

**CHRISTIAN SERVICE UNIVERSITY COLLEGE
DEPARTMENT OF PLANNING AND DEVELOPMENT**

**TECHNOLOGY IN CRIME FIGHTING: AN EVALUATION OF THE USE OF
CLOSE-CIRCUIT TELEVISION (CCTV) IN THE KUMASI CENTRAL
BUSINESS DISTRICT OF THE ASHANTI REGION**

BY

PRINCE DOGBATSE

2019

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Dissertation submitted to the Department of Planning and Development, Christian Service University College, in partial fulfilment of the requirements for the award of Master in Monitoring and Evaluation

MAY, 2019

DECLARATION

Candidate's Declaration

I, hereby declare that this dissertation is the result of my original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature..... Date.....

Name.....

Supervisor's Declaration

I hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines and supervision of dissertation laid down by the Christian Service University College.

Supervisor's Signature..... Date.....

Name.....

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DEDICATION

To my very dearest son Jason Aseye Kwame Dogbatse

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ABSTRACT

Crime is among the most important problems in modern societies. In recent times, Ghanaians have been bombarded with news stories regarding grisly accounts of gun-related violence, spree killings, gangsterism, armed robberies as well as cars jacking and mobile phones snatching from the Ashanti Region, particularly the Kumasi Central Business District. As a result, this development has thus necessitated the researcher to evaluate the use of CCTV cameras in fighting crime in the Kumasi Central Business District. Specifically, the study seeks to identify the types of crime that occur in the KCBD, investigate the effectiveness of CCTV Cameras installed in fighting crime in KCBD, determine the cost and management of CCTV cameras in the KCBD and develop strategies required for effective use of CCTV cameras in solving and preventing crime in KCBD. The study made use of survey research design. Purposive sampling procedure was also used to select twenty (20) respondents, comprising 10 Police officers, 5 officials of KMA, and 5 Technical persons who are involved in the installation of CCTV cameras within the Kumasi Central Business District. The study made use of both questionnaires and focus group interviews as data collection instruments. The study found that stealing, assault, fraud, armed robbery, and murder are the major crimes in KCBD. The study confirms that the CCTV appears to have assisted in reducing crime in Kumasi Central Business District. The study revealed that the CCTV camera is effective in building feeling of security among business operators in Kumasi Central Business District. The study affirmed that the KCBD project acquired both Dome and Stationary cameras and the acquisition of the CCTV cameras costed \$42000 and \$20,000 respectively. Based on this, it was recommended that the government should provide a policy framework and a set of underlying principles to assist agencies considering CCTV schemes as a response to local community safety concerns.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Crime is among the most important problems in modern societies. Criminal behaviour does not only harm victims, but also the social structure of society. Several researchers have brought the issues of fear of crime (Dolan & Peasgood, 2007; Gray et al., 2008; Hale, 1996; Rountree, 1998; Zhao et al, 2015) to pay attention to the destructive effects of crime on social life. Even though some individuals may not have faced crime and have not become victimised in their life, they may fear of being victimised. This fear influences their social behaviours and daily routines (Biderman et al., 2007). Thus, criminal behaviour and crime become the serious problem of modern societies due to its destructive influence on basic tenets of social life. Crime however comes in many forms, from shoplifting and petty fraud right up to armed robbery and terrorism (Levi, 2013).

There is undoubtedly a spiralling rate of crimes and as such, the Police and people in authority should as a matter of urgency explore avenues in curbing the menace. As opined by Fennelly (2012), fighting crime is a key part of the security industry's mission, although traditionally many security measures played a more passive part in crime fighting and prevention. As a result, modern integrated systems however offer so much more, not only for the businesses and organisations that use them, but also as useful and sometimes vital additions to the Police and government security services fighting crime and terrorism.

Studies (Telep & Weisburd, 2012, La Vigne et. al., 2011) investigate what kinds of strategies and programmes are effective in crime fighting to get sense of effective

policing and to guide Police departments in crime fighting strategies. In lieu of developments and advances in technology, Police departments are in favour of using technological applications in fighting against crime. New technological applications and gadgets assist Police departments to use their limited resources more effectively (Telep & Weisburd, 2012). Even though technological devices and systems bear significant amount of burden for Police departments' budgets, they are seen as effective and efficient ways of doing policing in the modern society. Thus, Police departments follow up-to-date information systems and technological innovations to better prepare in crime prevention and crime fighting (Telep & Weisburd, 2012).

As per Custers (2012), there are many recent advances and changes in both the hard and soft technologies of policing used by law enforcement departments in a wide range of contexts. The recent innovations and implementations which increase the efficiency and effectiveness of policing including network analysis, GIS, Crime Mapping, Biometrics, Fingerprints, DNA Research, Facial Recognition, Speech Recognition, Social Media Policing, Shotspotter Detection System, and Closed-Circuit Television (CCTV). According to Fredericks (2004), one of the effective technology applications in crime fighting is Closed Circuit Television (CCTV). Closed-circuit television (CCTV) surveillance cameras serve many functions and are used in both public and private settings (Byrne & Marx, 2011). The prevention of personal and property crime is among the primary objectives in public space. As an intervention targeted at crime, CCTV is a type of situational crime prevention (Clarke, 1995). According to Clarke and Homel's (1997) classification of situational crime prevention, CCTV is viewed as a technique of "formal surveillance." In this regard, CCTV cameras are seen to enhance or take the place of security personnel. As

surveillance technology, CCTV assists Police in order to provide social control and maintain order, prevent and catch criminals (Goold, 2003; Kruegle, 2007).

CCTV cameras have been commonly used in order to decrease crimes such as theft, crimes against personnel and assets and terrorism (Kruegle, 2007). Specifically, 9/11 terrorist attacks have forced governments to invest in surveillance technology in order to protect their citizens against such dreadful attacks. In order to prevent future similar attacks, law enforcement agencies have started to extensively use surveillance systems, especially CCTV, to monitor human activities at airports, seaports, borders, and crowded city streets (Goold, 2003). According to Caputo (2014), CCTV systems relied upon a security operator continuously watching the feed and alerting the security team to deal with any issues. Over the years, there has been a noticeable adoption of modern security systems which has superseded these issues by introducing highly developed automated intelligence. Systems which actually analyse real CCTV feeds and can detect potential problems, automatically alerting the security team, have revolutionised the effectiveness of these surveillance systems. CCTV is no longer a passive part of the security mix; it is now a key tool in the fight against crime (Surette, 2005).

1.2 Statement of the Problem

As the age old cliché goes, prevention is better than cure, and it is much the same when it comes to crime. A security system which is not only effective, but also has the reputation for being so, is always preferable. Crimes happen all around us day in day out. Crimes can be perpetrated both at noisy and rather calm places. Observing surveillance at these rather quiet places where personal attacks, theft, vandalism and graffiti and all forms of risks is difficult at deserted places. Currently such crimes are

even common at market squares and unsuspecting crowded places. A well-integrated and effective security system will help to protect these areas and publicising their presence will help to deter criminals, especially opportunistic individuals or groups.

The Ashanti Region is gradually becoming a den for notorious criminals who have been taking the residents for a ride (Appiahene, 2016). In recent times, Ghanaians have been bombarded with news stories regarding grisly accounts of gun-related violence, spree killings, gangsterism, armed robberies as well as cars jacking and mobile phones snatching from the Ashanti Region, particularly the Kumasi Central Business District. Although crime rates are said to have declined in the region, crimes of violence in Kumasi in particular still exceed those of most cities in the country (Adu, 2013). After remaining dormant for many years, organised youth gangs today terrorise neighbourhoods in the Kumasi city. Areas such as Bantama, Aboabo, Adum, Agric Nzema, Asafo, and KNUST and its environs have become actively involved in robbery, murder and other violent crimes. Gangsterism has become a regular feature in the city with criminals acting with impunity (Adu, 2013).

According to the recent survey by Ghana Statistical Service (2010), 2.4% of car owners had something stolen from their vehicle in Kumasi Central Business District and 47.8% of livestock owners had some animals stolen. Rates of personal theft and burglary are also high (37.3% and 23.1% of the total sample respectively), while robbery, i.e. theft by using force or violence, is experienced by a smaller portion of the sample (6.9%). In addition, 16.9% of the respondents are victims of assault/threat and 6.0% of the respondents were victims of sexual offences. Less than 1% of the respondents were victims of kidnapping.

Insecurity within the Kumasi Central Business District is evidenced by poor methods of policing which do not incorporate effective use of recent innovative technology and implementations which increase the efficiency and effectiveness of policing including network analysis. The ratio of the number of Policemen patrolling the streets to the number of Civilians has a great disparity. According to the UN benchmark, one Police officer is to 500 civilians for which the Ghana Police Service (GPS) has a shortfall of about 28,000 personnel, leaving the nation still short of the required ratio of one Police officer to 500 civilians. As a result, this development has thus necessitated the researcher to evaluate the use of CCTV cameras in fighting crime in the Kumasi Central Business District.

1.3 Objectives of the Study

Specifically, the study seeks to:

1. Analyse the types of crime that occur in the Kumasi Central Business District.
2. Investigate the effectiveness of CCTV Cameras installed in fighting crime in the Kumasi Central Business District.
3. Determine the cost and management of CCTV cameras in the Kumasi Central Business District.
4. Develop strategies required for effective use of CCTV cameras in solving and preventing crime in the Kumasi Central Business District

1.4 Research Questions

The following research questions were developed to guide the study

1. What are the types of crime that occur in the Kumasi Central Business District?

2. Are CCTV Cameras effective in fighting crime in the Kumasi Central Business District?
3. What are the cost and management of CCTV cameras in the Kumasi Central Business District?
4. Are there any strategies required for effective use of CCTV cameras in solving and preventing crime in the Kumasi Central Business District?

1.5 Significance of the Study

This study intends to evaluate the use of CCTV cameras in fighting crimes in the Kumasi Central Business District. Generally, it is expected that the results obtained from this study will throw more light on the true state of crime fighting especially in the area of crime prevention in the Kumasi Central Business District. Hence, revealing whether the installations of these CCTV cameras have been beneficial also ascertains whether or not the investment in such technologies is worthwhile. It is also important to note that the outcome of this research may also guide the implementation and roll-out of similar projects on the wider coverage across Ghana.

The results of this study will directly benefit the Ghana Police Service (GPS) in their fight against crime. For instance, by determining the balance between the cost and benefit of using CCTV cameras, the Police Service can efficiently integrate its use in their daily fight against crime. In addition, if the Police Service eventually integrates the use of CCTV cameras into their services based on the findings from this study, the society at large will be the greatest beneficiary since individuals will feel safe at both public and obscured places.

From the study, the other stakeholders may use the findings in strengthening policies related to crime fighting in the Kumasi Central Business District. The findings of the study may provide information to the authorities in Kumasi Central Business District about the type of crime and the strategies for solving and preventing them.

To the academia and students, this study will help build the knowledge base in the discipline by adding on the existing literature on crime fighting. The study will be used as a source of reference material besides suggesting areas where future research may be conducted.

1.6 Scope of the Study

The study is limited to Kumasi Central Business District of the Ashanti Region of Ghana. The study is conceptually, theoretically and empirically limited to the research objectives including; the types of crime that occur in the Kumasi Central Business District; effectiveness of CCTV Cameras installed in fighting crime in the Kumasi Central Business District; the cost and management of the current CCTV cameras in fighting crime in the Kumasi Central Business District; and the strategies required for effective use of CCTV cameras in solving and preventing crime in the Kumasi Central Business District.

1.7 Organization of the Study

The study is orderly arranged in five chapters. The first chapter deals with the background to the study, statement of problem, research objectives of the study, research questions, significance of the study, scope of the study and overview of the study. Chapter two concentrates on review of existing literature on the topic while chapter three deals with the methodological aspects of the research describing and justifying the design that would be used, the data collection methods employed, and

why they were considered appropriate for the study. Chapter four presents the results and discussion of the study and chapter five finally deals with summary of findings, conclusion and make recommendations based on the salient issues emerging from the research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter devotes its attention towards the theoretical, empirical and conceptual frameworks in respect of the use of CCTV camera as a technology in fighting crime. The study reviewed crime in urban areas, the use of technology by Police in fighting crimes and developed technologies used in policing. The study further reviewed the effectiveness of CCTV camera in fighting crime.

2.1 Theoretical Framework

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory of a research study. This study reviews the social disorganisation theory, and routine activities theory.

2.1.1 The Social Disorganisation Theory

Social disorganization is a theoretical perspective that explains ecological differences in levels of crime based on structural and cultural factors shaping the nature of the social order across communities (Rengifo, 2017). The consequences of urbanisation and its impact on crime rates have received greater academic attention particularly in the developed world (Shaw & McKay, 1942, cited in Lersch, 2007). Lersch (2007) noted that the association existing between inhabitants and environment is woven into the fabric of the social structure and its institutions, which undeniably encompasses the high level of residential mobility, low socio-economic status and ethnic heterogeneity experienced by members of the society. They maintain that there is

always an upsurge in crime rates when the building blocks of the social structure, which ensures homogeneity and cohesiveness collapses.

The breakdown of social interaction and norms create conditions that encourage and facilitate criminal behaviour (Breetzke, 2008). Critics of the theory however argue that it fails to measure its primary construct of social disorganisation, including, for example, enquiring from residents how many of their neighbours they know by their name and how often an eye is kept on children in peer groups who engage in activities unsupervised.

2.1.2 The Routine Activities Theory

In 1979, Lawrence E. Cohen and Marcus Felson published in the *American Sociological Review* an article, 'Social Change and Crime Rate Trends: A Routine Activity Approach'. Their focus was on predatory crimes, which were defined as illegal acts that involved the direct damaging or taking of a person or property of another (Cohen & Felson, 1979). According to Routine Activity Theory presented by Cohen and Felson (1979), there should be convergence in space and time of likely offenders, suitable targets, and the absence of capable guardians. CCTV cameras prevent the convergence of these three elements by providing a capable guardian all the time. Last but not least, CCTV cameras help the Police to detect offenders by recording images of offences taking place. These records play important role in arresting, sentencing and incarcerating of the criminals. Thus, criminals are caught and cannot commit new crimes and justice is served for the society.

Routine Activity Theory (RAT) is a framework for this study to observe whether CCTV can be seen as a capable guardian in crime prevention and its effect on the fear of crime among citizens. In their influential study, Cohen and Felson (1979) analysed

macro-economic and social factors of US since 1950s to understand what causes crime. At the end of their analysis, they realized that even though macro-economic and social factors were going better since the Second World War in the US, crime rates did not decrease, but rather increased. CCTV is also seen as a fear reduction strategy (Lee, 2007) and offered as a capable guardian (Oc and Tiesdell, 1997; Caputo, 2014). Nevertheless, the role of CCTV in reducing fear of crime is questionable (Smith, 2002). Sarno, Hough and Bulos (1999) found that CCTV had a significant impact on reducing fear of crime in the boroughs of London. In addition, some researchers did pre/post surveys to evaluate the level of fear of crime among the public; they noted positive effect of CCTV on the reduction of fear of crime (Phillips, 1999).

The theory was criticised for taking offenders as given (Hirschi's 1969 control theory), and in response Felson's later works in 1986 took into account informal social control of offenders. This resulted in a two-step version of the control theory: First, society establishes social bonds and thus attaches a 'handle' to each individual; and the Second, being the task of identifying exactly who is breaking the rules. As the ecology of everyday life changes, it becomes easier to evade social controls by breaking rules in places where one is not recognized. In a nutshell, just as a guardian supervises the suitable target in the routine activity theory by Cohen and Felson, a handler supervises the likely offender in this new routine activity approach by Felson. In both cases, direct physical contact serves to discourage crime from occurring. Thus, social control in society requires keeping suitable targets near capable guardians and likely offenders near intimate handlers (Felson, 1989).

2.2 Overview of Crime

Crime is any form of illegal activity which when committed exposes the perpetrator to a specific level of punishment laid down by law (Kimou, 2009). Crime could be an action or serious offence against an individual, group of people, organisation or the state which calls for penalty. Marshall and Clark (1952) also wrote, 'Crime is any act or omission prohibited by public law for the protection of the public and punishable by state in a judicial proceeding in its own name'. Similarly Tappan (1960) defined that 'a crime is an instrumental act or omission in violation of criminal law, committed without justification and sanctioned by the state as felony or misdemeanor'. Crime is a deviant behaviour that violates prevailing norms—cultural standards prescribing how humans ought to behave normally. To be considered as a crime, the activity must however, be found in the statute books. Thus, crime is an illegal activity (GSS, 2010).

Crimes in urban areas are affected by the nature of cities and the social, economic and geographical environments in which they exist. According to Louise (2001), 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 victimisation, a relationship most often clearly manifests in homicide rates.

2.2.1 Types of crime

Many types of crime exist. Criminal acts can generally be divided into four primary categories: personal crimes, property crimes, inchoate crimes, statutory crimes, and financial crimes (Barkan, 2012).

i. Personal Crimes

Personal crimes are those that result in physical or mental harm to another person (Barkan, 2012). Personal crimes include: assault, battery, homicide, false imprisonment, kidnapping, rape etc. According to Fox, Levin and Quinet (2012), research on personal crime tends to focus on homicide and on rape and sexual assault. Homicide is considered the most serious crime because it involves the taking of a human life. As well, homicide data are considered more accurate than those for other crimes because most homicides come to the attention of the Police and are more likely than other crimes to lead to an arrest. For its part, the focus on rape and sexual assault reflects the contemporary women's movement's interest in these related crimes beginning in the 1970s and the corresponding interest of criminologists, both female and male, in the criminal victimisation of women (Barkan, 2012).

ii. Property Crimes

Property crimes typically involve interference with the property of another. Although they may involve physical or mental harm to another, they primarily result in the deprivation of the use or enjoyment of property (Blumstein, & Wallman, 2006). Many property crimes are theft crimes, including burglary, larceny, robbery, auto theft, and shoplifting.

Heise, Ellseberg and Gottemoeller (1999) emphasised that much property crime can be understood in terms of the roles and social networks of property criminals. In this regard, many scholars distinguish between amateur theft and professional theft. Most property offenders are amateur offenders: They are young and unskilled in the ways

of crime, and the amount they gain from any single theft is relatively small. They also do not plan their crimes and instead commit them when they see an opportunity for quick illegal gain. In contrast, professional property offenders tend to be older and quite skilled in their ways of crime, and the amount they gain from any single theft is relatively large (Heise et al., 1999).

iii. Inchoate Crimes

Inchoate crimes refer to those crimes that were initiated but not completed, and acts that assist in the commission of another crime (Lilienfeld, 1991). Inchoate crimes require more than a person simply intending or hoping to commit a crime. Rather, the individual must take a “substantial step” towards the completion of the crime in order to be found guilty. Inchoate crimes include aiding and abetting, attempt and conspiracy (Cullen, Maakestad, & Cavender, 2006). Lilienfeld (1991) further revealed that inchoate crimes can be punished to the same degree that the underlying crime would be punished, while in other cases, the punishment might be less severe.

iv. Statutory Crimes

Statutory crimes include those crimes, in addition to the crimes discussed above, which are proscribed by statute (Messner, Deane, & Beaulieu, 2002). Three significant types of statutory crimes are alcohol related crime, drug crimes, traffic offences and white collar crimes. These crimes are specifically prohibited by statute because society hopes to deter individuals from engaging in them. Alcohol-related crimes include a variety of offences regarding how and where alcohol can be consumed, such as:

- Driving under the Influence of alcohol
- Open container violations

- Minor in possession of alcohol
- Public intoxication

According to Rosoff, Pontell and Tillman (2010), drug crimes concern any involvement in the creation or distribution of drugs, including drug possession, drug manufacturing and drug trafficking. One area of criminal law that is currently receiving a great deal of attention is the regulation and prosecution of drug crimes related to medical marijuana. Due to state trends toward the legalisation of medical marijuana, this is an area of criminal law that is in flux (Rosoff et al., 2010).

As per Messner et al. (2002), traffic offences include crimes that may arise while an individual is driving a vehicle on public roadways. Additional traffic offences include driving on suspended or revoked license, driving without a license, hit-and-run accidents, reckless driving and vehicular assault. Traffic offence results in death, it can be charged as a far more serious crime, such as a form of homicide (Messner et al., 2002).

v. Financial and Other Crimes

Financial crimes often involve deception or fraud for financial gain (Barkan, 2012). Although white-collar crimes derive their name from the corporate officers who historically perpetrated them, anyone in any industry can commit a white-collar crime. These crimes include many types of fraud and blackmail, embezzlement and money laundering, tax evasion and cybercrime (Fox, et al., 2012; Barkan, 2012; Blumstein, & Wallman, 2006).

2.3 Technologies used in Fighting Crime

There are many developed technologies used by law enforcement departments. The recent innovations and implementations which increase the efficiency and effectiveness of policing include network analysis, GIS, crime mapping, biometrics, fingerprints, DNA research, facial recognition, speech recognition, social media policing, shotspotter detection system, and CCTV.

2.3.1 Network Analysis

Sutherland (1947) claimed that the social networks of an individual can serve as the source for crimes and delinquency. According to this author if a person is subject to criminal activities and criminals then the probability of his learning to carry out criminal and delinquency activities will be high as criminal behaviours are learned.

Network analysis is an important tool for law enforcement purposes and one can demonstrate the nature of any emerging relationship between two persons in this regard. Knowing who knows who in social network sites like Facebook and MySpace may help Police Forces to shed light on a given criminal case. On the other hand, the information from traffic data on telephones and email may represent an important clue to solving a criminal activity (Custers, 2012). In particular, social network analysis (SNA) is a powerful tool for law enforcement that can help Police to analyse, discover and envision the actions of criminal suspects. Beside using SNA, it is possible to map the relationship of a criminal when Police Forces have sufficient data to analyse.

The manual examination of social networks is time consuming and ineffective compared to the use of SNA which increases the effectiveness and efficiency of law enforcement agencies. It is known that social networks sometimes cause the spread of

illegal behaviours. They can cause young people to carry out illegal behaviours such as juvenile delinquency. Thus, to reduce criminal behaviour, the use of SNAs by law enforcement agencies is essential in the context of having an effective crime fighting strategy (Johnson, Reitzel, Norwood, McCoy, Cummings, & Tate, 2013).

2.3.2 Geographical Information System (GIS) and Crime Mapping

Geographical Information System and crime mapping have been well used within policing (Crossland & Wynne, 1994). GIS is a spatial decision support system (SDSS) that focuses on decision making and problem solving processes (Crossland & Wynne, 1994). “GIS is not simply another alternative data display tool. It is a comprehensive set of tools for collecting, storing, retrieving, analysing and displaying spatially referenced information” (Crossland & Wynne, 1994 p. 542). In GIS implementations, automated computerised pin mapping and hot spot analysis are the most widely used applications among law enforcement departments. Crime mapping provides an informative output and mental representation that increases the accuracy of decisions on decision making process. Hence, the system minimises the effort and enhances the decision maker’s (law enforcement) existing capacity (Vessey, 1991; Smelcer & Carmel, 1997).

Crime mapping applications enable law enforcement agencies to analyse crime incidents and affect factors within any geographic area. It is worth noting here that “a picture is worth a thousand words” (Vessey, 1991). In other words, mapping allows officers to see the big picture on a single snapshot and it helps agencies to determine high-crime points, crime types, and the best way to respond. It also helps them to identify high risk and hazardous points in a geographical area. Hence, the system enables agencies to create more effective crime prevention strategies and methods in the policing context.

Caplan and Kennedy (2010) emphasised that a GIS application does not aim to predict specific events and their offenders in a certain time. It is very difficult to predict certain time, point, and event to occur, but the applications can help to identify the most likely areas where they may occur and which crimes may occur in a jurisdiction. Regarding this issue, Risk Terrain Modeling (RTM) is a good example that can be created in GIS. RTM is a method of representing risk assessment which was developed by the Rutgers University School of Criminal Justice (Caplan, 2014). RTM provides an approach to analysts that helps them to identify risk terrains which represent actionable meaning related to crime outcomes. This approach can help planners to predict where crimes are more likely to happen. The RTM process occurs in three steps; First, based on theoretical grounding, analysts use criminological theories which provides an overview of the social and environmental risk factors influencing crime patterns. In the second step, RTM use technical methods that employ ArcGIS software to represent risk terrains. In the final step, analysts present their ideas and forecasts to decision makers developing strategic and tactical decision making in the future (Caplan & Kennedy, 2010). In short, RTM provides meaningful and measurable information and interpretations that can address the most vulnerable areas in a jurisdiction for decision makers at all levels.

2.3.3 Biometrics

Biometrics refers to technologies based on an individual's unique characteristics, such as their finger prints, their DNA make-up, and their voice patterns (Custers, 2012). Biometrics has been used for many years in Police Forces and intelligence agencies around the world. Biometrics are used to identify the individual. In addition they are used to figure out who the suspects or criminals are, who are responsible for

committing a crime (FBI, 2014). Biometric technology is utilised in law enforcement for matching sensitive information by comparing this with different regional and national databases that have a superior authentication ability. Portable biometric identity management technologies also enable Police Forces to verify drivers' licenses and mug shots over fingerprint readers.

A fingerprint is one of the most important forms of biometrics that is utilised in law enforcement agencies around the world. Fingerprints vary depending on the individual and are unique to different persons and do not change over the time. Thus, fingerprint analysis is a very useful tool for law enforcement agencies in terms of identifying the suspect and providing useful evidence related to verifying the suspect of any crime. The Integrated Automated Fingerprint Identification System used by FBI does not store fingerprints, but keeps a record of criminal histories such as mug shots, scars, and hair and eye color. That system has the fingerprints of 70 million suspects and 34 million civil prints in its database (FBI, 2014).

Beside using fingerprints, law enforcement agencies have obtained lots of advantages with the application of DNA research. The popularity of using DNA increased when forensic scientists took part mostly in many TV documentaries and others items of various channels. It is a fact that no other investigative tool has changed the viewpoint in justice system as much as the use of DNA tests and analysis (Prime & Newman, 2007). DNA analysis gives direction to Police Forces in investigation process. First of all, DNA analysis can solve lots of difficult cases, especially those that have failed when using other techniques. Secondly, even if there are no witnesses, DNA analysis can provide some additional crime clues of importance. In addition, it also reduces arrests that were implemented wrongly with the use of old techniques. Additionally, it

improves the reliability of the evidence. Last, but not least, it can depict the connection of one crime case with other cases (Prime & Newman, 2007).

2.3.4 Social Media

According to Stuart (2013), social media is a crucial tool for law enforcement agents, because it can help them connect with the general public. With social media, the general public can send and receive real time information and provide related documents such as pictures and audio records that can help to solve crimes. Social media allow law enforcement agents to remain in contact with local communities thus providing a useful source of information in an effective way.

Many law enforcement agencies also use social media to some extent. In particular, social media is an important key tool in crisis situations such as earthquakes, tsunamis, and riots etc. For example, in 2011, investigators from Kentucky State Police posted photos of jewelry and a facial composite of an unknown person found ten years ago and after that the Police identified the deceased person as a result of receiving some evidence from users of social media (Highland, 2011). The Boston Police Department also used social media following the bombings at the 2013 Boston Marathon. After the attacks the department actively used social media as a means of sharing information with the community to find suspects.

The Vancouver riots provide another important example of the use of social media in policing. After the Vancouver team lost at the 2011 Stanley Cup Playoffs, a riot started in downtown Vancouver and the rioters destroyed stores and cars. Within an hour of the riot, social media users organised themselves and cooperated with the Police. They started to submit photos and videos through Facebook and mobile

technologies. People created a kind of surveillance on their own using social media and this process resulted in direct and rapid cooperation between the community and the Police. The Vancouver Police obtained and benefited from thousands of pieces of digital evidence related to the events (Trottier, 2012). Hence, social media can provide one of the easiest and cheapest ways for law enforcement agencies to obtain and access evidence in any event. The problem that the law enforcement agencies face is how to obtain accurate information in any communication with the public. As seen in the Vancouver example, social media and mobile technologies can help to solve crimes by providing an effective means of communication between public members and law enforcement agencies.

2.3.5 Shot Spotter Detection System

This system is very useful for law enforcement agents in the context of detecting gunfire. These sensors can be located on rooftops and can be used for monitoring the sounds made by a gun (Petho, Fallis, & Keating, 2013). The system can log hundreds of gunfire incidents in a given period of time. For example, approximately 39000 separate incidents of gunfire have been documented with 300 acoustic sensors across 20 square miles of Washington DC. The system can be installed at sites where the most violent crimes occur to provide information on the specific location of the crime. Shot Spotter detection systems also enable Police to report all gunfire incidents (Petho, et al., 2013).

2.3.6 Closed-circuit Television (CCTV)

Closed circuit television (CCTV) cameras serve many functions and are used in both public and private settings. The prevention of personal and property crime is among

the primary objectives in public space. As an intervention targeted at crime, CCTV is a type of situational crime prevention (Clarke, 1995). The factors that make a society feel unsafe such as higher crime rates, increased terrorist attacks, and school and workplace shootings have led law enforcement agencies to install closed-circuit television (CCTV) security monitoring systems in many locations. Some of these video cameras are installed inside Police vehicles and are used to monitor stops and vehicle movement. With the development of technology, the cost of CCTV equipment has declined. Thus many security managers have started to install and implement security monitoring systems in the locations they are responsible for. As well, wireless technology has enabled law enforcement agencies to monitor security cameras from their laptops and mobile phones.

Crime investigation units of law enforcement agencies can also take advantage of CCTV. Crucial evidence captured by CCTV is often helpful for enlightening a crime case and providing evidence to the court. Videos are utilised mostly in Police departments for patrol vehicle in-car cameras, training, public affairs, robbery investigation, crime scene processing, undercover surveillance, tactical operations, vehicle collision investigation, interrogation, and video lineup (Fredericks, 2004).

2.4 CCTV Effectiveness in Fighting Crime

It is claimed that CCTV is an effective measure in preventing crime, but this claim is often based on a handful of apparently successful projects that were poorly evaluated using simple before-and-after designs with no comparison conditions (Armitage et al., 1999). This design is seriously flawed, because it fails to address many threats to internal validity (Farrington & Painter, 2003).

The first systematic review of the effects of CCTV in preventing crime was carried out by Welsh and Farrington (2002). Systematic reviews have explicit objectives, explicit criteria for including or excluding studies, extensive searches all over the world for eligible evaluations, careful extraction and coding of key features of studies, a structured and detailed report of the methods used for locating, appraising, and synthesising evidence, and explicit conclusions about effect sizes (Farrington & Petrosino, 2000). In their systematic review, Welsh and Farrington (2002) only included evaluations with before-and-after measures of crime in experimental and comparable control areas. This was regarded as the minimum standard of methodological quality that was adequate for drawing conclusions about effectiveness in evaluation research (Cook & Campbell, 1979; Sherman et al., 2006).

According to Muller and Boos (2004), CCTV technology is deemed as an efficient and successful tool for reducing crime rates within targeted areas. There have been, and continue to be, countless studies devoted to proving this stance and asserting the claim that CCTV systems are useful and at times the best solution. Honovich (2008) suggested that CCTV systems have preventative and reactive measures, revive business in desolate or poor areas, increase the efficiency of the Police Force, build social cohesion, protect the private environment of citizens and assure confidence and ensure feelings of safety and security, thus leading to a more ordered and stable society.

Most studies (Musy 2008; Leman-Langlois, 2003) that found a causal link between CCTV use and reduction in crime were usually associated with property crimes or car park offences. The UK-based organization Nacro conducted a review of CCTV

studies and found that property crimes reduced in areas covered by video surveillance, especially in car parks (car theft). It is commonly found that the presence of cameras in public spaces has had a positive impact on crimes. However, the same Nacro review revealed that public video surveillance had no impact on personal crimes (assault, drunkenness). Helten and Fischer's study (2004) in Germany reveals a similar point, whereby CCTV had little or no effect on reducing, what they term as, 'crimes of passion' such as public drunkenness and acts of rage. These studies demonstrate the ineffectiveness of CCTV as a crime reducing tool and moreover suggest that either there is a general lack of awareness of video surveillance cameras or an overall indifference. Other studies have explored the situation of 'Diffusion of Benefits' or 'Displacement', whereby once potential offenders are aware of public cameras they change choice or location of the crime (IACP). In the end, there is no reduction in the overall crime rate. This situation was found mainly for robbery and theft, which according to CCTV advocates are the most prominent and reduced crimes.

Welsh and Farrington (2006) concluded that existing evaluation research showed that CCTV was effective in reducing crimes in car parks but not in city centres or public housing, was effective in reducing vehicle crimes, but not violent crimes, and was most effective when combined with improved lighting. Welsh and Farrington (2004) compared the effectiveness of CCTV and improved street lighting and concluded that improved lighting was more effective in reducing crimes in city centres and residential areas. These reviews did not aim to address other possible effects of CCTV, such as helping to detect offenders, helping to deploy Police, providing evidence for use in court, or reducing the fear of crime.

2.5 Conceptual Framework for Crime Prevention

In order to develop a conceptual framework for understanding crime fighting in Kumasi Central Business District, an effective CCTV system requires an integration of various sectors. Failure in fighting crime in Kumasi Central Business District 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. Stakeholders' involvement can be measured by institutions/Businessmen participation and level of involvement in decision making on issues affecting them. Figure 2.1 shows the critical components that will ensure the effective use of CCTV cameras in fighting crime.

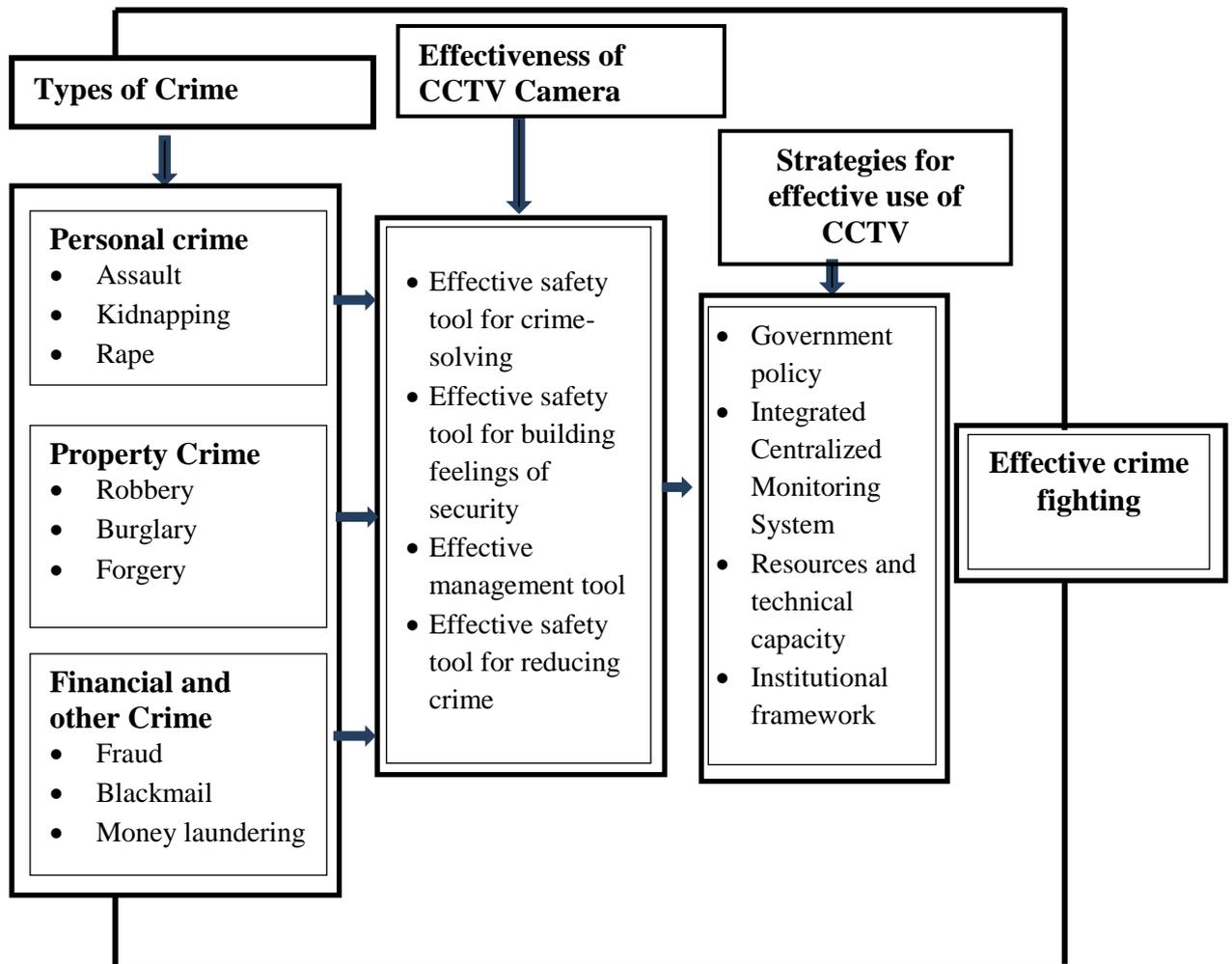


Figure 1: Conceptual approach for effective crime fighting

Source: Researcher's Construct, 2019

A conceptual framework was used to help focus on the variables in the study. Some authors have represents CCTV a new and valuable weapon in the fight against crime and public disorder. For instance, McCahill and Norris (2002) reported that CCTV systems can provide warning signs of potential criminal offences and act as a reactive tool. CCTV monitors crowds and individuals, responds to threats and thus notifies the operator(s) of harmful behaviour and actions before, during and after the occurrence of an event.

CCTV can be effective in reducing or fighting 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 can be effective if there is an effective government policy, integrated centralised monitoring system, resources and technical capacity, and institutional framework. Government 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 assembly or Police as the most appropriate owners of CCTV schemes in public places.

Integrated Centralised Monitoring System involves effective monitoring using integrated centralised systems where staffs are dedicated in monitoring/surveillance. Control rooms should be placed at all Police Stations within the Kumasi 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. On the other hand, availability of financial resources and technical capacity is key to the successful implementation projects. The KMA, Police and the Ministry should play a critical role in financing or securing resources through the government and the donors. This is a critical component for the effective use of CCTV camera as a tool for fighting crime. Concerning the Institutional Frame Work, Kumasi Metropolitan Assembly (KMA) should be the owners of the system as they play a key role in coordination of all local authorities programme. KMA should be responsible for financing the implementation and ongoing costs of CCTV, and the implementing and monitoring the auditing procedures for the implementation of CCTV as a crime prevention strategy. The Law Enforcement Agency (Police) is tasked with maintenance of law and order and is the lead agency in internal security.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter details and discusses the methodology used in this study. It outlines the, research design, the population under study, the sampling and sampling technique, and the method that was used to collect data. The data collection procedure is addressed. Ethical considerations pertaining to the research are also discussed.

3.1 Research Design

The study made use of survey research design. Survey research design is a type of descriptive research where the researcher administers a questionnaire to a sample or to the entire population to describe the attitudes, opinions, behaviours or characteristics of the population (Creswell, 2012). Creswell asserts that in this procedure, survey researchers collect quantitative, numbered data using questionnaires (e.g., mailed questionnaires) and statistically analyse the data to describe trends about responses to questions and to test research questions. Considering the nature of the study, the survey design was deemed appropriate in terms of collecting data from a large group of respondents within a relatively short period of time.

The survey design allowed for collection of both quantitative and qualitative data at the same time (Borg, Gall & Gall, 1996), it was thought to be suitable to this study. Qualitative data provided detailed information about the phenomenon being studied enabling the researcher to establish patterns, trends, and relationships. Quantitative data on the other hand allowed the researcher to meaningfully describe the distribution of variables using standard statistical procedures (Borg et al., 1996) such as means, frequency distributions and measures of variability.

3.2 Population of the Study

The decision of what information you need depends on the decision regarding what your population is going to be. For Muijs (2004), the population is the group of individuals from whom the researcher wants to generalise his/her results. Before data collection takes place, it is important to be clear about the study population. Based on the above assumptions, the target population for this study included; institutions/ Businessmen (Administrators, Supermarkets, Banks, Hotels, Forex Bureau), Police Officers, Kumasi Metropolitan Assembly officials, Technical persons involved in installation of CCTV cameras within the Kumasi Central Business District (KCBD). The study estimated about 160 respondents, comprising 120 institutions/businessmen, 20 Police officers, 10 KMA officials and 10 Technical persons in the KCBD.

3.3 Sampling Size and Sampling Technique

Multi stage sampling technique was used to select the sample. These include cluster sampling, and simple random sampling. Purposive sampling was also used in the sampling procedure. Multistage sampling technique was used because it is an appropriate technique for drawing sample from large population with limited time and cost. According to this technique, sampling is done in two or more stages and it is effective in primary data collection from geographically dispersed population when face to face contact is required (Johnson, Onwuegbuzie, & Turner, 2007).

In determining the sample size for the study, a table developed by the Research Advisors (2006) with a confidence level of 95% and margin of error (degree of accuracy) of 5.0% was used. Based on this Table a sample of 110 respondents were

selected, comprising 85 institutions/businessmen, 13 Police Officers, 6 KMA Officials and 6 Technical persons in the KCBD (Appendix A).

All the institution/Businessmen in the Kumasi Central Business District were grouped into six clusters, representing the five area councils namely; Bantama area, Adum area, Cenral Market area, Suame area and Asafo area. After grouping them into clusters, the researcher conducted a simple random sampling (balloting) to select the 17 institutions/businessmen to be studied in each of the area. In all, 85 institutions/businessmen were selected and the institutions were numbered and another simple random sampling was conducted to enable the researcher select the respondents that represent the institutions/Businessmen. The reason for choosing random sampling for this study is to ensure that all the five areas were equally represented and also to give every institutions/businessmen in the Kumasi Central Business an equal chance of being selected for the study in order to reduce biases (Stark, 2004).

Purposive sampling procedure was also used to select twenty five (25) respondents, comprising 13 Police Officers, 6 Officials of KMA, and 6 Technical persons who are involved in the installation of the CCTV cameras within the Kumasi Central Business District. These are the people who were studied using in-depth interviews. Purposive sampling also referred to as judgment, selective or subjective sampling is a non-probability sampling that is characterised by a deliberate effort to gain representative samples by including groups or typical areas in a sample (Patton 1990). Purposive sampling was used because the researcher wanted to use specific people.

Table 1: Percentages of each stratum selected samples

Status	Population	No. of sample	Proportion (%)
Institutions/Businessmen	120	85	70.8
Police officers	20	13	65.0
Officials of KMA	10	6	60.0
Technical persons involved in the CCTV installation	10	6	60.0
Total	160	110	68.8

Source: Researcher's Field Construct, May, 2019.

3.5 Data collection Instruments

The choice of the data collection techniques was based on the extent to which it would allow the researcher to obtain the information needed to answer the research questions and to obtain a full picture of the problem under investigation (Johnson & Christensen, 2004). Because of its advantages, educational researchers are increasingly recognising the value of using different data collecting tools. Thus, this research used questionnaires and focus group interviews as data collection instruments.

3.5.1 Questionnaires

A questionnaire is a carefully designed instrument for collecting data in accordance with the specifications of the research questions. In this study the questionnaire method was used to ascertain the types of crime, effectiveness of CCTV Cameras, and strategies required for effective use of CCTV in the Kumasi Central Business District. The questions on the personal backgrounds of the respondents were also included in the questionnaire. The questionnaire was used because some of the respondents could read, write and understand the simple questions posed to them. Another reason for the

use of the questionnaire as an instrument for collecting data was its efficacy in collecting information. It is also an efficient method in the sense that some respondents can be reached within a relatively short period of time.

Mertens and Ginsberg (2009) concluded that the questionnaire have the advantage of promoting the identity or privacy of the respondents and also resources and time which is crucial and adequately saved. It is for this reason that the questionnaire was chosen as a tool for collecting information for this work. In all 50 respondents were served with the questionnaires.

3.5.2 Interview

According to Kvale (1996), interviews are an interchange of ideas among two or more individuals on a topic of common interest, are based on the centrality of human interaction for knowledge production and emphasise the social situations of research data. Interviews with Police Officers, KMA Officials, and Technical persons involved in installation of CCTV cameras within the Kumasi Central Business District were conducted using a purposive sampling technique. According to Patton (1990), “The logic and power of purposeful sampling lies in selecting information-rich cases for study in depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research.” Different researchers recommend and use different numbers of respondents for group interviews. Krueger, (2000) suggests six to nine participants, while Langford *et al.* (2002) propose six to ten participants. In turn, Johnson and Christensen (2004) feel that the ideal number is six to twelve. Thus, for this research, focus group interviews consisted of five to ten participants.

The interviews were conducted at the beginning of March 2018. During the interviews, Olympus Digital Voice Recorder (VN 6200PC) was used with the permission of the participants and the researcher noted all the relevant information during the discussions and transcribed them immediately after the discussions. Each group interview was conducted for one to one and a half hours. Most researchers use one and one and a half to two hours (Morse & Niehaus, 2009) and, in some cases, continue until no new information was revealed, which showed that sufficient information had been gathered, as suggested by Berg (1998). The interview guide was developed carefully, as most researchers agree that the interview guide is crucial for the success of focus group interviews (Morse & Niehaus, 2009). Accordingly, the interview schedule was reviewed by the supervisor, who gave his comments on it as well.

3.6 Data Collection Procedures

A letter of introduction was obtained from the researcher's Head of Department to carry out the research work in the selected study area. The questionnaires for the respondents were administered to the selected participants personally by the researcher. Before the commencement of data collection, the researcher officially visited the selected institutions/Businessmen. During the visits, the researcher explained the purpose and objectives of the study to the respondents. The researcher and the respondents agreed on an appropriate date and time for the administration of the questionnaire and interview. This helped the respondents to prepare well in advance in order to provide appropriate responses to the questions within the stipulated time.

The respondents were given one week starting from the day of administering the questionnaire on a particular site to answer the questionnaire. The researcher explained questionnaire items to illiterate respondents in the language they understood better and given some time to reflect on the responses before giving their options. However, most of the respondents completed and delivered their questionnaire on the spot with concern that it might be misplaced due to their busy schedules.

3.7 Data Analysis

Data collected was edited to eliminate any incomplete questionnaire. The valid questionnaires were coded to reflect their corresponding categories in accordance with scoring key in the questionnaire. Afterwards the scored questionnaires were analysed using Statistical Product for Service Solutions (SPSS) version 20. Descriptive statistics method was employed to analyse the study results due to descriptive nature of the data gathered. Descriptive surveys do not typically require complex statistical analysis. However, descriptive statistics such as frequencies and percentages were used to draw inference from the study results.

Qualitative data (focus group interviews) were analysed using content analysis methods to identify the themes. Content analysis is defined as a research tool that is used to describe and identify words or concepts or trends in communicating the content of the group interview.

3.8 Ethical Issues

All professions are guided by ethics and so is research. Research has code of ethics which govern the way research is conducted. Prior to the study, approval was sought from appropriate authorities and basic schools who were involved in the study. The

respondents were given prior notice before the data was collected. The information collected was treated with strict confidentiality. The study ensured the standard of anonymity of respondents in all documents resulting from this study by not providing options on the questionnaires for information such as name of the respondents. Hence, the study was conducted in an ethical *way* without compulsion which aided the accuracy of responses, rate of response and timeliness of data collection.

CHAPTER FOUR

EVALUATION OF CCTV SYSTEM IN THE KUMASI CENTRAL BUSINESS DISTRICT

4.1 Introduction

This chapter presents the results and discusses the findings of the study. It focuses on the responses of businessmen, Police Officers, Officials of Kumasi Metropolitan Assembly (KMA) and Technical persons involved in the CCTV camera installation in the Kumasi Central Business District. The chapter is presented under the following headings: types of crime that occur in the Kumasi Central Business District, cost and management of CCTV cameras installed in Kumasi Central Business District, effectiveness of CCTV Cameras installed in fighting crime in the Kumasi Central Business District, and the strategies required for effective use of CCTV cameras in solving and preventing crime in the Kumasi Central Business District.

4.2 Study Area

Kumasi is a city in Ashanti Region and is among the largest metropolitan areas in Ghana. Kumasi is near Lake Bosomtwe, in a rain forest region, and is the commercial, industrial and cultural capital of Asanteman. Kumasi is approximately 500 kilometres (300 mi) north of the Equator and 200 kilometres (100 mi) north of the Gulf of Guinea. Kumasi is alternatively known as "The Garden City" because of its many beautiful species of flowers and plants. The Central Business District of Kumasi includes areas such as Adum, Bantama and Bompata (popularly called Roman Hill) is concentrated with lots of banks, department stalls, hotels like Golden Tulip Hotel, Golden Bean Hotel among other luxury hotels. Economic activities in Kumasi include financial and commercial sectors, pottery, clothing and textile. There is a huge timber

processing community in Kumasi serving the needs of people in Ghana. Bantama High Street and Prempeh II Street in Bantama and Adum respectively have the reputation of being the hub of business and night life in Kumasi.

The 2009 Crime Victimization Survey in Ghana was carried out in Kumasi Central Business District (KCBD). It was a pilot study designed to facilitate a broader understanding of crime and its burden on the citizenry (Ghana Statistical Service, 2010). In line with this, close-circuit television (CCTV) cameras was procured and installed within the Central Business District (CBD) and known flashpoints – to be networked to a central security monitoring system to assure the residents of their safety to enable them to go about their duties without fear or panic. The CCTV Cameras as installed in the Kumasi Central Business District are located at the following areas: Komfo Anokye Roundabout, Aboabo Post Office, Adum Post Office, Ahodwo Roundabout, Anloga Junction, Asafo Traffic Light, Atinga Junction, Bank of Ghana, Bekwai Roundabout, Bureau of National Communication Junction, Jubilee Park, Kumasi Park, Kumasi Airport, Labour Roundabout, Manhyia Roundabout, MTN Nhyiaeso Junction, New Zongo Police Station, Post Office Roundabout, Ratray Park, Santasi Roundabout, Victoria Opoku Ware Junction/Cedar, Aboabo Junction, GRIDCO, Ridge Police Station and Asawasi Police Station.

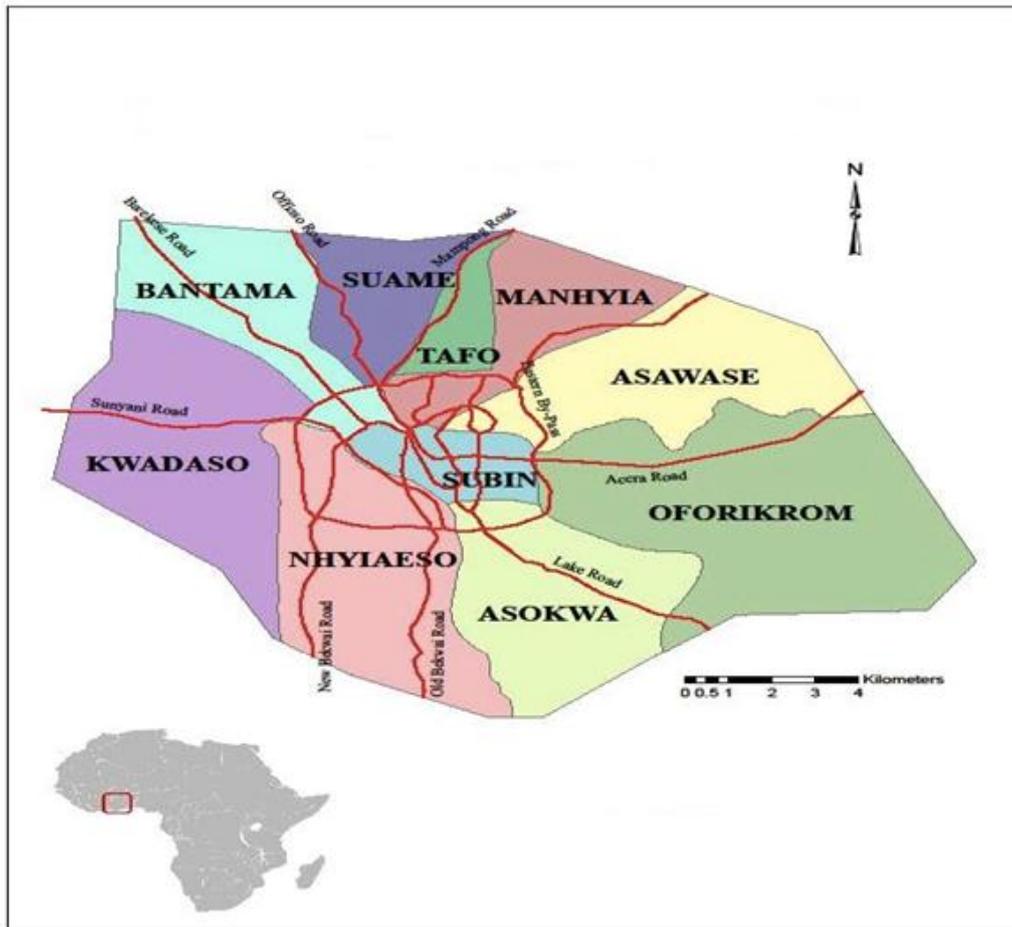


Figure 2: Map of Kumasi Metropolis and major Municipalities
Source: Millennium Cities Initiatives (2014)

4.3 Types of crime that occur in the Kumasi Central Business District

This section is on the types of crime that occur in Kumasi Central Business District. The overriding crimes that emerged from the respondents were assault, murder, armed robbery, stealing and fraud. For example, both the business operators and the key informants (Police Officers, KMA officials, and Technical persons) indicated that on a daily basis robbery and stealing in Kumasi Central Business District is reported in the media. According to the report by Ghana Statistical Service (GSS) (2010), majority of residents in Kumasi Central Business District suffer stealing, assault/threat and theft of motorcycle. This indicates that there is need for a comprehensive measure to manage crime within the KUMASI CENTRAL BUSINESS DISTRICT.

The Police Officers indicated that there are serious crimes and minor offences in the Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT). There are professional criminals that steal and rob from people, and ordinary people who occasionally break the law. The Police Officers further revealed that stealing and theft done with violence are high in Kumasi Central Business District. We must do no less in addressing the crime problem. We must commit all the resources necessary to make a difference. However small the size of the Police strength, truth is that we can never have enough officers to use traditional policing techniques to deter crime in Kumasi Central Business District.

Officials of Kumasi Metropolitan Assembly (KMA) claimed that fear of crime is a huge problem in Kumasi today. In certain communities in Kumasi, people are afraid of being robbed or murdered, they are afraid to walk the streets in the evening. According to the Technical persons involved in the CCTV installation, the unemployment rate for young people is related to serious crime problem; stealing, murder, assault, robbery and fraud. This country's social problems are well beyond the ability of the Police to deal with alone. The Technical persons involved in the CCTV installation further established that street congestion, Police non-visibility/slow response, poverty, poor lighting, inadequate technology in fighting crime and other factors such as drug abuse contribute to crime in KUMASI CENTRAL BUSINESS DISTRICT.

Schrank et al. (2012) similarly found that street congestion is a major problem in many cities. The view of the business operators that Police non-visibility/slow response contributes to crime in KUMASI CENTRAL BUSINESS DISTRICT clarifies the fact that Police officers play a critical role in enforcement of crime. However, there is the need to find better methods to make them efficient in crime

response which can be done through the use of CCTV cameras. This is supported by Clarke and Homel (1997) who state that if CCTV operates as a guardian, offences against targets should be reduced.

The view of the respondents that poverty contributes to crime in KUMASI CENTRAL BUSINESS DISTRICT has long been noted by sociologists that poverty is strongly positively associated with rates of violent crime (Braithwaite, 1979; Eisner, 2001 and 2003). However, it is argued that in countries where there is not only significant poverty, but also a wide gap between the wealthy and the poor, rates of crime are elevated further (Hsieh & Pugh, 1992; Pickett et al., 2005). In investigating the relationship between poverty and crime or homicide, poverty has been found to have demonstrable effects on violent crime rates (Eisner, 2001; Fajnzylber et al., 2002).

The view of the business operators that other factors (i.e. drug abuse, and unemployment) are potent factors which predispose the people to indulge in crime supports the study by Kahn (1999) who identifies economic factors such as unemployment as a factor that contributes to crime in urban areas.

4.4 Cost and management of CCTV cameras installed in KCBD

In determining the cost and management of CCTV camera installed in KCBD, it appeared that the KCBD project acquired both Dome and Stationary cameras. The Technical people indicated that the camera type (Dome and Stationary) perform different functions in terms of coverage. Dome cameras capture cross-section of areas than the Stationary one. According to the Technical persons involved in the CCTV installation, 24 CCTV cameras comprising 14 Dome and 10 Stationary were procured and installed within the Central Business District (CBD) and known flashpoints – to

be networked to a central security monitoring system to assure the residents of their safety to enable them to go about their duties without fear or panic. The acquisition of the CCTV cameras costed \$42,000.00 and \$20,000.00 for the Dome and Stationary cameras respectively.

According to the respondents, the installed CCTV cameras at the various flash point are unable to capture all number plates due to bad weather, and not all the cameras are monitored at all times. The study further revealed that poor lighting also does not create room for good graphics and subsequent recording of footages. During the study, the researcher found that some of the cameras are malfunctioning, and some too have been accidentally damaged by road accidents.

It appeared that care is not taken to ensure the community's privacy when capturing images. Images for National Security purpose are recorded and securely stored 24 hours a day and are kept for a 30 day period. After this period, the footage is recorded over onto a cloud storage space.

4.5 Effectiveness of CCTV Cameras in fighting crime

This section assesses the effectiveness of the installed CCTV camera in the Kumasi Central Business District in fighting and preventing crime. It establishes the effectiveness of the CCTV system in improving security, enhancing policing, providing warning signs and serving as a complementary tool. An interview with the key informants expressed that the CCTV cameras installed in the Kumasi Central Business District have been seen to work effectively in crime-solving, reducing crime, building feeling of security, and as a management tool.

The Police Officers indicated that completed and attempted crime have decreased. According to the Police Officers before the implementation of the CCTV project, the

Police had arrested and charged fewer offenders in KCBD as compared to the post-installation period. This indicates that the CCTV appears to have assisted in reducing crime in Kumasi Central Business District. The Police Officers further affirmed that CCTV cameras installed in the KUMASI CENTRAL BUSINESS DISTRICT have the ability to detect and fight crime. The CCTV is able to provide evidence of criminal activity, video footages through monitoring, activities geared towards crime commission can be easily detected.

The KMA officials seemed to have myopic view with respect to the effectiveness of the installed CCTV cameras in KCBD. The KMA officials asserted that they were not involved in the installation of CCTV cameras in the KCBD. According to the officials of KMA the CCTV is monitored and managed by the experts and that the CCTV camera is not known to them as it is a strategic decision of the National Security and the Police. Some section of KMA officials mentioned that the CCTV systems are effective management tool since they are less expensive than Police Officers and are more efficient in detecting or preventing criminal offences. Unlike security personnel, cameras are not subject to fatigue or loss of concentration and therefore provide uninterrupted and consistent effort.

The Technical persons involved in the installation of CCTV cameras on the other hand revealed that the CCTV systems in KUMASI CENTRAL BUSINESS DISTRICT have preventative and reactive measures, revive business in desolate or poor areas, increase the efficiency of the Police Force, build social cohesion, protect the private environment of citizens and assure confidence and ensure feelings of safety and security. Technical persons involved in the CCTV project further reported that CCTV has given the Business operators in Kumasi Central Business District

confidence to approach customers who were acting suspiciously. Armitage, Smyth, and Pease (1999) argued that CCTV (especially if well publicised) may prevent crime. Also, CCTV may increase the true probability of detection, may increase pedestrian usage of places and hence further increase the subjective probability, may encourage potential victims to take security precautions, and may direct Police and security personnel to intervene to prevent crime (Armitage et al., 1999). Welsh and Farrington (2002) also asserted that CCTV could signal improvements in the area and hence increase community pride, community cohesion, and informal social control.

4.6 Strategies for effective use of CCTV cameras in preventing crime

Concerning the strategies required for effective use of CCTV cameras in solving and preventing crime in the Kumasi Central Business District, the Police officers indicated that the Police should be given total access to the installed CCTV to monitor the streets where users of the street are victimized by criminals. The Police Officers further commented that making available database with records (Biometrics) would ensure effective use of CCTV cameras installed in the KUMASI CENTRAL BUSINESS DISTRICT. The Police officers specified that the major problem is tracing suspects from images for arrest. This mainly happens because the Police do not have a database with records (Biometrics) for tracing suspects on CCTV footage. The Police have to wait for help from members of the public by publishing the images in the press which rarely leads to arrest of the suspects. Again, the Police officers mentioned that the capacity of the Police should be built in manning CCTV cameras installed in the Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT), in order to monitor the streets effectively.

According to the Technical persons involved in the installation of the CCTV cameras, the CCTV Camera requires huge resources for its successful implementation. In addition, the cost of maintenance of the control room and coordination with Police personnel require additional resources for its effective operation in terms of logistic.

On the same issue, the officials of KMA affirmed that security within the KUMASI CENTRAL BUSINESS DISTRICT is regarded by most Building owners/Businessmen as the responsibility of the Government. Owners of the premises, operators of business and the authorities in Kumasi Metropolitan Assembly should be involved in protecting business/property by having a role on the CCTV camera project in the KCBD.

According to Mackay (2002), the development of town centre CCTV systems has been driven by the availability of central government support and other funding and a coalescing of stakeholders. Allard, Wortley and Steward (2008) examined the effect of CCTV on offenders' behaviour in Brisbane, Australia and identified that CCTV tends to be an effective deterrent against planned offences. Allard et al. (2008) found that training of Police personnel has been identified as a critical component. Allard et al. (2008) was of the view that for CCTV cameras to be effective the Police need to be trained on the use of the cameras. Availability of financial resources was also identified as a critical component in ensuring that CCTV cameras become effective (Allard et al., 2008).

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter summarizes the study, presents conclusion highlighting findings and recommendations to inform policy and decision making.

5.2 Summary of Findings

The presentation of the main findings of the study was presented according to the specific objectives set out in Chapter One of this work.

5.2.1 Types of crimes that occur in Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT)

- The study found that stealing, assault, fraud, armed robbery, and murder are the major crimes in Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT).

5.2.2 Effectiveness of CCTV cameras in crime prevention

- Across the evaluation period, completed and attempted, it appeared that crime decreased per month. Before the implementation of CCTV, the Police had arrested fewer offenders compared to the post-installation period.
- The study confirms that the CCTV appears to have assisted in reducing crime in Kumasi Central Business District.
- It appeared that the CCTV camera is effective in building feeling of security among business operators in Kumasi Central Business District.

- The study indicated that The CCTV camera installed in the Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT) has been shown to work effectively in crime-solving,
- The study revealed that CCTV is an effective management tool.

5.2.3 Cost and management of CCTV cameras installed in KCBD

- The study indicated that the KCBD project acquired both Dome and Stationary cameras and the acquisition of the CCTV cameras costed \$42,000.00 and \$20,000.00 respectively.
- The study found that the images for National Security purpose are recorded and securely stored 24 hours a day and are kept for a 30 day period. After this period, the footage is recorded over onto a cloud storage space.

5.2.4 Strategies for effective use of CCTV cameras

- The study indicated that building the capacity of Police on CCTV technology, involving the Police in monitoring the footage, and making available database with records (Biometrics) will ensure effective use of CCTV cameras.
- The study found that involving stakeholders and providing of resources by government will ensure effective use of CCTV cameras installed in Kumasi Central Business District.

5.3 Conclusion

The nature of cities and the social, economic and geographical environments pose a challenge to the Police in effecting policing. Crimes: i.e. stealing, assault, threat of harm/death, fraud, robbery, murder, forgery and possessing fire arms without

authority/permission are high in Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT). Regardless of social or economic development, the larger the population of a city, the greater the level of crime and victimization, a relationship that mostly manifests in homicide rates.

However, adoption of modern technology i.e. CCTV cameras in policing will ensure that insecurity within the Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT) is managed effectively. The CCTV installed in the Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT) has been shown to work effectively in crime-solving, reducing crime, building feeling of security, and as a management tool, thereby improving the performance of the law enforcement agencies in crime detection and prevention. Building the capacity of the Police on CCTV technology, involving the Police in monitoring the footage will ensure a sustainable CCTV project within the Central Business District. Moreover, available database with records (Biometrics), involving stakeholders and provision of resources by government will ensure effective use of CCTV cameras installed in Kumasi Central Business District.

5.5 Recommendations

The following recommendations were made for the study:

- Massive resources required for an effective CCTV system in Kumasi Central Business District. There is need to incorporate all stakeholders when undertaking this kind of project for it to be successful. 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.

- CCTV project design is usually undertaken by experts but there is need to involve the community and in this case; Kumasi Central Business District (Building owners and proprietors). Community participation should be considered in decision making when a CCTV scheme is being implemented.
- The government should provide a policy framework and a set of underlying principles to assist agencies considering CCTV schemes as a response to local community safety concerns.
- Law Enforcement in Kumasi Business Area (Police) should be given a major role in hosting the control rooms and providing personnel to effect arrest of criminals, and working with the Metropolitan Assembly to develop Codes of Practice with the National Security (NS) in relation to the operation of the CCTV programme.
- Kumasi Metropolitan Assembly (KMA) should have some significant role in the CCTV system in KUMASI CENTRAL BUSINESS DISTRICT as they play a key role in coordination of all local authorities programmes.
- The CCTV system should also be expanded to cover the wider scope i.e. potential customers, Embassies, Government offices, Banks, Hotels etc. This system can also be replicated in other major towns in Kumasi and the nation at large.

REFERENCES

- Adu, E. K. (2013). Kumasi: Haven for rampaging killers. Retrieved from <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Kumasi-Haven-For-Rampaging-Killers>. Accessed: May, 4, 2018.
- Allard, R. Wortley, K. and Steward, P. (2008). Crime placement, displacement, and deflection. In M. Tonry & N. Morris, (Eds.), *Crime and justice: A review of the research* Vol. 12 Chicago, IL: University of Chicago Press.
- Appiahene, G. J. (2016). Violent crime in Ghana: The case of robbery. *Ghana Journal of Criminal Justice Volume*, 26 (5), 409-424.
- Armitage, R., Smyth, G., & Pease, K. (1999). Burnley CCTV evaluation. In K. A. Painter & N. Tilley (Eds.), *Surveillance of public space*.
- Barkan, S. E. (2012). *Criminology: A sociological understanding* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
- Ber, R. (1998). Environment, routine, and situation: Toward a pattern theory of crime. In R. V. Clarke. & M. Felson (Eds.), *Advances in criminological theory* Vol. 5. New Brunswick, N. J.: Transaction Publishers.
- Biderman, A. D, Johnson, A.L. McIntyre, J. and Weir, A.W. (2007). *Report on a pilot study in the District of Columbia on victimization and attitudes toward law enforcement. President's Commission on Law Enforcement and Administration of Justice, Field Surveys I*. Washington, DC: US Government Printing Office.
- Blumstein, A., & Wallman, J. (Eds.). (2006). *The crime drop in America* (2nd ed.). Cambridge: Cambridge University Press.
- Borg, W. R., Gall, M. D. & Gall, M. D. (1996). *Educational research: An introduction*. New York: Longman

- Braithwaite, M. (1979). *Situational Crime Prevention: Successful Case Studies*. Second Edition. New York: ISBN 0-911577-39-4 Harrow and Heston publishers.
- Brown, B. (1995). *CCTV in town centres: Three case studies*. Crime detection and prevention series: Paper No. 68. London: Home Office Police Research Group
- Byrne, J., & Marx, G. (2011). Technological innovations in crime prevention and policing. A review of the research on implementation and impact. *Journal of Police Studies*, 20(3),17-40.
- Caplan J. M. (2014). *Risk Terrain Modeling for Strategic and Tactical Action*. Crime Mapping and Analysis News, A police Foundation Publication.
- Caplan, J. M. & Kennedy, L. W. (2010). *Risk Terrain Modeling Manual*. Newark, NJ: Rutgers Center on Public Security.
- Caputo, A. C. (2014). *Digital video surveillance and security*. Butterworth Heinemann.
- Clarke, R.V. (1995). "Situational Crime Prevention." In: M. Tonry and D.P. Farrington (eds.), *Building a Safer Society: Strategic Approaches to Crime Prevention*. (Crime and Justice: A Review of Research, vol. 19.) Chicago, IL: University of Chicago Press.
- Clarke, R.V. and Homel, R. (1997). A revised classification of situational crime prevention techniques. In S.P. Lab (Ed.), *Crime Prevention at a Crossroads* (pp. 17 27). Cincinnati, OH: Anderson.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Chicago, IL: Rand McNally.
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Upper Saddle River, NJ: Merrill.

- Crossland, M., & Wynne, B. (1994). Measuring and testing the effectiveness of a spatial decision support system. *Proceedings of the Twenty- Seventh Hawaii International Conference on System Sciences*, 27(4), 542-551.
- Cullen, F. T., Maakestad, W. J., & Cavender, G. (2006). *Corporate crime under attack: The fight to criminalize business violence*. Cincinnati, OH: Anderson.
- Custers, B. (2012). Technology in policing: Experiences, obstacles and police needs. *Computer Law & Security Review*, 28(1), 62-68.
- Dolan, P. & Peasgood, T. (2007). Estimating the economic and social costs of the fear of crime. *British Journal of Criminology*, 47,1: 121-132.
- Eisner, T. (2001). "Public Attitudes Towards CCTV in Public Places." *Studies on Crime and Crime Prevention* 5(1):72-90.
- Eisner, T. (2003). *Assessing Crime Prevention Initiatives: The First Steps*. (Crime Prevention Unit Paper, #31.) London, UK: Home Office.
- Fajnzyblber, S., Henshaw, C. and Pease, K. (2002). "Does CCTV Evidence Increase Sentence Severity?" Unpublished report to the Nuffield Foundation, U.K.
- Farrington, D. P., & Painter, K. A. (2003). How to evaluate the impact of CCTV on crime. *Crime Prevention and Community Safety*, 5, 7–16.
- Farrington, D. P., & Petrosino, A. (2000). Systematic reviews of criminological interventions: The Campbell Collaboration Crime and Justice Group. *International Annals of Criminology*, 38,49–66.
- Federal Bureau of Investigation (FBI) (2011). *Crime in the United States: Federal Bureau of Investigation, U.S. Department of Justice*. Retrieved from: www.fbi.gov.
- Fennelly, L. J. (2012). *Hand book of loss prevention and crime prevention*. Elsevier.
- Fox, J. A., Levin, J., & Quinet, K. (2012). *The will to kill: Making sense of senseless murder*. Upper Saddle River, NJ: Prentice Hall.

- Fredericks, W. (2004). "CCTV: Potential Crime Impact." Bristol, UK: Bristol City Council.
- Ghana Statistical Service (GSS) (2010). Victimization survey in Ghana. Accra.
- Goold, B. J. (2003). Public area surveillance and police work: the impact of CCTV on police behaviour and autonomy. *Journal of Surveillance and Society*, 1,2: 191-203
- Gray, S. Chatterton, M. R. and Frenz, S.J. (2008). "Closed Circuit Television: Its Role in Reducing Burglaries and the Fear of Crime in Sheltered Accommodation for the Elderly." *Security Journal* 5(3): 133-139.
- Hale, C. (1996). Fear of crime: A review of the literature. *International Review of Victimology*, 4,2: 79-150.
- Heise, L., Ellseberg, M., & Gottemoeller, M. (1999). Ending violence against women. *Population Reports*, 27(4), 1-44.
- Helten, G., M. and Fischer, V. (2004). CCTV in a London Borough, Leicester: Perpetuity Research and Consultancy International.
- Highland, T. (2011). Evaluating _realistic evaluations_: Evidence from a study of CCTV. In K. Painter & N. Tilly (Eds.), *Surveillance of public space: CCTV, street lighting and crime prevention*. Monsey, NY: Criminal Justice Press.
- Honovich, B. (2008). *CCTV in Town Centres: Three Case Studies*. (Police Research Group Crime Detection and Prevention Series Paper, #68.) London, UK: Home Office.
- Hsieh, T. & Pugh, C. E. (1992). 'Closed Circuit Television in Public Places: Its Acceptability and Perceived Effectiveness, Police Research Group Crime Prevention Unit, 35, London: Home Office Police Department.
- Johnson, A. J., Reitzel, D. J., Norwood, F. B., McCoy, M., Cummings, B. & Tate, R. R. (2013). Social Network Analysis: A Systematic Approach for Investigating. <http://www.fbi.gov/statsservices/publications/law-enforcementbulletin/20138March/social-network-analysis>

- Johnson, R. B. & Christensen, L. (2004). *Educational research: Quantitative, qualitative, and mixed approaches*. Thousand Oaks, CA: SAGE Publications.
- Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research, 1*(2), 112–133.
- Kahn, S. (1999). "What's the Problem, Girls? CCTV and the Gendering of Public Safety." In: C. Norris, J. Moran and G. Armstrong (eds.), *Surveillance, Closed Circuit Television and Social Control*. Aldershot, UK: Ashgate.
- Kedrian, J. (2017). Effectively Using CCTV to Fight Crime. *Studies on Crime and Crime Prevention, 5*(1):72-90.
- Kimou, J. C. A. (2009). Economic Conditions, Enforcement and Criminal activities in the District of Abidjan: International Institute of Public Finance (IIPF) Congress.
- Krueger, R. A. (2000). *Focus Groups. A Practical Guide for Applied Research* (3rd Ed.). Thousand Oaks, CA: Sage Publications
- Kruegle, H. (2007). *CCTV surveillance: Video practices and technology*. Newton, MA: Butterworth-Heinemann.
- Kvale, S. (1996). *Interview Views An Introduction to Qualitative Research Interviewing*. Thousand Oaks, CA Sage Publications.
- La Vigne, N.G., Lowry, S.S., Dwyer, A.M., & Markman, J.A. (2011). *Using Public Surveillance Systems for Crime Control and Prevention: a practical guide for law enforcement and their municipal partners*. Washington: DC: The Urban Institute.
- Langford, B., Bonell, C. P., Komro, K. A., Murphy, S., Magnus, D., Waters, E., & Campbell, R. (2016). The Health Promoting Schools Framework: Known Unknowns and an Agenda for Future Research. *Health Education and Behavior*. <https://doi.org/10.1177/>
- Leman-Langlois, S. (2003). The Myopic Panopticon: The Social Consequences of Policing Through the Lens, *Policing and Society, 13*, 1, 44-58.

- Levi, M. (2013). *Regulating Fraud (Routledge Revivals): White-Collar Crime and the Criminal Process*. Routledge.
- Lilienfeld, D. E. (1991). The silence: The asbestos industry and early occupational cancer research—a case study. *American Journal of Public Health*, 81, 791–800.
- Louise I. S. (2001). *Crime and Modernization: The Impact of Industrialization and Urbanization on Crime*, Carbondale, United States of America, Southern Illinois University Press
- Mackay, D. (2002). *Self interest: the true reasons for supporting town centre CCTV systems: a case study*. University Of Leicester Scarman Centre (in press).
- Marshall, M.C., & Clarke, R.V. (1952). *Television surveillance and crime prevention: Evaluating an attempt to create defensible space in public housing*. *Social Science Quarterly*. Volume 58 (pp 647-56)
- Mertens, D. M., & Ginsberg, P. E. (2009). *The handbook of social research ethics*. Thousand Oaks, CA: Sage.
- Messner, S. F., Deane, G., & Beaulieu, M. (2002). A log-multiplicative association model for allocating homicides with unknown victim-offender relationships. *Criminology*, 40, 457–479.
- Morse, J. M., & Niehaus, L. (2009). *Mixed methods design: Principles and procedures*. Walnut Creek, CA: Left Coast Press.
- Muijs, D. (2004). *Doing Quantitative Research in Education: With SPSS*. Thousand Oaks, CA: SAGE Publications
- Müller, C. and Boos, D. (2004). Zurich Main Railway Station: A Typology of Public CCTV Systems, *Surveillance and Society*, 2, 2/3, 161-76.
- Musy, I. (2008). « Big Brother » veille sur les JO, *Le Temps*, August 6, <https://www.letemps.ch/dossiers/dossiersarticle.asp?ID=237113>

- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage,
- Petho, A., Fallis, S. D., & Keating, D. (2013). ShotSpotter detection system documents 39,000 shooting incidents in the District <http://www.washingtonpost.com/investigations/shotspotter-detection-systmdocuments-39000-shooting-incidents-in-the-district/2013/11/02/055f8e9c-2ab1-11e3-8ade-a1f23cda135>
- Pickett, M. C, Levine, J.P. and Palumbo, D.J. (2005). "Television Surveillance and Crime Prevention: Evaluating An Attempt to Create Defensible Space in Public Housing." *Social Science Quarterly* 58(4):647-656.
- Prime. R. J., & Newman, J. (2007). The impact of DNA on policing: Past, Present, and Future. *The PoliceChief*. http://www.policechiefmagazine.org/magazine/index.cfm?fuseaction=display_arch&article_d=1320&issue_id=112007
- Rengifo, A. F. (2017). *Social Disorganization* (2nd ed.). Chicago: Univ. of Chicago Press.
- Rosoff, S. M., Pontell, H. N., & Tillman, R. (2010). *Profit without honor: White collar crime and the looting of America* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
- Rountree, P. W. (1998). A reexamination of the crime-fear linkage. *Journal of Research in Crime and Delinquency*, 35,3: 341-372
- Schrank, C, Moran, J. and Armstrong, G. (2012). "Algorithmic Surveillance: The Future of Automated Visual Surveillance." In: C. Norris, J. Moran and G. Armstrong (eds.), *Surveillance, Closed Circuit Television and Social Control*. Aldershot, UK: Ashgate.
- Sherman, L. W., Farrington, D. P., Welsh, B. C., & MacKenzie, D. L. (Eds.) (2006). *Evidence-based crime prevention* (revised ed.) London: Routledge.

- Smelcer, J. B., & Carmel, E. (1997). The effectiveness of different representations for managerial problem solving: Comparing tables and maps. *Decision Sciences*, 28(2), 391-420.
- Stuart, D. R. (2013). Social media: Establishing criteria for law enforcement use. <http://www.fbi.gov/stats-services/publications/law-enforcementbulletin/2018/february/social-media-establishing-criteria-for-lawenforcement-use>.
- Surette, R. (2005). The thinking eye: Pros and cons of second generation CCTV surveillance systems. *Policing: An International Journal of Police Strategies & Management*, 28 (1),152-173.
- Sutherland, E.H. (1947). *Principles of Criminology*. Fourth edition, Chicago:J.B. Lippincott.
- Tappan, J. (1960). "The Impact of Closed Circuit Television on Crime in the London Underground." In: P. Mayhew, R.V.G. Clarke, J.N. Burrows, J.M. Hough and S.W.C. Winchester (eds.), *Crime in Public View*. (Home Office Research Study, #49.) London, UK: Her Majesty's Stationery Office.
- Telep, C. W, and Weisburd, D. (2012). What is known about the effectiveness of police practices in reducing crime and disorder? *Police Quarterly*, 1098611112447611.
- Trottier, M. (2012). *Closed Circuit Television and Local Authority Initiatives: The First National Survey*. (Research monograph.) London, UK: School of Land Management and Urban Policy, South Bank University.
- Vessey, I. (1991). Cognitive fit: A theory-based analysis of the graphs versus tables literature. *Decision Sciences*, 22(2), 219-240.
- Welsh, B. C., & Farrington, D. P. (2002). Crime prevention effects of closed circuit television: A systematic review. London: Home Office (Research Study No. 252).

Welsh, B. C., & Farrington, D. P. (2004). Surveillance for crime prevention in public space: Results and policy choices in Britain and America. *Criminology and Public Policy*, 3, 497–525.

Welsh, B. C., & Farrington, D. P. (2006). Closed-circuit television surveillance. In B. C. Welsh & D. P. Farrington (Eds.), *Preventing crime: What works for children, offenders, victims, and places* (pp. 193–208). Dordrecht, Netherlands: Springer.

Wilson, J. Q. and Kelling, G. L. 1982). *Fixing Broken Windows: Restoring Order and Reducing Crime in Our Communities*, ISBN 0-684-83738-2.

Woodhouse, J. (2010). *CCTV and its effectiveness in tackling crime*. Englewood Cliffs, NJ: Prentice Hall

Zhao, J. S, Lawton, B. and Longmire, D. (2015). An examination of the micro-level crime–fear of crime link. *Crime & Delinquency*, 61,1: 19-44.

Internet Sources:

1.http://www.jamaicaobserver.com/news/effectively-using-cctv-to-fightcrime_103696?profile=1444

2.http://www.tdsi.co.uk/Fighting_Crime_using_Security_Technology.html

APPENDIX A

SAMPLE SIZE DETERMINATION

Required Sample Size[†]

Population Size	Confidence = 95%				Confidence = 99%			
	Margin of Error				Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586

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APPENDIX B



CHRISTIAN SERVICE UNIVERSITY COLLEGE, KUMASI

DEPARTMENT OF PLANNING AND DEVELOPMENT

To the Respondents

The researcher, a student of Christian Service University College, is seeking information relating to the topic **“TECHNOLOGY IN CRIME FIGHTING: AN EVALUATION OF THE USE OF CLOSE-CIRCUIT TELEVISION (CCTV) IN THE KUMASI CENTRAL BUSINESS DISTRICT OF THE ASHANTI REGION”**. Please you have been selected to participate in the research. Kindly provide answers by ticking [] or completing the blank space. Your responses will be kept confidential.

QUESTIONNAIRE

Section A: Socio-demographic characteristics

1. What is your sex? Male () Female ()

2. What is your age (in years)?
Below 20 () 20 -25 () 26-35 () above 35 ()

3. What types of business/institution do you operate?
Banks () Forex Bureau () Computer Accessories Shop ()
Supermarket () Any Other.....
.....

4. For how long have you worked as a business person?
Below 1 year () 1 – 3 years () above 3 years ()

Section B: Types of crime that occur in the Kumasi Central Business District

5. What crimes are commonly perpetrated within your area?

.....
.....
.....

6. How often do the Police arrest based on CCTV camera evidence?

- A. Always () B. Occasionally () C. Never () D. Hardly ever ()

7. How helpful is the CCTV camera to crime fighting within your area?

- A. Very helpful () B. Helpful () C. Not helpful () D. Bane on taxes ()

8. Do you think the installation of CCTV cameras in the CBD has improved security within the city? Yes () No ()

9. Do you think the installation of CCTV cameras within the CBD can enhance policing the city? Yes () No ()

10. What are the major factors that contribute to crime within the Kumasi Central Business District?

- a. Street Congestion ()
- b. Police non-visibility/ Slow response ()
- c. Poverty ()
- d. Poor Lighting ()
- e. Inadequate technology in fighting crime ()
- f. Any other.....

Section C: Effectiveness of CCTV cameras in fighting crime

11. Do the CCTV cameras provide warning signs to potential criminals?
Yes () No ()
12. Do the cameras serve as complementary tools in policing the central Business District? Yes () No ()
14. Do you think that the installation of CCTV cameras has influenced more foreign investors into the Central Business District? Yes () No ()

Section D: Strategies for effective use of CCTV cameras in solving and preventing crime

15. Would you want the Police to be empowered to man the CCTV cameras in the CBD? Yes () No ()
16. Do you think the Police should be made to control the CCTV cameras within the CBD? Yes () No ()
17. Must the Police have database (Biometric) for tracing criminals on CCTV footage? Yes () No ()
18. Do you think the Central government should provide resources to enable effective management of the CCTV cameras? Yes () No ()

APPENDIX C



CHRISTIAN SERVICE UNIVERSITY COLLEGE

DEPARTMENT OF PLANNING AND DEVELOPMENT

To the Respondents

The researcher, a student of Christian Service University College, seeking information relating to the topic “**TECHNOLOGY IN CRIME FIGHTING: AN EVALUATION OF THE USE OF CLOSE-CIRCUIT TELEVISION (CCTV) IN THE KUMASI CENTRAL BUSINESS DISTRICT OF THE ASHANTI REGION**”.Your response is assured of utmost confidentiality since the result will be used only for academic purposes.

INTERVIEW GUIDE

- 1. Institution Name:
- 2. Date of interview:

Section A: Personal Details of Respondent

- 4. Age;
- 5. Educational Level;
- 6. Position Held;.....

Section B: Types of crimes that occur in Kumasi Central Business District

- 7. In your opinion, what are the types of crime experienced within the Kumasi Central Business District?
 - i)
 - ii)
 - iii)
 - iv)
 - v)
 - vi)

8. What do you think are the major factors that contribute to crime within the Kumasi Central business District?

i)

ii)

iii)

iv)

v)

Section C: Effectiveness of CCTV cameras in crime prevention within Kumasi Central Business District

9. Have you heard of CCTV project being carried out in the Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT) in fighting crime?

Yes () No ()

10. How many Police officers patrol the CBD to monitor the CCTV cameras?

.....
.....

11. What are the Design Standards for the CCTV cameras installed in the Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT)?

.....
.....

12. Does the CCTV cameras installed at KUMASI CENTRAL BUSINESS DISTRICT have the ability to fight crime?

Yes () No ()

If "Yes" how?

.....

.....

13. Does the CCTV cameras have the ability to detect crime at Kumasi Central

Business District (KUMASI CENTRAL BUSINESS DISTRICT)?

Yes () No ()

If "Yes" how?.....
.....
.....

14. Is the CCTV cameras an effective safety tool for building feelings of security at

Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT)?

Yes () No ()

If "Yes" how? :.....
.....
.....

15. Do you think the use of Close Circuit Television (CCTV) Camera help in

managing crime within the Kumasi Central Business District (KUMASI CENTRAL BUSINESS DISTRICT)?

Yes () No ()

If "Yes" how?
.....
.....

Section D: Cost and management of CCTV cameras installed in Kumasi Central Business District

16. What is the cost of installing the CCTV cameras in Kumasi Central Business District.....

.....
.....

17. What is the cost of managing CCTV cameras in Kumasi Central Business District for its effective operation?

.....
.....
.....

Section D: Strategies for effective use of CCTV Cameras in Kumasi Central Business District

18. In your opinion, what policies should be put in place for effective use of CCTV within the Kumasi Central Business District?

- a)
- b)
- c)
- d)
- e)

19. What should be done to empower the Police to ensure effective use of CCTV Cameras in fighting crime?

- i)
- ii)
- iii)
- iv)
- v)