crime is not an indication of failure in investigations neither does the conviction of an accused person imply that investigations were intelligently conducted (Hekim et al., 2013). An investigation may however be considered successful if; all available physical evidence has been gathered, all available physical evidence has been properly handled, all relevant witnesses have been interviewed intelligently, suspects effectively interrogated, logical leads properly tied and developed and the case comprehensively compiled and disposed off by way of prosecution or otherwise as deemed necessary (Mauriello, 2015).

Other factors include the accuracy of a suspect profile, moving a case forward, help catch the offender, prevention of wrongful conviction such as in court appeals, assist

detectives understand the case better, saving time and resources in handling the case, and victim or victim's family thoroughly understanding the case (Scherer & Jarvis, 2014). Success is therefore not just about apprehending the wrongdoer or convictions (Scherer & Jarvis, 2014).

Others consider good communication skills towards suspect interviewing, case file preparation, statement taking and witness interviewing as key components of successful criminal investigations (O'Neill & Milne, 2014). In addition to catching the offender, other investigators consider identifying the offender, knowing the offender's location and having enough evidence to support arrest as success factors (Archambault, 2013). Yet others consider detection of a crime or offence, following the investigative procedure, reducing effects of crime on communities, preventive measures overall to reduce crime as success factors as well (Brookman & Innes, 2013).

## **2.7 Empirical Studies in ICT Applications and Criminal Investigations**

A few studies have established a lack of a significant relationship between the use of ICT and clearance rates of cases in criminal investigations (Hekim et al., 2013; Randal, 2018). Hekim et al. (2013) concluded that this lack of a significant relationship could be due poor implementation and use of information technologies by police departments. This finding was also explained by the productivity paradox that asserts that it is difficult to demonstrate that ICT investments increase output.

A study conducted by Karake (2014) on the adoption of electronic policing services in crime control in Nairobi County in Kenya 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 systems that have contributed to effectiveness of Crime Control in Nairobi County. The study also established that the adoption of Electronic policing systems has to a great extent influenced the effectiveness of Crime Control.

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) are Electronic policing systems that have 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.

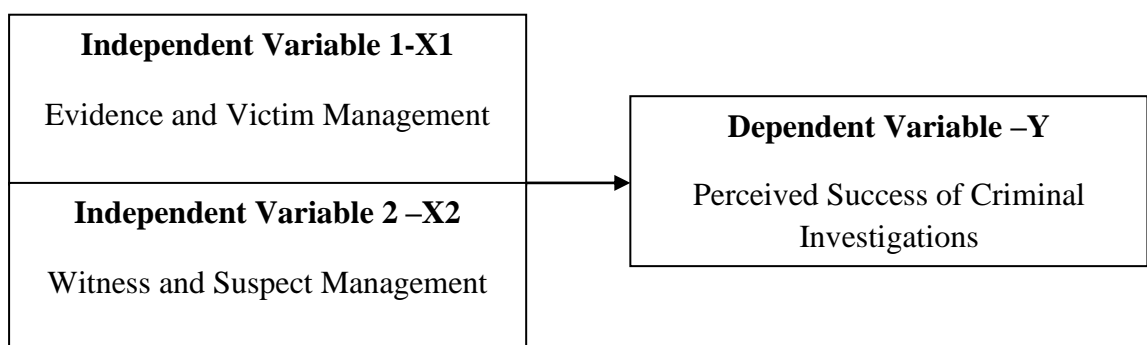
A study by Atinga (2016) to assess Police e-readiness using a case of five police stations in Kenya revealed that providing personnel with necessary equipment and tools in their job is important. But empowering them as well communicates to them that they are important employees and will therefore perform better and warranty success in adopting ICT.

On the relationship between quality of criminal investigations and the use of ICT in conducting criminal investigations, past literature has generally found that ICT has

overly had a positive relationship with quality of police work with electronic policing systems in a city such as Nairobi in Kenya having greatly enhanced the effectiveness and efficiency of crime control (Karake, 2014). Past studies have also shown that providing personnel with necessary equipment and tools in their job is important. But empowering them as well communicates to them that they are important employees and will therefore perform better and warranty success in adopting ICT (Atinga, 2016).

## 2.8 Conceptual Framework

The independent variables in this study were; evidence and victim management and witness and suspect management. The dependent variable in the study was success of criminal investigations. The conceptual framework of this study (see Fig. 2.1) shows the effect that ICT application in evidence and victim management and witness and suspect management (the two major categories of the criminal investigations process as revealed by this study) had on the success of criminal investigations in Marsabit County.



**Figure 2.1: Conceptual Model**

Source: Research Data (2018)

## **2.9 Summary**

There are numerous ways in which ICT is being used to carry out police work the world over. There are also many drivers of ICT use among police officers some of which include the benefits accruing from ICT applications. Challenges are also never lacking in the application of ICT. But despite the challenges and the fact that there are not many studies evaluating the relationship between ICT use and success of criminal investigations, existing studies generally reveal positive contributions of information systems to police work.

Majority of past studies have looked at either application of ICT in front line police duties or in enabling crime. Few if any have ventured into ICT adoption to solve crime. They have also not addressed specific ICT needs of Kenya's DCI. The study attempted to fill this research gap by examining ICT use at DCI in conducting criminal investigations and the perceived success of criminal investigations using a case in point of Marsabit County.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter covers the research design, data collection and data analysis methods that were used in the study.

#### **3.2 Research Design**

The study used both descriptive and inferential survey designs. These designs were suitable for the study because the study's aim was both descriptive and inferential in nature. The first three objectives of the study were not to manipulate the variables in any way rather they were to provide a description. Since descriptive surveys are concerned with a description of conditions as they exist and provide for respondents to give their opinions about a phenomenon, the current study found a descriptive survey suitable to gather information on the extent of ICT use, drivers of ICT use among police detectives in Marsabit County and challenges that police detectives faced in their use of ICT to conduct criminal investigations in Marsabit County.

In addition, the study used an inferential survey design as it sought to establish whether there was a relationship between its variables, that is, whether there was a relationship between ICT application and success in criminal investigations. A regression design was suitable for the study as the current study endeavored to simply establish whether a relationship existed between the two variables without presuming causation. The target of the study was all the DCI officers in Marsabit County and a census survey rendered itself suitable to achieve this target.

### **3.3 Population**

The target population of the study was all 6 Divisional Criminal Investigations Offices as well as Criminal Intelligence Bureau (CIB), Anti-Terrorism Police Unit (ATPU) and Crime Scene Support Services (CSSS) units respectively all based in Marsabit County with an estimated population of 60 police detectives serving in various ranks. Therefore, the study target was to conduct a population census.

### **3.4 Data Collection**

Questionnaires were used to collect data. Items in the questionnaire were grouped under five sections. Section A addressed demographic information of police detectives in Marsabit County; Section B covered extent of ICT use among police detectives in Marsabit County in criminal investigations; Section C tackled the drivers of ICT use among police detectives in Marsabit County in conducting criminal investigations; Section D dealt with the challenges that police detectives in Marsabit County face in the application of ICT to conduct criminal investigations and Section E addressed the relationship between ICT use and success of criminal investigations in Marsabit County.

The questionnaire in Appendix I was administered to the police detectives of each of Marsabit County's 6DCIO's offices as well as CIB, ATPU and CSSS units respectively. These respondents were selected due to their wealth of knowledge and experience in conducting criminal investigations and their first hand interaction and involvement with ICT tools relevant to criminal investigations. The researcher explained the purpose of the research to the respondents and received their consent to participate in the study. The researcher assured the respondents of confidentiality. The



researcher maintained privacy of the respondents by assigning them research identification numbers and not their actual names.

The researcher personally administered the questionnaires to respondents at their work stations. The researcher explained to the respondents the Likert Scale items and how to complete the questionnaire. The researcher was present to provide any clarification when needed. The respondents required at most 20 minutes to complete the questionnaires. With some respondents, the researcher conducted open ended interviews to garner in-depth information. Once duly completed, the researcher collected the questionnaires and moved to the next location. All questionnaires from the respondents were then collected and sorted for analysis.

### **3.5 Data Analysis**

After collecting data, all questionnaires from the respondents were checked to confirm that all relevant items had been responded to and whether responses were logical, believable and consistent. All the responses were then coded. Data analysis using both descriptive and inferential statistics was then performed. Section A data was subjected to frequency counts and percentages and presented in frequency distribution tables. Section B data was subjected to means, standard deviation and factor analysis. Section C and D data were subjected to means and standard deviation while Section E data was also subjected to means ,standard deviation as well as multiple linear regression to establish the relationship between ICT use in conducting criminal investigations in Marsabit County and the success of criminal investigations as perceived by detectives in Marsabit County.

## **CHAPTER FOUR**

### **DATA ANALYSIS, RESULTS AND DISCUSSION**

#### **4.1 Introduction**

This chapter captured the analysis and findings of the study following the research methodology outlined in Chapter 3. The results were presented on ICT use and criminal investigations at DCI in Marsabit County and were based on the four objectives of the study.

The study targeted 60 respondents out of which 30 responded contributing to a 50% response rate. This response rate was sufficient and representative and is in line with Mugenda and Mugenda (2003) stipulation that 50% a response rate is acceptable for analysis and reporting. Questionnaires were administered in real time and interviews conducted where clarifications were required. Several observations were also made as will be seen in the chapter. The chapter covers demographic information of respondents as well as findings based on analysis of data collected in line with the study objectives.

#### **4.2 Demographic Information**

Demographic information indicated respondents' background and that of the organization in focus. It also indicated the respondents' suitability in answering the questions.

#### 4.2.1 Stations of the Respondents

Data on where the respondents were stationed within Marsabit County was sought.

The results of the data gave results as shown in Table 4.2.1.

**Table 4.2.1: Stations of the Respondents**

<b>Station</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Anti-Terror Police Unit</b>	3	10.00
<b>Crime Scene Support Services</b>	1	3.33
<b>Laisamis</b>	1	3.33
<b>Loiyangalani</b>	6	20.00
<b>Marsabit Central</b>	4	13.33
<b>Moyale</b>	11	36.67
<b>North Horr</b>	1	3.33
<b>Turbi</b>	3	10.00
<b>Total</b>	30	100.00

Source: Research Data (2018)

From the findings shown in Table 4.2.1, majority of the respondents (36.67%) were based in Moyale while the rest were distributed in other parts of Marsabit County.

#### 4.2.2 Gender of the Respondents

The study also sought to establish the respondents' gender distribution. Data in this respect was collected and analyzed giving the results as shown in Table 4.2.2.

**Table 4.2.2: Gender of the Respondents**

<b>Gender</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Male</b>	30	100.00
<b>Female</b>	0	0
<b>Total</b>	30	100.00

Source: Research Data (2018)

From the findings shown in Table 4.2.2, all the respondents (100%) were male.

However, respondents in Marsabit Central indicated that they had one female officer

who was absent at the time of the study. This illustrated that majority of DCI officers in Marsabit county were male.

### 4.2.3 Ages of the Respondents

The study also sought to establish the age distribution of the respondents. Data relating to ages was collected and analyzed. The results are as shown in Table 4.2.3.

**Table 4.2.3: Ages of the Respondents**

Age	Frequency	Percent (%)	Cumulative (%)
25 or less	2	6.67	6.67
26-30	6	20.00	26.67
30-35	7	23.33	50.00
36-40	4	13.33	63.33
41-45	2	6.67	70.00
46-50	3	10.00	80.00
51-55	5	16.67	96.67
Over 55	1	3.33	100.00
<b>Total</b>	30	100.00	

Source: Research Data (2018)

According to the findings, most of the respondents (23.33%) were between 31 and 35 years of age, 20% were between 26 and 30 years while 16.67% were aged 51-54 years. Cumulative percentage depicts that 50% of the respondents were aged 35 years and below while the other 50% were aged 36 years and above.

### 4.2.4 Work Experience of the Respondents

The study also sought to establish the respondents' work experience at DCI. Data relating to this was collected, analyzed and the results are as shown in Table 4.2.4.

**Table 4.2.4: Work Experience of the Respondents**

<b>Experience</b>	<b>Frequency</b>	<b>Percent (%)</b>	<b>Cumulative (%)</b>
<b>5 years and below</b>	13	43.33	43.33
<b>6 - 10 years</b>	7	23.33	66.67
<b>11-15 years</b>	4	13.33	80.00
<b>16-20 years</b>	5	16.67	96.67
<b>21 years and above</b>	1	3.33	100.00
<b>Total</b>	30	100.00	

Source: Research Data (2018)

#### 4.2.5 Current Rank of the Respondents

Respondents were also asked to indicate the ranks in which they were serving in the DCI and the National Police Service (NPS) in general. Findings were collected and analysed as presented in Table 4.2.5.

**Table 4.2.5: Current Rank of the Respondents**

<b>Rank</b>	<b>Frequency</b>	<b>Percent (%)</b>	<b>Cumulative (%)</b>
Assistant Inspector General	0	0	0
Commissioner of Police	0	0	0
Senior Superintendent of Police	0	0	0
Superintendent of Police	1	3.33	3.33
Assistant Superintendent	0	0	3.33
Chief inspector of Police	1	3.33	6.67
Inspector of Police	1	3.33	10.00
Senior Sergeant of Police	1	3.33	13.33
Sergeant of Police	3	10.00	23.33
Corporal of Police	5	16.67	40.00
Police Constable	18	60.00	100.00
<b>Total</b>	30	100.00	

Source: Research Data (2018)

The findings indicated that majority (60%) of the respondents in Marsabit County held the rank of police constable.

#### 4.2.6 Current Unit of the Respondents

The study also sought to establish the specialist units in which the respondents were serving. The data was captured, analysed and presented in Table 4.2.6.

**Table 4.2.6: Current Unit of the Respondents**

<b>Unit</b>	<b>Frequency</b>	<b>Percent (%)</b>	<b>Cumulative (%)</b>
General Investigations	24	80.00	80.00
ATPU	3	10.00	90.00
CIB	2	6.67	96.67
Crime Scene Support Services (CSSS)	1	3.33	100.00
<b>Total</b>	<b>30</b>	<b>100.00</b>	

The findings indicated that there were four DCI units or sections operating in Marsabit County namely; General Investigations, ATPU, CIB and CSSS. The findings also showed that the majority of the respondents (80%) were serving under General Investigations while the rest were distributed across the other 3 units respectively. CSSS had the least number of personnel at (3.33%) followed closely by CIB and ATPU at 6.67% and 10% respectively.

#### 4.2.7 Level of Education of the Respondents

Also collected was data on respondents' academic qualification. It was analyzed and presented in Table 4.2.7.

**Table 4.2.7: Level of Education of the Respondents**

<b>Education</b>	<b>Frequency</b>	<b>Percent (%)</b>	<b>Cumulative (%)</b>
'O' level	18	60.00	60.00
'A' level	2	6.67	66.67
Tertiary	1	3.33	70.00
Undergraduate degree	8	26.67	96.67
Postgraduate degree	1	3.33	100.00
<b>Total</b>	<b>30</b>	<b>100.00</b>	

Source: Research Data (2018)

The findings revealed that majority of the respondents (60%) were ‘O’ level holders followed by first degree holders at 26.67%.

### **4.3 Extent of ICT Use in Criminal Investigations**

The first objective of this study was to establish the extent to which ICT was being adopted by detectives in conducting criminal investigations in Marsabit County. Data was collected and analysed on two fronts namely; the extent of general ICT use of various technologies and secondly in the criminal investigation process. Responses were rated on a five-point scale indicating to what extent respondents agreed to the statements, where: 1- To no extent, 2- To a little extent, 3- To a moderate extent, 4- To a large extent and 5-To a very large extent. The mean and standard deviations were generated from SPSS and are as illustrated in Tables 4.3.1 and 4.3.2 below respectively. The mean values were interpreted in the scale where:  $< 1.5$ = to no extent;  $1.5 \leq 2.5$ = to a little extent;  $2.5 \leq 3.5$ = to a moderate extent;  $3.5 \leq 4.5$ = to a large extent;  $\geq 4.5$ = to a very large extent

#### **4.3.1 General ICT Application**

In this section, the study sought to establish the level of ICT use broadly in criminal investigations as compared to its specific use in the steps that constitute the criminal investigations process. The outcome was presented in Table 4.3.1

**Table 4.3. 1: General ICT Application in Criminal Investigations**

<b>ICT Application</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Computers</b>	3.67	0.71
<b>Printers</b>	3.56	0.73
<b>Scanners</b>	3.44	1.23
<b>Photocopy machines</b>	3.44	1.13
<b>Internet</b>	3.78	0.97
<b>Social media</b>	3.00	1.32
<b>Pocket phones</b>	2.56	0.73
<b>Mobile phones</b>	4.11	0.93
<b>Voice recorders</b>	2.67	1.22
<b>Digital cameras</b>	2.78	0.97

Source: Research Data (2018)

In addition to the listed ICT applications, one respondent indicated that he used locators to a very large extent to establish the location of suspects whose whereabouts are unknown. Locators are Global Positioning System (GPS) enabled devices that detect mobile phone signals while placing their location. From findings in Table 4.3.1, ICT applications that were majorly used by the respondents in Marsabit County to conduct criminal investigations as indicated by the means were mobile phones at 4.11, internet at 3.78 and computers at 3.67. However, the use of ICT is also harnessed in the criminal investigations process.

#### **4.3.2 ICT Application in the Criminal Investigation Process**

This section sought to establish ICT use in the specific steps that constitute the criminal investigations process. Findings were presented in Table 4.3.2.



**Table 4.3.2: ICT Application in the Criminal Investigation Process**

Stage(s) in the Criminal Investigation Process	Mean	Standard Deviation
<b>1.Initial Response and Evidence Gathering</b>	3.13	1.36
<b>2. Preliminary Victim Interview</b>	3.13	1.46
<b>3. Identification of any additional evidence and analysis of existing leads</b>	3.63	1.30
<b>4. Witness Interviews</b>	2.88	1.46
<b>5. Preliminary Suspect Identification and Interviews</b>	3.38	1.30
<b>6. Follow Up on Victim’s Interview e.g. for further statement(s)</b>	3.13	1.46
<b>7. Suspect Interrogation</b>	3.25	1.75
<b>8. Arrest of suspect</b>	3.63	1.30
<b>9. Case Preparation with prosecutor e.g. preparation of charges and case file</b>	4.00	1.31
<b>10. Trial</b>	3.13	1.36

Source: Research Data (2018)

From Table 4.3.2, police detectives in Marsabit County used ICT more in the preparation of cases for presentation before court than in any other stage of the process as shown by a mean of 4.00. This was followed by the identification of any additional evidence and analysis of existing leads as illustrated by a mean of 3.63. It is at the witness interviews stage that ICT was least used by detectives as depicted by a mean of 2.88.

### **4.3.3 Factor Analysis -ICT Application in the Criminal Investigation Process**

Factor analysis was performed on ICT application in the criminal investigation process. The extraction method was the principle component analysis.

### **4.3.3.1 List of Variables (ICT Application in the Criminal Investigation Process)**

The initial step of the analysis was to generate a list of variables as shown in Table 4.3.3.

**Table 4.3.3 List of Variables (ICT Application in the Criminal Investigations Process)**

<b>Factors</b>	<b>Variables of the criminal investigations process</b>
F1	Initial response and evidence gathering
F2	Preliminary victim interview
F3	Identification of any additional evidence and analysis of existing leads
F4	Witness interviews
F5	Preliminary suspect identification and interviews
F6	Follow up on victim's interview
F7	Suspect interrogation
F8	Arrest of suspect
F9	Case preparation with prosecutor
F10	Trial

Source: Research Data (2018)

These were the variables that were considered for analysis. The extraction method was the principle component analysis.

### **4.3.3.2 Correlation Matrix (ICT Application in the Criminal Investigation Process)**

All Factors of ICT application in the criminal investigations process at DCI in Marsabit County in the view of the respondents were also analysed for their correlation. The outcome was presented in Table 4.3.4.

**Table 4.3.4 Correlation Matrix (ICT application in the Criminal Investigation Process)**

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	1	0.303	0.479	0.297	0.404	0.225	0.180	0.286	0.239	0.380
F2	0.303	1	0.590	0.847	0.792	0.504	0.629	0.415	0.570	0.253
F3	0.479	0.590	1	0.482	0.584	0.629	0.409	0.269	0.454	0.333
F4	0.297	0.847	0.482	1	0.680	0.494	0.702	0.522	0.461	0.228
F5	0.404	0.792	0.584	0.680	1	0.475	0.712	0.658	0.614	0.313
F6	0.225	0.504	0.629	0.494	0.475	1	0.626	0.205	0.082	0.449
F7	0.180	0.629	0.409	0.702	0.712	0.626	1	0.558	0.273	0.296
F8	0.286	0.415	0.269	0.522	0.658	0.205	0.558	1	0.478	0.238
F9	0.239	0.570	0.454	0.461	0.614	0.082	0.273	0.478	1	0.243
F10	0.380	0.253	0.333	0.228	0.313	0.449	0.296	0.238	0.243	1

Findings in Table 4.3.4 explained the relationship and the strength of the relationship between each factor and the other factors. “Preliminary victim interview” (F2) was positively, strongly correlated with “Witness Interviews” (F4) with an  $r= 0.847$ . “Initial response and evidence gathering” (F1) had a positive, weak correlation with “Suspect Interrogation” (F7). The existence of large correlation coefficients between subsets of the variables suggests that the variables could be measuring aspects of the same underlying dimensions.

### 4.3.3.3 Communalities (ICT application in the Criminal Investigation Process)

Factor analysis produced communalities of the factors of ICT application in the criminal investigation process. Table 4.3.5 shows the communalities or the communality matrix of the factors. These communalities indicate the variance in each factor that is accounted for by the components. They were obtained through the extraction method known as Principal Component Analysis.

**Table 4.3.5 Communalities (ICT application in the Criminal Investigations Process)**

	Initial	Extraction
Initial response and evidence gathering	1.000	0.586
Preliminary victim interview	1.000	0.823
Identification of any additional evidence and analysis of existing leads	1.000	0.722
Witness interviews	1.000	0.805
Preliminary suspect identification and interviews	1.000	0.863
Follow up on victim's interview	1.000	0.646
Suspect interrogation	1.000	0.689
Arrest of suspect	1.000	0.615
Case preparation with prosecutor	1.000	0.559
Trial	1.000	0.681

All the extraction values in Table 4.3.5 were higher than 0.400. From the findings, "Preliminary suspect identification and interviews" had the highest communality of (0.863) while "Case preparation with prosecutor" had the lowest (0.559).

### 4.3.3.4 Factor Extraction (Total Variance)-ICT Application in the Criminal Investigation Process

In the case of ICT application in the criminal investigation process, principal component analysis method was used to extract 10 factors as shown in Table 4.3.6.

The table presents total variance of all the factors.

**Table 4.3.6 Factor Extraction (Total Variance) - ICT Application in the Criminal Investigations Process**

#### Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.965	59.650	59.650	5.965	59.650	59.650	4.369	43.688	43.688
2	1.026	10.259	69.909	1.026	10.259	69.909	2.622	26.222	69.909
3	.891	8.907	78.816						
4	.650	6.502	85.318						
5	.532	5.321	90.639						
6	.376	3.757	94.396						
7	.223	2.229	96.624						
8	.156	1.564	98.188						
9	.124	1.243	99.430						
10	.057	.570	100.000						

Extraction Method: Principal Component Analysis.

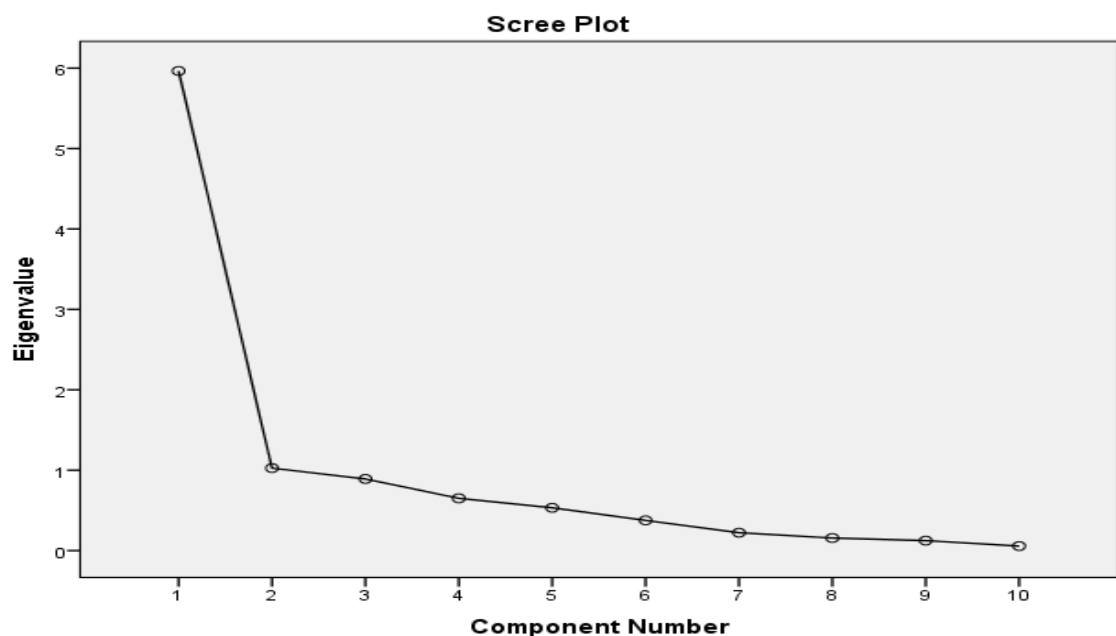
Table 4.3.6 shows all the stages in the criminal investigation process extracted from the analysis along with their Eigen values, the percent of variance attributed to each factor and the cumulative variance of the factor and the previous factors. Based on the size of Eigen values in the table, the number of principal components are 2. The first factor accounted for 43.69% of the variance and the second factor 26.22% of the variance. The 2 accounted for 69.91% of total variability.

### 4.3.3.5 Scree plot-ICT Application in the Criminal Investigation

#### Process

The scree plot is a plot of the factor Eigen values against components as shown in Figure 4.1.

**Figure 4. 1 Scree Plot**



According to Figure 4.1, 2 factors were considered because the curve tends to flatten from the second component onwards because of relatively low Eigen values.

### 4.3.3.6 Component Matrix-ICT Application in the Criminal Investigation Process

A component matrix containing the Eigen values in respect to each factor was extracted from the factor analysis. The results are presented in Table 4.3.7.

**Table 4.3.7 Component Matrix-ICT Application in the Criminal Investigation Process**

	Component	
	1	2
Initial response and evidence gathering	0.603	0.472
Preliminary victim interview	0.886	-
Identification of any additional evidence and analysis of existing leads	0.805	0.273
Witness interviews	0.862	-
Preliminary suspect identification and interviews	0.911	-
Follow up on victim’s interview	0.746	0.300
Suspect interrogation	0.804	-
Arrest of suspect	0.730	-
Case preparation with prosecutor	0.723	-
Trial	0.582	0.586

Extraction Method: Principal Component Analysis.

- a. 2 components extracted.

From the results in Table 4.3.7, all the factors load on component 1. “Preliminary suspect identification and interviews” loads 0.911 on component 1 and has the highest load. This shows that all the factors correlate with component 1 more than with component 2.

### 4.3.3.7 Rotated Component Matrix-ICT Application in the Criminal Investigation Process

Through Principal component Analysis, the factors were rotated through Varimax with Kaiser Normalization method.

**Table 4.3.8 Rotated Component Matrix-ICT Application in the Criminal Investigation Process**

	Component	
	1	2
Initial response and evidence gathering	0.228	0.731
Preliminary victim interview	0.840	0.342
Identification of any additional evidence and analysis of existing leads	0.507	0.682
Witness interviews	0.851	0.284
Preliminary suspect identification and interviews	0.853	0.368
Follow up on victim's interview	0.443	0.671
Suspect interrogation	0.779	0.288
Arrest of suspect	0.764	0.179
Case preparation with prosecutor	0.703	0.254
Trial	0.146	0.812

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Analysis presented in Table 4.3.8 contains the loading, that is, correlations between the use of ICT in each of the stages in the criminal investigation process and the estimated components. All the factors moderately to strongly correlate with



component 1. Thus component 1 seems to correlate strongly with the criminal investigation process as far as the use of ICT in the process is concerned.

Interpretation of loadings in Table 4.3.8 was difficult because of cross loadings. Further iterations (rotations) were carried out to eliminate cross loadings by suppressing the relatively small coefficients (0.4 to 0.65). The outcome was presented in Table 4.3.9.

**Table 4.3.9 Rotated Component Matrix (7<sup>th</sup> Iteration)-ICT Application in the Criminal Investigation Process**

	Component	
	1	2
Initial response and evidence gathering		0.731
Preliminary victim interview	0.840	
Identification of any additional evidence and analysis of existing leads		0.682
Witness interviews	0.851	
Preliminary suspect identification and interviews	0.853	
Follow up on victim's interview		0.671
Suspect interrogation	0.779	
Arrest of suspect	0.764	
Case preparation with prosecutor	0.703	
Trial		0.812

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

### 4.3.3.8 Factor Isolation-ICT Application in the Criminal Investigation Process

Isolation of factors of ICT application in the criminal investigations process involves isolating each factor that constitutes each component based on the factor loadings. These are the correlation between the factors and the components. For this particular study all factors of ICT application in the criminal investigations process were categorized under each of the two components into two sub-categories as shown in Table 4.3.10.

**Table 4.3.10 Factor Isolation-ICT Application in the Criminal Investigation Process**

	Component	
	1	2
Trial		<b>0.812</b>
Initial response and evidence gathering		<b>0.731</b>
Identification of any additional evidence and analysis of existing leads		<b>0.682</b>
Follow up on victim's interview		<b>0.671</b>
Preliminary suspect identification and interviews	0.853	
Witness interviews	0.851	
Preliminary victim interview	0.840	
Suspect interrogation	0.779	
Arrest of suspect	0.764	
Case preparation with prosecutor	0.703	
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 7 iterations.		

Components in Table 4.3.10 were interpreted in a similar fashion to arrive at the following descriptions:

Component 1-“Evidence and Victim Management” (EVM)

Component 2-“Case Preparation” (CP)

#### 4.4 Drivers of ICT Use in Criminal Investigations

The study also sought to establish factors that motivate police detectives in Marsabit County to use ICT to conduct criminal investigations. The data was analysed and presented in Table 4.4.1. The mean values were interpreted in the scale where:

< 1.5= to no extent;  $1.5 \leq 2.5$ = to a little extent;  $2.5 \leq 3.5$ = to a moderate extent;  $3.5 \leq 4.5$ = to a large extent;  $\geq 4.5$ = to a very large extent

**Table 4.4.1: Drivers of ICT Use in Criminal Investigations**

ICT Drivers	Mean	Standard Deviation
To recover digital evidence	4.00	1.00
To safely and securely store information	4.00	1.00
For effective and efficient communication	3.67	1.12
To analyze social media evidence	3.56	1.33
Enables suspect profiling	4.11	1.05
Faster processing of case documents and files	4.22	0.97
Ease of preparation and presentation of case documents and files	3.89	1.17
Neat and tidy presentation of case documents and files	3.56	1.13

Source: Research Data (2018)

Findings in Table 4.4.1 indicated that faster processing of case documents, suspect profiling, recovery of digital evidence and safe and secure storage of information were what mostly drove police detectives in Marsabit County to harness ICT to conduct criminal investigations as indicated by respective mean scores of 4.22, 4.11, 4.00 and 4.00.

## 4.5 Challenges Faced in ICT Use to Conduct Criminal Investigations

Data regarding the challenges that detectives in Marsabit County faced while using ICT to conduct criminal investigations in Marsabit County was also captured. The analysis for mean and standard deviation was done and the results shown in Table 4.5.1. The mean values were interpreted in the scale where:  $< 1.5$  = to no extent;  $1.5 \leq 2.5$  = to a little extent;  $2.5 \leq 3.5$  = to a moderate extent;  $3.5 \leq 4.5$  = to a large extent;  $\geq 4.5$  = to a very large extent

**Table 4.5.1: Challenges Faced in ICT Use to Conduct Criminal Investigations**

Challenges in ICT use	Mean	Standard Deviation
Lack of technical knowledge	3.50	1.31
Inadequate top administrative support	3.38	1.19
Lack of CCTV cameras in critical areas within your jurisdiction	4.00	1.07
Insufficient evidence to prosecute	2.50	1.20
Inadequate ICT technologies to gather sufficient evidence	3.63	1.19
Inadequate ICT technologies to handle (store and preserve) evidence	3.63	1.06
Political influence	2.88	1.13
Legal issues	3.25	1.04

Source: Research Data (2018)

From Table 4.5.1, the major challenges that police detectives in Marsabit County had to contend with in their use of ICT to conduct criminal investigations were lack of CCTV cameras in critical areas within their work jurisdiction (mean of 4.00), inadequate ICT technologies to store and preserve evidence (mean of 3.63), inadequate ICT technologies to gather sufficient evidence (mean of 3.63) and lack of technical knowledge (mean of 3.50).

## 4.6 Success Factors as Perceived by the Respondents

This section sought to establish what the respondents perceived as measures of success of criminal investigations. Responses were rated on a five-point scale

indicating to what extent respondents agreed 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 for the perceived factors as illustrated in Table 4.6.1. The mean values were interpreted in the scale where:  $< 1.5$ = to no extent;  $1.5 \leq 2.5$ = to a little extent;  $2.5 \leq 3.5$ = to a moderate extent;  $3.5 \leq 4.5$ = to a large extent;  $\geq 4.5$ = to a very large extent

#### 4.6.1 Means and Standard Deviations

**Table 4.6.1: Means and Standard Deviations**

Success Factors	Mean	Standard Deviation
All available physical evidence gathered	3.56	1.13
All available physical evidence properly handled (stored and preserved)	3.78	0.83
All relevant witnesses intelligently interviewed	3.89	0.93
Suspect if willing effectively interrogated	4.11	0.60
All logical leads properly tied and developed	4.11	0.78
The case comprehensively compiled and disposed off by way of prosecution or otherwise as deemed necessary e.g. inquest, inquiry, charges dropped	4.11	0.78
Accuracy of suspect profile	4.44	0.73
Moving the case forward	4.11	0.78
Enabling to catch offender	4.22	1.09
Prevention of wrongful conviction in court	3.89	0.93
Help investigator better understand the case	3.89	0.78
Saving of time and other resources	4.00	1.00
Victim(s) family or families understanding the case and theories of potential suspects and why	3.24	1.30
Good communication skills towards suspect interviewing, case file preparation, statement taking and witness interviewing	3.56	0.73
Identifying the offender	4.33	0.71
Knowing the offender's location	4.44	0.73
Detection of a crime or offence	4.22	0.83
Following the investigative procedure	3.78	1.09
Reducing effects of crime on communities	4.00	1.00
Preventive measures in place to reduce crime	3.78	1.09

Source: Research Data (2018)

Mean values in Table 4.6.1 show that the greatest measures of successful criminal investigations by police detectives in Marsabit County were accuracy of suspect profile, knowing the offender’s location and identifying the offender with mean outcomes of 4.44, 4.44 and 4.33 respectively.

## **4.7 Relationship between ICT Use and Success of Criminal Investigations**

The fourth objective of this study was to determine the relationship between ICT use and success of criminal investigations in Marsabit County. Regression analysis was performed on the independent variables and the dependent variable. The independent variables were arrived at using factor analysis (Section 4.3.2) where two variables were arrived at after eliminating many variables that were interrelating.

### **4.7.1 Regression Analysis – Output of Analysis**

Regression analysis yielded a summary of the model, Analysis of Variance (ANOVA) and coefficients.

### **4.7.2 Summary of Model**

**Table 4.7.1: Model Summary**

<b>Model Summary</b>				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.998 <sup>a</sup>	0.996	0.987	0.02598

a. Predictors: (Constant), Witness and Suspect Management (Component 2), Evidence and Victim Management (Component 1)

R square is known as the coefficient of determination. It tells us how ICT application impacted on the success of criminal investigations in Marsabit County. The analysis yielded R square of 0.996 or 99.6% which means that 99.6% of the variance in success of criminal investigations (Y) can be attributed to the independent variables (X1 and X2) or Component 1 and 2. This also therefore means that other factors not studied in this research that affect success of criminal investigations added up to 0.4%.

### 4.7.3 Analysis of Variance (ANOVA)

**Table 4.7.2: Analysis of Variance (ANOVA)**

		Sum of				
Model		Squares	df	Mean Square	F	Sig.
1	Regression	0.157	2	0.078	116.058	0.065 <sup>b</sup>
	Residual	0.001	1	0.001		
	Total	0.157	3			

a. Dependent Variable: Success of Criminal Investigations

b. Predictors: (Constant), Witness and Suspect Management (Component 2), Evidence and Victim Management (Component 1)

## 4.7.4 Coefficients

**Table 4.7.3: Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
X1	(Constant )	7.90	0.37		21.44	0.03	3.22	12.57
	Evidence and Victim Management (Component 1)	-2.88	0.58	-0.44	-5.0	0.13	-10.18	4.43
X2	Witness and Suspect Management (Component 2)	-2.30	0.31	-0.65	-7.40	0.09	-6.27	1.66

a. Dependent Variable: Success of Criminal Investigations

From Table 4.6.5 we can derive a multiple linear regression as follows:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \mu \dots\dots\dots (1)$$

Where Y is the dependent variable,  $\beta_0$ ,  $\beta_1$ , and  $\beta_2$  are the unstandardized coefficients, X1 and X2 are the independent variables, and  $\mu$  is the error term.

X1 and X2 were determined through factor analysis (see page 56 Table 4.3.10)

$$Y = 7.90 - 2.88X_1 - 2.30X_2 + \mu \dots\dots\dots (2)$$

## 4.8 Discussion of the Results

In light of the objectives that guided this study namely; to establish the extent of ICT use among police detectives in Marsabit County in conducting criminal investigations, to establish the drivers of ICT use among police detectives in Marsabit



County to conduct criminal investigations, to establish the challenges that police detectives in Marsabit County face in the application of ICT to conduct criminal investigations and to determine the relationship between ICT use and success of criminal investigations in Marsabit County, the analysis yielded the following:

For the study objective on the establishment of the extent of ICT use in criminal investigations, the study found that general ICT applications that were majorly adopted by detectives in Marsabit County to conduct criminal investigations as indicated by the means were: mobile phones, internet, computers and printers. In contrast, findings from a study conducted in the Netherlands by Custers and Vergouw (2015) enumerated that the most commonly used ICT devices by their police service include fingerprints, camera surveillance, databases, file coupling, cryptography and DNA. It seems that countries in the Western world seem to use more sophisticated information technologies than what is use in Marsabit County.

In application of ICT in the criminal investigations process, the study revealed that detectives in Marsabit County used ICT more in preparation of cases for presentation before court than in any other stage of the process as shown by a mean of 4.00. This was followed by the identification of any additional evidence as well as analysis of existing leads as illustrated by a mean of 3.63 for each. It is at the witness interviews stage that ICT was least used by detectives as depicted by a mean of 2.88. For the study objective on the establishment of the drivers of ICT use among detectives in Marsabit County to conduct criminal investigations, findings of the study were that faster processing of case documents, suspect profiling, recovery of digital evidence and safe and secure storage of information were what mostly drove police detectives

in Marsabit County to harness ICT to conduct criminal investigations as indicated by respective mean scores of 4.22, 4.11, 4.00 and 4.00.

On the study objective of the identification of major challenges that police detectives in Marsabit County had to contend with in their use of ICT to conduct criminal investigations, findings showed that there was lack of the actual technology such as CCTV cameras in critical areas within their work jurisdiction, inadequate ICT technologies to store; preserve evidence as well as inadequate ICT to gather sufficient evidence and lack of technical knowledge. Some of these findings are in line with a study conducted by Custers and Vergouw (2015) which found that the key challenge to the use of ICT in the police service was “lack of understanding and limited knowledge on emergent technologies”.

On the study objective on the determination of a relationship between ICT and success of criminal investigations in Marsabit County, multiple regression analysis yielded an R square of 0.996 or 99.6% which means that 99.6% of the variance in success of criminal investigations can be attributed to the use of ICT. This therefore means that other factors not studied in this research that affect success of criminal investigations added up to 0.4 %. Further, the p-value yielded by ANOVA test was  $p= 0.065$ . This shows that the independent variable does not show a significant relationship with the dependent variable. This is in line with a study that established a lack of a significant relationship between the use of ICT and clearance rates of cases in criminal investigations (Hekim et al., 2013). Hekim et al. (2013) concluded that this lack of a significant relationship could be due poor implementation and use of information technologies by police departments. This finding could also be explained

by the productivity paradox that asserts that it is difficult to demonstrate that ICT investments increase output (Chan, 2001). In the case of Marsabit County this is probably the case because of the challenges that the police detectives were facing in ICT use to conduct criminal investigations namely; lack of the actual technology such as CCTV cameras in critical areas within their work jurisdiction, inadequate ICT technologies to gather and preserve evidence and lack of technical knowledge on technologies pertinent to criminal investigations. It could also be that other variables (intervening variables) not considered in the current study jointly with ICT application influence success of criminal investigations.

## **CHAPTER FIVE**

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

#### **5.1 Introduction**

This chapter presents a summary of the findings of the study, conclusion, recommendations made upon consideration of the data analysis, limitations of the study and direction for further research.

#### **5.2 Summary of Findings**

Towards establishing the extent of ICT use in criminal investigations, the study found that general ICT applications that were majorly adopted by detectives in Marsabit County to conduct criminal investigations were mobile phones, internet, computers, scanners and photocopy machines. This was in contrast with findings from a study conducted in the Netherlands by Custers and Vergouw (2015) that enumerated that the most commonly used ICT devices by their police service include fingerprints, camera surveillance, databases, file coupling, cryptography and DNA.

In the use of ICT in the criminal investigation process, the study revealed that detectives in Marsabit County used ICT more in preparation of cases for presentation before court than in any other stage of the process. This was followed by the identification of any additional evidence as well as analysis of existing leads. ICT was least used witness interviewing stage.

On the establishment of the drivers of ICT use among detectives in Marsabit County to conduct criminal investigations, findings of the study were that faster processing of case documents, suspect profiling, recovery of digital evidence and safe and secure storage of information were what mostly drove police detectives in Marsabit County to use ICT to conduct criminal investigations. The study also established that the major challenges that police detectives in Marsabit County had to contend with in their use of ICT to conduct criminal investigations was lack of the actual technology such as CCTV cameras in critical areas within their work jurisdiction, inadequate ICT technologies to store and preserve evidence, inadequate ICT to gather sufficient evidence and lack of technical knowledge. This was in line with a study by Custers and Vergouw (2015) which found that a key challenge to the use of ICT in the police service was “lack of understanding and limited knowledge on emergent technologies”.

In understanding the relationship between ICT and success of criminal investigations in Marsabit County, the study established that ICT use does not show a significant relationship with the success of criminal investigation. This is in line with a study by Hekim et al. (2013) that established a lack of a significant relationship between the use of ICT and clearance rates of cases in criminal investigations. Hekim et al. (2013) concluded that this lack of a significant relationship could be due to poor implementation and use of information technologies by police departments. This finding could also be explained by the productivity paradox that asserts that it is difficult to demonstrate that ICT investments increase output. In the case of Marsabit County this is probably the case because of the challenges that the police detectives were facing in ICT use to conduct criminal investigations namely; lack of the actual

technology such as CCTV cameras in critical areas within their work jurisdiction, inadequate ICT technologies to gather and preserve evidence and lack of technical knowledge on technologies pertinent to criminal investigations.

### **5.3 Conclusion**

The study concluded that as far as the extent of ICT use in criminal investigations is concerned, respondents mainly and generally used mobile phones, internet, computers, scanners and photocopy machines to conduct criminal investigations. The study also concluded that respondents used ICT in the criminal investigation process to mainly prepare cases to be taken to court, identification of any additional evidence and analysis of existing leads. In addition, the study also concluded that the major drivers of ICT use among the respondents were to be able to process case documents much faster, to enable them profile suspects, to recover digital evidence and to safely and securely store information.

The study also concluded that the major challenges that detectives in Marsabit County had to contend with in their use of ICT to conduct criminal investigations were lack of CCTV cameras in critical areas within their work jurisdiction, inadequate ICT technologies to store and preserve evidence, inadequate ICT technologies to gather sufficient evidence and lack of technical knowledge.

The study further established that the greatest measures of successful criminal investigations by detectives in Marsabit County were saving of time and other resources, knowing the offender's location, identifying the offender and accuracy of suspect profile. This meant that these were the areas that the respondents desired to be

enhanced so as to improve the quality of criminal investigations that they undertook. In addition, the majority of the respondents appreciated and acknowledged the value of ICT in conducting successful criminal investigations.

Lastly the coefficient of determination was 0.996 (99.6%) which meant that the independent variables that were studied (Evidence and Witness Management (EWM) and Case Preparation (CP)) explained only 99.6% of the dependent variable (success of criminal investigations). This also meant that other variables (exogenous variables) with an effect on the success of criminal investigations not studied in the research added up to 0.4 %. Further, the p-value yielded by ANOVA test was  $p= 0.065$ . This shows that the independent variables do not show a significant relationship with the dependent variable. This finding could perhaps be an emphasis to the productivity paradox that asserts that it is difficult to demonstrate that ICT investments increase output (Chan, 2001). In the case of Marsabit County this is probably the case because of the challenges that the police detectives were facing in ICT use to conduct criminal investigations namely; lack of the actual technology such as CCTV cameras in critical areas within their work jurisdiction, inadequate ICT technologies to gather and preserve evidence and lack of technical knowledge on technologies pertinent to criminal investigations. It could also be that other variables (intervening variables) not considered in the current study jointly with ICT application influence success of criminal investigations.

#### **5.4 Recommendations**

To improve the success of ICT use in criminal investigations in Marsabit County in light of the finding that there was no significant relationship between ICT use and

success of criminal investigations, and in line with tackling the major challenges that detectives in Marsabit County had to contend with in using ICT to conduct criminal investigations, the study recommends the following;

The challenge of lack of CCTV cameras in critical areas be solved through an assessment of critical areas where CCTV cameras should be installed. The installations should then be promptly undertaken even if it takes private and public collaboration. The challenge of inadequate ICT technologies to store and preserve evidence should be addressed through harnessing emerging trends such as cloud computing and storage to manage the large volumes of data that detectives interact with. The study also recommends proper budgetary policy to allow adequate funding of the investigative function of the police to be able to acquire modern ICT tools for effective mapping of security threats such as leveraging on social media, profiling of suspects and criminals, conducting investigations and training of personnel in the use of the tools. The study also suggests that adequate physical and virtual space for storage of evidence be provided and secured.

The study recommends that the challenge of inadequate ICT technologies to gather sufficient evidence be tackled through a number of ways; the DCI should improve forensic equipment and facilities to foster investigations. There should be better equipment to help in data mining, preliminary report preparation and modern scene and victim analysis. Efficiency and effectiveness of profilation of suspects should be improved through a digitization process. The challenge can also be tackled through provision of smart ICT tools to sniff out arms, narcotic drugs and psychotropic



substances and the capacity of specialist units such as ANU (Anti-narcotics unit),ATPU, CIB and CSSS enhanced by being equipped with such tools.

Moreover, as investigative services get devolved, investment in modern equipment should also be devolved. There should also be a linkage of local crime data bases to similar databases in for example the FBI and Interpol to enable sharing of crime data and criminal profiles. Additional recommendations include the creation of crime databases (complete with criminal profiles, DNA, fingerprints, criminal records, modus operandi and other relevant crime data) and provision of facilities to analyse evidence such as the Integrated Ballistic System (IBIS) for analyzing firearms.

Other recommendations include: improvement of work conditions to ensure that work pressures and limitations do not demoralize detectives in learning and applying ICT to solve crime. Necessary training be conducted to investigative officers on continuous basis to sharpen their skills and keep them up to date with new techniques and technologies, partnerships be forged with for example other government agencies such as Constituency Development Fund (CDF) and the Kenya National Library Services (KNLS) to train officers in even the most basic of ICT skills such as word processing and internet use at local libraries that are well equipped with ICT tools. This would go a long way in assisting detectives better organize their cases and enable them conduct online research.

## **5.5 Limitations of the Study**

The study faced a number of limitations. The study targeted a census however, the researcher conducted a purposive sample that yielded 30 participants, which

amounted to half of the population. In addition, there was no set measure or model of success of criminal investigations. The study was therefore mostly based on perceived success. Another limitation encountered was that the relevance of the information gathered from the study was limited to the duration within which the study was carried out. Future changes are bound to occur that may transform the way activities are carried out in the DCI within Marsabit County.

In addition, the research findings might not be generalizable and applicable to other counties owing to the fact that different counties in the country have different needs and different practices and policies on ICT use. The study was also affected by the ICT paradox since it was not easy to relate the success of criminal investigations directly to the use of ICT investments. The ICT paradox is that there is no correspondent increase in productivity when ICT use is enhanced (Brynjolfsson & Hitt as cited in Kinuthia, 2012). But despite the limitations, the study will be useful in highlighting the extent, benefits and challenges of ICT use by police detectives in Marsabit County in conducting criminal investigations.

## **5.6 Direction for Further Research**

There is no set measure or model of success of criminal investigations thus the study was mostly based on perceived success. There is need for further research on a model to measure success of criminal investigations. The impact of particular factors such as funds, infrastructure, security, hardware and software, ISPs and ICT personnel could also be studied. The researcher also found no study done on the success or failure rate of cases taken over or handled by DCI so as to measure DCI's effectiveness in successfully investigating crimes in Kenya. Perhaps this then becomes another

potential research area to further research on what entails successful criminal investigations.

Information on the success or failure statistics of cases taken over by DCI was also scarce and therefore another area that can be explored in order to further knowledge on the significance, relevance and effectiveness of DCI. Another area that the researcher found not explored is the state of criminal investigations generally in Kenya as has been done for other investigative agencies such as the FBI in the United States of America and Scotland Yard in the United Kingdom. Studies on comparisons can also be done so as to encourage competition of quality investigations and therefore the growth of the criminal investigations field.

For such a study to be useful to criminal investigations in Kenya as a whole, the study suggests similar studies be done in other counties in the area of ICT use to conduct criminal investigations. Different counties have unique needs that call for unique solutions likely to affect outcomes of such a study. Further research is also recommended on determining the other independent variables (exogenous variables) not considered in this study that affect success of criminal investigations. This is in line with one of the findings of this study which showed that other factors other than ICT use affect success of criminal investigations. In addition, repeating the study at a different time and asking fairly similar questions. This will enable the collection of information that can easily be compared.

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## APPENDICES

### APPENDIX ONE: QUESTIONNAIRE

#### ICT APPLICATION AND CRIMINAL INVESTIGATIONS AT DCI IN MARSABIT COUNTY

My name is Edward Mukiri Mambo. I am a student at the University of Nairobi, undertaking a master's research project in Business Administration. It is a university requirement that I undertake a research for me to complete a Master of Business Administration course. I am conducting a research to investigate the link between the use of ICT in Marsabit County to conduct criminal investigations and successful criminal investigations in the County. I have chosen you to be part of my respondents. Please feel free to participate by providing information whose purpose is academic and will be handled with the highest regard to confidentiality.

#### Instructions

Please read the questions and answer them by filling in the blanks provided or ticking the check boxes [✓] or tables. Kindly give an explanation where necessary or where required to do so.

#### SECTION A: DEMOGRAPHIC INFORMATION/ GENERAL INFORMATION

1. Station/Division:

- Marsabit South/Laisamis..... [ ]
- Marsabit Central..... [ ]
- North Horr/Loiyangalani..... [ ]
- Marsabit North/Turbi..... [ ]
- Moyale..... [ ]
- ATPU..... [ ]

2. Gender (tick [✓] where appropriate)

Male [ ] Female [ ]

3. Age in years (tick [✓] where appropriate)

25 or less..... [ ]

26-30..... [ ]

31-35..... [ ]

36-40..... [ ]

41-45..... [ ]

46-50..... [ ]

51-55..... [ ]

Over 55..... [ ]

4. How many years have you served in DCI? (Tick [✓] where appropriate):

5 years and below..... [ ]

6-10 years..... [ ]

11-15 years..... [ ]

16 -20 years..... [ ]

21 and above years..... [ ]

5. Current Rank/Designation (tick [✓] where appropriate):

Assistant inspector General of Police..... [ ]

Commissioner of Police..... [ ]

Senior Superintendent of Police..... [ ]

Superintendent of Police..... [ ]

Assistant Superintendent of Police..... [ ]

Chief inspector of Police..... [ ]

Inspector of Police..... [ ]



Senior Sergeant of Police..... [ ]

Sergeant of Police..... [ ]

Corporal of Police..... [ ]

Police Constable..... [ ]

6. Current DCI Unit/Section (General Investigations, ATPU, CIB e.t.c). (tick [✓] where appropriate).

General Investigations..... [ ]

ATPU..... [ ]

CIB..... [ ]

CSSS..... [ ]

7. Indicate your highest level of educational qualification (tick [✓] where appropriate).

‘O’ level.....[ ]

‘A’ level..... [ ]

Tertiary..... [ ]

Under graduate..... [ ]

Post graduate..... [ ]

Any other \_\_\_\_\_

**SECTION B: EXTENT OF ICT USE IN CRIMINAL INVESTIGATIONS**

**I. GENERAL ICT APPLICATION**

To what extent has ICT been generally used by DCI in your station? (Tick to indicate using the scale given for each of the applications below)

SCALE: 1-To no extent, 2-To a Little extent, 3-To a Moderate extent, 4-To a Large Extent, 5-To a Very Large Extent

<b>ICT Applications</b>	<b>To No Extent</b>	<b>To a Little Extent</b>	<b>To a Moderate Extent</b>	<b>To a Large Extent</b>	<b>To a Very Large Extent</b>
Computers					
Printers					
Scanners					
Photocopy machines					
Internet					
Social Media					
Pocket Phones					
Mobile phones					
Voice recorders					
Digital Cameras					
Others (specify and rate accordingly):					
1.					
2.					
3.					

## II. ICT APPLICATION IN THE CRIMINAL INVESTIGATION PROCESS

Indicate the extent to which you have used ICT in each of the stages of the criminal investigation process in your station? Indicate the extent by a tick for each of the stages. Use the scale.

SCALE: 1-To no extent, 2-To a Little extent, 3-To a Moderate extent, 4-To a Large Extent, 5-To a Very Large Extent

<b>Stage(s) in the Criminal Investigation Process</b>	<b>To No Extent</b>	<b>To a Little Extent</b>	<b>To a Moderate Extent</b>	<b>To a Large Extent</b>	<b>To a Very Large Extent</b>
1. Initial Response and Evidence Gathering					
2. Preliminary Victim Interview					
3. Identification of any additional evidence and analysis of existing leads					
4. Witness Interviews					
5. Preliminary Suspect Identification and Interviews					
6. Follow Up on Victim's Interview e.g.					

for further statement(s)					
7. Suspect Interrogation					
8. Arrest of suspect					
9. Case Preparation with prosecutor e.g. preparation of charges and case file					
10. Trial					

**SECTION C: DRIVERS OF ICT USE IN CRIMINAL INVESTIGATIONS**

To what extent did each of the following lead (or drove) you to use ICT to conduct criminal investigations. Indicate by a tick the extent for each lead (or drive). Use the scale.

SCALE: 1-To no extent, 2-To a Little extent, 3-To a Moderate extent, 4-To a Large Extent, 5-To a Very Large Extent

<b>ICT Drivers</b>	<b>To No Extent</b>	<b>To a Little Extent</b>	<b>To a Moderate Extent</b>	<b>To a Large Extent</b>	<b>To a Very Large Extent</b>
To recover digital evidence					
To safely and securely store information					
For effective and					

efficient communication					
To analyse social media evidence					
Enables suspect profiling					
Faster processing of case documents					
Neat preparation and presentation of case files					
Others (specify and rate accordingly):					
1.					
2.					
3.					

**SECTION D: CHALLENGES FACED IN ICT USE TO CONDUCT CRIMINAL INVESTIGATIONS**

The following are challenges faced in use of ICT in conducting criminal investigations. To what extent have you faced each of these challenges when using ICT for the investigations? Indicate by a tick for each. Use the scale.

SCALE: 1-To no extent, 2-To a Little extent, 3-To a Moderate extent, 4-To a Large Extent, 5-To a Very Large Extent

<b>Challenges in ICT use</b>	<b>To No Extent</b>	<b>To a Little Extent</b>	<b>To a Moderate Extent</b>	<b>To a Large Extent</b>	<b>To a Very Large Extent</b>
Lack of technical knowledge					
Inadequate top administrative support					
Lack of CCTV cameras in critical areas within your jurisdiction					
Insufficient evidence to prosecute					
Inadequate ICT technologies to gather sufficient evidence					
Inadequate ICT technologies to handle (store and preserve) evidence.					
Political influence					
Legal issues					
Others (specify and tick as per scale):					
1.					
2.					
3.					

**SECTION E: SUCCESS FACTORS OF CRIMINAL INVESTIGATIONS**

**I. SUCCESS FACTORS AS PERCEIVED BY THE INVESTIGATOR**

To what extent have you achieved each of the following results in conducting Criminal Investigations with the use of ICT? Indicate by a tick for each result. Use the scale.

SCALE: 1-To no extent, 2-To a Little extent, 3-To a Moderate extent, 4-To a Large Extent, 5-To a Very Large Extent

<b>Success factors</b>	<b>To No Extent</b>	<b>To a Little Extent</b>	<b>To a Moderate Extent</b>	<b>To a Large Extent</b>	<b>To a Very Large Extent</b>
All available physical evidence gathered					
All available physical evidence properly handled (stored and preserved)					
All relevant witnesses intelligently interviewed					
Suspect if willing effectively interrogated					
All logical leads properly tied and developed					
The case comprehensively compiled and disposed off by way of prosecution or					

otherwise as deemed necessary e.g. inquest, inquiry, charges dropped					
Accuracy of suspect profile					
Moving the case forward					
Enabling to catch offender					
Prevention of wrongful conviction in court					
Help investigator better understand the case					
Saving of time and other resources					
Victim(s) family or families understanding the case and theories of potential suspects and why					
Good communication skills towards suspect interviewing, case file preparation, statement taking and witness interviewing					
Identifying the offender					
Knowing the offender's location					
Detection of a crime or					



offence					
Following the investigative procedure					
Reducing effects of crime on communities					
Preventive measures in place to reduce crime					
Others (specify and rate accordingly):					
1.					
2.					
3.					

**II. SUCCESS BY ACTUAL DATA**

In the last 3 years, what percentage of cases assigned to you have you been able to complete through use of ICT?.....

**THANK YOU FOR PARTICIPATING IN THIS SURVEY**