



Constraints of E-Policing Adoption: A Case of Dodoma, Tanzania

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ABSTRACT

We describe a study on constraints of electronic policing (e-policing) adoption in Tanzania. E-policing refers to use electronic means for policing activities. In other words it involves the use of Information and Communication Technology (ICT) in policing activities. The goal is to improve law enforcement and increase community safety. Data was collected using questionnaires, interviews, focused group discussion and document analysis. The study revealed several issues: e-policing adoption is at rudimentary level in Tanzania. ICT is regarded as an agent of confidential information disclosure in policing activities. A number of constraints still exist. These include inadequate computer skills among police officers; insufficient funds to facilitate various activities including training; inappropriate selection of police staff for training on ICT use; inadequate training programs; low Internet penetration and reliability; and less developed ICT infrastructure. The study recommends, among other things, introduction of an information system for e-policing whereby a citizen can report crime incidents by sending a short text message and a notification to the officer responsible is sent for action.

Keywords: *E-Policing adoption; Information and Communication Technology; ICT; Constraints; Challenges; Community Policing; Tanzania*

1. INTRODUCTION

1.1 Community Policing to E-Policing

This paper focuses on e-policing adoption in relation to community policing through which the public can be properly involved. Community Policing aims at enhancing police-community partnerships in crime prevention within their localities. With community policing, service delivery can be improved; problems can be jointly identified and solved; interaction of police force and the public increases; and trust of the public on police force can be enhanced [5]. In order to achieve these goals an efficient and effective means of communication is necessary. This is where e-policing takes its role. But e-policing is not limited to community partnerships alone as it is elaborated below.

The advantages of involving the Community in policing activities include: (i) increased prevention and reduction of crime incidents; (ii) reduction of social disorder and anti-social behaviour; (iii) improved police-community relationships as well as community accountability; (iv) reduced corruption among police force; (v) enhanced respect of human rights; (vi) improved community capacity to handle local problems, (vii) improved police officers' attitudes and behaviour towards policing [15].

In Tanzania, Community Policing was established as "Sungusungu" (a people's Militia) at the beginning. This was formed by the People's Militia Law of 1973 (amended in 1989). Sungusungu was a type of Community Policing adopted by a number of African countries including Kenya and Tanzania [8]. This is an approach that involves community members in policing activities with the goal of fighting crime incidents. The Ministry of Home Affairs of Tanzania [15] reported that the core roles of Tanzania police

force are under section 5 of the police force and Auxiliary Service Act Cap 322. This states that "*The Force shall be employed in and throughout the United Republic for the preservation of peace, the maintenance of law and order, the prevention and detection of crime, the apprehension and guarding of offenders and the protection of property, and for the performance of all such duties shall be entitled to carry arms*". Community policing therefore enhances police force core roles through the involvement of the public. Mwema [17] urges that most of democratic societies provide a strategy for sharing responsibility between the public and law enforcers. Community policing is one of the strategy.

In order for community policing to be effective and efficient, a fast means of communication are needed. This can be brought by adoption and use of ICT including mobile phones [21]. E-policing involves adoption and use of ICT in policing operations. There are many definitions of e-policing. Boondao and Tripathi [1] tried to give highlights of e-policing definitions. Firstly, they defined e-policing as the use of the Internet (i.e. networked computers) to deliver police services to the public. This can refer to a website; e-mail and fax are contact methods that the public can use in addition to the telephone and face-to-face communication channels. Secondly, they described e-policing as the use of the computers including digital telephony to deliver police services. Thirdly, they characterize e-policing as the use of ICT in police work to improve effectiveness and efficiency, support frontline officers and assist in local problem-solving initiatives resulting into reduced crime incidents. LeBeuf [14] argues that e-policing is the transaction of services and information between the police and citizens via the Internet.

Our search for more recent published definitions did not bear much fruits. Based on the above definitions, it can generally be said that e-policing refers to the use of electronic means in policing activities including modern and traditional



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information and communication technology. These can include the use of radio, television, fax machines, intelligent machines including robots, the Internet, computers, information systems and telephones in policing activities. Koper et al. [13] argues that the high impact technologies in e-policing include DNA testing equipment; integrated databases; geographic information systems (GIS); computer-aided dispatch with global positioning system (GPS) for tracking of patrol cars; video surveillance networks; wireless access in patrol cars; inter-agency radios; use of force computer simulators; fingerprint readers; conducted energy devices; knowledge discovery (investigative) software like data mining software.

There are several advantages of e-policing. These include facilitation of efficient communications, increased access to information, improved transparency, accountability, and enhanced partnership with the community. Efficient and effective communication can improve police-community relationships. ICT optimizes communications by improving the capability of the law enforcers to reach large number of people efficiently and effectively. In addition investigations can be done faster with reliable findings of crime incidents. In other words e-policing can result into improved crime detection, analysis and investigation [10, 13]. In this case, e-policing can be regarded as the most efficient and effective approach in community policing.

1.2 Problem Statement of Research

The adoption of e-policing can lead to improved communications and the management of the security and safety of the community by sharing information and improving interaction efficiently and effectively [10, 13]. ICT has been reported to increase efficiency and effectiveness of Community policing in a number of countries [10, 19, 20].

However, Mwema [17] reported that the adoption of e-policing in Tanzania has been identified as one of the major obstacle in modernizing the police force. But there have been no data showing the extent of the problem and the underlying causes of the obstacle are not well known. Furthermore, the literature does not show the constraints of e-policing adoption. The study was therefore aimed at bridging the knowledge gap of constraints of e-policing adoption by the Tanzanian Police Force. It further makes recommendations for improving the situation.

1.3 Objectives and Research Questions

The goal is to improve law enforcement and security of the public by taking the advantages of ICT and opportunities that it offers. Specific objectives include:

- i. To identify and examine the key constraints in adopting and using ICT to improve the policing activities.
- ii. To recommend on the possible ways to mitigate the constraints

Research Questions that guided the study include the followings:

- i. What are the constraints facing the adoption of e-policing? This question aimed at getting an insight of the challenges of adopting and using ICT and recommend for a solution.
- ii. What are the ways or strategies that can help in mitigating the constraints? This question aimed at recommending possible and practical strategies that can help in improving the adoption of e-policing. In so doing the police force can learn and take up the challenges for improved law enforcement.

This work gives positive contributions to both the society and to the police force. On the police force, it gives an understanding on how they can introduce and adopt e-policing to improve service delivery. On the other hand the society can realize safety and tranquillity. Due to budget constraints the study was limited to Dodoma region the political capital of Tanzania.

1.4 Organisation of the Paper

The following Section introduces the methods that were adopted. In Section 3, we present the findings and a discussion in which we highlight various issues arising from the study. Section 4 gives the conclusions, recommendations and open questions that need further empirical studies.

2 METHODS

2.1 Area of Study

The study was conducted in Dodoma region the political capital of Tanzania. The region comprises Dodoma Municipality, Bahi, Chamwino and Mpwapwa districts. Key informants were interviewed up to a ward level. Dodoma Municipality covers an area of 2,669 square kilometres [18]. Based on the 2002 National Population and Housing Census, the population was 324,347 people [18]. The municipality is subdivided into four divisions namely; Urban, Hombolo, Kikombo and Zuzu. The main activities of the residents are commerce, farming, civil service employment and livestock keeping.

2.2 Sampling, Data Collection and Analysis

A sample size of 238 respondents was used. 194 citizens were randomly selected from residents. On the other hand 44 key informants from police officers were purposively selected targeting mainly in-charge of police stations. Focused group discussion was also used to supplement the information obtained particularly on ICT technical personnel. Data analysis involved coding, data entry to a statistical package namely SPSS (Statistical Package for Social Sciences data analysis software (SPSS)). We did perform computation of descriptive statistics such as frequencies, and percentages.



Determination of statistical significance of various proportions was done as well and validated using R[¥] software.

3 RESULTS AND DISCUSSION

The study revealed the following challenges: inadequacy of police staff with Computer skills; Lack of sufficient budget to facilitate training on ICT resources; inappropriate selection of police staff to go for training on ICT use; financial constraints; low Internet access and reliability; undeveloped infrastructure to enable the use of ICT; and ICT is regarded to reduce confidentiality in policing activities as a result its acceptance among police officers is still a challenge.

3.1 Characteristics of Respondents

Table 1 summarizes the percentage of representation of respondents that were recruited for the survey. It depicts the characteristics of respondents to give the background and suitability of the population. It can be seen that that a majority (63%) of respondents are a range of 25 – 40 years of age. This follows the adult population distribution because the average life expectancy of Tanzanian is 58 [24]. Furthermore, CIA [3] claimed that the median age in Tanzania is 18.7.

Table 1: Summaries of Respondents (N=238)

Variable	Percentage of Citizens	Percentage	
		(Police General)	(Police with IT Knowledge)
Age			
Below 25	24.2	11.8	10.0
25-40	63.9	67.6	80.0
41-55	10.8	20.6	10.0
Above 55	1.0	0.0	0.0
Sex			
Male	60.8	82.4	90.0
Female	39.2	17.6	10.0
Education			
Primary Education	4.6	0.0	0.0
Secondary Education	7.2	64.7	30.0
Diploma	30.9	11.8	20.0
Degree	45.9	23.5	30.0
Masters	11.3	0.0	20.0

In addition, it is notable that males (60.8%) are more than females (39.2%) because the questionnaire was administered at work places where fewer women work outside the home in Tanzania. This is common in African societies [12]. The majority of police officers (64.7%) have secondary education. Police officers with IT knowledge are in middle range that is 30.0% and are degree holders in terms of education and 20.0% have second degree level.

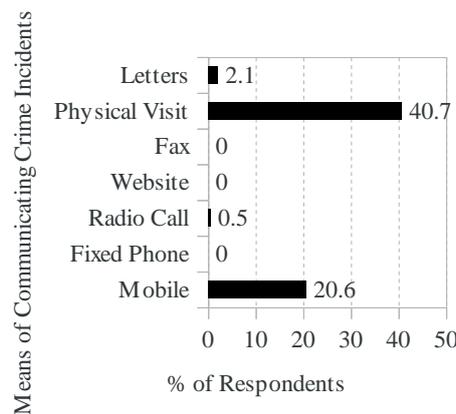


Figure 1: Comparison of Means of Communicating Crime Incidents

3.2 Use of ICT in Reporting Crime Incidents

The use of ICT by citizens is summarized in Figure 1. Respondents that who use mobile phones in policing activities account for 20.6% which is a statistically significant proportion ($p < 0.001$). Other means include radio call and letters are used by very few respondents accounting for 0.5% and 2.1% respectively. None of the respondents use website, fax, and fixed phones. As far as ICT technologies, mobile phones are the mostly used.

3.3 Use of ICT in Community Policing Activities

In many police forces in the world, Forensic Technologies are used. Forensic deals with crime scene investigation. Examples of common forensic procedures include use of DNA and use of fingerprints [6]. In our findings these imaging technologies are not currently in use. In other words, the high impact technologies in e-policing mentioned by Koper et al. [13] are lacking in the area surveyed. In Figure 2, we provide various technologies or services used in the community policing activities. It can be observed that mobile phones are leading in terms of communication means mainly used for voice calls and short message services (SMS). Information systems do not exist as none of the respondent mentioned it. Furthermore, only 2.3% of the police stations claimed to be connected to the Internet.

[¥] R is a statistical software found at www.R-project.org/

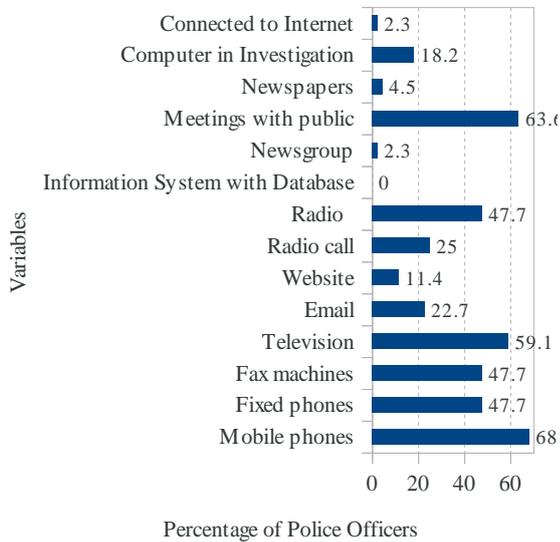


Figure 2: Extent of Adoption and Use of ICT in Community Policing

The results on Internet connectivity are in agreement with TCRA [23] report which shows that only 11% of the Tanzanian are accessing the Internet in 2010. While this is true the penetration rate of Internet remained at high levels in developed countries and adoption of mobile phone still at early stage in the world [16].

3.4 Constraints of E-Policing Adoption

3.4.1 Acceptability and Awareness of ICT use by Police Officers

We asked the key informants of police officers that were recruited to the survey to provide an estimate of the level of awareness on ICT particularly for use in policing activities. Only 4.5% of them claimed that the awareness is at the good level. The rest of them acknowledged that it is at bad level. The implication is that e-policing has not received enough attention in enabling the policing operations due to the fact that most of police force operations are done manually. Acceptance of e-policing is still very low because 56.8% of the respondents said acceptance is minimal. There are no information systems to assist in doing their activities. One of the major reasons given was that ICT is regarded as an agent of confidential information disclosure.

This is contrary to the developed countries such as Australia, United Kingdom and United States of America [10, 19, 20] where large numbers of policing activities are done using ICT. In the USA for example [19] all police officers are given mobile ICT gadgets for emergency, improved efficiency, and cost effective operations.

There is a need of creating strategies of improving awareness which could include training of police officers and provision of ICT devices or equipment to increase efficiency and effectiveness of policing operations. Up to now, recording of crime incidents for example in Tanzania is done using manual methods in report books. When it happens there is a need of certain information, someone must search the particulars in stored paper files which results into inefficiency.

3.4.2 Limited or No Funding for ICT

It was learnt that there is insufficient funds set for ICT matters. All the respondents agreed that financing ICT matters is a bottleneck. The interview shows that usually there is no funds clearly set for ICT matters including training of personnel. This is in line with BoT [2] report which claimed that the level of fiscal deficit has continued to rise in Tanzania. It adds by showing that the gap between domestic revenue and expenditure has also grown over time which directly affects many plans including ICT matters. For quick e-policing adoption there is a need for the police force to dedicate funds for ICT matters. This can be realized in understanding that ICT can bring efficiency and cost-effectiveness in policing activities [10, 19, 20].

In addition, there are no funds set aside for official communication purposes particularly at lower cadres. This means that they can not communicate easily in emergency situation. Police officers that need to communicate to their immediate bosses can not do that so that they can realize savings of their own personal funds. There is a need of creating a closed user group for police officers for efficiency and effective communication at lower costs while preserving information security [7].

3.4.3 Few staff with Computer skills

The majority (55%) of the police respondents have no skills. Among the respondents, police staff who work as ICT persons have skills on computer use. This is a challenge or constraint of e-policing adoption. E-policing require basic computer skills that can help in using various information system and equipment for increased efficiency and effectiveness. Without ICT skills it is a dream that can not come true if e-policing has to be successfully adopted in Tanzania. Earlier we saw that most of the police officers have a secondary education certificate (see Table 1). This means if the secondary education curriculum and that all secondary schools would be teaching basic computer skills this would not be a big problem. The current situation shows that although there are no official data very few secondary schools have ICT equipment [22].

3.4.4 Inadequate or Lack of ICT Training

This study has revealed that there are no training programs in ICT for police staff. All (100%) respondents said that there is no definite program for ICT training. The findings are in line with Mwema [17] who reported that the police force need to



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be modernized and ICT skills are required. However, the pace for modernization which include training of police staff need to be re-looked into. As for now the situation is still disappointing. Training programmes need to exist so that e-policing adoption can increase efficiency and effectiveness of the police force. On the other hand, if it happens that there is any kind of training, 63.8% of police officers complained that there is no clear way of selecting candidates for further studies. There is a need of putting forward clear methods of selecting staff for training including in ICT matters.

3.4.5 Lack of Internet Connectivity

Another constraint is lack of Internet connectivity. Internet connection exists only at the region office. All other districts have no Internet connection. All police department at districts and ward levels have no internet access and as a result adoption of e-policing is practically impossible if the current situation shall continue to prevail. Sometimes if there is information to be sent electronically to another office someone must move to regional office. This has caused delay especially when information is needed urgently. In order to improve communication and have easy transfer of information from one place to another, Internet services are inevitable.

The literature shares similar information with this finding. TCRA [23] reported that only 11% of the Tanzanian have access to the Internet. But it is surprising to learn that the police force is not taking large proportions of those who have Internet access. Furthermore, ITU [11] categorizes Tanzania as one of the least connected countries. The situation of Internet connectivity is different in many of the developed world. According to ITU [11] the developed world is fast growing into broadband based information societies with always-on connections to the Internet and constant mobility.

3.4.6 Less Developed ICT Infrastructure

During our survey all (100%) key informants of police officers acknowledged that there is inadequate ICT infrastructure to allow adoption of e-policing. Although the coverage of wireless technology through telecom companies is changing the situation, some areas in Dodoma have no signals leading to difficulties in using mobile devices. These are mainly the rural areas where policing activities need to be present as well. Areas that were found without enough wireless signals include (*in brackets are district names*) Manda (Chamwino), Mangaliza (Mpwapwa), Matonya (Mpwapwa), Idodomia (Mpwapwa), Chali (Bahi), Galigali (Mpwapwa) to mention a few. This is in line with the literature as it shows that although the growth rate of mobile network coverage is high in the urban areas, the situation is different in rural areas where rarely wireless signal are minimal [9].

3.4.7 Lack or Unreliable Electric Power Supply

E-policing needs constant and reliable supply of electricity. In Tanzania, electric power supply is unreliable in areas that has electrification. The percentage of the population with electrification is still very low both in urban and rural areas.

WB [25] reported that Tanzania's power sector was characterized by exceptionally limited electrification (10.6% of the entire population), and unreliability of supply, even by the standards of other low income countries in Africa. The access to electric power in urban areas was standing at 38.9% of the population in 2010 and 1.8% of the population in rural areas. If we assume that achieving these proportions took 50 years of independence, nothing much might not have changed at present (after 2 years). Furthermore, CTI [4] claimed that Tanzania is still experiencing the obstacle of unreliable, intermittent power supply, frequent rationing and outages. The report further explains that electric power production is insufficient even to the already installed transmission and distribution infrastructure. It is therefore obvious that this situation calls for enormous effort for successful e-policing adoption.

3.4.8 Scarcity of ICT Equipment

All (100%) of the key informants acknowledged that there are inadequate ICT equipment. There are no enough computers, radio calls, fax machines, scanners, and cameras. DNA testing equipment including other imaging technologies for retina scanning do not exist. All police departments at Districts and Ward levels do not have cameras, fax machines and scanners. These are available only at the regional police office. All information from these departments to other places which need to be faxed or scanned must first go through regional police offices. If e-policing has to be adopted this could be one of the constraints as heavy investments need to be done. While heavy investments are required there are financing constraints.

Table 2 summarizes the ICT equipment present for the whole Dodoma region which is the Tanzanian capital. The two fax machines available at the regional offices create a long queue for information to be communicated elsewhere. The police force at the region receives information from each district to be sent to the Police Head Quarters. These reports are sent through hard copies, the person concerned has to re-type the same information. This is tedious work which needs not to be done to serve public funds by creating ample time for the police officers to work on other matters. With e-policing the heavy requirements of staffing would be minimized [10].

Table 2: ICT Equipment Available for Whole Region

ICT Devices	Number available
Camera (not digital)	2
Scanner	2
Fax	2
Digital Cameras	2

Source: Field Survey Data



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4 CONCLUSION, RECOMMENDATIONS AND FUTURE WORK

4.1 Conclusions

The major technologies identified at present include radio, radio calls, wired (fixed) telephones, website (centralized), emails, computer technology, cameras, fax, scanners, and mobile phones. The high impact technologies are lacking. There are places where the mobile phones signals are not detected because the signals receivers are placed too far away from them. Constraints to adoption of e-policing include lack of basic skills; lack of ICT equipment, less developed ICT infrastructure; budget constraints; lack of Internet connectivity, low electrification and unreliability of electric power supply.

4.2 Recommendations

The police force has to increase the efforts for e-policing adoption for improved efficiency and effectiveness. Since many people are using mobile phones it is recommended that an interactive system using mobile technologies should be adopted for fast e-policing adoption. Free and open source software could be customized to reduce the total cost of ownership. The government should launch ICT projects for the police force and allocate enough funds for ICT matters. By setting sufficient funds for ICT will reduce the heavy requirement of staffing levels and provide cost-effective solutions.

There is a need of providing enough ICT equipment these should go along with ICT training to ensure proper use. ICT equipment or technologies could include DNA testing, computerized fingerprint print recognition, retina scan, and provision of mobile radio calls observing the closed user group concept for security reasons.

The force should have a defined training programme and selection criteria of trainees at the beginning. With time training will be required for almost all staff. Provision of ICT technical support from specialists might be required. On the other hand the ministry of education and vocational training (MoVET) need to ensure that all secondary schools teach computer basic skills so that the market for labour force can supply staff with required skills. Alternatively police training should also include computer basic skills. Internet is a backbone for communication. Internet connection must be available in all police departments to foster the communication between police to police and police to citizens for a high impact e-policing.

4.3 Future Work

The findings should be regarded as a baseline for future assessment. Firstly an impact assessment survey can be conducted after an action research to this area. It will be informative if this similar study is conducted in other regions. Some challenges might be very difficult for the force to solve.

Issues like financing mechanisms. It might be important to come up with a policy focused research that would improve the funding of the force.

REFERENCES

- [1] Boondao, R.; and Tripathi, N.K.; (2007), "Electronic Policing: A Framework for Crime Control and Citizen Services". In Social Implications and Challenges of E-Business Edited by Feng Li. IGI Global. pp. 78-93.
- [2] BoT (2011). Bank of Tanzania Annual Report 2009/2010. Dar es Salaam: Bank of Tanzania
- [3] CIA (2012), The World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/geos/tz.html> Accessed on 8th December 2012
- [4] CTI (2011), "Challenges of Unreliable Electricity Supply to Manufacturers in Tanzania." A Policy Research Paper Submitted to Energy Sector Stakeholders in Advocacy for Ensured Reliable Electricity Supply to Tanzanian Manufacturers. Confederation of Tanzania Industries.
- [5] Dominique, W. (2010), UNDP Workshop on Community Security and Social cohesion, Montreux.
- [6] EU – European Commission (2012), "DNA-Database management Review and Recommendations" . ENFSI DNA Working Group, European Commission. Retrieved on 18th January 2013 from www.enfsi.eu/
- [7] GoI. (2012) – Government of India. "National Disaster Management Guidelines: National Management Information and Communication System". National Disaster Management Authority.
- [8] Heald, S. (2002), "Domesticating Leviathan: Sungusungu in Tanzania". Internet WorldStats, "Usage and Population statistics": <http://www.internetworld>
- [9] Hellström, J. (2010), "The Innovative Use of Mobile Applications in East Africa". Sida Review 2010:12. ISBN: 978-91-586-4129-7. This publication can be downloaded from: <http://www.sida.se/publications/>
- [10] HMIC (2012), "Policing in austerity: One year on" Her Majesty Inspectorate of Constabulary (HMIC). ISBN: 978-1-84987-856-2. www.hmic.gov.uk/media/policing-in-austerity-one-year-on.pdf
- [11] ITU, (2012), Measuring the Information Society. International Telecommunications Union (ITU), Geneva
- [12] Kombo, I. and Minungu, L. (2012), "Gender Imbalance in the Leadership of Local Government Authorities in Tanzania: The Case of Dodoma Municipality". African Journal of Social Sciences. Vol. 2. No. 3. pp. 116-123.



<http://www.esjournals.org>

- [13] Koper, C.S. Taylor, B.G. and Kubu, B.E. (2009), "Law Enforcement Technology Needs Assessment: Future Technologies to Address the Operational Needs of Law Enforcement". A report submitted to Police Executive Research Forum and Lockheed Martin Foundation. Bureau. August 7, 2012. www.opp.ca/ecms/files/268766874.2.pdf
- [14] LeBeuf, M. (2006), "E-Policing in Police Services - Definitions, Issues and Current Experiences". The Royal Canadian Mounted Police, Canada. ISBN 978-0-662-46262-0. Retrieved on 18th January 2013 from www.cpc.phippsinc.com/cplib/pdf/63276e.pdf
- [15] MHA (2012) Ministry of Home Affairs, Tanzania <http://www.moha.go.tz/> Accessed on 10th June 2012.
- [16] Meeker, M. (2012), Internet Trends, The 10th Digital Conference, May 30, 2012
- [17] Mwema, S., (2008), "Challenges of Enhancing Performance and Responsiveness in the Police Force", Paper presented at the National Convention on Public Sector Reforms on Achieving Rapid Results in Public Sector Reforms at Ubungo Plaza, 18th June, Tanzania (Accessed 13th January, 2011).
- [18] NBS (2006), Analytic Report, Tanzania Census 2002. National Bureau of Statistics. Vol X. 2006.
- [19] OPP (2012), "Understanding Ontario Provincial Police (OPP) Municipal Policing Costs". Produced by the OPP Municipal Policing Bureau, OPP Corporate Communications, OPP Business and Financial Services
- [20] Putt, J. (2010), "Community Policing in Australia" AIC Reports, Research and Public Policy Series 111. Australian Institute of Criminology 2010, 11836-2079 (Online), ISBN # 78 1 921532 72 6 (Print), 9978 1 921532 73 3 (Online).
- [21] Sife, A.S.; Kiondo, E.; and Lyimo-macha, J.G. (2010). Contribution of Mobile Phones to Rural Livelihoods and Poverty Reduction in Morogoro Region, Tanzania. The Electronic Journal on Information Systems in Developing Countries. Vol. 42, No. 3, pp. 1-15.
- [22] Swarts, P. and Wachira, M. (2010), "Tanzania: ICT in Education Situational Analysis". Global e-Schools and Communities Initiatives.
- [23] TCRA (2010). Report on Internet and Data Services in Tanzania: A Supply-side Survey report. Retrieved on 18th January 2013 from www.tcra.go.tz/publications/InternetDataSurveyScd.pdf
- [24] UN – HDR 2011 – United Nations Human Development Report 2011, Sustainability and Equity: A better future for all.
- [25] WB, (2010), "Tanzania Infrastructure: A Continental Perspective". Country Report. Africa Infrastructure Country Diagnostic. World Bank (WB).