ICT Use and Criminal Investigations: Perspectives from Dar es Salaam Special Police Zone

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Abstract :- The focus of this study was to examine if there is a relationship between ICT use and success in criminal investigations in Dar es Salaam Special Police Zone. Descriptive and inferential survey designs were adopted. Analysis was done using frequencies, means, standard deviation and factor analysis. Regression analysis was also used to establish whether a relationship between ICT use and the success of criminal investigations existed. Findings showed that there was no significant relationship between ICT use and success in criminal investigations in Dar es Salaam Special Police Zone. The findings revealed that information, interrogation, interview and instrumentation were among of the tools used during criminal investigation. The findings revealed that police officers have family with hardware tools such as computers, printers, tape recorders, cameras and spy pens while few of them had no family with hardware tools such as computers, printers, tape recorders, cameras and spy pens and they used for criminal investigation. The study concluded that as far as the extent of ICT use in criminal investigations is concerned, respondents mainly and generally used mobile phones, internet, computers, scanners and photocopy machines to conduct criminal investigations. The study recommends that the challenge of inadequate ICT technologies to gather sufficient evidence be tackled through a number of ways; the DCI should improve forensic equipment and facilities to foster investigations.

Keywords:- Criminal Investigation, ICT, Relationship and Tanzania Police Force.

I. INTRODUCTION

Policing is at the core of every functional criminal justice system because it directly confronts the difficulties that courts encounter daily. Population growth and rising crime rates strain under-resourced police agencies' ability to prevent and investigate crimes. For example, in Tanzania, the perception of pervasive corruption at all levels of the Tanzania Police Force (TPF) strains the force's ability to maintain public confidence [1]. The TPF is governed by the Police Force and Auxiliary Services Act and the Criminal Procedure Act Cap 20 of 2012 [1].

The TPF's ability to investigate and prevent crime is hampered by poor investigation methodologies, forensic capacity and evidence management competence. There are also limited transport and communication facilities and officers suffer from low pay and bad living conditions. As a result of low morale, abuse of power, fabrication of charges against innocent individuals, avarice, ability to get away with it and community sensitivity, corruption rises. As a result of public pressure and ignorance of the law, 'mob rule' occurs. The mob rules the police while politicians and other prominent individuals pressure the cops to bend the rules to suit their goals. While other countries like Zambia have Victim Support Units and Public Police Complaints Authorities, the TPF does not [1]. Despite lacking in proper criminal record keeping, having weak criminal control systems and lengthy criminal trials, all cases are investigated by Tanzania's Criminal Investigation Department (CID).The public's opinion of police is negative and this undermines community policing. Family affairs, gender and sexual assaults are dealt as such, with no specific facilities.

Intervention is inevitable if peace, justice and criminal-free atmosphere is required to prevail in Tanzania. Police investigative work involves gathering, analyzing and interpreting information about criminal activities [2]. According to Luen and Al-Hawamdeh [3], effective policing requires fast and reliable information. The TPF should thus use information technologies to maximize the likelihood of obtaining reliable data. Information technologies help criminal investigators create, store, retrieve, transfer, and apply information [4]. Moreover, information technologies may assist cops make better use of their time. Automating some common investigative activities is expected to reduce crime and enhance community trust in Tanzania Police Force.

Before the adoption criminal investigation technologies, criminal investigations were conducted using manual methods of analyzing physical evidence and conducting forensic examination [4]. These were tedious and time consuming due to the large amount of data investigators handle. In a study conducted by Chan (2001)[6] a police detective indicated that 5-6 years ago it used to take 5-6 hours to type the outcome of an interview for a large investigation; It could now be done in half an hour through taping of interviews. In addition, forensic evidence was underutilized due to lack of tools for its examination [5].

The need for ICT use in criminal investigation is timely and has received a lot of attention. A few studies have established a lack of a significant relationship between the use of ICT and criminal investigations [5].

Most studies conducted on ICT and policing have majorly focused on front line police work, that is general police work such as patrolling, crime reporting, crime detection and traffic duties and have generally found that ICT led policing is effective [7]. These studies have left out ICT application in criminal investigations. Further, there is dearth information on the DCI and as such, past studies have failed to address the relationship between ICT use and success of criminal investigations at the DCI in Dar Es Salaam special zone. The current study hence sought to fill this gap by addressing the following questions; what is the relationship between ICT use in conducting criminal investigations in Dar es Salaam special zone and the success of those investigations?

Findings of the study would support the Diffusion of Innovations theory in criminal investigation practices. The relationship between ICT use and success in criminal investigations at the DCI in Dar Es Salaam Police Zone are outcomes of choice on what ICT innovations to adopt on the basis of technical compatibility and complexity, and the advantage that can be drawn from ICT adoption.

II. LITERATURE REVIEW

To try and establish the relationship between ICT use and success of criminal investigations, the study attempted to explain criminal investigations and how relevant factors individually or interactively dictate its outcome. The study borrowed from Diffusion of Innovations Theory (DOI) also known as the Innovation Diffusion Theory (IDT). The theory holds that inventions are transmitted over particular avenues and in a certain people system where people are viewed as possessing varying degrees of adopting innovations. Studies have persistently established that technical compatibility, technical complexity, and relative advantage (perceived need) are valuable to the adoption of inventions. IDT was relevant to the current study as it would enable the current study understand the contribution of ICT inventions to successful criminal investigations at the DCI in Dar Es Salaam Police Zone.

A. Success Factors of Criminal Investigations

There is no laid down standard for judging the failure or success of an investigation. An unsolved crime is not an indication of failure in investigations neither does the conviction of an accused person imply that investigations were intelligently conducted [5]. An investigation may however be considered successful if; all available physical evidence has been gathered, all available physical evidence has been properly handled, all relevant witnesses have been interviewed intelligently, suspects effectively interrogated, logical leads properly tied and developed and the case comprehensively compiled and disposed of by way of prosecution or otherwise as deemed necessary.

Other factors include the accuracy of a suspect profile, moving a case forward, help catch the offender, prevention of wrongful conviction such as in court appeals, assist detectives understand the case better, saving time and resources in handling the case, and victim or victim's family thoroughly understanding the case [8]. Success is therefore not just about apprehending the wrongdoer or convictions [8].

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

B. Empirical Review

A few studies have established a lack of a significant relationship between the use of ICT and clearance rates of cases in criminal investigations concluded that this lack of a significant relationship could be due poor implementation and use of information technologies by police departments [5]. This finding was also explained by the productivity paradox that asserts that it is difficult to demonstrate that ICT investments increase output.

Brayne, [9] conducted a study on the use of ICT in criminal investigation processes in Tanzania. The study used three main methods in data collection including; literature review, questionnaires and interviews through which data collected from police officers of different ranks. The study revealed that; the use of ICT in criminal investigation processes is very small, only at regional office where ICT has been mostly used. Such poor utilization of ICT in TPF is attributed to acceptance challenge on ICT uses, lack of funds, computer illiterate to investigators, scarcity of ICT resources and poor internet connectivity which is not reliable [10]. Therefore, this study recommends a prototype which is capable to store videos, audios, photographs captured from installed digital cameras, tape recorders, and spy pens in investigation rooms. Furthermore, the prototype is capable to store case files and help supervisors to perform their managerial duties. The prototype and the study therefore, are very important to help criminal investigation processes progress in Dodoma region and Tanzania.

A study conducted by Karake [7] on the adoption of electronic policing services in crime control in Nairobi County in Kenya established that Centralized Information Storehouse; Closed Circuit Television (CCTV); Electronic Identification; Online Verification and Fingerprints Reader; Radio Frequency Identification (RFID) and Police-Public Interface were the electronic policing systems that have contributed to effectiveness of Crime Control in Nairobi County. The study also established that the adoption of Electronic policing systems has to a great extent influenced the effectiveness of Crime Control.

C. Conclusion

Majority of past studies have looked at either application of ICT in front line police duties or in enabling crime. Few if any have ventured into ICT adoption to solve crime. They have also not addressed specific ICT needs of Tanzanian's DCI. The study attempted to fill this research gap by examining the ICT use and success of criminal investigations in Dar es Salaam Police Zone.

III. METHODOLOGY

The study used both descriptive and inferential survey designs. These designs were suitable for the study because the study's aim was both descriptive and inferential in nature. The study used an inferential survey design as it sought to establish whether there was a relationship between its variables, that is, whether there was a relationship between ICT application and success in criminal investigations. A regression design was suitable for the study as the current study endeavored to simply establish whether a relationship existed between the two variables without presuming causation.

The study used 30 respondents as a sample size where the police officers working in the Criminal Investigation Department, Traffic and General Duty Departments, as well as public prosecutors in the Dar es Salaam region, was assessed during data collection. Questionnaires were used to collect data. The questionnaire was administered to the police detectives of each of Dar es Salaam Police Special Zone offices as well as other units respectively. These respondents were selected due to their wealth of knowledge and experience in conducting criminal investigations and their first hand interaction and involvement with ICT tools relevant to criminal investigations. The researcher explained the purpose of the research to the respondents and received their consent to participate in the study. The researcher assured the respondents of confidentiality. The researcher maintained privacy of the respondents by assigning them research identification numbers and not their actual names.

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

After collecting data, all questionnaires from the respondents were checked to confirm that all relevant items had been responded to and whether responses were logical, believable and consistent. All the responses were then coded. Data analysis using both descriptive and inferential statistics was then performed. The analysis was subjected to means, standard deviation as well as multiple linear regression to establish the relationship between ICT use in conducting criminal investigations and the success of criminal investigations as perceived by detectives.

IV. FINDING AND DISCUSSION

This section captured the analysis and findings of the study following the research methodology outlined in methodology section. The results were presented on the relationship between ICT use and success of criminal investigations.

A. Demographic Characteristics

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

TABLE I: DEMOGRAPHIC CHARACTERISTICS

		Frequencies	Percentages	Cumulative Percent
Gender	Male	25	83	83
	Female	5	17	100.0
	Total	30	100	100.0
Age	25 or less	2	6.67	6.67
	26-30	6	20.00	26.67
	30-35	7	23.33	50.00
	36-40	4	13.33	63.33
	41-45	2	6.67	70.00
	46-50	3	10.00	80.00
	51-55	5	16.67	96.67
	Over 55	1	3.33	100.00
	Total	30	100.0	
Education	Certificate	18	60	60.00
	Diploma	8	27	87.00
	Bachelor	3	10	97.00
	Masters	1	3	100
	Total	30	100.0	
Position	Commissioned Officer	5	17	17
	Non-commissioned officer	15	49	66
	Gazette officer	5	17	83
	Forensics Officers	5	17	100
	Total	30	100.0	
Work Experience	5 years and below	13	43.33	43.33
	6 - 10 years	7	23.33	66.67
	11-15 years	4	13.33	80.00
	16-20 years	5	16.67	96.67

21 years and above	1	3.33	100.00
Total	30	100.0	

From the findings shown in Table 4.1,83% of the respondents were male and 17% of the respondents were female. However, respondents in the field indicated that they had five female officers who were present at the time of the study. This illustrated that majority of respondents in Dar es Salaam Police Special Zone were male.

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

The findings also revealed that majority (49%) of the respondents were non-commissioned officers, while others were inspectorate and a few of them were gazette officers (17) and forensic officers. Also the findings show that, the majority of respondents had certificate level (60%) while others had diploma level (27) and a few (13%) of them had bachelor's degree and master's degree level. This indicates that the majority of the respondents have an educational background and could give relevant information on the subject matter.

B. Success Factors as Perceived by the Respondents

This section sought to establish what the respondents perceived as measures of success for a criminal investigation. Responses were rated on a five-point Likert scale measuring the extent to which respondents agreed to the statements, where: 1- To no extent, 2- To a little extent, 3- To a moderate extent, 4- To a great extent and 5-To a very great extent. The mean and standard deviations were generated from SPSS for the perceived factors as illustrated in Table 4.2. The mean values were interpreted in the scale where: < 1.5= to no extent; $1.5 \leq 2.5$= to a little extent; $2.5 \leq 3.5$= to a moderate extent; $3.5 \leq 4.5$= to a large extent; ≥ 4.5= to a very large extent.

TABLE II: MEANS AND STANDARD DEVIATIONS

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

Mean values in Table II show that the greatest measures of successful criminal investigations by police detectives in Dar es Salaam Special Police Zone were accuracy of suspect profile, knowing the offender's location and identifying the offender with mean outcomes of 4.44, 4.44 and 4.33 respectively.

C. Relationship between ICT Use and Success of Criminal Investigations

The objective of this study was to determine the relationship between ICT use and success of criminal investigations in Dar Es Salaam Special Police Zone. Regression analysis was performed on the independent variables and the dependent variable.

D. Regression Analysis – Output of Analysis

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

E. Summary of Model

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

TABLE III: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.998a	0.996	0.987	0.02598

F. Coefficients

TABLE IV: COEFFICIENTS

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0%Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
X1	(Constant)	7.90	0.37		21.44	0.03	3.22	12.57
	Evidence and Victim Management (Component1)	-2.88	0.58	-0.44	-5.0	0.13	-10.18	4.43
X2	Witness and Suspect Management (Component 2)	-2.30	0.31	-0.65	-7.40	0.09	-6.27	1.66
a. Dependent Variable: Success of Criminal Investigations								

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

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where Y is the dependent variable, β_0, β_1, and β_2 are the unstandardized coefficients, X1 and X2 are the independent variables, and μ is the error term.

XI and X2 were determined through factor analysis.

$$Y = 7.90 - 2.88X_1 - 2.30X_2 + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots.(2)$$

Where is the discussion of the findings? Also try to draw inference from existing body of literature on the subject matter to draw some comparison (contradiction or confirmation of previous study findings)

G. Analysis of Variance (ANOVA)

TABLE V: ANALYSIS OF VARIANCE (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.157	2	0.078	116.058	0.065b
	Residual	0.001	1	0.001		
	Total	0.157	3			
a. Dependent Variable: Success of Criminal Investigations						
b. Predictors: (Constant), Witness and Suspect Management (Component 2), Evidence and Victim Management (Component 1)						

V. DISCUSSION OF THE FINDINGS

The finding showed that the majorities agree there is a problem with the manual investigation system that is used in criminal investigation and also majorities of respondents agree that the manual investigation system leads to mishandling of information and lost paperwork these findings agree with Mohammed, (2018) studied on the challenges associated with manual records management in public institutions and found that manual record management is challenged by improper records management; inadequate proper security for records; inadequate professionally trained records managers; there are inadequate resources to facilitate proper records management practices; insufficient space for records management; misplacement of vital records; loss of vital records; inadequate computer terminals; lack of record keeping policy; lack of record retention; lack of disposition schedule; ineffective means of retrieving record and improper records management.

VI. CONCLUSION AND RECOMMENDATION

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

in Dar Es Salaam Police stations had to contend with in their use of ICT to conduct criminal investigations were the lack of CCTV cameras in critical areas within their work jurisdiction, inadequate ICT technologies to store and preserve evidence, inadequate ICT technologies to gather sufficient evidence and lack of technical knowledge.

The study recommends that proper budgetary policy to allow adequate funding for the investigative function of the police to be able to acquire modern ICT tools for effective mapping of security threats such as leveraging social media, profiling suspects and criminals, conducting investigations, and training personnel in the use of the tools. The study also suggests that adequate physical and virtual space for the storage of evidence be provided and secured.Moreover, the challenge of inadequate ICT technologies to gather sufficient evidence be tackled through several ways; the DCI should improve forensic equipment and facilities to foster investigations. There should be better equipment to help in data mining, preliminary report preparation, and modern scene and victim analysis. The efficiency and effectiveness of the population of suspects should be improved through a digitization process. The challenge can also be tackled through the provision of smart ICT tools to sniff out arms, narcotic drugs, and psychotropic substances and the capacity of specialist units.

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