An Evaluation of Circuit Television Cameras in Crime Management: A case Study of Nairobi Central Business District

By

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Declaration

This research is my original work and has not been presented for examination in any other university.

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Dedication

This work is dedicated to my parents Mr. and Mrs. Okere; my wife Christine for the contribution to my success.

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Abstract

The study focused on the effectiveness of Closed Circuit Television Cameras (CCTV) in Urban Crime Management in the Central Business District (CBD) of Nairobi. The objective of the study was to explore the extent and effectiveness of CCTV Cameras in alleviating insecurity within Nairobi Central Business District.

The theoretical framework looked into the location theory, routine activities theory, situation crime prevention theory and crime prevention through environmental design to understand how crime manifests itself and crime prevention measures adopted. The conceptual framework looked into the Location, Institutional Framework, Resources, Government Policy, Societal value systems, Community participation and Integrated Centralized Surveillance System that makes CCTV system effective in an urban environment.

The Methodology used involved CCTV observation, Stratified random sampling of four Strata namely; Institutions/Businesses, Hotels, Supermarkets and Small Business Enterprise using CCTV Cameras. Interviews Schedule was used to interview Administrators, ICT Experts in installation of CCTV Cameras, Law Enforcement agents and urban planners from City Council of Nairobi.

The study found out that 92.9% of the total respondents had installed CCTV cameras inside the buildings to offer surveillance inside the buildings. Those connected outside are mainly used to monitor traffic with a few located in strategic areas for crime prevention. 85.7% of the respondents indicated that CCTV cameras were effective where installed and location and coverage of cameras being a critical component.

The study recommends the installation of CCTV cameras on the streets for crime prevention. There is also the need to involve all stakeholders including community participation to ensure project sustainability. Finally there is an urgent need for the government to come up with policy guidelines which sets out standards and conditions to be adopted in the operation of CCTV cameras schemes.

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Acronyms

UN	- United Nations
KIPPRA	- Kenya Institute of Policy Research and Analysis
UNEP	- United Nations Environmental Programme
GPS	- Global Positioning System
CCTV	- Closed Circuit Television
CBD	- Central Business District
CBD	-Central Business District
UNEP	- United Nations Environment Program
UN -Habitat	- UN Center for Human Settlement
NCBDA	-Nairobi Central Business District
BACSA	- Business Against Crime of South Africa
SAPS	- South African Police Service
JMC	- Johannesburg Metropolitan Council
JMPD	- Johannesburg Metropolitan Police Department
CDMA	- Code Division Multiple Access
ICPC	- International Centre for Prevention of Crime
UNDP	- United Nations Development Programme
CPTED	- Crime Prevention Through Environmental Design

Chapter 1: Introduction

1.1 Background to the Research Problem

Crime within urban areas is complicated by the rapid urbanization, increase in urban population and density which is associated with increased crime. Poor urban planning, design and management have been increasingly cited as shaping the urban environment and putting citizens and property at risk (Schneider & Kitchen 2002). The physical fabric and layout of urban areas have a bearing on the movements of offenders, victims and opportunities for crime. It has been estimated that 10 to 15 per cent of crimes have environmental design and management component and effective urban planning, design and governance should seek to manipulate the built environment in ways that are intended to reduce or even eliminate the opportunity to commit crimes (UN Habitat 2007). Therefore environmental design should solve problems that arise out of a variety of environmental conditions related to the building, the site, and the location and how the place is used.

Crime and violence are fundamental threats to human security and safety from crime, violence including the resulting fear of insecurity is increasingly being acknowledged internationally as a public good, as well as a basic human right. Over the past five years, 60 per cent of all urban residents in developing countries have been victims of crime (UN- Habitat 2007). Impact of crime and violence has significantly worsened in most cities over the recent years. These impacts include: increased fear among urban residents; falling income resulting from the destruction or flight of businesses from affected areas; growth of the private security industry and of urban gated communities; and the diversion of development resources towards investment in public and private security (UN- Habitat 2007).

Urban crime and violence in the world's large cities is generally not a spontaneous occurrence, but rather the product of inequality and social exclusion. Although rapid urbanization and poverty partly explain the scale and extent of urban violence and crime, other factors such as the political and economic climate, local traditions and values, and the degree of social cohesion and solidarity among urban communities also play a role (Ellen M. Brennan, 1999).

According to the studies carried out by the International Crime Victimization Survey report "African cities have the highest Africa's cities have the highest burglary and assault rates and the second highest rates of robberies" (UN –Habitat 2007).

Urban Security is one of the major concerns among urban dwellers within Nairobi especially businesspersons who have invested within the Central Business District. In Nairobi, bank raids, carjacking, muggings and armed robberies had become routine for almost a decade that led to the United Nations to downgrade Nairobi as a hardship post for its staff from a B-station to a C-station in January 2001 and later upgraded to B-station status in 2010. Apart from boasting the busiest airport in the East and Central Africa region and being home to several diplomatic missions, Nairobi is headquarters of United Nations Environment Program (UNEP) and the UN Center for Human Settlement (UN –Habitat 2007).

Since the downgrading, efforts have been made to address the insecurity threats and eliminate criminals, who in 2006 almost paralyzed the city as they frequently raided banks and other businesses with impunity. In less than a month, about KSh 200 million had been stolen by gunmen from banks and foreign exchange bureaus, (Kenya Police Annual Report, 2006). This inadequate security impacts negatively on the economy and impedes economic growth and investment (KIPPRA, 2004).

Policy-makers and practitioners are increasingly recognizing that tackling urban insecurity is one of the most pressing tasks for public policy today. Interventions to deal with crime and disorder in urban areas can be divided into those that are:

- targeted at particular risk factors – the conditions that increase the likelihood of an area decaying and declining
- engaged in resilience building, enabling some places to withstand and mitigate the risks and threats they are exposed to, or
- designed to trigger wider recovery processes, enhancing security and contributing to a material improvement in urban environment.

The most frequent purpose for installing CCTV has been to combat 'anti-social behaviour'. However CCTV has also fulfilled a broader function, and has been linked to urban rejuvenation efforts. A common goal of most CCTV systems has been the prevention of crime and disorder through deterrence. It is also assumed that CCTV aids detection through its surveillance capability and the opportunity it may afford to deploy security personnel or police officers appropriately. Claims are also made that CCTV provides public reassurance and therefore reduces fear of crime, which may, in turn, increase the use of public spaces (Bennett and Gelsthorpe, 1996; Tilley, 1997 who suggests that CCTV may reduce crime as people are deterred from visiting CCTV-covered areas, believing them to be too dangerous). CCTV is also used as a site management tool, for example, to observe traffic patterns or for crowd control at football matches. CCTV may even indirectly increase trade and protect substantial property investments (Roberts and Goulette, 1996; Brown, 1995).

Technological advances have been incorporated as a crime prevention measure with the use of CCTV being predominant. CCTV security system technology can be used in both internal and external environments to enhance surveillance and protect people, property, vehicles and valuables. CCTV equipment can provide instant alerts when problematic trouble occurs, ensuring that crime against people, theft and vandalism are all substantially reduced and covered. And when crime does occur, CCTV system incident recording can provide valuable evidence, improving the likelihood of a conviction (Jerry Ratcliffe, 2006).

In Nairobi several crime prevention strategies have been put in place with no major impact on reduction of crime incidents. These strategies include the introduction of police booths along strategic areas, removal of hawkers from the Central Business District, use of plain clothes police officers and recently the use of CCTV.

Over the years most institutions have installed Closed Circuit Cameras inside the building; however this has not resulted in crime reduction within the Central Business District, this is evidenced by the steady increase of crime in the CBD from 1165 cases in 2008 to 1875 cases in 2010 (Kenya Police Statistics). Lack of open street CCTV cameras had made criminals have taken advantage of the streets which are free from surveillance to attack unsuspecting members

of the public which is evidenced by the increased number of security personnel on the streets. In addition CCTV cameras installed by different institutions are manned by private security personnel who are not linked to any central system. In addition there is lack of a police system to monitor CCTV cameras leads to poor response. Flawed communications between police and operators also seriously impede the crime prevention potential of CCTV.

Use of open street CCTV camera was incorporated in 2007 in Nairobi's Central Business District to deter criminals, increase detection and prosecution of cases. In the first two months there was improvement in crime detection, response, traffic control management and increase in prosecution (through provision of CCTV footage in court) around Kenya National Archives where the CCTV cameras were installed. (Minutes of the CCTV NCBDA Project). The project was later abandoned after facing implementation challenges and loss of equipment at the Kenya National Archives in June 2010 and lack of technical capacity within the police department. Today the CCTV control system at Nairobi Area Police Headquarters is connected to Butterfly Cameras owned by Kenya Data Network to monitor traffic which is not effective in monitoring non-traffic oriented crime.

Crime is a serious problem in cities all over the world. Fear of crime is a serious threat to the stability of cities, sustainable economic development, the quality of life and human rights.

In solving this insecurity problem there is need to put several strategies in place that includes the use of modern technology i.e Closed Circuit Television Camera (CCTV) cameras both inside the buildings and on the streets. In addition location and management of CCTV cameras are critical in ensuring effective surveillance and response to crime incidents as practiced in Johannesburg, South Africa. The use of CCTV Cameras enhances the current policing methods and has been adopted by major urban cities in the world in controlling crime levels and improving urban security and safety.

1.2 Problem Statement

Nairobi Central Business District is currently being policed by Central Police Division and falls under Nairobi Area Police Command. According to the Kenya Police Statistics 2010, Central Police Division recorded the highest number of crime incidents in Nairobi area Command; a total

of 1675 crimes were reported out of 6102 reported in Nairobi which is an equivalent of 28% of all the crimes reported in Nairobi. Other Police Divisions recorded crimes as follows;- Kilimani 14%, Kasarani, 13%, Buru Buru 12%, Langata 11%, Embakasi 7%, Ngong 5%, Kayole 4% , Gigiri 4% and Kajiado North 2%.

Over the last three years (2008, 2009, 2010) Central Police Division reported a steady increase in crimes reported from 1165, 1544, 1875 Cases. Stealing contributed to 32% of all the crimes committed, theft by servant 9%, Breaking /Burglary 8%, Assault 6%, Vehicle and other thefts 6% and Robbery 3%.

The Nairobi Central Business District is synonymous with cases of burglary, stealing and robbery with violence (Mugging/walk in walk out). In addition poor lighting in some areas e.g at Railways terminus among others increases opportunity for occurrence of crime. Insecurity deters investment and makes businesses incur heavy resources that are required to improve the security. In addition it also affects businesses which cannot open for longer hours and customers not to shop due to fear which discourages the 24hr economy concept.

Insecurity within the Central Business District is evidenced by poor methods of policing which don't incorporate effective use of Closed Circuit Television Cameras. The ratio of the number of policemen patrolling the streets to the Civilians is overwhelmed hence the need to employ a different policing method in provision of security. Use of CCTV cameras can enable few police officers to monitor a wider area in comparison to a beat man who has to patrol a whole street.

CCTV cameras within Nairobi CBD are mainly installed inside the buildings with few cameras installed to monitor the streets. In addition the police manned Open Street CCTV system is faced with challenges that have reduced it to monitoring traffic rather than crime prevention. In addition there is lack of a centralized system to monitor cameras installed inside the building by the police or competent authority to arrest criminals or respond to crime incidents. Over the years business have also relocated from the CBD and one of the reasons being cited being insecurity.

1.3 Purpose of the Study

This study was aims to examine the extent and effectiveness of CCTV cameras in crime prevention within Nairobi Central Business District.

1.4 Scope of the Study

The study covered Nairobi Central Business District and established the crime trends/patterns and crime hot spots within the City of Nairobi and was focused mainly on property crimes which is prevalent in the CBD. Use of CCTV Cameras inside and outside the buildings was explored in order to understand how it can be used effectively in crime prevention within Nairobi Central Business District. Urban planning and management principles was explored by interviewing law enforcers/administrators, local/business community and urban planners in Nairobi City Council.

1.5 Research Objectives

The general objective was to explore the extent and effectiveness of CCTV Cameras in alleviating insecurity within Nairobi Central Business District.

Specific Objectives

1. To examine the extent and effectiveness of CCTV cameras use in crime prevention
2. To identify the operational challenges in the use of CCTV Cameras
3. Identify and suggest policy guidelines required for effective use of CCTV Cameras

1.6 Research Questions

The main research question was how effective are CCTV cameras in alleviating insecurity within Nairobi Central Business District. Supporting questions include;-

a) To what extent has CCTV cameras been used in crime prevention?
b) What is the effectiveness of CCTV cameras been used in crime prevention?
c) What are the operational challenges faced in the use of CCTV?
d) What policy guidelines are required for effective use of CCTV?

1.7 Research Hypothesis

Ho. Installation of CCTV cameras has not contributed to crime prevention within Nairobi Central Business District

The hypotheses allows for the analysis on victimization rates where CCTV cameras have been installed. The type of CCTV cameras, location of CCTV cameras can have either positive or negative impact on the surrounding environment

Dependent variable: CCTV cameras

Measurement: Measurement: victimization rates where CCTV cameras have been installed (perceived impact)

Independent variable: Crime occurrence, loss of properties, location, resources, community participation, societal values, government policy

1.8 Justification and Significance of the Study

The lack of integration of crime prevention strategies within comprehensive city planning practices is a factor facilitating opportunities for urban crime. Therefore by carrying out the study it has suggest policy guidelines to inform a better understanding in planning and management of crime in urban areas using CCTV Cameras. The study has explored best practices in CCTV Cameras use with a view of promoting urban security management/planning. Crime causes people to fear and affects their everyday activities and is an impediment to business. Fear of crime makes the investor to relocate to other safer areas or adapt to the environment by incurring extra costs such as use CCTV cameras e.tc. Nairobi Central Business District is currently being policed by Central Police Division which recorded 28% of all the crimes reported in Nairobi (Kenya Police Crime Statistics 2010).

1.9 Assumptions of the Study

Commercial land uses such as witnessed in Nairobi CBD continues attracting continual flow of people of all manner including criminals and victims, which according to routine activity theory is a recipe for crime. This requires technology such as CCTV Cameras which is a growing field in crime prevention within urban areas. It is further assumed that these crimes affect people and their business within Nairobi Central Business District. In addition property crimes were explored as the crimes that can be managed with the use of CCTV Cameras.

1.10 Limitations of the Study

The following limitations were experienced during the study;-

1. Limited literature availability on CCTV camera systems in Africa urban setting

2. Sensitivity of the subjects towards security of their institution
3. Resources

1.11 Organization of the Study

The study was organized into seven chapters that outlined different components of the study to appropriate sections. Chapter one which is the introduction covers introduction of the study, background of the problem, problem statement, objectives, significance of the study, assumptions of the study, study limitations and operationalization of study methodologies. Chapter 2 gave discusses of previous works focusing on areas of study from global to specific context, conceptualization of study variables and the theoretical framework informing the study. Chapter 3 highlights the research design, data collection and sampling techniques, data analysis methods. Chapter 4 section gave a historical background of Nairobi CBD, the land use types and population dynamics. Chapter 5 gives a highlight of the extent and use of CCTV Cameras and operational challenges faced in their operation. Chapter 6 discusses the effectiveness of CCTV cameras and policy guidelines. Finally chapter 7 covers the conclusions and recommendations of the study.

1.12 Definitions of Terms and Variables

Crime- It is an offence against the state (penal Code)

Crime prevention is the attempt to reduce victimization and to deter crime and criminals. It is applied specifically to efforts made by governments to reduce crime, enforce the law, and maintain criminal justice.

Offence- is act or an omission punishable by law (Penal Code)

Fear of crime refers to the fear of being a victim of crime as opposed to the actual probability of being a victim of crime. (http://en.wikipedia.org/wiki/Fear_of_crime)

Open Street CCTV Cameras- CCTV Cameras mounted on the streets for surveillance.

Property Crimes- This includes Robbery (Mugging, walk in walk out), Stealing, theft from motor vehicle, theft of motor vehicle parts and breaking/burglary.

Urban crime: criminal activity occurring in a public place, usually in an urban area

Chapter 2: Literature Review

2.1 Introduction

This chapter reviews documented literature on crime in urban areas, crime prevention in urban areas and concepts/theories that explain the concept of CCTV cameras. This review explored how CCTV location can inform urban planning and design in management of crime within urban areas.

2.2 Crime in Urban Areas

Urban crime is universal, but research suggests that patterns of urban crime are affected by the nature of cities and the social, economic and geographical environments in which they exist. For example property crime tends to be higher in cities in developed countries, while violent crime is higher in cities in the developing world. Regardless of social or economic development, the larger the population of a city, the greater the level of crime and victimization, a relationship often most clearly manifest in homicide rates. (Louise, 2001)

Geographical location and crime patterns from outside the city also make a difference, as do differences in law, culture or approaches to crime. Over time and across each city, specific crime patterns influence the general social climate and social reactions to crime, which have a longer-term influence: cultural developments may favour lawlessness or the rule of law and social conformity, depending on circumstances. (UN Economic and Social Council, 2007)

Most other forms of transnational organized crime also take place largely in cities, where organized criminal groups use the same infrastructure as legitimate commerce and use cities and their populations to conceal their activities. In such cases, crime and its after-effects in the city are only part of a bigger picture, raising the need to coordinate municipal countermeasures with those taken at the national and international levels. Urban environments may also have an effect on the ways in which the community reacts or responds to crime and how it is perceived by residents. This can be seen both institutionally in the presence of and roles played by law enforcement and the mass media in big cities, and in some cases directly, as when riots or mass violence have been sparked by crime or law enforcement actions. (UN Economic and Social Council, 2007)

The nature of life in cities also significantly influences crime: some types of crime are more or less prevalent in urban environments and some crimes take different forms in urban and rural environments. Urban conditions also exert a powerful influence on the ways societies react or respond to crime with preventive, law enforcement, victim-support and other measures. (UN Economic and Social Council, 2007)

The study agrees with the line of argument by Louise and Shelly, 2001 opinion that in developing countries violent crimes are more than property crimes in urban areas. However in the Nairobi Central Business district property crimes constitute a large percentage of crimes committed. For example in Nairobi CBD Stealing ,theft by servant, Breaking /Burglary, Vehicle and other thefts and Robbery (Mugging) contributed to 58% according to the Kenya Police Statistics of all the crimes committed in the CBD. Criminals in urban areas also take advantage of the high population in urban areas to conceal their criminal activities. In addition geographical locations (this includes lighting, pathways) and cultural developments where the society accepts crime as a normal occurrence are factors that compound the situation.

2.2.1 Causes of Crime within Urban Areas

According to Lima (2000) Crime is defined by mainly by values system and every society has its own values system. In every society crime is caused by one reason or another but throughout history though the rate, type, cause, and effect on each society might be highly different. Among criminologist there is a general consensus that urban areas have higher rates of crime than rural areas but of less certainty is why certain urban settings have higher crime rates than other urban settings with widespread variation in crime levels across urban spaces.

Among the theorists of this group is Kahn (1999), who attributes the growing urban crime to a series of socioeconomic factors, such as unemployment rates, underemployment, rapid urbanization, low wages, social gap between the rich and the poor, educational levels, age composition, and population growth rates. Key determinants in developing countries is contributed by an explosive combination of modernization and fast urbanization, together with high levels of social discrepancies, aggravated consumption levels, and political freedom, among others.

Martin, 2009 noted that causes of the crimes fall under four major categories - psychological, biological, economic and sociological (http://EzineArticles.com/5753322). He summarizes them as follows;-

Psychological causes

One's personality and predispositions induces one to commit crimes. One relates the occurrence that happens in the surroundings to his traits and predispositions and reacts. If there is an imbalance one person's id, ego and super-ego then it results in disorderly behavior. While super-ego influences good behavior, a predominance of id over super-ego propels one to commit crimes regardless of the consequences.

Biological causes

Biological causes are governed by genetics and neurological make up of an individual. Genetically speaking, an individual is predisposed to commit crime if one's parents have a criminal past. Neurologically, abnormalities and chemical imbalances in brain are reasons for one to behave criminally.

Economic Causes

Poverty and deprivation makes an individual to commit crimes. Poverty leads to frustration and anger and provokes criminal activities. Criminal activity gives vent to their anger. Crimes are committed on the assumption that they will end one's deprivation. But it is not poverty and wants that lead to crimes. Greediness is also a big contributor to criminal acts.

Sociological Causes

The ever-changing lifestyle of people in urban areas is a major cause for crimes. The position of an individual in an urban society puts a limit on him, and to adapt himself to the compelling limitations one resorts to crimes. An individual also needs to have chances to learn how to commit a crime for which the environment he lives in comes in handy.

From the above authors it is worth noting that crime is caused by a variety of factors which include; - Political, social, economic, institutional factors. The interaction of these factors influences the level of crime within the urban areas with the environment being a crucial component.

2.2.3 Crime in Nairobi CBD

"Over the last two decades, violent crimes such as armed robbery, murder, mugging, carjacking, housebreaking, physical and sexual assault and other forms of violent crime have been on the increase in Nairobi. Other forms of offences include commercial and property crimes such as burglaries." (UN Global Report on Human Settlements, 2007)

Intermediate Technology Development Group- East Africa under the supervision of the Safer Cities Programme of the United Nations Human Settlements Programme (UN HABITAT) conducted a victimization survey in 2001 that also covered the Central Business District and residential areas. The main conclusion of the victimization survey was that crime is more prevalent in Nairobi than in other similar cities. In terms of the types of crimes that are most prevalent, and the circumstances in which they occur, Nairobi is similar to other cities surveyed using the same methodologies in Africa, namely in South Africa and Tanzania.

Some of the Key findings of the survey were;-

- About 37% of all respondents have been victims of robbery and 22% victims of theft at least once during the previous year. About 18% percent of respondents had also been personally physically assaulted.
- The inner city tops the list of areas where snatching is most common, but robberies and physical assaults are most likely to occur in low income areas.
- Majority (90%) of the respondents suggest that all personal crimes occur in the open when residents are in transit to and from work or school. In two-thirds of all the cases the respondents were alone when the attack occurred.
- Physical strength was the most common weapon used against women and knives against men. Nearly 40% of all victims were injured as a result of violence used in the robbery. In 60% of all cases, bystanders watching the incident chose to ignore it. A fraction over one-half of all victims do not report the incident to the police.
- A total of 30% of all respondents in commercial enterprises revealed that they had been victims of burglary during the year preceding the survey. Two-thirds of all respondents felt that crime against the commercial sector had increased during the past year. Firearms were used in almost 80% of all robberies.

According to the UN Habitat survey in 2001, decision makers need to urgently address the social and institutional cause of crime by embarking on an inclusive strategy of crime prevention. At the same time, steps should be taken to strengthen the capacity of the local authorities and the police to handle criminal cases.

Over the last three years (2008, 2009, 2010) Nairobi CBD which falls under Central Police Division has reported a steady increase in crimes reported from 1168, 1544, 1675 Cases which is equivalent to 28% of the crimes committed in Nairobi. Stealing contributed to 32% of all the crimes committed, theft by servant 9%, Breaking /Burglary 8%, Assault 6%, Vehicle and other thefts 6% and Robbery 3%. (Kenya Police Crime Statistics)

Table 1: Nairobi Area Crime Figures 2008, 2009, 2010

Division	**2008**	**2009**	**2010**	**%**
Central	1168	1544	1675	28
Kasarani	683	435	771	12
Gigiri	271	190	255	5
Buruburu	615	741	724	13
Kayole	311	184	264	5
Kilimani	524	543	866	12
Embakasi	439	293	452	8
Langata	528	527	694	11
Ngong	128	255	272	4
Kajiado North	-*	-*	129	1
	4667	**4712**	**6102**	**100**

Source: Kenya Police 2010

*In the year 2008 and 2009 Kajiado North Division was nonexistence until 2010 when it was created and incorporated Nairobi Area.

Global report on Human Settlement 2007, Kenya Police Statistics and the Kenya Association of Manufacturers report, May 2009 all concur that crime has been on the increase in Nairobi CBD. This clearly shows that there is need for review of crime prevention strategies or review of the

current ones that seem to be ineffective. The findings of both reports also show that property crimes i.e Burglary, Robbery, Vehicle thefts, stealing as some of the crimes commonly committed within Nairobi Central Business District.

2.3 CCTV as a Crime Prevention Tool

There is evidence that CCTV is more effective in some contexts than others, and certainly more effective against some types of crime than others. Generally speaking, property crimes seem more susceptible to the impact of CCTV especially thefts from and of vehicles while personal crimes such as assault are less likely to be influenced (Skinns, 1998; Tilley, 1993). Welsh and Farrington's (2002) review found that CCTV had no effect on crimes of violence, but a significant impact on vehicle crime. The location and focus of the scheme were found to be important CCTV works better and can be evidenced by reduction in crime rate at a particular location e.g car park.

More recent studies measuring public attitudes towards CCTV have been concerned mainly with public 'feelings of safety'. While some studies have concluded that CCTV makes people feel safer (Sarno *et al.*, 1999), and those who already feel safe, feel even safer. In any event, in order to feel safe, people need to notice the cameras (Ditton, 2002 and Charman, 1992).

Short and Ditton (1998) found some scope for optimism, in that some offenders said they were deterred and others resorted to less serious offences. The one optimistic sign is that those who had been caught on camera were significantly more likely to view CCTV as a threat. Perhaps as more are caught on CCTV, and as offenders become aware of this, the threat it is seen to pose will increase.

Early concerns that CCTV might become a substitute for police officers do not appear to have been realized; indeed the public appears to favour more police on the beat rather than CCTV when given a choice (Bennett and Gelsthorpe, 1996). Also, when police officers are asked about their views of CCTV they are very positive (Gill and Hemming, 2004). Yet there is some evidence that this enthusiasm is not always matched by the officer's actions. And there have been practical difficulties in using images in court: both police and the parties involved in the prosecution of offenders are suffering from information overload.

Displacement has long been the weakness of situational measures, and CCTV is no exception. It is, however, unclear whether or not CCTV displaces crime. There is evidence that CCTV does displace offences, but this does not always mean that its overall effects have been negative (Skinns, 1998). Commonly, there will be displacement of some crimes and not others.

The conclusion to derive from this review is that different criteria may be used to assess effectiveness CCTV. Knowing how CCTV works is vital for developing 'transferable lessons' that enable good practice in one area to be repeated in another. Listed below are a number of mechanisms, devised by Tilley (1993), which seek to explain how CCTV may work:

- Caught in the act – CCTV could reduce crime by increasing the likelihood that present offenders will be caught, stopped, removed, punished and therefore deterred.
- You've been framed – CCTV could reduce crime by deterring potential offenders who will not want to be observed by CCTV operators or have evidence against them captured on camera.
- Nosy parker – a reduction could take place because more natural surveillance is encouraged as more people use the area covered by CCTV. This may deter offenders who fear an increased risk of apprehension.
- Effective deployment – CCTV may facilitate the effective deployment of police officers and security staff to locations where suspicious behaviour is occurring. Their presence may deter offenders, or may mean they are caught in the act.
- Publicity (general) – this may assist in deterring offenders.
- Publicity (specific) – CCTV cameras and signs show people are taking crime seriously, and thus offenders may be deterred.
- Time for crime – CCTV may have less of an impact on crimes that can be done quickly as opposed to those that take a longer time, as offenders assume that they will have enough time to avoid the cameras, or to escape from police officers and security staff.
- Memory jogging – publicity about CCTV encourages potential victims to be more security conscious and to take precautionary measures.
- Appeal to the cautious – those who are more security-minded use the areas with CCTV, driving out the more careless who may be vulnerable to crime elsewhere.

Gill and Turbin (1999) have suggested other mechanisms:

- CCTV may give third parties (shop staff, members of the public, householders) more confidence to challenge offenders, thereby preventing or deterring them.
- By viewing CCTV monitors, police and others may be able to more effectively pinpoint trouble spots, times, activities etc., and anticipate/remove crime catalysts.

However, as the authors note, CCTV may not always operate positively. Gill and Turbin (1999) have identified a number of negative effects that CCTV could have:

- Officials (police etc.) and third parties vigilance may decrease as they begin to rely on CCTV, creating both additional possibilities for crime and reducing the benefits of vigilance.
- CCTV may reduce natural surveillance as fewer people use the area, because they dislike the idea of being watched.

What studies have shown is that CCTV was successful on some criteria and unsuccessful on others. It is therefore important to understand the many potential benefits of CCTV when considering effectiveness. Understanding the different aims of CCTV, and the mechanisms by which those aims are to be realized, provides a theory of how CCTV should work, and a hypothesis for the evaluation. Moreover, precisely because CCTV systems differ, and contexts can be enormously complicated, comparing the findings of one study with those of another requires close attention to detail, which frequently does not appear in evaluation reports.

While CCTV in some locations and car parks are the best example, show some success, it is typically introduced alongside other measures. CCTV cameras act as deterrent measures when visible and the images got from the CCTV's can also be used for successful prosecution of cases. CCTV can also cause displacement however its effect to other areas can either be positive or negative. CCTV cameras can also improve deployment of Police Officers in hotspot areas which can reduce crime levels. There is one aspect of CCTV that is important in any discussion about impact, and that is the cost-effectiveness of CCTV. For policy purposes, the ultimate test of a positive impact is whether it can be reproduced at a cost-effective price. This is another topic where there is a crucial gap in knowledge.

2.4 Urban Planning and Crime

The new UN-HABITAT report, Enhancing Urban Safety and Security: Global Report on Human Settlements 2007 looks into crime prevention strategies through environmental design. The report notes that rapid development places increased pressures on the ability of authorities to meet public security and safety demands. It further explains the link between crime and city size in developing countries by the following three factors.

- Returns on crime are likely to be higher in larger cities due to the greater concentration of wealthier victims, more opportunities to commit various types of crime, and a more developed second-hand market for the disposal of stolen items.
- The chances of arresting a criminal might be lower in larger cities because large cities spend less on law enforcement per capita, or have lower levels of community cooperation with the police, or require more police officers per inhabitant to effect an arrest.
- Finally, larger cities have a greater proportion of crime-prone individuals/potential criminals.

The report also notes that Poor urban planning, design and management plays a role in the shaping of urban environments that put citizens and property at risk and estimates that 10 to 15 per cent of crimes have environmental design and management components. It further states effective urban planning, design and governance should seek to manipulate the built environment in ways that are intended to reduce or even eliminate the opportunity to commit crimes.

"From a planning and public policy standpoint, where crimes occur and how places are designed and managed are at least as important as whom the perpetrators are. Crime and violence tend to reoccur in relatively limited numbers of places in cities that provide niches for offending. The lack of integration of crime prevention strategies within comprehensive city planning practices is a factor in facilitating opportunities for urban crime" (UN- Habitat 2007).

The process of enhancing urban safety and security through effective urban planning, design and governance is in its infancy in many parts of the world, although in some countries such as the UK, the US and Canada it is more advanced. Getting the planning system to regard crime prevention as one of its major objectives in the drive to secure sustainable development requires a "top-down" approach coupled with effective action at the local level. Focusing on the setting of

crime, linking crime prevention and reduction to changes in physical design, is most advanced in the developed world (UN- Habitat 2007).

"The UK has deployed closed circuit television cameras (CCTVs) widely during recent years, not just in public places such as shopping centres and car parks, but also in some residential areas. Although their impact is still unclear, CCTV cameras have now become a commonplace part of initiatives against crime and violence in many parts of the world. Evidence suggests that the most successful policy responses to prevent and reduce the incidence and impacts of crime and violence are those that take cognizance of the local context, rather than those based on the experience of other places" (UN- Habitat 2007).

The UN-HABITAT report groups policy initiatives at the local level to address issues of urban crime and violence into six broad categories:

- Enhancing urban safety and security through effective urban planning, design and governance;
- Community-based approaches to enhancing urban safety and security;
- Strengthening formal criminal justice systems and policing;
- Reducing risk factors;
- Non-violent resolution of conflicts; and
- Strengthening social capital.

2.5 Crime Prevention in Urban areas

Researchers, Commissions and research bodies like World Health Organization, United Nations, the United States National Research Council, the UK Audit Commission and so on, have addressed critical issues in lowering the rate of crime. Most of them agree that the government has to go beyond law enforcement and criminal justice to tackle the risk factors that cause crime because it is more cost effective and leads to greater social benefits than the standard ways of responding to crime.

Knowledge about the factors that put populations, communities and individuals at risk enables crime prevention programmes to be targeted to areas and neighbourhoods at high risk, or to

groups of individuals who are already involved in offending or at risk. At the national level, this assists Governments in prioritizing crime problems, and in targeting programmes to the regions, cities or sectors that seem most. Such targeting of programmes and funds to tackle the greatest needs has been shown to be an effective and economical way of reducing levels of crime. However there is always a tendency, nevertheless, to overemphasize the role of individual factors in crime prevention programmes. This leads to a neglect of the wider social and economic factors, which may seem more difficult to address. A well-planned prevention strategy will work to address both individual and social and economic issues (UNODC Handbook on the crime prevention guidelines, 2010).

A more positive approach involves examining the quality known as resilience, and the capacity of cities, communities and individuals for avoiding crime and victimization in spite of their circumstances. So-called protective factors help to build or strengthen the resilience of communities and individuals to risks. They include factors such as well-governed cities with low levels of inequality, and effective and fair leadership, effective and transparent criminal justice systems, adequate funding for social, environmental and economic programmes and citizen participation. (UNODC Handbook on the crime prevention guidelines, 2010).

The UNODC Handbook on crime prevention guidelines 2010 outlines four types of crime prevention strategies as follows;-

1. ***Crime prevention through social development*** includes a range of social, educational, health and training programmes, such as those that target at-risk children or families when the children are very young, to provide them with support and child-rearing skills.
2. ***Community, or locally-based crime prevention***, instead of targeting individuals, targets areas where the risks of becoming involved in crime or being victimized are high. This includes areas with high levels of deprivation, both in terms of infrastructure, services and wealth, or lack of community cohesion.
3. ***Situational crime prevention*** covers approaches that aim to reduce the opportunities for people to commit crimes, to increase the risks and costs of being caught and to minimize the benefits.

Five specific categories of situational prevention strategies have been identified:

- Those that increase the effort of offenders
- Those that increase the risks for offenders
- Those that reduce the rewards for offenders
- Those that reduce the provocation to offend
- Those that remove the excuses for offending

Situational techniques are designed to be directed at highly specific forms of crime, and assume that would-be offenders make rational decisions about the potential risks and rewards of breaking the law. They involve the management, design or manipulation of the immediate environment in a systematic and permanent way.

4. ***Reintegration programmes***. Crime prevention through reintegration refers to all programmes that work with children, young people or adults already involved in the criminal justice system, including those in custody and returning to the community.

Since the approval of technical guidelines on crime prevention in 1997 and the adoption of ECOSOC resolution 2002/13, countries and cities have been able to refer to norms and standards for the development of crime prevention strategies and policies. The guidelines contained in the resolution set out the basic principles for such policies, including the importance of:

- Government leadership;
- Socio-economic development and inclusion;
- Cooperation and partnerships;
- Sustainability and accountability;
- Use of a knowledge base;
- Human rights and a culture of lawfulness;
- Interdependency;
- Differentiation.

Effective urban crime prevention strategies require: strong leadership from national and local governments; strategic planning based on sound analysis of problems and causes, and comprehensive strategies which include the whole range of services and institutions affecting the

daily lives of people; community-based and problem-solving policing; and strong partnerships between policy makers, service providers and civil society. (Magret Shaw, 2007).

Urban Crime Prevention has also been dealt with by the Safer Cities Programme of the United Nations Human Settlements Programme. This was launched in 1996 at the request of African mayors, who wanted to address urban violence by developing a prevention strategy at the city level. It supports the implementation of the Habitat Agenda, 19 (United Nations Conference on Human Settlements (Habitat II), Istanbul, 3-14 June 1996) which also acknowledges the responsibility of local authorities, among others, for crime prevention. The main objectives of the Safer Cities Programme are to build capacities at city level to adequately address urban insecurity, thereby contributing to a culture of crime prevention.

In Kenya, the National Police Service Act, 2011 stipulates the functions of the National Police Service as:-

a) provision of assistance to the public when in need;
b) maintenance of law and order;
c) preservation of peace;
d) protection of life and property;
e) investigation of crimes;
f) collection of criminal intelligence;
g) prevention and detection of crime;
h) provision of specialized stock theft prevention services;
i) apprehension of offenders;
j) enforcement of all laws and regulations with which it is charged; and
k) performance of any other duties that may be prescribed by the Inspector-General under this Act or any other written law from time to time.

This act gives the police the mandate to ensure there crime prevention in order to protect life and property. However for successful crime prevention strategies to be put in place it is necessary to ensure that all stakeholders are included for positive results to be achieved.

Crime prevention programme initiatives face many challenges among them lack of government support and implementation challenges that leads to poor stakeholder involvement, weak laws, lack of finance, poor community involvement, lack of accountability and sustainability of projects. However it's noteworthy to appreciate law enforcement as critical agency in implementation of crime prevention programmes as it forms the link between the Government and the Governed.

Successful crime prevention strategies need to be comprehensive by incorporating social and economic factors. The Role of Municipalities in crime prevention is also critical because they are best able to organize the strategies to tackle the risk factors that cause crime. In addition for successful crime prevention strategies it is essential for the police to be included as they play a critical component in response to crime incidents and arrest of criminals for prosecution in courts. A critical look of the wider social environment is also necessary for the implementation of crime prevention programmes. This emphasizes on the situational crime prevention measures which includes use of CCTV cameras among others. However social problems mutate with time and it is not easy to factor them as crime prevention strategies in the short term but in the long term they can have a positive impact. No specific crime prevention approach should be considered superior to the others.

A combination of several crime strategies will produce better results and any approach selected should form part of a strategic and balanced plan, and the advantages and disadvantages of each approach in a particular context should be considered.

2.5.1 Crime Preventions Initiatives in Nairobi

The City Council of Nairobi in collaboration with the UN-HABITAT and other stakeholders, have since 2001 started a number of initiatives and strategies aimed at restoring safety and security in the city. The City Council of Nairobi's planning department provides a pivotal role of coordinating multi-sectoral responses to crime. Overall, it provides periodic cross cutting development strategies which have implications on security and safety. Planning therefore provides regulations and guidelines to developers that help to enhance safety and security. Some of the crime prevention strategies initiated in Nairobi CBD include;-

a) Community Policing (Police Booths)

The most recognized efforts to establish community police partnership programs started at the beginning of the 1990s. In Nairobi the first formal Community Policing was started with the support of the private sector responding to specific security threats under the auspices of the Nairobi Central Business District Association (NCBDA) (Ruteere and Pommerolle, 2003). Their driving motivations were varied, with the NCBDA strategy being to respond to the often cited lack of resources for the police that was seen as an impediment to fight increasing crime targeting business in the central business district.

The NCBDA sponsored initiative was a public-private partnership with the private sector providing the police with the means to respond to its indentified security needs. It involved the training of the police, installing police booths in many parts of the central business district to increase police visibility and providing police with a vehicle to increase their response to criminal incidents.

NCBDA was concerned about vigilante groups and spiraling crime, collaborated with the police by donating ten police assistant booths. The others followed this lead with booths coming up all over Nairobi CBD, this initiative lacked sustainability since it was not formalized into law but taken up on experimental basis (Murkarjee, 2003). These booths were a means of bringing the police closer to the people: they served as sources of information and as places where people can report security problems.

The Daily Nation on 23 November 2004 reported that: "The security project of police booths at strategic points initiated by NCBDA has collapsed. Investigations by the nation reveal that none of the 12 booths meant to bring security agency closer to the people and restore public confidence in the police is being manned".

b) Relocation of Hawkers

In a bid to stem out crime from the city streets, the City council embarked on a holistic planning process to decongest the streets. This was particular aimed at relocating hawkers from the streets through the provision of markets through the establishment of public private partnerships.

Businessmen who see these "competitors" sometimes hawking right in front of their shops the very items that the shopkeepers are selling. Yet the hawkers do not have to pay rent for buildings and therefore are in a position to undercut the prices charged by shopkeepers. (Nairobi Salama Newsletter, 2006)

Muthurwa market is located about one and a half kilometers from the CBD was constructed to accommodate the hawkers who were hawking in the CBD. It spans a two kilometer square area which also includes a bus terminus. The Nairobi city council reports that the market can accommodate up to 8,000 hawkers. Nairobi city council officials had a rough time allocating stalls due to an overwhelming turnout of hawkers. By dawn, all available stalls had been grabbed. During the commissioning of the construction work in December 2006, then local government minister Musikari Kombo said the market would be truly a ''hawkers bazaar'', devoid of cartels, middlemen or brokers. (Nairobi Salama Newsletter, 2006)

The hawkers should not be seen as a problem: they play an important role in society. But what we need is a better organisation of this segment of the business community. We should learn from what is done in other countries. For instance, on weekends when there is less business activity in the city, they could be allowed to operate in streets which are designated for this purpose. The main thing is to organize their activities in an orderly manner so that it does not interfere with other business or causes harm to the environment (Wanjohi, 2001).

c) Redesigning Public Spaces

Public spaces have also tended to provide opportunities for crime to thrive. Fencing with hedges has for a long time been the preferred choice of municipal authorities charged with the responsibility over the maintenance of public parks. It has now emerged that hedges are envelopes that quickly predispose parks and recreational facilities to criminal activities. High walls in residential districts have also provided safe havens for criminals to carry out their misdeeds with impunity behind the screens erected to provide privacy, security and safety in the first instance. Jeevanjee Gardens is a case in point where citizens have been killed in such circumstances. The council in conjunction with other stakeholders is currently implementing a project at the gardens involving Crime Prevention Through Environmental Design [CPTED]

approaches as part of its strategy for safety. Other urban regeneration projects being implemented by the council with active stakeholder participation include; the Aga Khan Walk and the Kipande Side Walk. Efforts have also been made to beef up safety and security in both the Central and Uhuru parks, which in the recent past have been notorious hot spots for rape and mugging. (Nairobi Salama Newsletter, 2006)

d) Review of By-Laws

Indeed, the review is premised on the Crime Prevention Strategy of the Safer Cities Initiative that aims at enhancing safety and security in the city through a holistic and integrated approach. Noteworthy, the review of the bylaws is part of the mandate of the City Council. According to policy requirements, the City Council is duty bound to regularly review its by-laws to ensure that they are in tandem and responsive to the current trends. In pursuit of this, the City Council is keen to ensure that the laws that govern the city abide and respond to human rights and good governance principles. Clearing Pedestrian pathways of obstruction and maintaining clear vision lines is yet another technique for effectively dealing with crime using urban design and planning interventions. The review of the bylaws is imperative as it is a key component of good urban governance in the city. (Nairobi Salama Newsletter, 2006)

The actors in the review process have adopted a consultative and participatory approach. This is aimed at ensuring that the process and ultimately the laws incorporate the diverse needs and views of the different stakeholders. In response to this, the City Council of Nairobi and UNHABITAT organized a design workshop aimed at charting the way forward for a safer and attractive Jeevanjee garden-100 years on. The workshop brought together a mosaic of designers and planners. The design considerations lay bare the fact that the revitalization of the Garden would involve major changes to the entire precinct of the city immediate to the Garden. . (Nairobi Salama Newsletter, 2006)

e) "Toa Habari Kwa Polisi" (Billboard and Suggestion Boxes)

'Toa Habari Kwa Polisi' (a billboard and suggestion boxes private sector partnership with the Kenya Police) is a community policing strategy that is aimed at enhancing information flow between the members of the public and the police. Several boxes were placed in strategic places

within the CBD and it's environ. In collaboration with its members, KARA is significantly involved in the implementation of the Community-Policing Programme (CPP). Remarkably, the programme seeks to meaningfully employ participatory and consultative approaches to restoring security in the city. (Nairobi Salama Newsletter, 2006).

f) Lighting

Over the years the City Council of Nairobi has endeavored to light the streets of the CBD in order to make them safer. For instance, poorly lit and deserted suburbs are a perfect recipe for carjacking and night muggings. The council has endeavored to ensure the street light work, however some areas in the city are poorly lit due to frequent damage of the street lamps.

g) CCTV

In 2007 the Nairobi Central Business District Association mooted the setting up of the CCTV surveillance project in cooperation with a team of security experts from United Kingdom PSK Ltd. In addition other stakeholders including NGOMA Communication systems, Crime prevention / law enforcement, city planning and local provincial government departments were incorporated. The Closed Circuit Management Systems for Central Business District Kenya situated at National Archives was commissioned on 3rd September 2007 (NCBDA CCTV Implementation Committee Minutes, 2007).

The CCTV Camera project is located at Kenya National Archives along Moi Avenue while the Control room is located at Nairobi Area Provincial Police Headquarters within the Nairobi Central Business District. The CCTV Camera Project was installed in 2007 and subsequently upgraded and connected to the Kenya Data Network Butterfly cameras in 2009. The cameras are monitored by the police at the Nairobi Area Provincial Headquarters.

Photo 1: Kenya National Archives **(source: www.google.com)**

The location and system design were both carefully chosen for maximum impact. The National Archives Building is situated in the centre the intersection of five of Nairobi's most important roads. From the National Archives Building, fibre infrastructure from the Kenya Data Network is used to send images live to a control room at the city's Nairobi Provincial Police Headquarters, two miles away. 22 police officers were trained to use of the equipment in the control room, which has now been set up as a Special Surveillance Unit (NCBDA CCTV Implementation Committee Minutes, 2007).

Kenya National Archive was identified as a focal point with a lot of activities

- Two sets of cameras made up of two static cameras and on PTZ, camera is located along parapets of the Kenya National Archives Building
- The first set overlooks Moi Avenue and its intersection
- The second set overlooks Tomboya Avenue and adjoining intersection.
- One dome camera was located inside the building
- The location sights the Railway Headquarter and University way and onto Taifa Road, Uhuru highway between Kenyatta mausoleum and Intercontinental Hotel.
- Another set is placed on Tom Mboya Street of the Kenya National Archives building views the Fire Station, Luthuli Avenue, Latema Road and Hailesellasie Avenue.
- The camera views the following locations

- Kencom Bus Station along City Hall Way
- The Ambassador Bus Stop on Moi Avenue
- Latema Road (Matatu Terminus)
- The Accra road (Matatu Terminus
- The Fire station (Matatu Terminus)

The Authorities are able to monitor movement and activities of the people in the coverage area. This assists in alleviating traffic congestion management in the CBD where the authorities have a great view of the area.

The Cost Estimate

The project was estimated to cost Kshs. 70 million which included additional donation and support from the Kenya Data Network, Nairobi Central Business District Association and other relevant stakeholders (NCBDA CCTV Implementation Committee Minutes, 2007).

The main works consisted of the following;-

1. Acquisition of the CCTV cameras Equipment includes;-
   - PTZ Camera, with Day/Night function, zoom lens
   - Microwave transceiver, power supplies and battery backups as appropriate
   - Civil works, design, build and installation of camera masts
2. Acquisition of equipment for the control room
   - Camera switching equipment
   - Display monitors
   - Large rear projection screens
3. Internet connections through the fibre optics
4. Employment and training of personnel to carry out the monitoring of the cameras
5. Service and maintenance of equipment during and implementation of the project

Actual Costs

The actual cost of the project was close to the estimate cost with the following stakeholders assisting in reducing its costs;-

- The equipment for the initial installation i.e Cameras, Computers were donated and installation and expert services offered by PSK UK.

- Kenya Police provided the control room at Nairobi Provincial headquarters and providing personnel to man the cameras.
- Kenya Data network provided the required fibre optic connections by laying cables up to the Nairobi Area Provincial Headquarters and later connecting the system to its butterfly cameras free of charge.
- The Communications Commissions of Kenya provided the licences for connections free of charge i.e Public Data Network Operator license, Broad band licenser
- Approvals from National Security Intelligence Service and Nairobi City Council to place surveillance cameras at Kenya National Archives were offered free of charge.

Initial Measure of implementation

Infrastructure outlay for CCTV cameras installation required a lot of funds which the government cannot readily provide. In this case the Nairobi Central Business District galvanized funding for the project from both public and private sector. They continuously updated and coordinated information with all relevant stakeholders as shall be agreed upon. They were also tasked monitor and evaluate project progress for the project, provide financial accountability and audited reports to all relevant stakeholders, create and manage an awareness program, facilitate roll out of phase one immediately after approvals, ensure sustainability through private sector support, frequent updates by NCBDA to all partners and acts as an advisory role to the public sector on the way forward.

NGOMA Communication Systems from the private sector provided cost effective solution cheaper than the current government sector comparator and ensured all stakeholders signed a Joint Venture Agreement to necessitate a commencement of the project.

The intellectual property company (IPCo), NGOMA Communication, Cuiencident, West World responsible for Brand, Marketing material, Intellectual property, Design (Impact Zone, Technical Ops and incident Management), Research and Development, Upstart suppliers base, ISO 9001/2004, Own licence– Data, broad Band, Business trade and Financial banking and financing of infrastructure.

NGOMA and Joint Ventures Partners requirements ensured that the Public Data Network Operator license, Broad band license. While approvals were facilitated by City Council of

Nairobi. Kenya Police and Communications Commissions of Kenya (CCK) to operate a Private Surveillance System.

NCBDA and Kenya Private Sector Alliance (KEPSA) - were tasked to ensure access to market, political and commercial connections as well as business intelligence. Joint Ventures were tasked with providing the business network and marketing of the product. Crime prevention / law enforcement, city planning and local provincial government departments were required to have a contract commitment required (service level agreement which was not done).

Kenya Police acquired the approval to use Kenya National Archives and provided personnel in the Control room. In addition the Police responded to crime incidents.
Kenya Data Network – provided connectivity for all cameras, on fibre depending on provided space at their house equipment for the offside storage.
Cueincident- provided routers, hardware and software for the control room, server for off-site back-up.

Project Implementation

The project commencement date of project was 23rd August 2007 and was completed and handed over to the Government Formal Commencement was on 3rd September 2007. However, as it is seen in other projects there usually problems with project implementation

Initially the control room was Proposed to be hosted at the NCBDA Offices after Bruce House Standard Street, City hall annex (which houses Kenya Information Exchange point (space 7th, 13th and 14th at a cost of 52/= per sq feet) and Transmission Plaza, Mama Ngina Street, Houses Nairobi Java. 3rd Floor (1,000 sq feet and 1700sq feet) 9th Floor 1032 sq feet partitioned) all at Kshs 51/= per square feet 3 months deposit 1 year period) were rejected by the Kenya Police. It was finally located at Nairobi Area Provincial Headquarters after Kenya Police rejected the initial location due to security reasons.

The other problem is that Kenya Police was accommodated as a stakeholder very late in the project after the faced problems from the National Security Intelligence Service which required

approval from the Police Commissioner. This forced them to incorporate the police in order to get the approval. Kenya Police also requested for the Consoles to be manned by Police Officers and not by civilians as earlier proposed.

The tilt cameras were expected to cover Tomboya Street up to Hakati rd about and up to Railways Station round about which was not the case because of distance and curve on the street. In addition the pedestrian ways was covered by the buildings though the road was well covered and the traffic was viewed well. There was also the need to install street lights along Luthuli Avenue though the cameras were infra-red lighting.

Project Benefits

There was increased detection and prosecution of cases. Police officers were also able to use the CCTV cameras to cover a wider area in comparison to the number of Police Personnel that will be required to do the same. In addition Police officers were able to respond to real time incidents as they happen and able to control traffic snarl up along the six streets (NCBDA CCTV Implementation Committee Minutes, 2007).

On June 2010 project it stalled sue to lack of funding in addition Dome cameras installed at Kenya National Archives were stolen. The Police later in conjunction with the Kenya Data Network connected the system to the Butterfly Cameras owned by Kenya Data Network. Currently it is used to monitor traffic on the following streets Ngong Road- junction, Ngong Road –Kenya Science, Nyayo Stadium Round about, Westlands Round about, Ambassaduor Tomboya a Street, Kencom-Bus Station, Central Police, Harambee Avenue and City Hall Way and helps in controlling traffic snarl up within the City.

It's worth appreciating the efforts by the City Council of Nairobi through the Safer Cities programme. However over the years Nairobi has still been experiencing security problems despite the seven above crime initiatives. Re-Designing Public Places, Lighting and Review of By-Laws have been successful though their impacts can be enhanced by making some of the other crime strategies effective. Some of the initiatives like the Police Booths are not in existence while "Toa Habari Kwa Polisi", CCTV Cameras, Re- Location of Hawkers initiative are not effective. The Re-Location of hawker's project was successful in the short term with hawkers

leaving the streets. However hawkers have come back to the streets especially in the evening and weekends to sell their wares to the public on their way home.

The CCTV Project initiative was adopted extensively though its operation is faced with many challenges from project implementation, police response, financial resources and location of the Cameras. The CCTV initiative is critical for it enhances surveillance in the city and can help deter criminals by improving police response, arrest and prosecution of criminals. It is also one of the recent crime initiatives within Nairobi fronted by the NCBDA as a crime prevention strategy. Therefore there is need to explore it to understand why it is not effective or how to strengthen it so as to achieve the desired objective.

2.6 Operational challenges and lessons from other countries

The United Kingdom has made the most extensive use of CCTV as a crime prevention tool. However the past five years also has seen considerable expansion in other countries. Deployment of surveillance cameras in public now is extensive throughout the European Union. A similar trend is evident in Australia, New Zealand and South Africa. Public systems also are in operation in Canada and the United States, where rapid expansion in CCTV and the use of biometric technology has occurred in the wake of the September 11 World Trade Centre attacks and associated heightening of concerns about internal security and terrorism (http://ec.europa.eu/research/ research-eu).

In part, the rapid take-up of public CCTV has been driven by technological developments. These have included advances in imaging technology and the advent of the videotape and the Video Cassette Recorder (VCR) in the 1960s – the latter facilitating capture and playback of images without need for chemical processing. CCTV technology was first applied to crime control in 1967 with the launch in the UK of Photoscan, a retail sector system designed to deter and apprehend shoplifters (http://ec.europa.eu/research/ research-eu).

2.6.1 United Kingdom

The 'surveillance revolution' in the United Kingdom began with private CCTV systems. Private cameras were used from the 1970s onward to watch over banks, petrol stations and private car parks. Technological advances and growing acceptance led to increasing political support for the extension of CCTV to spaces of greater public significance. This included sports stadiums,

shopping centres and eventually the open streets of town centres (http://ec.europa.eu/research/ research-eu).

The first public-space surveillance system in the United Kingdom commenced operation in Bournemouth in 1985. However the most rapid expansion of CCTV occurred from 1994 onwards, when as part of its 'law and order' policy agenda the Conservative government signaled strong support for its installation in town centres. Financial support from the Home Office was significant in this context.

Between 1994 and 1998 the Home Office ran four annual CCTV challenge competitions, awarding a total of £38 million to bidders, mostly local authorities and parish councils but also schools and hospitals. Funds were used to support the capital costs of introducing video equipment. Home Office grants covered up to 50 percent of initial set up costs with the shortfall to be met by local partnerships. In 1995 78 percent of the Home Office budget for crime prevention was expended on schemes to establish CCTV in public spaces (http://ec.europa.eu/research/ research-eu).

In 1999 it was estimated that funding had been allocated to 530 town centre public surveillance schemes operating or scheduled for establishment across the United Kingdom. British government support for CCTV has not declined under the Blair Labour government. New funding challenges were announced, with £50 million available in 1999 and £103 million in 2000 (http://ec.europa.eu/research/ research-eu).

The Fifth Report of the House of Lords Science and Technology Committee (1998) expressed concern about no direct regulation and recommended a licensing regime and enforceable Codes of Practice. (Maguire 1998) The UK Data Protection Commissioner was given power to issue a Code of Practice under the Data Protection Act 1998 (section 51(3) (b)). A Code of Practice issued in July 2000 provided for some level of regulatory control over open-street CCTV systems. However much of it is still voluntary and represents 'good practice' rather than legally enforceable standards. The only legally enforceable sections cover the collection and processing of the images of individuals as prescribed by the Data Protection Act 1998. (http://ec.europa.eu/research/ research-eu)

2.6.2 South Africa (Johannesburg)

The use and implementation of public Open Street Closed Circuit Television (CCTV) surveillance systems in Central Business Districts (CBDs) in South Africa was solely for the purpose of crime control (reducing street crime) or crime prevention (deterrence) in South Africa. This initiative to start implementing and linking CCTV surveillance systems in CBDs in the major metropolitan cities of South Africa to local police services was taken in the mid-1990s by Business Against Crime of South Africa (BACSA).

Johannesburg city CBD CCTV project for centre was strongly linked to the Safety Lung Project of the Gauteng Department for Community Safety and the City Council's Safer Cities Programme. In addition, strong motivation for the installation of public crime control CCTV were made as being one of the essential pillars of the new 'urban renewal' or 'developmental rejuvenation' strategies for the city's central business district. It was reasoned that if the CCTV project could reduce all crime levels and positively change the perceptions about public safety then businesses and people would be encouraged to relocate back to the city centre. The CCTV project became a part of the new rejuvenation project with R600 million planned to be invested in the Johannesburg CBD area over a period of five years (Minnaar, A. 2006a).

The project as a whole was a partnership with Business Against Crime of South Africa (BAC (SA)), the Johannesburg Metropolitan Council (JMC) and the South Africa Police Service (SAPS) – each with a specific planning and practical role to play.

- The Gauteng Department of Community Safety provided the crime prevention policy framework;
- the JMC the municipal urban renewal framework (inclusive of municipal police personnel); BAC(SA) the business and operating framework (which included technical specifications and initial start-up installation funding, plus the soliciting of contributions from CBD businesses for operational and equipment costs for sustainable long-term success);
- The SAPS the policing framework (reaction and response personnel within their policing framework of visible and sector policing).

- In order to manage funds and resources for the project the partners agreed on the establishment of a company known as the Johannesburg Crime Watch.

The Project

- It achieved international "best practice" status and was the first such system in the world to be awarded (in 2004) ISO9001:2000 certification for being compliant in their key areas of competencies.
- Johannesburg CBD CCTV surveillance system covers most of the CBD of Johannesburg and cameras are linked to the central BAC (SA) controlled monitoring room to which the SAPS and JMPD have access.
- In the BAC(SA) administered Johannesburg control room a system has been developed whereby the CCTV operators are trained in risk profiling, non-verbal communication, surveillance techniques and incident management – all supervised by an incident manager (Rogers, 2005; Strauch, 2006 in Minnaar, A. 2006a).
- In the BAC (SA) Johannesburg Control Room three teams manage each of the consoles comprising of 16 cameras. Team members alternate duties and rest periods on an hourly basis to ensure that they maintain high levels of concentration. There is one police officer from the SAPS (assigned by the local police station) and one from the Johannesburg Metro Police, both on duty with a three eight-hour shift rotation of different officers.
- The area covered by the CCTVs has two dedicated police vehicles (one each from SAPS and JMPD) assigned to it and if any incident is observed either police officer on duty in the control room can radio the particular agency patrol vehicle immediately and dispatch it to the potential crime scene or municipal by-law infringement.
- The cameras, some mounted city lampposts and others on buildings and rooftops, have lenses that can zoom in accurately up to three kilometres. The time and date at which an incident is committed is recorded, and the footage is permitted as evidence in court. The cameras are backed by a team of up to 40 plain clothes JMPD and South African Police Service (SAPS) personnel, who respond to incidents and effect arrests.
- This system of crime and incident surveillance has additional back-up 'eyes' to the operators in the control room with the deployment of Johannesburg Metro Council employed security guards placed on most street corners in the CBD area. These municipal guards are linked to the control room by means of two-way radio communication.

- In 2005 the Code Division Multiple Access (CDMA) system offered many advantages over the optic fibre infrastructure, in particular connectivity in an area. One practical advantage of using a wireless system being that a colour image of a suspect could be downloaded from a CCTV camera and transmitted almost instantaneously to the cellphones of responding officers (or any other community guards of participating security companies in the CBD so that they can identify any suspect or keep a watch on the streets in an effort to apprehend such suspects.
- The electronic surveillance system costs R1.2 million a month to operate and monitoring crews are trained to read body language to anticipate incidents almost before they happen. Incidents taking place any time of day or night are captured on digital video camera, relayed instantaneously to the operation centre's secure 420 terabyte hard-drive and displayed on a bank of large video screens. (Minnaar, A. 2006a)

In the first year of its operation the Johannesburg CBD CCTV system had reported a 90% drop in muggings in the area while all reported crime decreased by 48 %. In April 2004 the crime rate was down, occupancy rates were up, new businesses were being opened in the area and investor confidence was growing. Since December 2007, with an average of about 260 arrests made each day for crimes ranging from bag snatching, pick pocketing, cell phone theft, assault, robbery, car hijackings, vandalism and smash-and-grab attacks. (Minnaar, A. 2006a). Success was attributed to the collaboration between the two law enforcement agencies.

From the two case studies, it is evident that the use of CCTV cameras can greatly reduce crime incidents and help in Urban Renewal of Cities. The Police and Legal framework put in plays also plays a critical role especially in installation of CCTV cameras in Public Places. However one of the drawbacks to its implementation for this purpose has been its costs and the inability to fund such implementation in the light of other more pressing priorities and demands on its finances by Government. Therefore for a CCTV project to succeed it is necessary for all stakeholders to be included. It is quite clear that Government resources are constrained however with public-private partnership the resources can be harnesses like in UK and Johannesburg. It is important for the Government to establish a Policy framework which will ensure coordination among all stakeholders for a successful project to be implemented.

2.7 Legal and Institutional Issues

2.7.1 Legal, Policy and regulatory framework guiding operations of CCTV cameras

Modes of legal regulation of CCTV vary greatly across Europe. Its employment is regulated by federal and state data protection acts, by police laws and codes of criminal procedure, by specific laws on video surveillance and furthermore special regulations for locations such as banks or sport stadiums. Also copyrights provisions touch the usage of CCTV. In some countries strict regulation exists in regard to private CCTV systems. In other countries mainly public systems are legally regulated.

At the European level CCTV is mainly regulated in the context of privacy and data protection: in particular Article 8 of the European Human Rights Convention, the European Convention on the Automated Processing of Personal Data of the Council of Europe and the Data Protection Directive (95/46/EC) of the European Union. Especially the latter, which is binding for all member states of the Union, has influenced the national regulation of CCTV during the lasts years throughout Europe. Passed in 1995 it came into force in October 1998 with the aim to harmonise European data protection legislation. Mainly the directive has led to a lot of similarities among the countries in regard to central definitions of terms like "personal data" or "sensitive data", "data subject" or "data controller", "data collecting" or "data processing". Signifying the political pressure towards the European national governments to update their provisions in respect of new technologies it has led to first more or less direct regulations of video surveillance in the countries. (Marianne L. Gras 2004)

As a general rule, different acts govern the employment of CCTV for purposes of public safety and the prevention of disorder or crime on the one hand and to all other areas on the other. The former employment is regulated by specific laws as police acts or codes of criminal procedure. The latter use is mostly regulated within the framework of the data protection legislation. Some countries such as Spain have explicit laws for CCTV surveillance by the police in the public realm. In Denmark the 'Law on the ban against TV-surveillance', which came into force on July 1st 1982 forbids the private use of CCTV in public areas. In other countries such as Germany explicit sections on CCTV by nonpolice actors can be found in the data protection acts. From

case to case this variety causes major differences, for example, in regard to the demand of transparency as required by data protection regulations. (Marianne L. Gras 2004)

In United Kingdom the Data Protection Act 1998 and Human Rights Act 1998 provides for the regulation of the operation of CCTV cameras. Under the Data Protection Act 1998, CCTV systems that process data must be notified to the Information Commissioner. When registering a system, the user must state what the purpose of the system is. Once registered compliance with a number of legally enforce able principles is required. The Data Protection Act requires that information be obtained fairly and lawfully, this includes codes of practice such as:

- Appropriately sized signs (A4 or A3) must be displayed where CCTV is in place.
- Signs should display a 'purpose of the system message'.
- The data/images captured should be used for the original purpose intended for the scheme.
- Cameras should be positioned to ensure that they avoid capturing images that are irrelevant or intrusive.
- Individuals have a right to a copy of any personal data held about them.

Public authorities such as the police, local authorities, prisons, government departments and courts are also bound by Article 8 of the Human Rights Act 1998 which came into force in October 2000. In order to comply with Article 8, public authorities should consider the following principles:

- **Proportionality**. Does the level of threat or risk to community safety warrant the existence of a CCTV scheme? Is the level of coverage commensurate to the level of crime and disorder? Is there a balance between public safety and the rights of the individual?
- **Legality**. CCTV operators must be fully aware and signed up to the system Codes of Practice and Procedures.
- **Accountability**. CCTV users must ensure that their monitoring practices are governed by the Codes of Practice and Procedures.
- **Necessity/compulsion**. Is the surveillance necessary at all? Are there other crime reduction measures which would achieve the same ends?

- **Subsidiarity**. The operation of the CCTV system should cause minimum interference with the privacy of the individual.

Although complying with such regulations avoids litigation, these guidelines are also designed to ensure that CCTV systems can be used to their maximum effect. As is highlighted in the advertising campaign from the Metropolitan Police's Anti-Terrorist Branch, unless cameras are set up and maintained correctly they are very little use. (Marianne L. Gras 2004)

In Kenya there is no law that explicit regulates the use of CCTV, however to install CCTV Cameras on the Open Street requires an approval from the City Council, Police and also approval from the Communication Commission of Kenya (In terms of Network Coverage). However inbuilt CCTV cameras can be installed without any form of approval. In addition there are no laws that govern data protection. This leads to installation of CCTV cameras without any legal or regulatory framework. This hampers a coordinated approach in installation of CCTV cameras, data protection, legality, accountability and community participation.

Therefore in Kenya there is need to come up with laws, regulatory framework and policy guidelines that will form a code of practice under a Data protection Act e.g appropriately sized signs (A4 or A3) must be displayed where CCTV is in place e.t.c

Legal and policy guidelines for operation of CCTV cameras will guarantee that issues of privacy and litigation don't arise in the use of these technologies. This ensures that the CCTV cameras are used mainly for safety and public disorder and not for personal reasons by complying with Article 8 of the Human Rights Act 1998.

2.8 Theoretical Framework

2.8.1 Location Theory

According to Mathijs Assink & Nico Groenendijk 2009, approximately a century ago transport costs and labour costs were considered to be the most important factors in the location choice in industrial countries like the Netherlands. These two factors also played a central role in the (neo) classical industrial location theories from the beginning of the twentieth century, as stated by

Weber and others. The optimal location for an organization could easily be calculated using the mentioned variables. Important presumptions in these theories are that organizations act rationally in a homogenous competitive market and that entrepreneurs are fully informed.

In the period after WW II, due to increased infrastructure transport costs and fall in regional disparities, labour costs decreased as a consequence of growing labour mobility. Agglomeration factors, significantly called "secondary location factors" by Weber, were considered to be of much importance and dominated location theory in the middle of the twentieth century, as in the growth-pole theory of Perroux and his successors and the cumulative causation theory of Myrdal. At the end of the twentieth century, there was shift in location tendencies and location choice no longer centered on pure facts (Assink & Groenendijk 2009).

Over the last decades tertiary factors like Government policies Level of "institutional thickness", Knowledge centres and ICT infrastructure, Quality/ mentality of workforce, Environmental aspects (sustainable business zones), Representative business locations and Quality of living/ recreational environments became important, as reflected in behavioral and institutional theories on location choices. Socio-economic developments like globalization; the emergence of network societies, of knowledge-based economies and of creative economies has made spatial quality become a powerful factor in location choice. Because of an ever increasing level playing field, increased mobility of organizations and the post-scarcity effect primary, secondary and tertiary location factors are of increasingly limited importance. Consequently, spatial quality may be considered to be the dominant location factor of our time (Assink & Groenendijk 2009).

Location theory has therefore shifted its attention away from factors, relating to the proximity of markets and suppliers, towards relatively factors as the (perceived) quality of institutions, knowledge levels, environmental quality, safety and security (Mathijs Assink & Nico Groenendijk 2009). Location choices of companies have been an important focus of political-administrative attention and tend to be more relevant to the economic development of cities and regions than some of the other choices that organizations make. Employment levels, regional income levels and growth are to a large extent dependent on the location and investment choices made.

Since the explicit introduction of spatial quality in the early 1980s it has become a core principle in spatial planning, mainly from an environmental perspective. Recently spatial quality has surpassed its status as a sustainability concept and has become an important aspect of competitiveness of cities and regions, as high spatial quality is assumed to attract economic activity spatial quality has thus entered the realm of location theory (Assink & Groenendijk 2009).

Personal perception by entrepreneurs of the business environment plays an important role, as well as the possibilities to participate in various economic and social networks. The behavioural and institutional bodies of thought correspond well to these changing insights in location decisions. In modern network society, with the influence of agglomeration factors being tangible on a growing scale, factors such as institutions, knowledge, environment, safety, mentality and image (which in earlier periods were thought of being trivial), are more and more decisive in actual location choices (Assink & Groenendijk 2009).

From the above review its worth to note that security plays a critical role in determining the location of businesses in today's urban environment. High crime rates often find it difficult to attract, retain, and expand private investment. In addition to deterring investments, crime has direct costs on firms (and households) through theft, loss and insecurity-related expenses, which translate into reduced competiveness and lower investment (sometimes even disinvestments). Whenever firms - especially small businesses fall victim to crime, they react by changing their hours of operation, raising prices to cover losses, relocating from the community in which they operate, or simply closing. Fear of crime isolates businesses much like fear isolates individuals.

2.8.2 Routine Activities Theory

CCTV alters the behavior of potential offenders through increased surveillance; this suggests that crime can be prevented by blocking opportunities for crime occurrence. This coincides with the routine activities theoretical approach taken by Felson. In the routine activities approach, three essential elements must interact for a crime to occur: (1) a motivated offender must have (2) a suitable target and (3) a time and a place lacking capable guardianship (Cohen and Felson 1979). The convergence of these three elements, referred to as the crime triangle, increases the

opportunity for crime to transpire. Hence the removal of any of these conditions should prevent crime.

Initially, the routine activities approach concentrated on how decreased guardianship made targets more vulnerable. (Cohen and Felson, 1979) suggested that motivated offenders and suitable targets have always been around; the supplies of these are persistent and plentiful. What explains the increase in crime rates is the variable decrease of capable guardians because of changes in patterns of activity in society and technological advances. Conversely, from this perspective, the way to prevent crime is to adequately guard the target when faced with a likely offender.

Eck (1995) builds on this new aspect of routine activities theory by stating that a third group of individuals can also inhibit crime—those who manage places, or place managers. According to Eck (1995), places with weak, neglectful management provide more suitable opportunities for crime than places where management is strong and vigilant. Thus, if CCTV effectively reduces crime under a routine activities approach operates as a guardian or a manager.

If CCTV operates as a guardian, offenses against targets should be reduced. These include offenses such as personal and property offenses that have a tangible, specified victim or focus. The potential offenders will realize that suitable targets are being supervised and adjust their behavior.

If CCTV operates as a manager, not only offenses against targets but also overall disorder and drug offenses, violations without a specific victim, should be reduced in the area. Hence there should be a general reduction in offenses. Individuals using that space who realize that the location is being monitored will be less likely to engage in criminal or disorderly behavior. Felson (1995) further suggests that the nearness of suppressors will be a factor that influences the potential for crime. The closer the potential offender is to the suppressor, the more effective the suppressor will be in influencing individuals against committing offenses.

It is good to note that CCTV cameras acts as surveillance and can target a particular location. These can help act as a guardian or a manager in locations with weak managers and act as suitable targets for criminals. The surveillance can cause displacement of crime but the displacement does not mean that crime is displaced elsewhere. I agree with Poyner 1988 that displacement can make a larger area be safe from criminals.

2.8.3 Situational Crime Prevention Theory

Situational crime prevention was developed by the British government's criminological research department in the mid-1970's (Clarke and Mayhew, 1980). This approach is concerned with reducing the opportunities for any kind of crime, occurring in any kind of setting. Situational crime prevention reduces the opportunities for criminals to commit crime changes criminals' ideas about whether they can get away with a particular crime makes it seem harder, riskier, and less rewarding to commit crime. This involves; -

- Making changes to buildings and streets to make them safer
- Asking the police for help
- Using common sense to stop criminals
- Using neighbors to look out for crime
- Working with people from different agencies

CCTV as a Situational Crime Prevention Mechanism

The central concept of situational crime prevention is that crime can be prevented by altering the environment or the situation where offenses occur (Clarke and Homel 1997). Situational crime prevention is based on a rational choices perspective, that individuals make choices based on environmental cues (Clarke and Homel 1997). Situational crime prevention seeks to change how potential offenders perceive opportunity in a particular environment or specific situation.

The notion is that the offender makes a series of semi rational choices about personally profitable activities based on information processed from the environment (Brantingham and Brantingham 1993). Situational crime prevention attempts to change the perception and information the potential offender processes regarding the gains, losses, and risk embodied in the situation. Thus,

criminal opportunities in any targeted environment will be perceived as either having greater risk and/or requiring more effort.

Changes in the environment or situation are designed to decrease the likelihood that an offender would have the opportunity or the inclination, based on a rational assessment of the situation, to commit specific criminal acts at a particular location (Taylor 1997a; 1997b). Clarke (1992) presents situational crime prevention as a common-sense approach to crime. Situational crime prevention allows the use of whatever theoretical constructs seem most useful in any particular situation. While not limiting itself solely to one distinctive theory, in practice, situational crime prevention draws heavily from the theoretical constructs of rational choice, routine activities, and lifestyles perspectives (Clarke and Felson 1993). In adopting this "outcome-based" philosophy, situational crime prevention targets a particular environment or a specific type of crime or criminal event (Cornish and Clarke 1986). As such, situational crime prevention techniques are not designed to work in every situation or for every problem. The utility of each technique can be, and often is, narrow and situation-specific. To accumulate practical knowledge, this approach calls for vigorous and constant evaluation of crime prevention techniques.

According to Clarke (1997), CCTV operates as a situational crime prevention mechanism. CCTV is introduced into the environment to reduce crime. Clarke (1992) classifies CCTV as a means of increasing the risk because CCTV operates by increasing the level of official surveillance at monitored locations, thereby While routine activities theory was presented as a macro theoretical explanation for crime in the United States, situational crime prevention draws heavily from this approach at the micro level (Clarke 1992) blocking opportunities to offend.

The primary question posed from a situational crime prevention perspective concerning CCTV is whether the introduction of CCTV results in a reduction of crime. This decrease can be evidenced by a general decline in deviance or a reduction in specific types of offenses in monitored areas.In my opinion, situational prevention can be used against all categories of crime since all crimes depend to some extent on opportunity.

Crime Prevention Through Environmental Design (CPTED)

ED is an acronym for crime prevention through environmental design which asserts that proper design and effective use of the built environment can lead to a reduction in the fear ncidence of crime, and an improvement in the quality of life" (Crowe, 2000).

at (1983) proposed that there are six broad characteristics to CPTED concepts; territoriality, illance (informal and formal), access control, image/maintenance, activity programme ort and target hardening. By optimising opportunities for surveillance, clearly defining daries and creating and maintaining a positive "image", urban design and management can ourage offending. This is explained by the fact that offenders are potentially more visible to -abiding" others, and therefore, perceive themselves to be more at risk of observation and sequent apprehension.

itionally, a well-maintained and appropriately used environment can signify that a sense of nership" and proprietary concern exists within the community. Fisher and Nasar, 1992 oduced a threefold grouping of physical features; prospect (for the user), refuge (for the ntial offender) and escape (for the user and potential offender) into CPTED theory.

his study Surveillance which is one of the factors in CPTED will be considered. Physical ign has the capacity to promote informal or natural surveillance opportunities for residents their agents and surveillance is part of capable guardianship (Painter and Tilley, 1999). If enders perceive that they can be observed (even if they are not), they may be less likely to end, given the increased potential for intervention, apprehension and prosecution. Different es include natural (e.g. residents' self-surveillance opportunities as facilitated by windows) mal or organised (e.g. police patrols) and mechanical surveillance strategies (e.g. street hting and CCTV). Properties with low levels of lighting at night, high walls/fences, or thick es or shrubbery can provide concealment opportunities for burglars particularly when close to ints of access such as windows and doors.

owever, the existence of natural surveillance opportunities within the built environment does ot necessarily mean that surveillance is routinely taking place, or that any direct action by

citizens is guaranteed (Barr and Pease, 1992). Indeed, this is one of the reasons for the development of second generation CPTED, which now seeks to engender positive social activities and diversity to encourage neighbours to take ownership of space and take advantage of natural surveillance.

Formal (or organised) surveillance is also provided by local stakeholders (shop keepers, security guards). Four studies of increased formal guardianship at parking lots and garages have demonstrated reductions in car-related crime (Poyner, 1994). Poyner notes that strategies to control access may reduce thefts of vehicles, but may do little to impact on theft from vehicles, raising the issue that what guards actually do may be as important as their physical presence.

Webb and Laycock (1992) found CCTV installation at London Underground stations reduced robberies compared with a control group and similarly CCTV at parking lots has been found to reduce car-related crime (Tilley, 1993). Skinns (1998) evaluated CCTV in Doncaster (UK) and found vehicle crime reduced while other property crimes did nott. Armitage et al. (1999) discovered CCTV significantly decreased all recorded property crime (burglary, car crime, criminal damage, handling stolen goods and fraud) in Burnley (UK).

Armitage, 2002 observes how the effects of CCTV on crime can begin before the cameras become operational by virtue of publicity campaigns. She also highlights the fact that the preventative potential of CCTV has a life cycle such that, unless routine management and publicity is maintained, any initial reductions in crime will evaporate.

Natural surveillance (e.g. residents' self-surveillance opportunities as facilitated by windows), formal surveillance (e.g. police patrols) and mechanical surveillance strategies (e.g. street lighting and CCTV) have all proven effective in reducing both crime and the fear of crime.

In summary, the review of the CPTED components of surveillance, access control, territorial reinforcement, activity support, image/management, and target hardening intimates that they have all individually contributed to reducing crime and the fear of crime in a broad range of studies. However the existence of surveillance opportunities does not mean that surveillance is

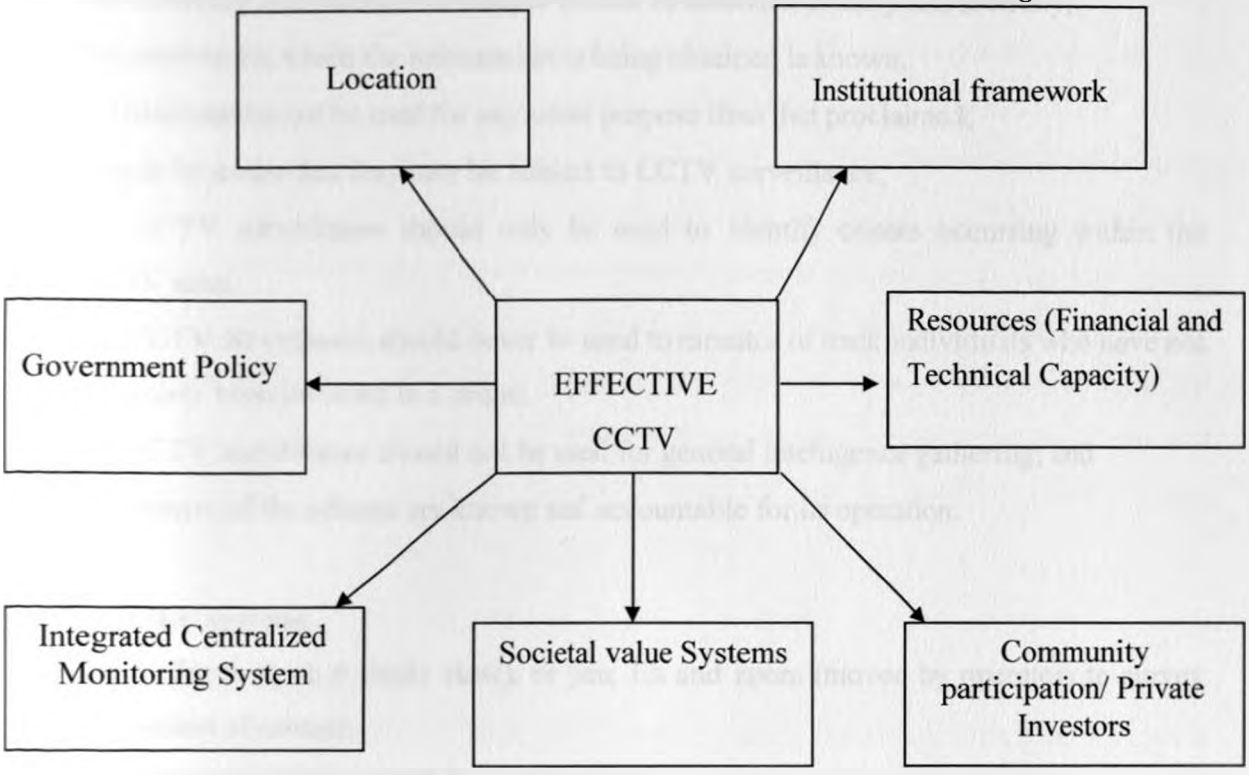
taking place. Therefore it is necessary to have an efficient unit to support the surveillance in terms of response to crime incidents and arrest of suspects. It is also worthy to note that increases activities on pathways and streets can help provide targets for crime and vice versa.

2.9 Conceptual Framework

Kenya currently has no policy guiding the installation of CCTV systems. An effective CCTV system in urban area requires an integration of various sectors. Provision of security is essential to the well-being of the people and economic development within urban areas. However available evidence shows that insecurity still persists within Nairobi causing urban dwellers to fear. One key point in addressing the issue is realization that failure is not just technical but it may be due to lack of integrated stakeholder involvement. Failure may be also due to lack of effective use of modern technology i.e CCTV technology in ensuring reduction of crime levels within the Central Business District. Stakeholder's involvement can be measured by Community participation and level of involvement in decision making on issues affecting them.

In this study the following major factors have been identified from the literature review as critical components that will ensure the effective use of CCTV cameras within an urban Environment;- Location, Institutional Framework, Resources, Government Policy, Societal value systems, Community participation and Integrated Centralized Surveillance System.

Figure 1: Closed Circuit Camera Television in relation to Urban Crime Management



Source: Developed by Author

2.9.1 CCTV

Closed Circuit Television Camera (CCTV) is important tool for crime prevention and security. Cameras collect images, which are transferred to a monitor- recording device, where they are available to be watched, reviewed and stored. It is a situational measure that enables an area to be kept under surveillance remotely. This makes it possible for the police, and other law and regulatory agencies such as private security, to respond to incidents when alerted, and to have information about what to look for when they arrive. The storing of images facilitates post-incident analysis to an investigation.

CCTV can be effective in reducing or preventing crime if it is part of a broader crime prevention and community safety strategy. CCTV can bring benefits to the community through a reduction in crime which can lead to enhanced perceptions of safety in a particular area. On the other hand, CCTV may involve a degree of cost to the community, for example in terms of the allocation of resources or in implications on personal privacy. It is therefore essential that:

- the recording and retention of images should be undertaken fairly and lawfully;
- the purpose for which the information is being obtained is known;
- the information not be used for any other purpose than that proclaimed;
- people be aware that they may be subject to CCTV surveillance;
- the CCTV surveillance should only be used to identify crimes occurring within the CCTV area;
- the CCTV surveillance should never be used to monitor or track individuals who have not obviously been involved in a crime;
- the CCTV surveillance should not be used for general intelligence gathering; and
- the owners of the scheme are known and accountable for its operation.

Types of CCTV systems

1. Static (focusing on a single view), or pan, tilt and zoom (moved by operators to survey succession of scenes);
2. Fixed (permanently installed in one location);
3. Redeployable (moved around power points within an area), or mobile (placed in vehicles and transported to where they are needed);

CCTV can transmit analogue or digital images, via cable or wireless links. The images can be recorded in different ways with different implications for quality. Methods of storing and manipulating images have different implications as regards the type and speed of monitoring that can be carried out. The availability of specialized uses, such as number plate and facial recognition, has generated yet more potential applications of this flexible technology.

CCTV systems may embody several of these technical features which includes;-

1. Technical specification of a system may well impact on its effectiveness
2. Emerging technology and assessments at any particular point in time need to take account of this.
3. Technical considerations are an important element in the evaluation of systems.

Technical expertise need to be consulted on technical specification is consistent with the objectives set. However, the technology is only one part of a CCTV system. No system can work without a control room, and there is wide variation in the way that these operate. They can be monitored full-time or for a limited number of hours a week, and by a dedicated operator or by one who has other duties besides CCTV monitoring. Staffing levels vary greatly, and so do the types of areas surveyed, including town centres, residential areas and car parks. There are also a range of control room cultures, management styles, and methods of communicating with the police. All of these factors, and others, influence the way the control room operate. Many systems also incorporate the installation, or improvement, of street lighting in their design and often such improvements are made at the same time as the cameras are installed. These are then treated as part of the scheme design rather than as confounding factors.

2.9.2 Government Policy

The existing policy can either encourage or discourage integrated stakeholder involvement in decision making and implementation of CCTV Cameras. Policy Guidelines should be developed by the Government to provide a policy framework and a set of underlying principles to assist agencies considering CCTV as a possible response to local community safety concerns. The Guidelines should principally aim at local councils or Police as the most appropriate owners of CCTV schemes in public places. Local councils are democratically organised, are close and accountable to local communities, and generally have the capacity to co-ordinate local activities in crime prevention and the promotion of community safety. It must be recognised that ownership brings with it accountability, responsibility for securing funding, responsibility to consult with and inform the community as interested parties, and responsibility for design, management, running costs, evaluation and audit activities.

The Guidelines should provide:

- a clear statement of the Government's policy on the appropriate establishment and use of CCTV schemes
- a set of principles underpinning the policy which sets out the values and conditions which should apply to the operation of CCTV schemes.
- the steps which local councils, transport authorities and other organisations should take when considering establishing and implementing a CCTV scheme

- the issues relating to privacy and liability which need to be considered
- a list of other sources of information or assistance which can supplement the Guidelines
- some information on the technical factors which will need to be considered in establishing a CCTV scheme
- some information on Code of Practice, Protocols and Standard Operating Procedures which should apply to operating schemes.

2.9.3 Institutional Frame Work

An effective organizational structure clearly identifying the roles of key players can enhance stakeholder involvement. E.g

a) City Council of Nairobi should be the owners of the system as they play a key role in coordination of all local authorities program. Local councils are responsible for the following key functions:
   - implementing a comprehensive consultative program with business groups, individuals, government instrumentalities and organisations, and cultural/community groups affected by the program
   - implementing a community information program
   - financing the implementation and ongoing costs of CCTV. This includes an independent evaluation of its effectiveness
   - implementing and monitoring the auditing procedures for the implementation of CCTV as a crime prevention strategy
   - developing and implementing an effective complaints handling mechanism
   - developing, in consultation with other key stakeholders and the CCTV Committee, a Code of Practice, Protocols and Standard Operating Procedures with other agencies in relation to their roles in the CCTV program

b) Law Enforcement Agencies (Kenya Police) - Police is mainly tasked with maintenance of law and order and is the lead agency in security. By involving the police who should be given a major role in;-
   - hosting the control rooms and provision of personnel to effect arrest of criminals.
   - providing information for and advice on the crime assessment

- working with the local council to develop Codes of Practice with other agencies in relation to the conduct of the CCTV program
- developing, in consultation with the local council, Protocols and Standard Operating Procedures between police and the local council in relation to their respective roles in the program
- training local police in their responsibilities in relation to the CCTV program as set out in the Code of Practice, Kenya Police Service Standard Operating Procedures
- ensuring personnel compliance with the Code of Practice, Kenya Police Service Standard Operating Procedure
- participating in the evaluation and monitoring processes for the CCTV program
- determining the appropriate level and priority of responses required to incidents identified by the CCTV cameras, according to available resources and existing priorities.

c) **Private Sector**- private investors are an important component for any economic development to be undertaken. They can be able to provide the necessary resources i.e the Cameras at a monthly fee if it's not affordable. Nairobi Central Business District Association- this association should be tasked to ensure that all the business proprietors are effectively involved in the operation of the CCTV project.

2.9.4 Resources and technical capacity

Availability of financial resources and technical capacity is key to the successful implementation projects. The City council, Kenya Police and NCBDA should play a critical role in financing or securing resources through the government and the donors. This is a critical component for the successful implementation of any project.

2.9.5 Societal Value Systems

In most cities crime rates are largely determined by social and environmental factors such as poverty, levels, single family households, racial makeup, income, education level, number of police officers and age group of the population. In addition lack of decentralization within the national government, lack of resources among police officers, weak management, outdated operation methods, equity and public participation are other factors that influence crime rates.

Ethnic heterogeneity, residential mobility, and low socioeconomic status on an area's ability to prevent crime are likely to lead to high levels of social disorganization, which in turn increases the likelihood of crime and criminal violence.

Social disorganization refers to the inability of a community structure to mobilize the common values of its residents to maintain effective social controls. neighborhoods characterized by high levels of poverty or economic deprivation, residential mobility, ethnic heterogeneity, family disruption, poor housing conditions, and low levels of education are most likely to be disorganized and have higher levels of crime and violence. Disorganization, a lack of solidarity and cohesion, and the absence of a shared sense of community and mutual commitment between residents allow crime to flourish because the community's capacity for informal social control is inhibited.

Certain groups carry sets of norms and values that make them more likely to engage in crime. High rates of violence result from a culture where criminality in general and violence in particular, are more acceptable forms of behavior. Social institutions themselves contribute to the development and persistence of a subculture conducive to criminality and violence. For example, the disintegration of particular institutions (i.e., churches, families, and schools) denies certain the opportunity to learn conventional norms and values. The result of such processes is that certain groups are more likely to use violence in their day-to-day encounters, and violence is seen as an acceptable means to solving disputes.

2.9.6 Integrated centralized Monitoring System

This involves effective monitoring using integrated centralized systems where staffs are dedicated in monitoring/surveillance. Control rooms should be placed at all Police Stations and Police Posts within the Central Business District to ensure that all their areas are covered and will increase incident response. This integrated system should be supported by police response teams who have vehicles fitted with the system and stationed at strategic locations within Nairobi Central Business District. The constraints in terms of network connection for effective communication in real-time requires a reliable network provider. In addition communication of the police patrol officers should follow the South African Model of CDMA to enhance visualization of the area of incident in the Patrol vehicles.

2.9.7 Private Investors/Community Participation

Community participation can be measured in many ways but for purposes of this study we will emphasize on involvement in implementation and decision making. Community consultation will help ensure that schemes are designed to meet local needs. It will also facilitate strong and continuing public support, if and when, a scheme is implemented. Publicity and high quality information provide an opportunity for the community to voice any concerns which may be held about the proposed scheme. The community should be consulted about the following:

- the proposed area to be monitored
- the current prevalence of crime
- community concerns about the area
- the objectives of the program (it is important that the community be provided with a **realistic** appraisal of what the program might achieve, i.e. what types of offences/ behaviours are/are not likely to be deterred. CCTV should not be promoted as a cure for all crime problems)
- the planned duration of the program, including the period after which it will be evaluated
- the proposed communication method between the scheme operators and police
- the cost and funding arrangements of the program. This includes both the installation and
- the ongoing costs of operating the system
- any environmental alterations required for the functioning of the program (i.e. removal or alterations to trees, vegetation or structures)
- the avenue by which complaints about the operation of the program may be lodged

2.9.8 Location

This is an important component of this model. It greatly influences the behavior of the criminals and the placement of the CCTV Cameras. There is need to install CCTV cameras inside the buildings and on the streets to ensure effective surveillance of the streets. The local council must carry out a crime assessment of the area where problems have been identified. The analysis should be conducted in consultation with local police, and as appropriate, representatives of the local community Consideration should be given to:

- the nature, type and volume of criminal activities occurring within the area under consideration

- the legitimate ways in which various members of the community use the area, including differences across weekdays, time of day, and seasons
- the situational and environmental factors which appear to contribute to the criminal activities
- the possibility of displacement (that is, merely shifting the crimes), both in terms of crime type and geographic location.

Effective location of cameras will be critical to the success of the program. Camera location should also be guided by the specific objectives of the program and should be done in consultation with the local police. As a guide, consideration should be given to the following:

- identified crime hot spots
- ATMs and banking institutions
- bus stops, taxi ranks, car parks and railway stations
- community facilities including toilets, telephones
- places frequented by potentially at-risk groups such as the elderly and young people.

While undertaking the analysis, consideration should also be given to a range of crime prevention initiatives which could address the identified problems. The possibility should always be borne in mind that CCTV may not be the best response to a place's particular problems, or that the costs of the scheme might outweigh the benefits.

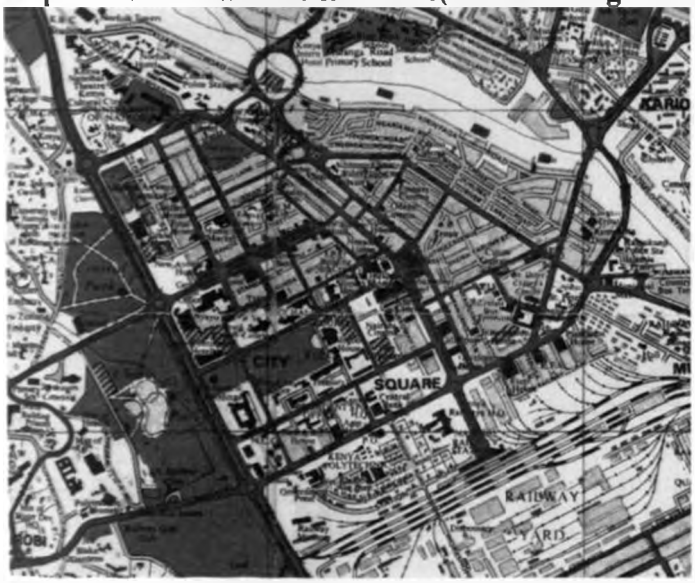
Chapter 3: Background into the study

3.1 Introduction

For purposes of this study the Central Business District covers the area bordered by University Way, Uhuru Highway, Haile Sellassie Avenue and Moi Avenue. It is one of the busiest areas in the Nairobi and attracts huge volume of vehicular and pedestrian traffic.

3.2 Description of Study Area

Map 1: Nairobi and its Environs(source. Google Maps)



Map 2: Nairobi Central Business District(source. Google Maps)

3.3 Climatic Conditions

Nairobi is situated 91.7 Km (57 miles) south of the equator (1,25S , 36 55E) and at an altitude of about 1676 (5,500 feet) above sea level and it is 526 Km (327 miles) from the coast and enjoys a continental tropical climate.

3.3.1 Temperature

The area receives an average of 79 mm of rainfall with two rainy seasons in the months of March-May and September – December

- The average temperature is 17.7 °C (64 °F).
- The average temperature range is 3.5 °C.
- The highest monthly average high temperature is 26 °C (79 °F) in February.
- The lowest monthly average low temperature is 10 °C (50 °F) in July, August & September.

3.3.2 Rainfall

Average temperature is 17.7 °C (64 °F) with an average temperature range of 3.5 °C.

- Nairobi's climate receives an average of 925 mm (36.4 in) of rainfall per year, or 77 mm (3.0 in) per month.
- On average there are 89 days per year with more than 0.1 mm (0.004 in) of rainfall (precipitation) or 7 days with a quantity of rain, sleet, snow etc. per month.
- The driest weather is in July when an average of 19 mm (0.7 in) of rainfall (precipitation) occurs across 3 days.
- The wettest weather is in April when an average of 206 mm (8.1 in) of rainfall (precipitation) occurs across 15 days.

3.3.3 Humidity

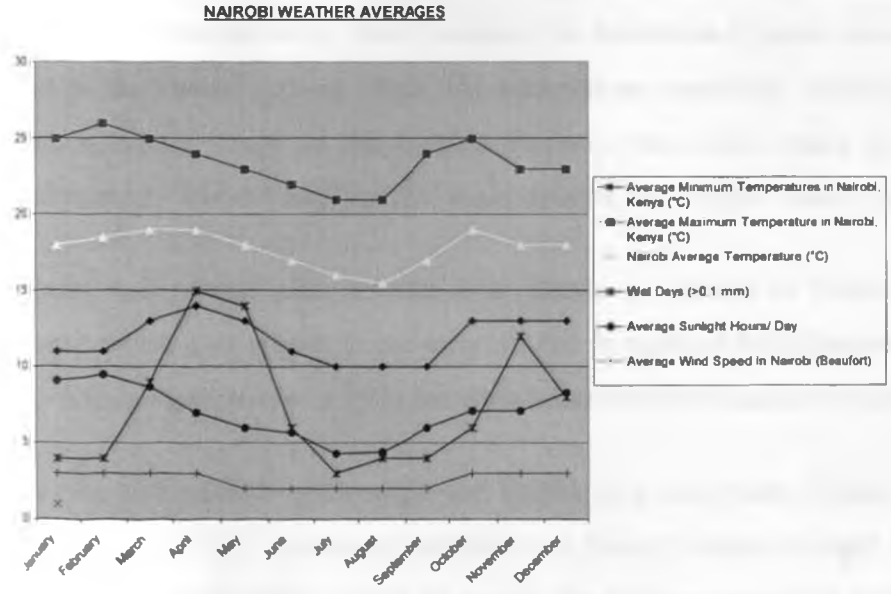
The average annual relative humidity is 72.8% and average monthly relative humidity ranges from 64% in October to 79% in July.

3.3.4 Sunlight

Average sunlight hours in Nairobi range between 4.3 hours per day in July and 9.5 hours per day in February.

There is an average of 2525 hours of sunlight per year with an average of 6.9 hours of sunlight per day.

Chart 1: Nairobi Weather Average



(Source: BBC 2011)

3.4 Land Use

The area of study is situated at the heart of the Central Business District with the major land use being administrative and commercial spaces. It is bordered by Industrial area in the east and residential neighbourhoods bordering the city.

3.5 Historical Background

Nairobi is the capital city of Kenya and is situated at an elevation of about 1660m in the highlands of the southern part of the country. It is the principal economic, administrative, and cultural center and is one of the largest and fastest growing cities in Africa.

Nairobi was a marshy waterhole for the Maasai people and of little interest to the European colonialists until the 19th Century when the spiritual leader of the Maasai negotiated a treaty with the British hence allowing them to march the Mombasa-Uganda railway line right through the heart of the Maasai grazing lands. The area was an essentially uninhabited swamp until in 1899 when a supply depot of the Uganda Railway was built, which soon became the railway's headquarters. The railway brought wealth into the city, which made it grow dramatically.

Nairobi was named after a water hole known in Maasai as Ewaso Nyirobi, meaning "cool waters" which was rebuilt in the early 1900s. It replaced Mombasa as the capital of the British East Africa Protectorate in 1905 and then became Kenya's second largest town after Mombasa.

The city continued to grow under the British rule, and many British people settled within the city's suburbs. This continuous expansion of the city began to anger the Maasai people, as the city was devouring their land to the south. The Kikuyus were also angered and wanted the land returned to them.

In 1919, Nairobi was declared a municipality and its boundary extended to include surrounding urban-settlements. The boundary was again extended in 1927 to cover 30 square miles (48sq.km) geographically, the city of Nairobi now occupies 695.1 Sq.km (2009 census).

3.6 Population and Demographic Characteristics

In 1906, the city has a population of 10,512. By 1963, when Kenya received independence from Britain, the city of Nairobi had a population of 350,000. Nairobi was the heart around which the predominantly agricultural economy pulsated. The population was mainly comprised of English settlers, Asians and ethnic communities of the Kikuyu and Kamba whose origins were in close proximity to the city. The Masaai had been relocated by the British a few years earlier to pave way for the settler occupation.

In 1989 the population was 827,755(1989 Census) and rose to 1,324,570 (1999 Census). Today, the city of Nairobi is cosmopolitan, multicultural, lively modern city with an ever-growing skyline. According to the 2009 census, the population of Nairobi stood at 3,138,369 and continues to grow. Nairobi continues to thrive and benefit greatly from the overall stability that Kenya enjoys as a nation. An important aspect of the post independent period has been the migration of people from rural areas to Nairobi. The majority of the immigrants come from the neighbouring Central and Eastern provinces, while others come from Western and Nyanza provinces. Almost every Kenyan ethnic tribe has a presence in Nairobi, leading to the rapid population growth.

3.7 Economic System

Economically, Nairobi has evolved to an important hub for the East African region. The city has grown exponentially and is now a centre for commercial, manufacturing and industrial facilities. The history of Nairobi is also intertwined closely with the rest of East Africa, in a relationship that began when the original East African Community, East African Railways & Harbors and the East African Airways housed their original headquarters in Nairobi. Thus Nairobi has been a regional centre driving economic activity in the region.

Chapter 4: Research Methodology

4.1 Introduction

The study covers Nairobi Central Business District and relied on both the field surveys and document information and analysis. The research process involved literature review, data collection, data analysis, findings and conclusion. However the literature review was on-going throughout the research.

4.2 Research Design

Grinell (1988) defines research design as a "logical strategy that plans research procedures and provides evidence for the development of knowledge". The research methodology was geared towards the main objective which was to evaluate the effectiveness of CCTV cameras within Nairobi Central Business District. To achieve this objective the research was divided into three phases and relied on both the field surveys and documented information.

Phase one. Exploratory research was conducted to identify any specific objectives or data requirements to be addressed through additional research i.e type and pattern of crime and measures/ interventions that have been put in place. Indeed, CCTV technology is a relatively new phenomenon in Nairobi CBD. Although the number of users is proliferating, there is little empirical evidence to help know how CCTV effectively constitutes consumer to crime prevention. Exploratory research is the foundation of a good study (Churchill & Iacobuci 2004) and it is normally flexible, unstructured and qualitative (Aaker et al. 2000; Burns & Bush 2002) and serves as an input to further research (Malhotra 1999).

In addition to reviews from the literature, key informant technique was used to tap the knowledge of those familiar with the subject matter i.e Police officers administering the study area, Administrators located at City Council "Safer Cities Initiative, Programme officer NCBDA, ICT experts involved in installation of CCTV Cameras among others. To also gain further understanding on CCTV cameras as a crime prevention tool, theories guiding operation of CCTV cameras, Legal and policies guiding operation of CCTV cameras and best practices in the world was explored. In this study secondary data and Key informant interview was carried out to

generate tentative explanations, defining important variables in the study and viability and practicality of the study was explored.

Phase two: Having obtained information from the exploratory research CCTV Observation was be carried out to find out operation of CCTV cameras within the CBD and it involved sampling views from the Nairobi Area Police Control Room.

Phase three. Having obtained some primary knowledge of the subject matter by an exploratory study and CCTV Observation, descriptive research was conducted. Contrary to an exploratory research, a descriptive study is more rigid, preplanned and structured, and is typically based on a large sample (Churchill & Iacobucci 2004; Hair et al. 2003; Malhotra 1999). Observations were also made on prevalent areas to identify the characteristics of the environment and crime prevention strategies put in place for crime prevention.

The purpose of descriptive research is to describe specific characteristics of existing crime patterns, the extent and use of CCTV cameras and challenges in use of CCTV cameras. For the purpose of this study, a cross sectional study was the appropriate technique. The information was collected from a given sample of the population at only one point in time with selected individuals asked to respond to a set of standardized and structured questions about what they think, feel and do.

The study was focused the causal relationships between CCTV cameras and Crime management (how it contributes crime prevention). The research employed descriptive methods to test the null hypothesis by describing and measuring as precisely as possible characteristics and how they are viewed by the groups described.

The objectives of the first stage were twofold: identify the information requirements and determine the source from which the information could be obtained. This stage began with identifying the information needed to meet the research objectives. As such an exploratory study was carried out. The decision to choose a survey method was based on a number of factors which include sampling, type of population, questionnaire form, question content, response rate, costs, and duration of data collection.

The most appropriate survey method for this research was personally administered one. This method was chosen for the following reasons:

- relevant groups can be identified obtained.
- The questions can be answered by circling the proper response format and with an interviewer present: respondents could seek clarity on any question as to meet consistent question objectives.
- A higher response rate of almost 100% can be assured since the questionnaires are collected immediately once they are completed
- Higher anonymity of respondents because respondents are not required to disclose their identities.
- This method offers highest degree of control over sample selection

4.2.1 Sources of Data

Primary Data included raw- data that was collected from the field survey, observation on the operation of the Nairobi CCTV control room, crime hotspots, buildings installed with CCTV cameras , the extent and usage of CCTV cameras and operational challenges experienced.

Secondary data included information extracted from Government publications, scholarly journals, Government documents, papers represented at conferences, periodicals , internet and any other alternative document. Such information extracted from these materials included the following; The type of crime, measures/interventions that have been put in place, best practices on CCTV usage, policy regulations guiding the use of CCTV cameras, Population figures and projections, historical background of the study area and existing data on crime levels.

The type of data was categorized as primary and secondary data. To achieve this, the study was divided into three phases. Phase one and two dealt with an exploratory study and the latter involved descriptive and causal research.

4.3 Research Population

The target population for this study was people who use spaces monitored by CCTV Cameras and involved in the process of installation of CCTV cameras and policing when the research was be conducted.

4.4 Sampling Frame

To establish the sample frame, the target population for this study included;- Law enforcers, Local community/Businessmen, Administrators and those involve in installation of CCTV cameras. Although the respondents were selected it was clearly expressed in the cover letter of the questionnaire (refer to Appendix) that their opinions should reflect their personal opinion.

4.4. Sample Size

The target population for this study included;-Institutions/ Businessmen (Administrators, Law enforcers, Supermarkets, Banks, Hotels, Forex Bureau), Nairobi Central Business District Association officials, Urban planners from City Council of Nairobi and IT Technical persons who use CCTV cameras or involved in installation of CCTV cameras within the Central Business District.

Table 2: Sample Size

S/No	Subject	Sample size
1	Government buildings/Institutions	9
2	Businesses	
	a) Commercial Banks	18
	b) Supermarkets	6
	c) Hotels	4
	d) Small Business Enterprise i.e Forex Bureau, Casinos, Computer Shops/Electronics	11
		50
3	Nairobi Central Business District Association officials,	NA
4	Government administrators (law enforcers)	NA
5	Urban planners from City Council of Nairobi and	NA
6	IT Technical persons who use CCTV cameras or involved in installation of CCTV cameras within the Central Business District.	NA

The numbers were determined after a pre- survey which established that there were 37 Banks, 18 Government buildings/ institutions, 13 Supermarkets, 8 hotels and 23 other institutions with Closed Circuit television Cameras. Which estimates the proportions of the subjects in the

population as follows; - Commercial Banks 37%, Government buildings/ Institutions 18%, Supermarkets 13%, Hotels 8% and Small Business Enterprises 23% of with CCTV Camera installations. A sample size of 50 from a target population of 99 was chosen in order to develop a stratified sample which covers all the business types/institutions a large sample of 50 was preferred and was representative for full coverage.

4.5 Sampling Method

4.5.1 CCTV Observation

This involved general observation and recording of the behaviour of subjects and occurrence of crime at the Nairobi area Police CCTV control room by taking a sample of 2 locations from 12 locations viewed in the Study area, observe location and buildings fitted with CCTV cameras and movement of people within those spaces. This involved observing the general environment i.e the extent and use of CCTV Cameras in monitoring crime incidents and movement of pedestrians during the day and night. An observation checklist (See Appendix Three) was used to help gather relevant information to meet the objectives of the study. This was subjected to tests for reliability and validity which eliminated subjective bias towards various issues. It also create a situational analysis.

4.5.2 Structured Interviews-

This was done through administering of questionnaires to the target population and responses got through oral verbal responses. Questionnaires were administered using Stratified random sampling. The sample size consisted of 5 strata and 50 subjects (Institutions and Business Premises who have installed CCTV Cameras) whose responses were analyzed. The population taken was heterogeneous in each stratum and all use the Nairobi Central Business District to conduct their day to day activities. (See Appendix two) Stratified sampling ensured that the sample is representative and all sub-groups are represented.

4.5.2.1 Designing the Questionnaire

This step involved selecting appropriate measurement scales, question wording and content, response format and finally the sequence of questions.

4.5.2.2 Measurement Scale

The study aimed to evaluate effectiveness of CCTV Cameras in Crime Prevention, multiple-item scales was be deemed appropriate. The use of a multi-item scale ensured that the overall score, which was composite of several observed scores, that was a reliable reflection of the underlying true scores. Two types of measurement scales were used in this research: nominal and ordinal. Nominal scale was used for identification purposes because they have no numeric value e.g location of crime (hotspots) on the other hand, ordinal scale were used to rank years of business/institutions have operated, number of cameras used among others.

4.5.2.3 Question Content and Wording

In relation to question content and wording, the questions were designed to be short, simple and comprehensible, avoiding ambiguous, vague, estimation, generalization, leading, double barreled and presumptuous questions.

4.5.2.4 Response Format

Four types of response format were used: open ended, dichotomous close ended and Nominal-polytomous (two ordered option), ordinal-polytomous (where the respondent has more than two ordered options).

4.5.2.4 Sequence of Questions

The questionnaire began with less complex and less sensitive questions and progressed to opinion-sought questions. The questionnaire consisted of two parts (A and B). The first section consisted of demographic information such as a respondent's age group. The second consisted of sections based on the objectives i.e Types of crimes that occur, their pattern and spatial distribution, Factors that contribute to the occurrence of crime, what measures/interventions have been put in place and their performance, effectiveness of CCTV cameras in crime prevention, operational challenges in the use of CCTV Cameras and policy guidelines required for effective use of CCTV Cameras. The respondents were also be asked to indicate their opinions on the various dimensions of the variables being studied.

4.5.2.5 Questionnaire Distribution and Administration.

This step involved the recruitment and training of research assistants. For the purpose of this research, three research assistants were recruited based on their projection of professionalism, enthusiasm and confidence. The primary role of the research assistants was distributing and collecting the questionnaire. The allocation of research assistants was proportionate to the number of respondents in each strata.

Finally, the sampling process for this research involved selection of a sufficient number of elements from the population, and was based on the data collected from a subset; an inference of the characteristics of the entire population was made. The sampling Process included several steps: define the population, establish the sampling frame, specify the sampling method, determine the sample size and select the sample.

4.5.3 Key Informant Interview

This was used to obtain relevant information from the key institutions and different informants who include:

- Administrators (Law Enforcement),
- Nairobi Central Business District Association official,
- Urban planners from City Council of Nairobi
- IT Technical persons dealing with installation of CCTV

Open ended questions based on the objectives was posed to the participants based on the interviewers guide (See Appendix two) to gain more insights on the operations of CCTV cameras.

4.6 Reliability and Validity Tests of the Instrument

The questionnaire was set to repeat questions in another form to test reliability of the responses. Content of this research was validated by determining the variables which have been defined and used previously in the literature. In this study, the dimensions of variables were identified and subsequent opinions from field experts sought to provide relevant inputs adding to what have been identified from the literature. In this study, the correlation matrix was used to test construct validity for convergence and discriminant validity.

4.7 Data Analysis

This was done in form of; - Written text, Photographs, Tables, Charts and Maps. The technique was determined by the data that was being presented. Data analysis involved steps such as coding the responses, cleaning, screening the data and selecting the appropriate data analysis strategy.

4.7.1 Coding of Responses

This task involved identifying, classifying and assigning a numeric or character symbol to data, which was done in two ways: pre-coded and post-coded. In this study, most of the responses were pre-coded except for open ended questions which were post coded. Upon completion, the data was then entered in a statistical analysis software package, SPSS version 19, for the next steps. Qualitative data from personal interviews was analyzed to provide qualitative data. Mapping and photography- maps were used to mark crime hotspots within the CBD and crime hotspots were photographed.

4.7.2 Cleaning and Screening Data

The process of cleaning and screening data included inconsistency checks and missing responses.

4.7.3 Ethical Considerations

Finally, it was pertinent to consider the proper conduct of this research. This research accommodated the responsibility to protect the interests of the respondents. With regards to the survey respondents, no one was be coerced to respond to this study.

The respondents were asked to participate on their own freewill, that is, they had rights not to participate or to end their participation if they so wished. Besides, they were briefed about the purpose of the study and how or why they were chosen. As such they were free from deception or stress that might arise from their participation in this research. The respondents were guaranteed protection through anonymity and all information that may reveal their identity are held in strict confidence.

4.8 Analytical Framework

Research Objectives	Type of Data	Collection Method	Source	Method of Analysis	Expected Results	Presentation Techniques
To examine the extent of CCTV cameras use in crime prevention	The extent/ usage, location of CCTV cameras, Design Standards and impact in crime prevention	Primary and Secondary Data	Sample Field Survey/inter views, Observation, journals , reports and internet	Examining the existing CCTV Design Standards and Extent of CCTV usage	Location of Cameras, Design Standards and impact on crime	Photographs and text
To identify the operational challenges in the use of CCTV Cameras	Effectiveness of CCTV cameras	Primary and secondary data	Sample Field Survey/inter views and journals ,reports and internet	Identifying Operation challenges	Challenges faced in the use of CCTV cameras	Text
Identify and suggest policy guidelines required for effective use of Open Street CCTV Cameras	Policy guidelines put in place	Primary and Secondary	Field Survey/inter views , journals , Books, reports and internet	Identifying Legal requirements guiding the use of CCTV	Policy guidelines put in place and suggest policy guidelines to be put in place to counter crime	text

Table 3: Analytical framework

Chapter 5: Extent of CCTV Camera use in Crime Prevention and Operational Challenges

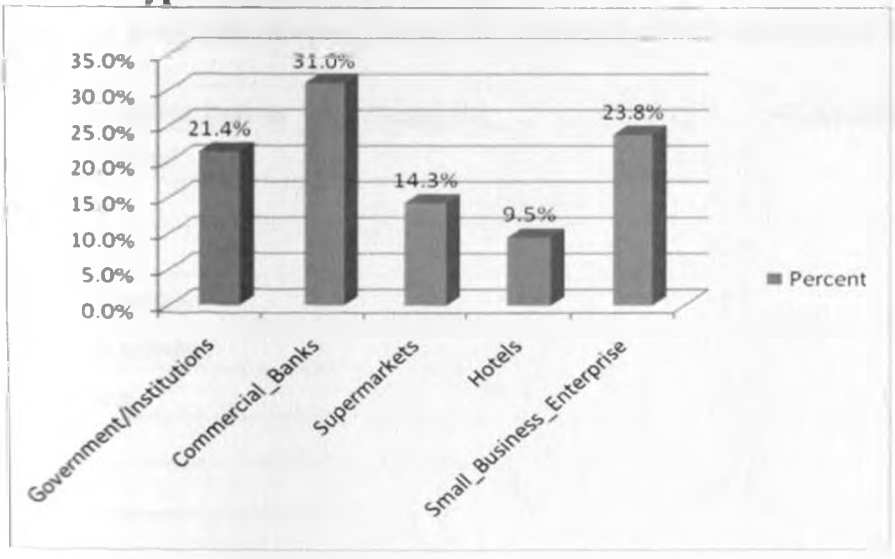
This chapter covers finding and data analysis types of crime that occur in the CBD and their spatial distribution, factors that contribute to crime and measures/ interventions that have been put in place, the extent of CCTV camera use in crime prevention and operational challenges faced in the operation of CCTV cameras.

5.1 Background Information

Respondents Background

The study interviewed **42** subjects among them were **9** Government/Institutions, **13** Banks and **6** Supermarket, **4** Hotels and **10** Small Business Enterprise (**3** Forex Bureau, **2** Casino, **2** Computer Shops, **1** internet Café).

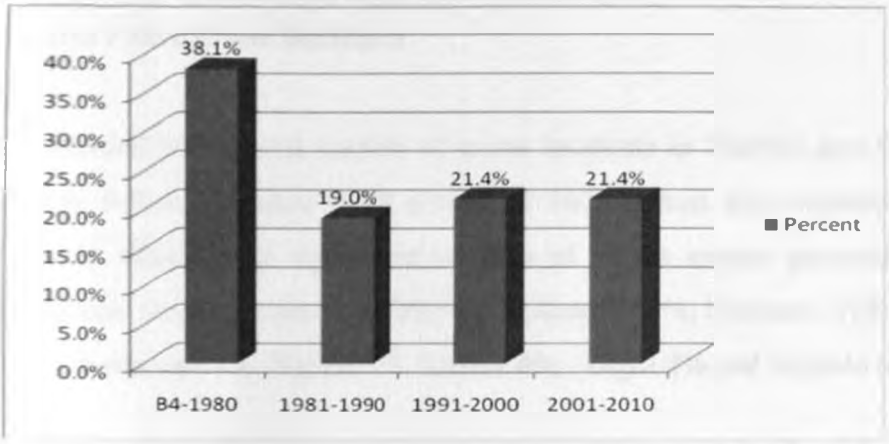
Chart 2: Type of Business Institutions



Years Business/Institution were started

The businesses/institutions where the respondent were interviewed 38.1 % were started before 1980, 19% between 1981-1990, 21.4% between 1991 – 2000 and 21.4% between 2001-2010.

Chart 3: Year Business/Institution were started



Activities carried out by the respondents (Business/Institutions)

Among the activities being carried out by the institution/business 21.4% were government related, 31% in Banking, 19% shopping , 9.5% accommodation, 7.1 % forex exchange, 4 % Gambling and 1% Internet.

Table 4: Activities carried out by the respondents (Business/Institutions)

Business/Institution	Frequency	Percent	Cumulative Percent
Govt_Related	9	21.4	21.4
Banking	13	31.0	52.4
Shopping	8	19.0	71.4
Accommodation	4	9.5	81.0
Forex_Exchange	3	7.1	88.1
Gambling	4	9.5	97.6
Internet	1	2.4	100.0
Total	42	100.0	

5.2 Types of crimes that occur, their pattern and spatial distribution

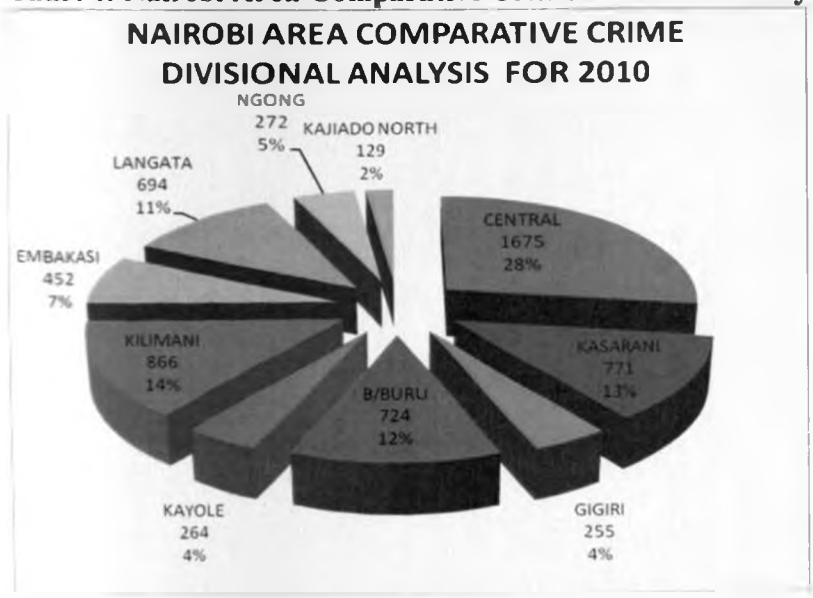
Crime Patterns and spatial distribution

Nairobi Central Business District is currently being policed by Central Police Division and falls under Nairobi Area Police Command. Over the last three years (2008, 2009, 2010) Nairobi CBD which falls under Central Police Division has reported a steady increase in crimes reported from 1168. 1544, 1875 Cases. Stealing contributed to 32% of all the crimes committed, theft by

servant 9%, Breaking /Burglary 8%, Assault 6%, Vehicle and other thefts 6% and Robbery 3%. (Kenya Police Crime Statistics)

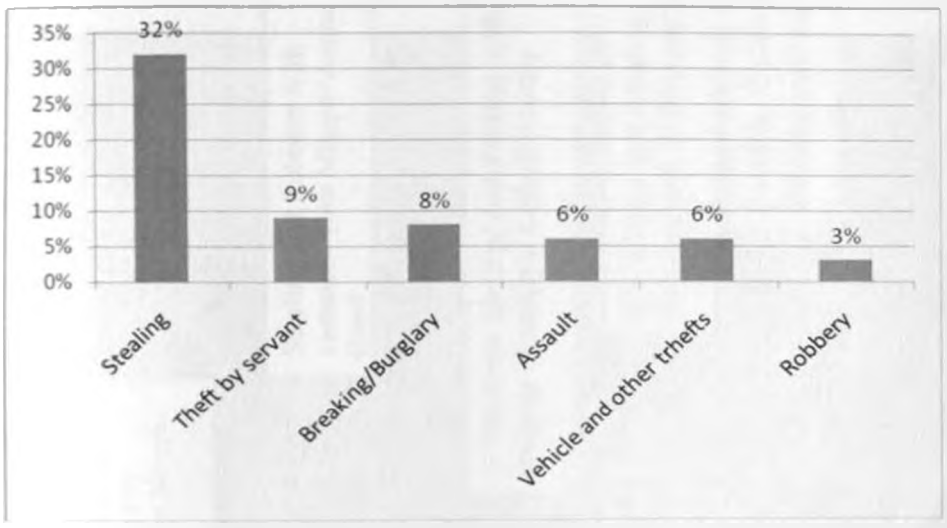
It recorded the highest number of crime incidents in Nairobi area Command according to the Kenya Police Statistics 2010; a total of 1675 crimes were reported out of 6102 reported in Nairobi which is an equivalent of 28% of all the crimes reported in Nairobi. Other Police Divisions recorded crimes as follows;- Kilimani 14%, Kasarani, 13%, Buru Buru 12%, Langata 11%, Embakasi 7%, Ngong 5%, Kayole 4% , Gigiri 4% and Kajiado North 2%.

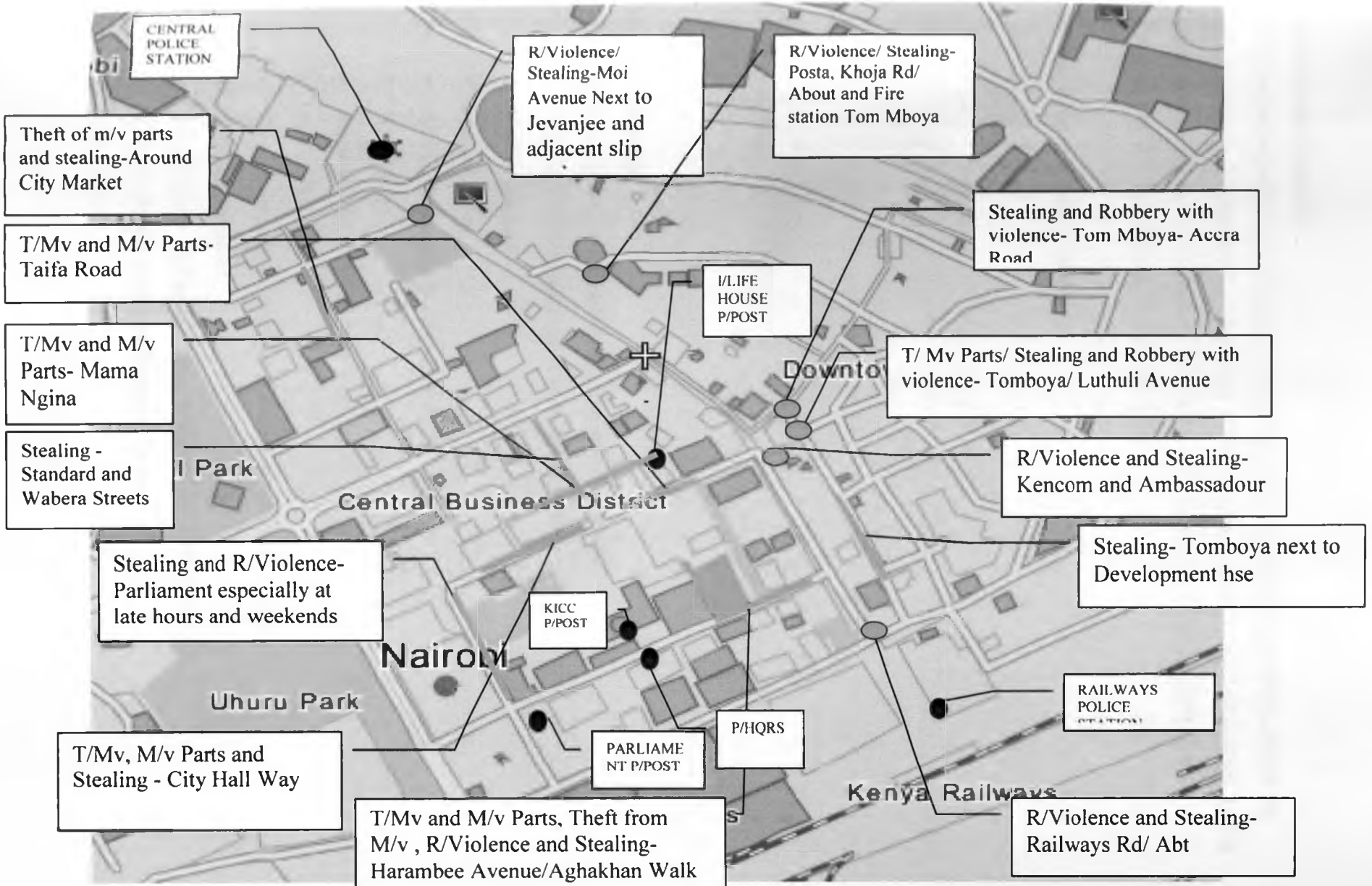
Chart 4: Nairobi Area Comparative Crime Divisional Analysis for2010



Over the last three years (2008, 2009, 2010) Central Police Division reported a steady increase in crimes reported from 1165, 1544, 1875 Cases. Stealing contributed to 32% of all the crimes committed, theft by servant 9%, Breaking /Burglary 8%, Assault 6%, Vehicle and other thefts 6% and Robbery 3%.

Chart 5: Property crimes contribution to all crimes within Central Police Division (2008-2010)



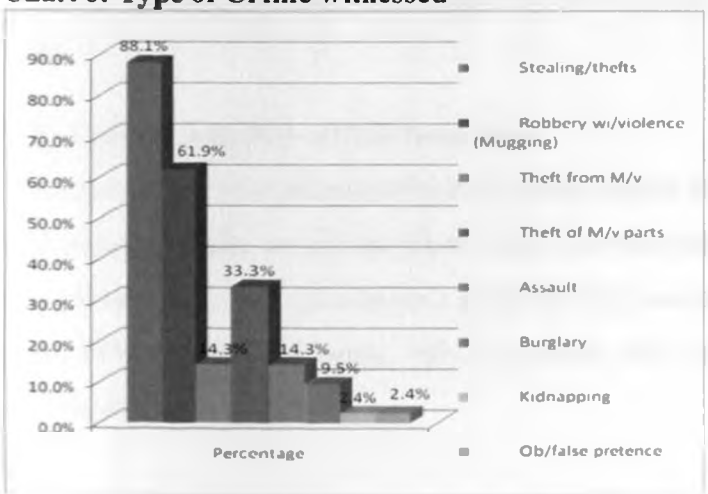


Map 3: Nairobi CBD Hot Spots

Type of crime witnessed

All the respondents interviewed had witnessed some form of crime since 2008 with 88.1% respondents having witnessed stealing/thefts, 61.9% Robbery with violence (Mugging), 14.3% Theft of motor vehicle, 33.3% theft of M/V parts, 14.3% Assault, 9.5% burglary, 2.4% kidnapping and 2.4 % obtaining by false pretence.

Chart 6: Type of Crime witnessed



Location of Crime

The locations crime was witnessed by the respondents include;-

- Along Kimathi Street (near former Nakumatt)
- Next to jevanjee
- City hall Way
- Along Wabera Street (Near Simmers)
- Fire Station
- Railway Round About
- Along Taifa way
- Along Tom Mboya- (Odeon-2, Development House, Afya)
- National Archives
- Agha Khan – Parking, Uchumi Supermarket, Kenya Cinema
- Along Harambee Avenue Opposite Treasury
- Moi avenue

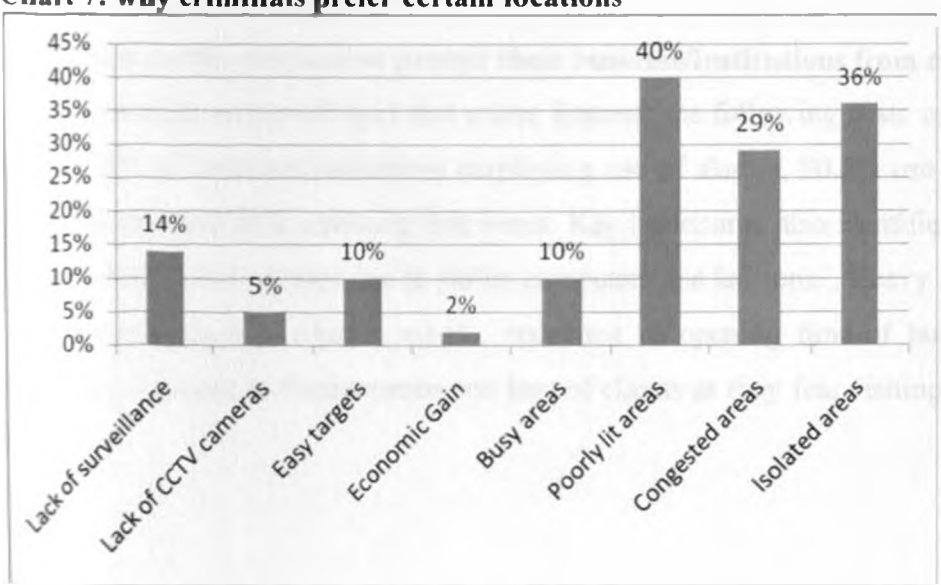
- Near City Market
- Near GPO
- Inside the Casino
- Loita house

Key informants also identified Prevalent areas of crime which include;- Ambassadour, Jevanjee Gardens, Wabera Street, City Market, Kenya National Archives, Biashara Street/Moi Avenue Junction, Kimathi Lane and GPO, Koinange Street, Near Khoja Mosque and Around Hermes Hotel.

Why Criminals prefer certain locations

The respondents were asked if criminals prefer certain locations and 97.6% of the respondents said criminals prefer certain locations while two percents thought otherwise. The respondents also indicated that 40% of criminals prefer poorly lit areas, 36% isolated areas, 29% congested areas, 14% lack of surveillance, 10% busy areas, 10% easy targets, 5% lack of CCTV cameras and 2% economic gain.

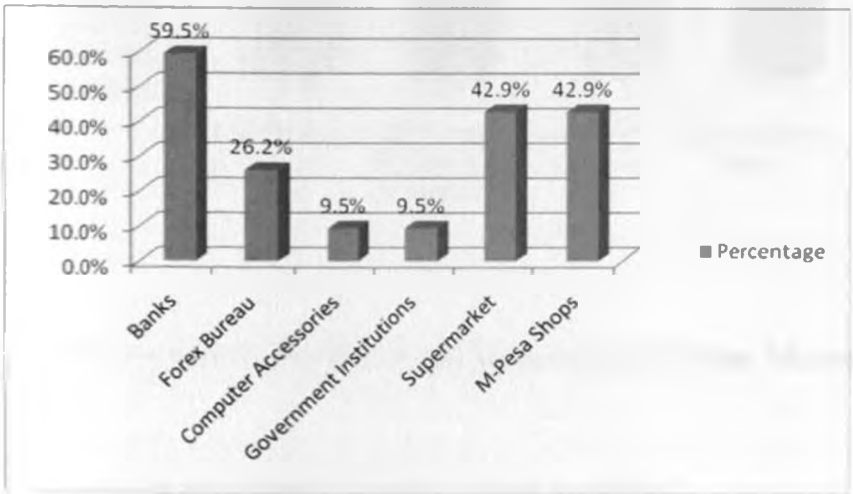
Chart 7: why criminals prefer certain locations



Businesses/Institutions most affected by crime in the CBD

The respondents also identified Business/ institutions that were most affected as follows;- 59.5% banks, 26.2% Forex Bureau, 9.5% Computer Accessories Shop, 9.5% Government Institutions, 42.9 % Supermarket, 4.8% M-Pesa Shops while 14.3% said all business get affected.

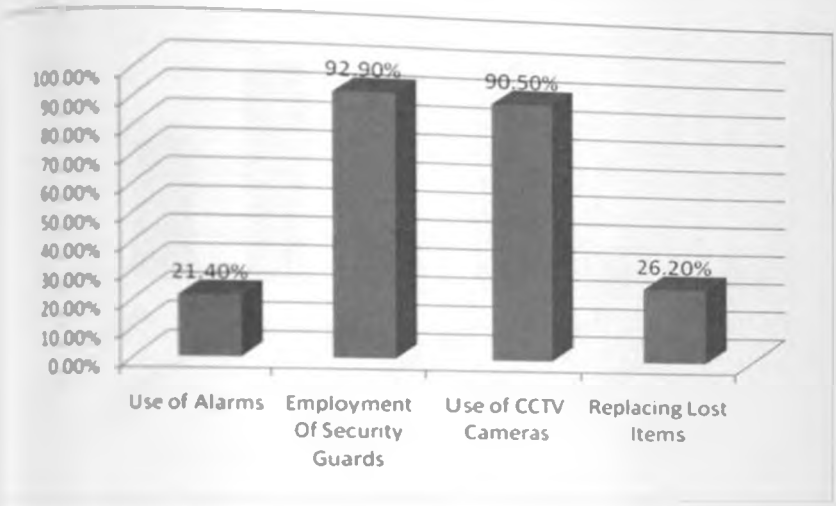
Chart 8: Businesses/institutions affected by crime in the CBD



Costs incurred by business to protect their business/Institutions from crime

The respondents acknowledged that crime imposes the following costs on institutions/business with 92.9% of business/institutions employing use of alarms, 90.5% use CCTV cameras, 21.4 use of alarms and 26.2 replacing lost items. Key informants also identified other costs incurred due to crime as loss of data due to stolen computers and lap tops. , Heavy investment in security (hire security guards, Alarms, e.t.c) , reduction of opening time of business due to fear of insecurity, increase in Maintenance and loss of clients as they fear visiting their premises at late hours.

Chart 9: Costs incurred by business to protect their business/Institutions from crime



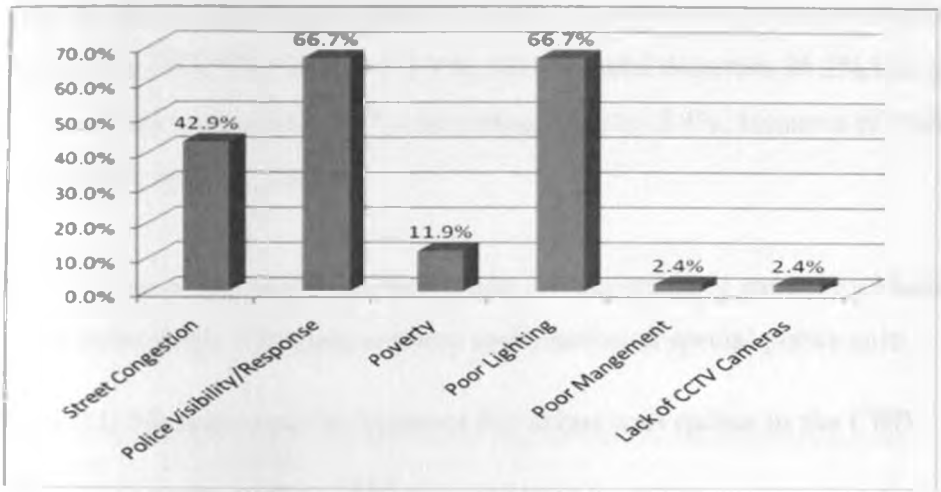
4.3 Factors that Contribute to the Occurrence of Crime Measures/Interventions Put In Place

Factors that contribute to crime within the CBD

The respondents also identified factors that contribute to crime as follows Street Congestion 12.9%, Police Visibility/Response, 66.7 Poor Lighting, 66.7%, Poverty, 11.9%, Poor Management, 2.4% and Lack of CCTV Cameras 2.4%.

Key informants also noted causes of crime as;- High Population, Insufficient police officers, lack of CCTV surveillance, poor lighting, street congestion, poverty, poor planning, unemployment, high cost of living, rising number of street children, corruption, proliferation of firearms , ill equipped police force, rural urban migration, weak laws.

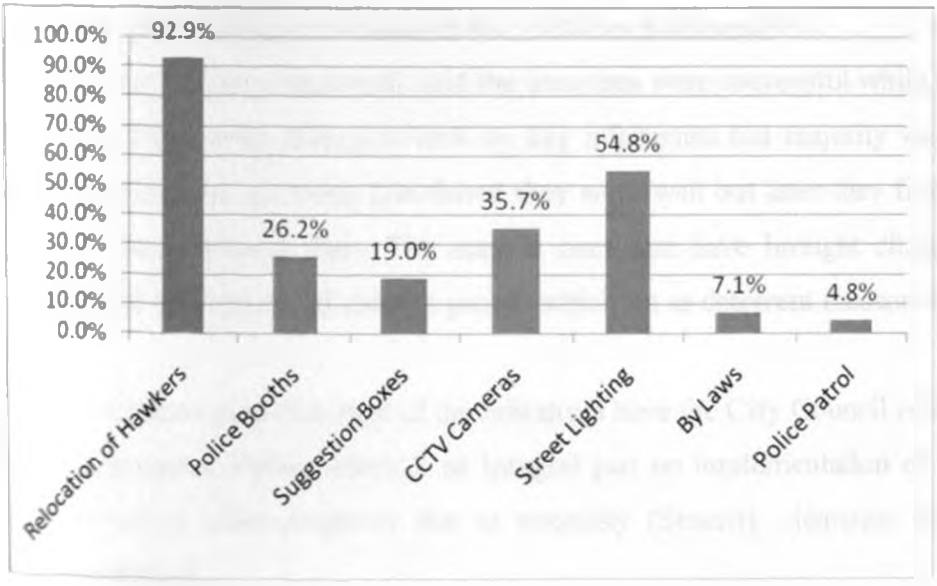
Chart 10: Factors that contribute to crime within the CBD



Crime Prevention Strategies/initiatives that have been put in place

The respondnets noted the following Crime Prevention Strategies having being carried out in the CBD :- 92.9% relocation of hawkers, 54.8% street lighting, 35.7% CCTV Cameras, 26.2% Police Booths, 19% Suggestion boxes, 7.1% By –laws and 4.8% Police Patrols. This was supported by observations made which identified the strategies that have been put in place as relocation of hawkers, police booths, suggestion boxes, street lighting.

Chart 11: Crime Prevention initiatives in that have been put in place in the CBD

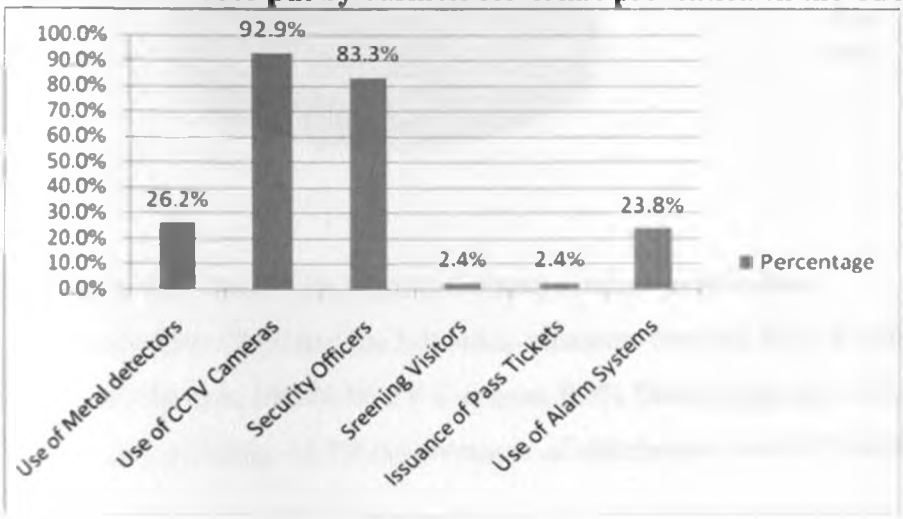


Measures put by Business/institutions for crime prevention in the CBD

The respondents also implemented the following measures in their business/institutions to curb crime:- Use of CCTV Cameras 92.9 %, Use of metal detectors 26.2%,Use of security officers 83.3%, Metal Locks/Grill 40.5%, Screening Visitors 2.4%, Issuance of Pass Tickets 2.4% and use of alarm systems, 23.8%

Key informants also noted others include;- Redesigning of streets e.g Mama Ngina, public-police partnership. Car track services and creation of special police units.

Chart 12: Measures put by business for crime prevention in the CBD



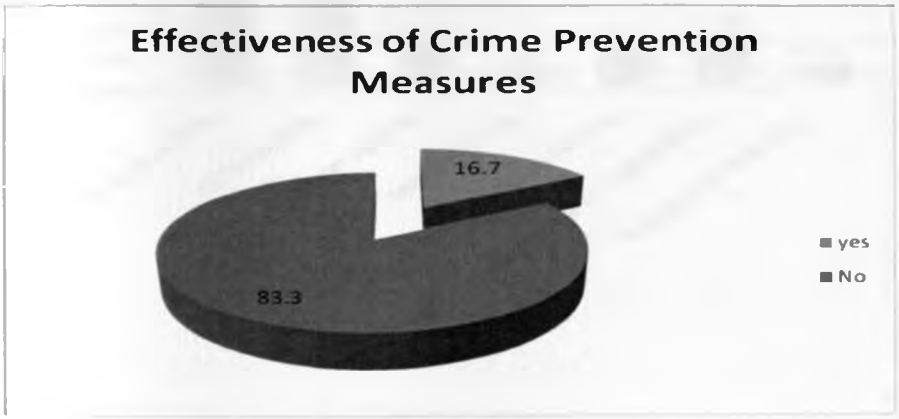
Have the measures/interventions in the CBD been Successful

However **16.7** of the respondents said the measures were successful while **83.3** percent said they were not. There were divergent view by key informants but majority were of the opinion that when the measures are being introduced they work well but later they fizzle out CCTV Camera initiative being among them. The notable ones that have brought change were identified as lighting and deployment of security guards which act as deterrent measures.

Key informants noted that most of the initiatives have the City Council of Nairobi or NCBDA as the lead agencies. Police which is an integral part on implementation of the strategies is often included as an afterthought or due to necessity (Security clearance or personnel to ensure implementation).

Redesigning of public places and lighting has been successful. The Community Policing Booths and Suggestion Boxes are not working with the rest being ineffective. However there is extensive use of inbuilt CCTV cameras in most buildings.

Chart 13: Effectiveness of crime prevention measures within the CBD

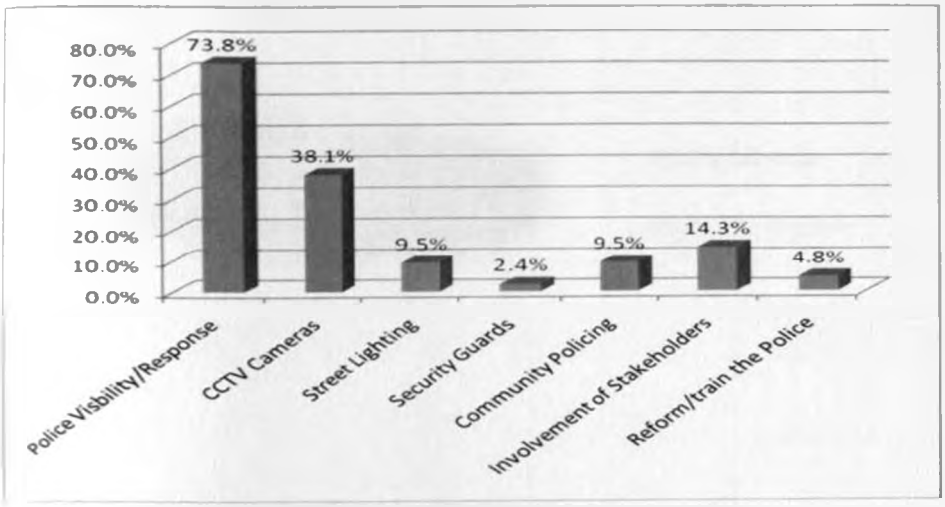


Measures that should be taken to improve crime prevention

The respondents identified the following measures that will help in reducing crime 73.8% Police visibility/response, 38.1% CCTV Cameras, 9.5% Street Lighting, 2.4% Security Guards, 9.5 % Community policing, 14.3% Involvement of stakeholders and 4.8%Reform/train the police.

Others identified by key informants include;- Community policing, public-private partnership, planning streets (pedestranization), Crime prevention through environmental design, creating employment for youths, increase number of police officers, Decentralization of services, removal of street families, Heavy penalties for criminals should be imposed.

Chart 14: Measures that should be put in place for crime prevention



5.4 Extent in use of CCTV cameras in crime prevention

Use of CCTV in crime prevention

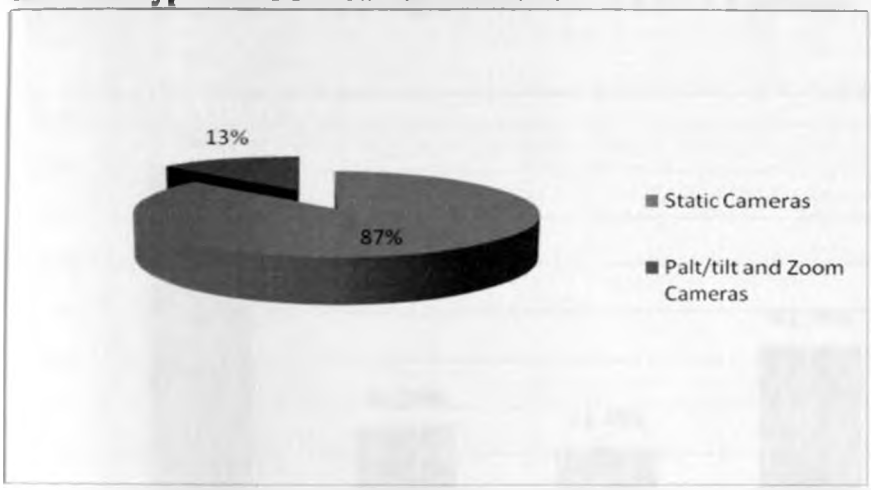
All the respondents said that they had installed CCTV cameras while 95.2% of the respondents were of the view that CCTV cameras help in reducing crime.

92.9% had installed CCTV inside the buildings, 8.1% both inside and outside the building. These places include bus termini, shopping malls, and entrance to buildings, traffic junctions.

Type of CCTV Cameras Installed

92.9 of the respondents had installed static cameras, while 14.3% of the respondents had installed palt/tilt and zoom cameras.

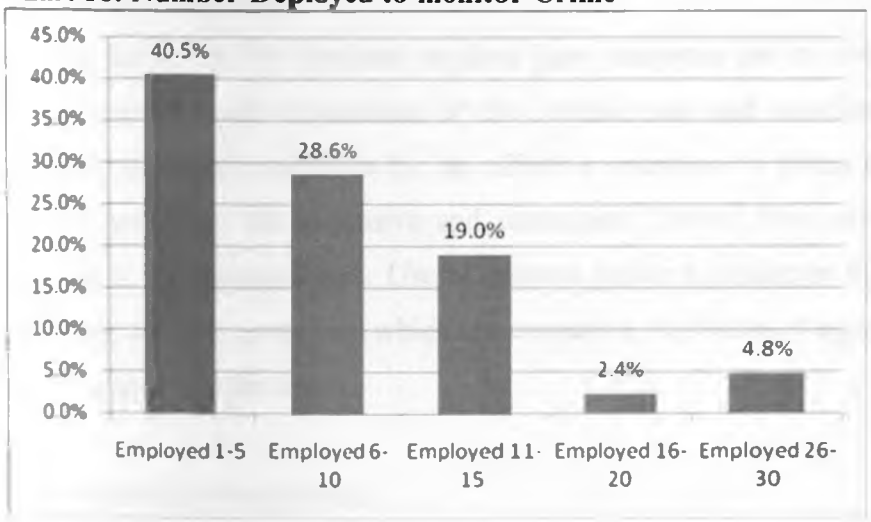
Chart 15: Type of CCTV Cameras Installed



Number of cameras deployed in the Business/Institutions

Institutions/business have deployed the following number of cameras in the operation rooms;- 40.5% have employed 1-5, 28.6% have deployed 6-10, 19% have employed 11-15, 4.8% have employed 16-20, 2.4 have employed 21-25 and 4.8% have employed 26-30.

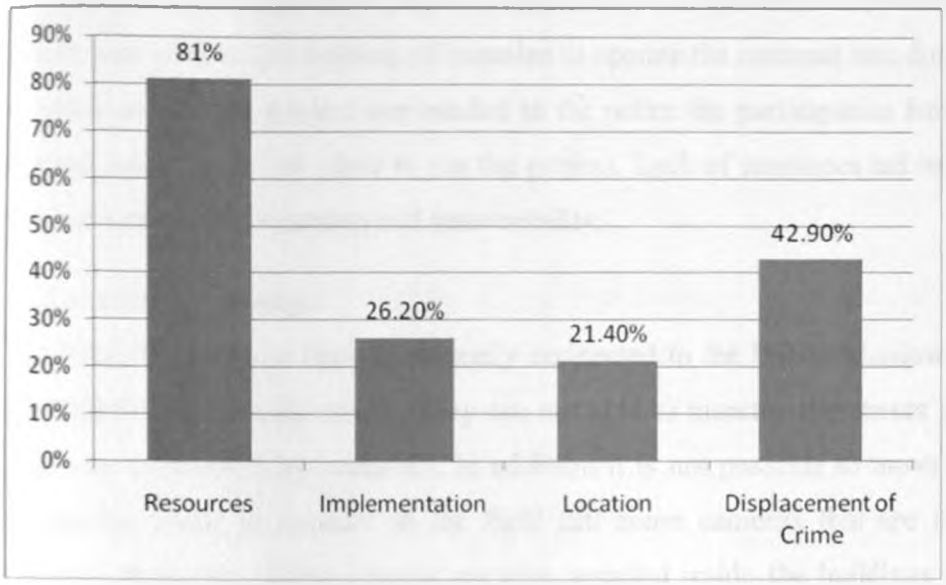
Chart 16: Number Deployed to monitor Crime



5.5 Operational Challenges in the use of CCTV cameras

The following was identified as the operational challenges facing operation of CCTV cameras; - 81% Resources, 26.2% Implementation, 21.4% Location and 42.9%Displacement of crime.

Chart 13: Operational Challenges in the Use of CCTV Cameras



Operational Challenges in the use of CCTV cameras identified include;-

- Lack of Resources

Installation of CCTV Cameras requires huge resources for its successful implementation. In addition the cost of maintenance of the control room and coordination with police personnel requires additional resources for its effective operation in terms of logistic. Bandwidths for internet providers are expensive and inadequate. Use of fibre network for real time images requires a lot of investment. Use of electric power to maintain the system is also expensive including standby generators which are expensive. High cost of equipment is also very high and requires huge investment.

- Stakeholder involvement

Security within the CBD is regarded by most Building owners/Businessmen as the responsibility of the Government. Owners of the premises don't see themselves as a community which needs to ensure that their environment is safe to attract the necessary investment. In addition they are ready to install alarms or employ security guards to protect their business/property and disregard the customer's safety outside the building. Most business owners feel only responsible for their business leaving the buildings to the owners and regard the street to belong to the government

hence not keen in investing in any project. The stakeholders initially who conceived the idea excluded the Police and the City council when the necessary approval needed required the two institution to be incorporated. The two institutions had and their contribution on planning of the project was minimal i.e training of consoles to operate the cameras was done in a hurry.
In addition once the project was handed to the police the participation from stakeholders fizzled out and police were left alone to run the project. Lack of resources led to stalling of the project hence affecting its expansion and sustainability

- Location of Cameras

The Butterfly cameras that are currently connected to the Police Monitored System are located too high for monitoring traffic. They are not able to monitor the streets where the users of the street are victimized by criminals. In addition it is not possible to move the cameras from the monitoring room in contrast to the Palt/ tilt/ zoom cameras that are installed at the Kenya National Archives. Most cameras are also installed inside the buildings and don't monitor the outside environment leaving the customers in the open away from surveillance. The inbuilt cameras also are located at the ground floor at the entrance of buildings leaving the other floors not under any surveillance.

- Communication

There is only one centralized monitoring room at Nairobi Area Police Headquarters. These only allow information to be passed from officers from a central command to other commands. The officers use radio calls to inform officers of an incident and description of a suspects to be arrested. The field officer has no visual image of the suspect, at times this leads to the arrest of the wrong suspect is slow and further to that the officer on patrol has to be described the suspect he is to arrest.

- Lack of Specialized Personnel

Police officers stationed at the consoles were initially trained. However with frequent transfers in the police the officers replacing them only learn how to operate the cameras through on job training. The officers lack therefore lack the necessary training to effectively perform their duties.

- Tracing Suspects

A major problem is tracing suspects from images by the police for arrest. This mainly happens because the police don't have a database with records (Biometrics) for tracing suspects on CCTV footage. The police have to wait for help for the members of the public by putting the images in the press which rarely leads to arrest of the suspects.

- Vandalism of Cameras

The system design was affected by loss of dome cameras at National archives in the year 2010 hence the cameras remaining were static hence no ability to zoom and monitor the streets effectively with static cameras.

5.6 Summary of Findings

The study found out that property crimes are the most witnessed incidents by the respondents. This is evidence by criminal activities are still being committed within the CBD. They include Robbery with violence (Mugging), Theft of Motor Vehicles, Robbery, Burglary, Stealing (Petty Thefts), Theft of M/v Parts and Obtaining by pretences. This is supported by UN Habitat Victimization survey in 2001 which identifies robbery, assault and burglary as the most prevalent crimes within Nairobi. The Global human settlements report and Kenya Police Statistics also indicate property crimes as the most prevalent crimes in the CBD. This indicates that there is need for the city to come up with a comprehensive measure in order to manage crime within the CBD.

The study also established that 14% prefer certain locations due to lack of surveillance and 5% due to lack CCTV cameras as one of the critical components while 40% due to poor lighting, 39% isolated areas, 29% congested areas 10% easy targets. This finding is supported by Cohen and Felson, 2009 (Routine Activities theory) who indicate that a motivated offender must have a suitable target and a time and place lacking guardianship. This is despite crime prevention initiated in the CBD by the City council in collaboration with other stake holders. Therefore for crime prevention measures to be put place there is need for a coordinated approach involving the redesign of the environment and increased surveillance. Guidelines for the UNODC handbook can also be adhered to which include;- Government leadership, Cooperation and partnership,

sustainability and accountability among others as methods of ensuring crime prevention methods are successful.

The study noted that 92.9% and 90.5 % of businesses within the CBD employ the use of Security guards and CCTV surveillance. These findings can be evidenced by the ever increasing number of private security and CCTV cameras hence business incurring extra costs in the operating their business to protect their premises and attract customers. This finding is supported by the UN Habitat, 2007 report which identifies the growth of private security and diversion of investment towards public and private security.

The study also found out that 66.7% of the respondents attribute lack of police visibility and response contribute to increase in crime. This shows that the police officers play a critical role in enforcement of crime. However there is need to find better methods to make them efficient in crime response which can be done through use of CCTV cameras. This is supported by ECK, 1995 who states that if CCTV operates as a guardian, offences against targets should be reduced. Clarke and Homel, 1997 concept of CCTV as crime prevention mechanism also supports the need to have CCTV as crime prevention tool that can prevent crime by altering the environment.

Other factors that contribute to crime include Poverty, poor management, proliferation of firearms, unemployment. This is supported by Kahn, 1999 who identifies economic factors such as unemployment, low wages, social gap among the rich and the poor and an explosive combination of modernization and fast urbanization as some of the factors that contribute to crime in urban areas. This indicates that to address crime there is need to address economic and social aspects of the population for them to be able to engage in gainful employment. In addition management of the built up environment in terms of CCTV cameras, lighting, improved police visibility, decongestion of streets among others need a coordinated approach by the relevant stakeholders. One agency cannot be left to address crime prevention but there is need to involve the whole community.

The study also found that relocation of hawkers and street lighting as the most popular crime prevention measures taken in the CBD with 92.9% and 54.8% of respondents respectively being

aware of them. The findings are supported by the Salama Newsletter report which indicated relocation of hawkers and street lighting as some of the crime prevention measures put in place. However 16.7% said the measures were not effective due to fizzling out of the initiatives i.e for the case of lights not being functional or poor maintenance. This indicates that the City council has to adopt measures to ensure sustainability of the projects.

The study found out that 92.9% of the respondents had installed CCTV cameras inside the buildings while 19% had installed them outside the building. This shows that there is need to install CCTV cameras outside the buildings where most of the crime is witnessed. The Location theory by Assink and Groenendijk, 2009 also indicate that environment and safety as more decisive location choices for entrepreneurs hence the need to ensure the outside environment is secure by installing the cameras on the streets in order to increase opening hours for business and attract customers due to security. Crowe, 2000 also asserts that proper design and effective use of built environment can lead to reduction in the fear and incidence of crime.

Chapter 6: The effectiveness of CCTV Cameras and Policy Guidelines

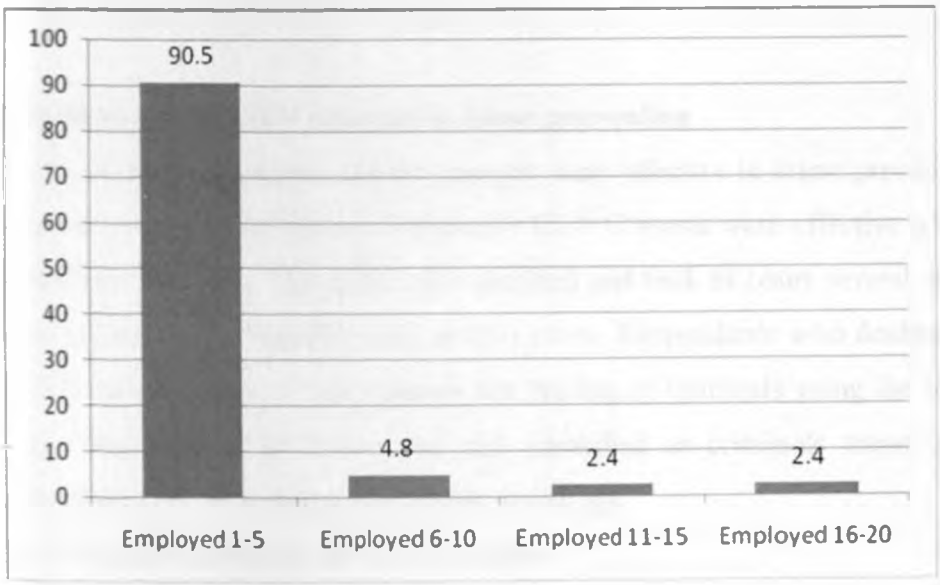
This chapter covers finding and data analysis on effectiveness of CCTV in crime prevention, policy guidelines required for effective use of CCTV Cameras and CCTV observation from Nairobi area CCTV room to determine its effectiveness.

6.1 Effectiveness of CCTV Cameras in Crime Prevention

Number of operators/consoles deployed in the monitoring rooms

Institutions/business have deployed the following number of operators in the monitoring rooms;- 90.5% have employed 1-5, 4.8% have deployed 6-10, 2.4% have employed 11-15 and 2.4% have employed 21-25.

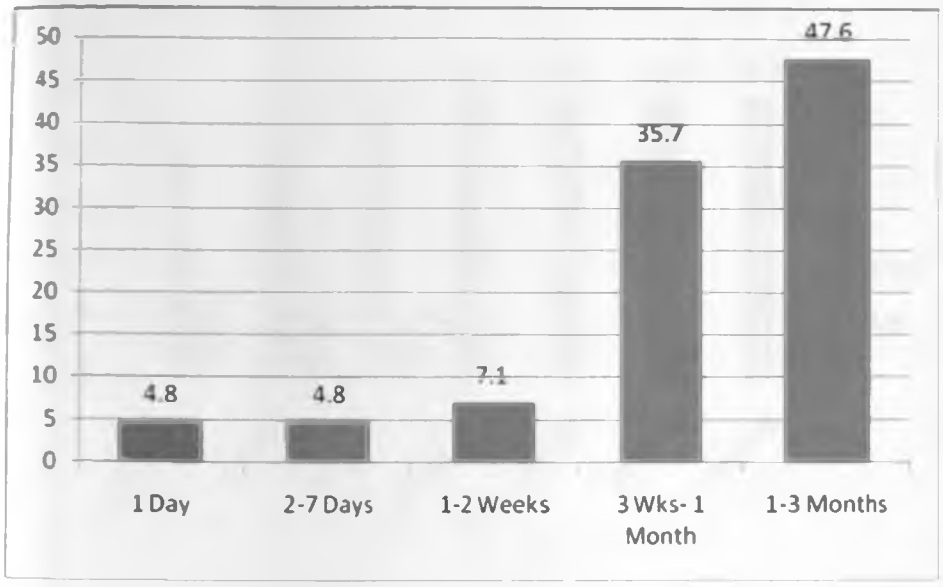
Chart 17: Number of Operators Monitoring Cameras



Storage capacity of the servers

The storage capacity of the server of the institutions/businesses was as follows;- 4.8%1 day, 4.8% 2-7 Days, 7.1% 1- 2 weeks, 35.7% 3 wks- 1 Month and 47.6% 1-3 Months.

Chart 18: Storage Capacity of Servers



Effectiveness of CCTV cameras in crime prevention

85.7% of the respondents said the cameras were effective in crime prevention while 14.3% said they were not. Key informants indicated CCTV Cameras were effective where it was installed as a deterrent measure. The police also arrested and took to court several suspects arrested using their system at the Nairobi areas control room. Respondents who doubted the effectiveness of CCTV cameras were of the opinion that tracing of criminals using the images captured is not easy. Displacement of crime was also identified as criminals move to other areas due to surveillance (From inside to outside the building).

Chart 19: Effectiveness of CCTV cameras

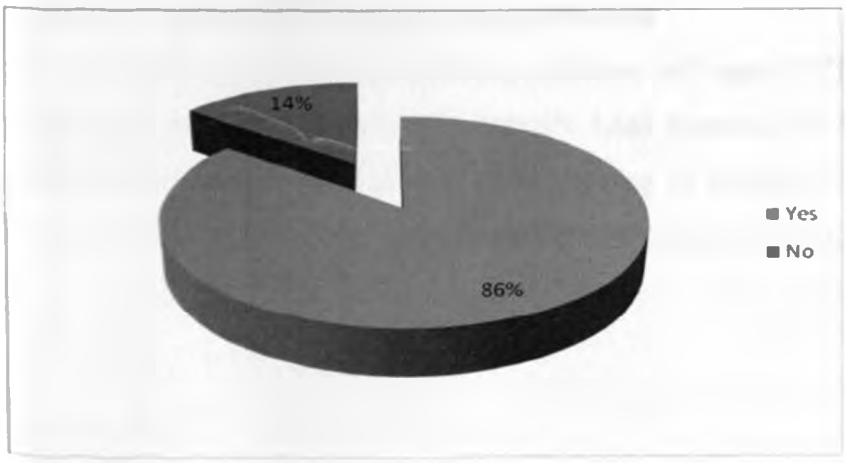
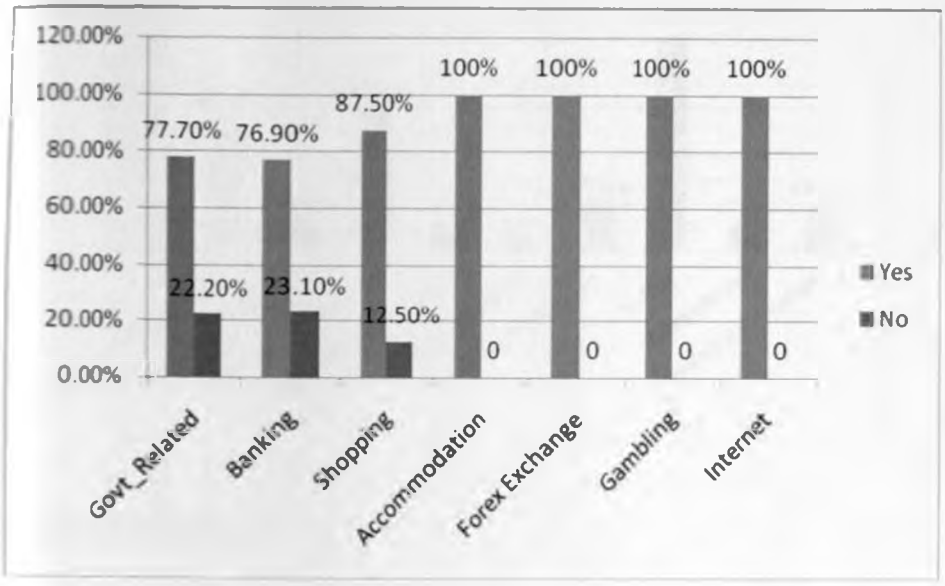


Chart 20: Effectiveness of using CCTV cameras among institution



77.7% of Government Related institution said the cameras were effective with 22.2% said they were not. Among banking institutions 76.9% said they were effective while 87.5% of shopping business said 87.5% that the cameras were effective. All respondents from Accommodation, Foreign exchange, Gambling and Internet activities said the cameras were effective.

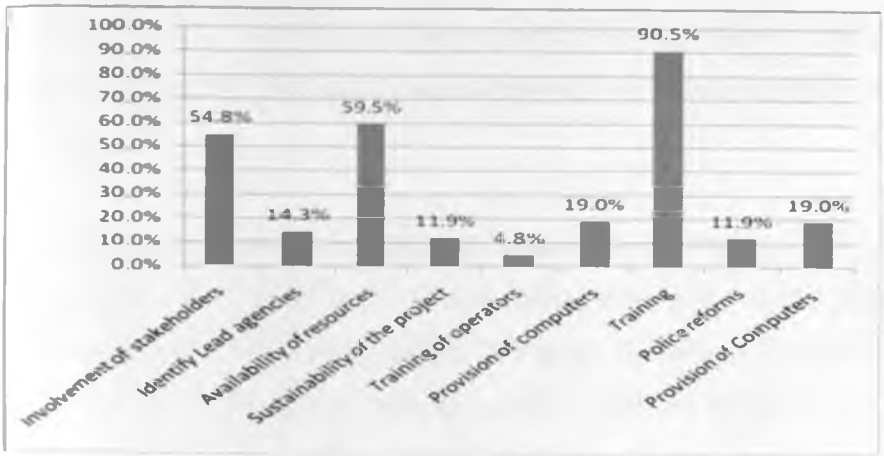
Preferred Location of installation of CCTV cameras

97.6% of the respondents were of the opinion that CCTV cameras should be installed both inside and outside the buildings.

Measures to make CCTV cameras more effective

The respondents suggested the following measures will make CCTV cameras effective;- 54.8 % Involvement of stakeholders 14.3% Identify Lead agencies, 59.5% Availability of resources, 11.9% Sustainability of the project, 4.8% Training of operators, 19% Provision of computers, 90.5% Training, 11.9% Police reforms and 19.0%Provision of Computers

Chart 21: Suggested measures to make CCTV cameras more effective



Hypothesis Testing

The null hypothesis stated that CCTV Cameras have not contributed to crime prevention within the Central Business District. To test this hypothesis a question was posed if CCTV was installed in the premises and another question if the cameras were effective in crime prevention where installed. A Pairwise T-test was carried out and the following results generated using SPSS.

```
T-TEST
 PAIRS = Q22 WITH Q28 (PAIRED)
 /CRITERIA = CI(.95)
```

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Q22	1.02	41	.156	.024
	Q28	1.15	41	.358	.056

Paired Samples Test

		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Q22 - Q28	-.122	.400	.062	-.248	.004	-1.954	40	.058

Table 5: Paired Sample T-Test

There test of the hypothesis using a two tailed test shows that the result figure of 0.058 is outside the critical area i.e -2.48 to 0.04 hence reject the null hypothesis and accept the Alternative hypothesis that CCTV cameras has contributed to crime prevention where the cameras have been installed.

This is supported further by those who knew the existence of the open street CCTV cameras at National Archives CBD with 47.6% saying they were aware effective with the area around national archives registering crime reduction. However issues of displacement of crime were noted as some of the major challenges and coverage of the cameras was limited in a small area.

6.2 Policy Guidelines

The policy guidelines suggested by Key informants include;-

- Installation of CCTV Cameras should be guided by a law this will take into account
    - Issues of privacy,
    - Warning signs at all CCTV monitored areas.
    - Confidentiality of information
- Guiding framework for the effective operation of CCTV cameras, this must incorporate all stakeholders including private security providers and building owners who are a separate entity from the institutions..
- Design of an effective model of CCTV operation within the CBD

6.3 CCTV Observation at Nairobi area CCTV Control room

Design Standards

The CCTV system uses IP static and pan, tilt & zoom cameras, which have been mounted on the outside of Kenya's National Archives Building;-

- offering a bird's eye view of the adjoining streets and surrounding areas.
- All video images from the eight cameras are recorded in high resolution to hard disk drives, and can be easily retrieved to provide evidence of any suspected criminal activity in the area.

- The control room boasts a Bosch VJ8008 1TB image storage system, together with LCD screens for monitoring and Sicura System's DigiFend NVR video management software. DigiFend was selected because it can incorporate video help points and automatic number plate recognition, all key requirements for the future.

The Cameras overlooks the following locations;-

- Moi Avenue and its intersection
- Tomboya Avenue.
- Railway Round About
- Taifa Road
- University way near central Police including Globe Cinema Rd About
- Kencom Bus Station along City Hall Way
- The Ambassador Bus Stop on Moi Avenue
- The Fire station (Matatu Terminus)
- Harambee Avenue next to National Bank
- Kenyatta Moi avenue

The Authorities are able to monitor movement and activities of the people in the coverage area. This assists in alleviating traffic congestion management in the CBD where the authorities have a view of the area.

Monitoring Operation

The monitoring room is located at Nairobi Area Provincial headquarters which is approximately 2 Kilometers away. The monitors allow recording for 24hrs a day. Images older than one month are routinely archived off the system by the control room operators.

The control room has an access control system fitted to restrict access to unauthorized personnel and the relevant law enforcement agency. 2 monitoring 17 inch flat monitors were acquired in addition to the large screen monitor.

Control Room

- Control room is remote away from operations and reaction teams
- Control room to communicate with reaction teams allowing for dispatch by control room, and monitoring and control incident response as necessary
- Large enough to cover requisite console and staff estimate at 10 staff.

Monitoring

The main characteristics of the monitors is that they display and records videos from each camera simultaneously and outfitted with the last open architecture hardware and software to allow for future upgrading /expansion of the system.

The 360° degree base system receiving equipment was installed to enable communication with each intersection PTZ camera installation.

- Computers have been installed with CCTV image display and recording software.
- High definition rear projection for computer displays camera selection.

Software

The information display;-

- The CCTV images are displayed on large 70° rear projection screens to ease operation..

Operators and Supervisors Training

A series of training was offered to 26 control personnel who included operator and supervisor training however more than half have been transferred to work in other areas except two.

Systems Flexibility

As the system is based on open architecture principles, the system expandability and flexibility is almost limitless. It is able to integrate other roadside traffic devises such as speed detection equipment, traffic lane control signs, red light detection units is possible.

Capabilities

All field equipment have at least 2hrs UPS power supply

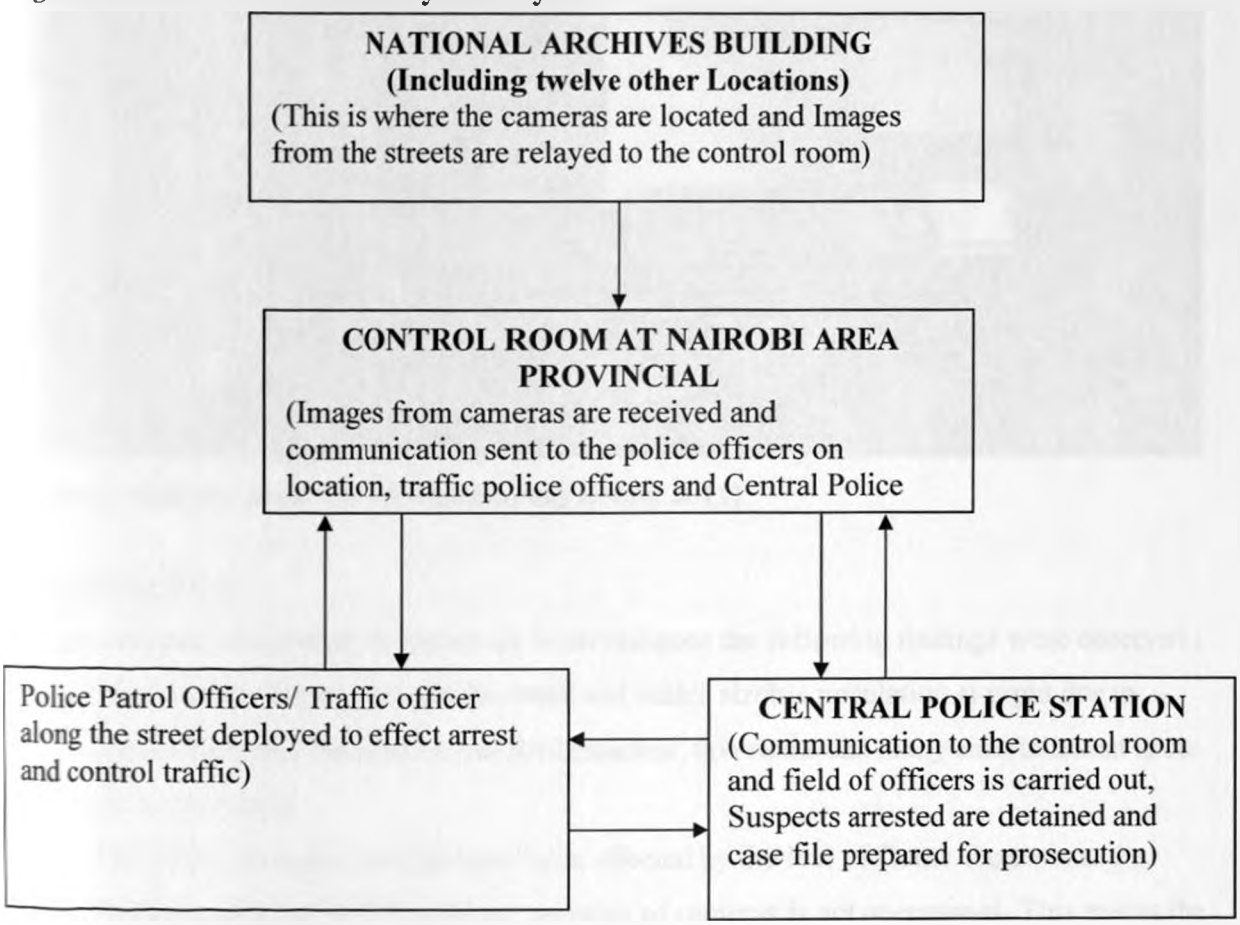
Type of network (Transmission equipment)

- Based on a data network provided by Kenya Data Network, with dedicated IP address to each field equipment station
- allows the instantaneous telemetry with less than 5ms latency
- Lighting protection and earthing of at least 0.001 ohms and covertly installed (In trenches) as required

Storage retention (Recording)

- Based on digital recording system allowing for a minimum of 21 days recording per camera

Figure 2: The CCTV Camera System layout



According to observations made from the Nairobi area CCTV Unit from three locations (Moi Avenue around National Archives, Harambee Avenue, Tomboya Street), the common type of crimes detected include;-

- Illegal collection of money
- Mob Injustice
- Causing obstruction
- Accident Scenes
- Procession and demonstrations
- Illegal gatherings
- Invasion of street by hawkers

- Traffic congestion
- Drunk disorderly
- Stealing

Photo 2: Monitoring Cameras at Nairobi Area Control Room

(Source: Nairobi Area CCTV Monitoring Room, 2011)

National Archives

The area around is crowded; though there is surveillance the following findings were observed ;

- The location is busy thought the week and with a sizable population at night due to proximity to the bus terminus at Ambassadour, taxi ranks and many entertainment spots around the area.
- The Palt/Tilt Zoom cameras have been affected by the loss of Dome Cameras at the National archives Building hence zooming of cameras is not operational. This makes the cameras are static hence unable to follow suspects.

Harambee Avenue

- The area is busy during the week with less number of people using the street over the weekends.
- The cameras cannot identify crime occurrence and criminals due to the location of cameras
- The butterfly cameras have been installed and can only be used for traffic regulation and not for crime prevention.

Photo 3: **Harambee Avenue from Butterfly cameras installed**

(Source: Nairobi Area CCTV Monitoring Room, 2011)

The following findings were common on observation made from the same monitoring room at Nairobi Area for National Archives and Harambee Avenue;-

- The current number of personnel observing the monitors are few considering the number of locations
- The observer consoles spend atleast six hours which is long for concentration
- The communication method used to pass information to the police is not efficient i.e the police have to be communicated through radio and described for the suspect leading to arrest of wrong persons.
- There is no data bank for tracing images captured with cameras hence relying on actual arrest or posting on daily papers
- The cameras cover a small areas and police response at times hampered due to lack of vehicles and number of uniformed officers deployed to man a street.

6.4 Summary of Findings

The study found out that 92.9% of CCTV cameras installed are static which indicate the need to adopt Palt/Tilt and Zoom cameras which are more flexible e.g tracking of suspects.

90% of the Businesses/ Institutions indicated that they had employed between 1-5 people to monitor the cameras

85.7% of respondents were of the opinion that the CCTV cameras were effective. This is supported by Short and Ditton, 1998 and Tilley, 1993 who state that offenders were deterred and view CCTV camera as a threat. However 14.3% of the respondents were of the opinion that the CCTV cameras were not effective. They attributed their reasons as tracing of suspects after retrieval of images is not easy and displacement of crime.

In addition the storage capacities of the cameras were excellent with 47.6% having between one and three month's storage capacity and 35.7% having between three weeks and 1 month storage capacity. However from the study only four institutions were able to show the existence of an monitoring room with most depending on the storage of images for retrieval when incidents have been reported especially in banks (ATM Machines).

Training of police has been identified as a critical component by the study with 90.5% of the respondents who were of the view that for CCTV cameras to be effective the police need to be trained on the use of the cameras. Availability resources were also identified as a critical component in ensuring CCTV cameras become effective.

The study observed that narrow and curved streets make it difficult to follow suspects using CCTV cameras. In addition the congested streets, entrance canopies into buildings and the building design make it difficult to observe or follow a suspect. The study found out that for open street CCTV to observe the pedestrian walkway one has to set the camera at the opposite building which is further hampered by the height of the canopies which is low.

The study also noted that there are no existing policy guidelines on CCTV management in the Country which should set out values and conditions that should apply in the operation of CCTV Schemes.

The study observed that the CCTV cameras installed at the Nairobi areas control room was of the required design standards. However the communication to field officers is ineffective with few officers monitoring the system. There is need to expand the system by building more control rooms install and more cameras for crime prevention.

Chapter7: Conclusion and Recommendations

7.1 Conclusion

Urban development will grow both in numbers and size. This growth poses a challenge to the police in effecting policing. However adoption of modern technology i.e CCTV cameras in policing will ensure that insecurity within the urban centres are managed effectively with increased detection and prosecution of criminals. Planners should therefore endevour to ensure that Street designs and building design help to improve visibility and improve circulation within an urban environment.

The CCTV cameras helps in monitoring and controlling movement of vehicular traffic through pedestrian ways and streets, tracking and recording the movement of undesirable persons and their vehicles, increasing confidence of foreign investors and tourist in the country thereby increasing revenue propensity and improving the performance of the law enforcement agencies in crime detection and prevention.

Participatory planning is important to have a sustainable CCTV project within the Central Business District. The time factor in planning is also important because most variables are not static. The more they vary the more our plans become absolute and the need to re-plan. Hence planning is cyclic in nature and very dynamic.

7.2 Recommendations

- Planning should endeavor to improve visibility to reduce the opportunity for occurrence of crime, improve guardianship by use of CCTV Cameras and improve circulation.
- Street design should incorporate the use of CCTV Cameras by designing wide streets which allow for monitoring of wider areas hence more effective in observation and arrest of suspect's/offenders.
- Create landscape designs that provide surveillance, especially in proximity to designated points of entry and opportunistic points of entry.
- Building designs should be designed to incorporate the use of CCTV especially the canopies at the entrance of buildings and the design of the pedestrian pathways effectively monitor these spaces.

- Location is an important component and is need to carry out an assessment of the area before installation CCTV cameras in conjunction with the local police and representatives of local community for Open street CCTV Cameras. Consideration should be given to the nature, type and volume of crime which should also include the situational and environmental factors which appear to contribute to the criminal activities. In addition possibility of displacement of crime should be considered and priority given to;-
  - Identified crime hot spots
  - ATMs and Banking institutions
  - Bus stops, taxi ranks, car parks and railway stations
  - Community facilities including toilets, telephones e.t.c
  - Places frequented by potentially at risk groups such as the young people.
- Massive resources required for an effective CCTV system, there is need to incorporate all stakeholders when undertaking this kind of project for it to be successful. The high initial costs i.e approximately Kshs 6 Billion (600 Million Rand in Johannesburg Project) in comparison to Kshs 70 million by the NCBDA is like a drop in the ocean. Stakeholders should try and come up with ways of attracting investors in this type of projects to assist the government by rewarding camera sponsorship and charging some fee for the services. There is also need for marketing of the success of the project in order to attract investors and other proprietors i.e keeping the people informed, Rewarding camera sponsorship, get media on board and Website for awareness. There is also the need to identify all the relevant stakeholders in the initial planning rather than incorporating them in the middle of the project. This will save a lot of time and money because project delays require re-planning which is double work.
- CCTV project design is usually undertaken by experts but there is need to incorporate the community we are planning for (Building owners and proprietors). Community participation should be involved in decision making when a CCTV scheme is being implemented. This will enable the community to voice its concerns about the proposed scheme. This should include current prevalent crime areas, objectives of the program, any alterations on the environment required for the functioning of the program and avenues to which complaints about the operation of the program may be lodged.

- NCBDA be tasked with encouraging building owners to acquire cameras to be connected to the Police CCTV system for wider coverage to offer surveillance for their buildings and make their premises attractive for business. There is also need to educate businessmen on the need and effective use of CCTV Cameras where there are being used to cover the interior of the building. There is also the need to connect their CCTV systems to a wider police system for improved security.
- For effective communication a CCTV scheme control rooms should be placed at all police stations within the Central Business District and should be supported by vehicles fitted with CCTV system with the Police having a system of patrolling the city. (The design should follow the South African Model of CDMA to enhance visualization of the area of incident in the patrol vehicles) There also need for a reliable network provider and fiber cable connected to obtain real-time images.
- There is need to train personnel who will monitor the cameras at the control rooms and set standards for minimum number of consoles at any particular time. Retention of officers trained in the case of the police officers who are frequently transferred should be looked into to encourage professionalism.
- There is need to build a database with records (Biometrics) to enhance tracing of suspects. There system should also be linked with other systems e.g for tracking owners of vehicles from number plate identification.
- Security of cameras should be paramount due to the nature and cost of the equipment. If the cameras have to be located at lower points they may be prone to vandalism.
- Policy guidelines should be developed by the government to provide a policy framework and a set of underlying principles to assist agencies considering CCTV schemes as a response to local community safety concerns. The guidelines should provide;-
    - a clear statement of the Government's policy on the appropriate establishment and use of CCTV schemes
    - a set of principles underpinning the policy which sets out the values and conditions which should apply to the operation of CCTV schemes.
    - the steps which local councils, transport authorities and other organisations should take when considering establishing and implementing a CCTV scheme
    - the issues relating to privacy and liability which need to be considered

- some information on the technical factors which will need to be considered in establishing a CCTV scheme
- some information on Code of Practice, Protocols and Standard Operating Procedures which should apply to operating schemes.

- An institutional framework with an effective organizational structure clearly identifying the roles of key players can enhance stakeholder involvement. E.g
  - **City Council of Nairobi** should be the owners of the system as they play a key role in coordination of all local authorities program. Local councils should be responsible for the following key functions:
    - implementing a comprehensive consultative program with business groups, individuals and cultural/community groups affected by the program
    - implementing a community information program
    - implementing and monitoring the auditing procedures for the implementation of CCTV as a crime prevention strategy
    - developing and implementing an effective complaints handling mechanism
    - developing, in consultation with other key stakeholders and the CCTV Committee, a Code of Practice, Protocols and Standard Operating Procedures with other agencies in relation to their roles in the CCTV program
  - **Law Enforcement Agencies (Kenya Police)** - Police is mainly tasked with maintenance of law and order and is the lead agency in security. By involving the police they should be given a major role in;-
    - hosting the control rooms and provision of personnel to effect arrest of criminals.
    - providing information for and advice on the crime assessment
    - working with the local council to develop Codes of Practice with other agencies in relation to the conduct of the CCTV program
    - developing, in consultation with the local council, Protocols and Standard Operating Procedures between police and the local council in relation to their respective roles in the program
    - training local police in their responsibilities in relation to the CCTV program as set out in the Code of Practice, Kenya Police Service Standard Operating Procedures

- ensuring personnel compliance with the Code of Practice, Kenya Police Service Standard Operating Procedure
- participating in the evaluation and monitoring processes for the CCTV program
- determining the appropriate level and priority of responses required to incidents identified by the CCTV cameras, according to available resources and existing priorities.

- The CCTV system should also be expanded to cover the wider Nairobi i.e Potential customers- Embassies, Government offices, Banks, Hotels e.t.c. This system can also be replicated in other major towns i.e Mombasa, Kisumu, Nakuru, Jomo Kenyatta International Airport, Moi International Airport, Kilindini e.t.c.
- There is need to enact laws that will regulate installation of CCTV Cameras within the City and the rest of the country to cater for issues relating to privacy and the purpose for which the information is being obtained to be known.
- We should endeavor to incorporate the social component in our planning. While it is easy to calculate the economic cost the social cost is omitted in terms of privacy and handling of information.
- CCTV Cameras-Displacement of crime should be considered as an area for further research

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Appendices

Appendix One

Table 6: Crime Template (Frequency)

Place	Type of Crime	Day	Night	Total

Appendix Two

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

M.A PLANNING RESEARCH PROJECT

AN EVALUATION OF CCTV CAMERAS IN CRIME MANAGEMENT

A CASE STUDY OF NAIROBI CENTRAL BUSINESS DISTRICT

Questionnaire for Businesses/Institutions

Declaration: The information obtained is purely confidential and will be used for academic purposes only

Name of Interviewer: .....

PART A

Background Information **Category: ------- / ----------**

1. Respondent Name ..... Position .....
2. Name of Business/Institution .....
3. Year of Institution/Business Started

   a) before 1980 b) 1981-1990

   c) 1991-2000 d) 2000- 2010
4. Physical location of Institution/business?

   .....
5. Type of Business?

   .....
6. Activities/services rendered?

   .....
7. Number of Workers?

   .....

PART B

Types of crimes that occur, their pattern and spatial distribution

8. Over the past five years (since 2008), have you witnessed or experienced any form of crime within the Central Business District?
   a) Yes b) No
9. What type of crime did you experience/witness?
   a) Stealing/theft
   b) Robbery with violence/mugging
   c) Theft from motor vehicle
   d) Theft of Motor Vehicle parts
   e) Assault
   f) Burglary
   g) Any Other.....
10. Where did the crime occur?
    .....
11. Do criminals prefer certain locations?
    a) Yes b) No

12. If yes why?.....
    .....
13. Which types of business/institutions are mostly affected?
    a) Banks
    b) Forex Bureau
    c) Computer Accessories Shop
    d) Supermarket
    e) Any Other.....

14. To what extent does crime impose cost on business/institution?
    a) Use of Alarms
    b) Employment of Security Guards
    c) Use of CCTV cameras
    d) Replacing lost items i.e mobile phones, motor vehicle side mirrors, wallets e.t.c
    e) Any other.....

Factors that contribute to the occurrence of crime, what measures/interventions have been put in place and their performance

15. What are the major factors that contribute to crime within the Nairobi Central Business District?
    a) Street Congestion
    b) Police visibility/ Slow response by Police

c) Poverty
d) Poor Lighting
e) Any other.....

16. What measures have you put in place reduce crime within your Institution/Business Premises?
    a) .....
    b) .....
    c) .....
    d) .....
17. What measures/interventions have been put in place to help in crime prevention in the CBD?
    a) Relocation of Hawkers
    b) Police Booths
    c) Suggestion Boxes (Toa Habari kwa Polisi)
    d) CCTV Cameras
    e) Street Lighting
    f) By Laws
    g) Any Other.....
18. Have these measures/interventions been successful?
    a) Yes b) No
19. If No
    why?.....
    .....
    .....
20. In your own opinion what measures should be taken to reduce crime within Nairobi Central Business District?
    a) .....
    b) .....
    c) .....
    d) .....
    e) .....

To examine the extent of CCTV cameras use in crime prevention

21. Do you think the use of Close Circuit Television (CCTV) Cameras helps in reducing crime?
    a) Yes b) No
22. Have you installed CCTV cameras in your premises?
    a) Yes b) No
23. Where have you installed it?
    a) Inside the Building b) Outside the building

24. Type of CCTV Cameras?
    a) Static
    b) Palt/Tilt Zoom
    c) Other.....

25. No of Cameras for monitoring?
    .....

26. Number of operators in the monitoring room?
    .....

27. Storage/ Retention Capacity of the Server?
    b) 1 day
    c) 2- 7 days
    d) 1 week-2 weeks
    e) 3 weeks- I month
    f) 3 Months
    g) More than three Months

28. Are the cameras effective (in crime Prevention)?
    a) Yes b) No

29. If No, why?
    .....
    .....

30. In your own opinion where is the appropriate location for Close Circuit Television (CCTV) Cameras?
    a) Streets
    b) Inside the building
    c) Streets and inside the building?

31. Have you witnessed/heard of any CCTV project being carried out in the Nairobi Central Business District?
    a) Yes b) No

32. If yes, what was the effectiveness/impact of the CCTV cameras on policing within the Nairobi Central Business District?

.....

.....

.....

Operational challenges in the use of CCTV Cameras

33. What operational challenges are faced in the use of CCTV Cameras?
    a) Resources
    b) Implementation
    c) Location
    d) Displacement of crime
    e) Any Other.....

Policy guidelines required for effective use of CCTV Cameras

34. What improvements are required for CCTV Cameras to be effective?

    a) Involvement of all stakeholders
    b) Identifying a lead agency
    c) Availability of resources
    d) Sustainability of the project
    e) Any other.....

35. To what extent should the police be empowered to ensure they can man the CCTV Cameras?
    a) Provision of more vehicles
    b) Provision of Computers
    c) Training
    d) Any other.....

Appendix Three

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

M.A PLANNING RESEARCH PROJECT

AN EVALUATION OF CCTV CAMERAS IN CRIME MANAGEMENT

A CASE STUDY OF NAIROBI CENTRAL BUSINESS DISTRICT

Interview Schedule for Key Informants

Declaration: The information obtained is purely confidential and will be used for academic purposes only

RESPONDENTS DETAILS (Optional)

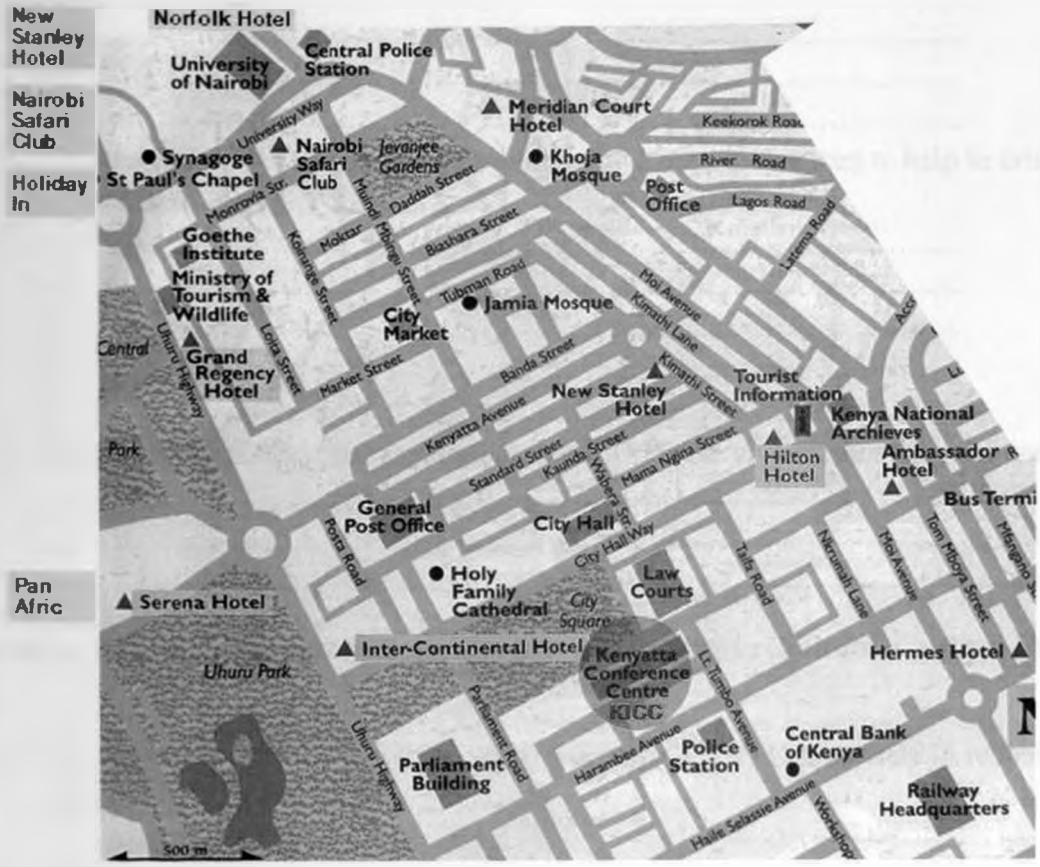
Name of Interviewer: Stephen Okere

1. Institutions Name.....
2. Respondents Name.....
3. Position Held.....

Types of crimes that occur, their pattern and spatial distribution

4. In your own opinion what are the types of crime experienced within the Central Business District?
   a) .....
   b) .....
   c) .....
   d) .....
   e) .....
   f) .....

5. Where are the prevalent areas of crime within the Central Business District?



6. In your own opinion, to what extent does crime impose cost on business/ institution?
   a) .....
   b) .....
   c) .....
   d) .....
   e) .....

Factors that contribute to the occurrence of crime, what measures/interventions have been put in place and their performance

7. Can you suggest the major factors that contribute to crime within the Nairobi Central business District?
   a) .....
   b) .....
   c) .....
   d) .....
   e) .....

8. In your own opinion what measures should be taken to reduce crime within Nairobi Central Business District?
   a) .....
   b) .....
   c) .....
   d) .....
   e) .....
9. Over the years what measures/interventions have been undertaken to help in crime prevention in the CBD?
   a) .....
   b) .....
   c) .....
   d) .....
   e) .....
10. Were these measures/interventions successful? Please give reasons for your answer.
    .....
    .....
    .....

Effectiveness of CCTV cameras in crime prevention within Nairobi Central Business District

11. Do you think the use of Close Circuit Television (CCTV) Camera help in reducing crime?
    a) Yes b) No
12. Where should they be located?
    .....
13. In your opinion where is the appropriate location for Close Circuit Television (CCTV) Cameras?
    a) .....
    b) .....
    c) .....
14. What are the Design Standards for a CCTV System to be effective?
    .....
    .....
    .....
    .....
    .....
15. Have you heard of any CCTV project being carried out in the Nairobi Central Business District?
    a) Yes b) No

16. If yes what was the effectiveness/impact of the CCTV cameras on policing within the Nairobi Central Business District?

.....

.....

.....

Operational challenges in the use of CCTV Cameras

17. What operational challenges are faced in the use of CCTV Cameras?

a) .....
b) .....
c) .....
d) .....
e) .....

Policy guidelines required for effective use of CCTV Cameras

18. Which policy guidelines should be put in place for effective use of CCTV Cameras?

a) .....
b) .....
c) .....
d) .....
e) .....

19. To what extent should the police be empowered to ensure they can man the CCTV Cameras?

a) .....
b) .....
c) .....
d) .....

Appendix Four

CCTV Observation Checklist

This checklist is intended to help both who are being observed and those who are observing. The focus is on the Control Room, location of CCTV Cameras installed and type of incidents detected.

1. **Police CCTV Control Room**
   - Design Standards
   - No of computers
   - Number of Monitors
   - Type of Software used
   - Number of Operators
   - Systems Flexibility/Capabilities
   - Number of Cameras
   - Type of network (Transmission equipment)
   - Storage retention (Recording)
   - The CCTV Camera System layout

2. **CCTV Cameras**
   - Location of the CCTV Cameras i.e inbuilt and open street
   - Buildings with CCTV Cameras
   - Type of incidents recorded and the frequency
   - Visibility of cameras

2. **Police Facilities**
   - Location of police facilities
   - Communication facilities available i.e how communication is passed to the police officers on patrol.

Appendix Five

Table 7: Serious crime incidents reported to the Police in the CBD (Sept 2011-Feb 2012)

Place	Type of Crime	Day	Night	Total
Uchumi Supermarket	Stealing	5	1	6
Near National Bank	Theft of M/v parts	11	7	18
Jamia Mosque	Obtaining by False Pretence	2	0	2
Parliament/Uhuru Highway	Stealing	0	1	1
	Robbery	0	4	4
County Lane	Theft by Servant	0	2	2
Phoenix Hse	Stealing	0	3	3
Parliament/coop Bank	Stealing	3	3	6
Parliament/Ufanisi Hse	Office Breaking	0	1	1
Haile Selassie	Conveying suspected Stolen Property	0	1	1
	Stealing Goods on Transit	0	1	1
	Attempted Stealing	6	0	6
	Stealing	0	2	2
Railways Rd About	Stealing	0	5	5
	Assault	3	0	3
Harambee Avn (Equity)	Stealing	2	0	2
Treasury	Off. Breaking	0	3	3
	Theft of M/v Parts	9	0	9
Central Bank/Koinange Lane	Stealing	1	0	1
Jogoo Hse	Off breaking	0	1	1
Harambee Avenue	Robbery	0	3	3
	Assault	0	5	5
	Theft from a Locked m/v	2	0	2
	Stealing	1	0	1
Koinange (inv Development)	Stealing	1	2	3
Koinange Street (Consolidated Bank)	Theft by servant	3	0	3
	Theft of Mv	1	0	1
Mundi Mbingu	Stealing	1	0	1

	Malicious Damage	1	0	1
	Robbery	0	1	1
	Theft of Motor Vehicle	4		4
ire station	Stealing	7	0	7
	Shop Breaking/Stealing	0	1	1
ity Market	Stealing	2	0	2
xpress Hotel	Theft by Servant	0	1	1
evelopment Hse	Stealing	1	1	2
Moi Avenue (Family Bank)	Stealing	1	0	1
	Assault	1	0	1
National Archive	Robbery	0	2	2
	Creating Disturbance	3	0	3
Kencom	Stealing	2	0	2
	Theft of M/v	1	0	1
	Theft of M/Cycle	0	1	1
Ambassador	Impersonating a Police Officer	1	0	1
Moi Avenue	Assault	0	1	1
	Theft of M/v parts	0	1	1
	Theft by servant	3	0	3
	Theft of M/v	3	1	4
	Robbery	0	1	1
Moi Avenue (Barclays)	Stealing	2	1	3
Tom Mboya Street	Shop Breaking	0	1	1
	Stealing	1	1	2
	Theft by servant	3	0	3
Tom Mboya (Afya Centre)	Stealing	1	0	1
Tom Mboya Street (Equity)	Stealing	1	0	1
Tom Mboya (Press Hse)	Stealing	0	3	3
Tom Mboya (Acccra)	Assault	0	1	1
Tom Mboya (ukwala)	Stealing	0	1	1
Tom Mboya (Tuskys)	Stealing	0	1	1
Garden Square	Lodging/ Stealing	0	1	1
City Hall way	Stealing	2	0	2
Intercontinental	Theft of m/v	1	0	1

Kenyatta Avenue	Stealing	1	0	1
	T/Mv	0	1	1
Kenyatta Avenue (Shell)	Stealing	1	0	1
Standard street Caxton hse	Shop Breaking and Stealing	0	1	1
Standard Building Wabera Street	Off Breaking	0	1	1
CFC Life Insurance	Theft by servant	1	0	1
Kimathi Street	Theft of m/v	2	0	2
	Stealing	1	0	1
	Assault	0	3	3
Loita	Theft of M/v	2	0	2
	Stealing	1	0	1
Anniversary towers	Theft of Motor Cycle	1	0	1
	Stealing	1	0	1
Wakumatt	Demanding by Menance	2	0	2
Kipande Rd	T/Motor Vehicle	3	0	3
Uhuru Highway (Neno Evangelist)	Stealing	0	2	2
Total		110	74	184

Source: Kenya Police Statistics Records, 2012

Appendix Six

CENTRAL DIVISON CRIME STATISTICS FOR THE YEARS 2008, 2009 AND 2010

	Category	Offence	2008	2009	2010	TOTAL
1	HOMICIDE	a) Murder	10	8	14	32
		b) Manslaughter	0	0	0	0
		c) Infanticide	0	0	0	0
		d) Procuring Abortion	0	1	0	1
		e) Concealing Birth	0	1	0	1
		f) Suicide	0	0	0	0
		g) Causing Death by D/Driving	1	2	5	8
		SUB TOTAL	**11**	**12**	**19**	**42**
2	OFFENCES AGAINIST MORALITY	a) Rape	3	9	12	24
		b) Defilement	3	8	0	11
		c) Incest	0	0	0	0
		d)Un-natural offences	0	2	0	2
		e) Bestiality	0	0	0	0
		f) Indecent assault	0	4	2	6
		g) Abduction	0	7	0	7
		h) Bigamy	0	0	0	0
		SUB TOTAL	**6**	**30**	**14**	**47**
3	OTHER OFFENCES AGAINST PERSONS	a) Assault	75	94	101	270
		b) Creating Disturbance	16	36	44	96
		c) Affray	1	2	10	13
		SUB TOTAL	**92**	**132**	**155**	**379**
4	ROBBERY	a) Robbery	4	6	16	26
		b) Robbery with Violence	37	33	34	104
		c) Cattle Rustling	0	0	7	7
		SUB TOTAL	**41**	**39**	**57**	**137**
5	BREAKINGS	a) House Breaking	8	27	44	79
		b) Burglary	2	6	23	31
		c) Other Breaking	121	63	69	253
		SUB TOTAL	**131**	**96**	**136**	**363**
6	THEFT OF STOCK	Theft of stock	0	0	0	0
		SUB TOTAL	**0**	**0**	**0**	**0**
7	STEALING	a) Handling Stolen Property	2	1	20	23
		b) Stealing from Person	47	77	60	184
		c) Stealing by Tenants/lodgers	0	0	2	2
		d) Stealing from a building	10	5	75	90
		e) General Stealing	317	401	472	1190
		SUB TOTAL	**376**	**484**	**629**	**1489**
8	THEFT BY SERVANT	a) Stealing by Directors	0	2	2	4
		b) Stealing by Agents	14	16	45	75
		c) Stealing by employee/servant	70	134	112	316
		SUB TOTAL	**84**	**152**	**159**	**395**
9	VEHICLE AND OTHER THEFTS	a) Theft of M/V	63	57	42	162
		b) Theft from M/V	20	19	18	57
		c) Theft of M/V parts	10	6	15	31
		d) Theft o f Motor cycle	13	6	18	37
		SUB TOTAL	**106**	**88**	**93**	**287**
10	DANGEROUS DRUGS	a) Possession	39	75	42	156
		b) Handling	0	0	1	1
		c) Trafficking	7	23	6	36
		d) Cultivating	0	0	0	0
		e) Usage	0	4	25	29
		SUB TOTAL	**46**	**102**	**74**	**222**
11	TRAFFIC OFFENCES	a) Taking Vehicle w/o Lawful authority	2	6	8	16
		b) Driving under influence of Alcohol	0	1	0	1
		SUB TOTAL	**2**	**7**	**8**	**17**
12	CRIMINAL DAMAGE	a) Malicious Damage	15	22	26	63

		b) Arson	0	1	0	1
		c) Negligent Acts	0	0	0	0
		Other criminal damage	0	0	4	4
		SUB TOTAL	**15**	**23**	**30**	**68**
13	ECONOMIC CRIMES	a) Obtaining by False Pretence	77	141	123	341
		b) Currency Forgery	3	9	4	16
		c) False Accounting	19	6	67	92
		d) Other Fraud/Forgery Offences	47	135	236	418
		SUB TOTAL	**146**	**291**	**430**	**867**
14	CORRUPTION	a) Soliciting for Bribe	0	1	0	1
		b) Accepting Bribe	0	0	0	0
		c) Accepting Free Gifts	0	0	0	0
		d) Demanding by false pretence	1	0	0	1
		e) Other Corruption Offences	5	0	1	6
		SUB TOTAL	**6**	**1**	**1**	**8**
15	OFFENCES INVOLVING POLICE OFFICERS	a) Soliciting for Bribe	0	1	0	1
		b) Accepting Bribe	0	0	0	0
		c) Accepting Free Gifts	0	0	0	0
		d) Demanding by false pretence	0	2	0	2
		e) Other Criminal Offences	0	0	0	0
		SUB TOTAL	**0**	**3**	**0**	**3**
16	OFFENCES INVOLVING TOURIST	a) Bag Snatching	0	0	0	0
		b) Other offences Against tourists	0	0	0	0
		c) Other Offences Involving Tourists	0	0	0	0
		SUB TOTAL	**0**	**0**	**0**	**0**
17	OTHER PENAL CODE OFFENCES	Other penal code offences	106	84	70	260
		SUB TOTAL	**106**	**84**	**70**	**260**
18	GRAND TOTAL	**GRAND TOTAL**	**1168**	**1544**	**1675**	**4587**

Table 8: Central Police Division Crime Statistics (Source: Kenya Police, 2010)