ICT Adoption Model within the Police Services in South Africa to Support eGovernment in Service Delivery

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Abstract

The key challenge however facing the South African Government is poor adoption of ICT by its public institutions to support e-government (Ebrahim & Irani 2005). As a result, the SA Government is unable to fully exploit the benefits of ICT adoption to ensure economic growth, effective governance and efficient service delivery. The research objective was to establish the factors which influence technology acceptance or rejection decisions within the South African police services (SAPS). In carrying out this objective, an understanding of the technology adoption context within the public sector would be established. A questionnaire was administered to a sample within the Northwest Province, with a 91% response rate achieved. The SAPS ICT model was derived using concepts from Technology Acceptance determinants. Six moderating factors were identified as part of the model. The research addressed gaps in management levels perceptions on associated value of information versus tools to aid in establishing an integrated approach towards ICT adoption within government departments.

Keywords: Governance, ICT adoption, Police Service, Technology acceptance, technology acceptance model.

Introduction

In the 21st century as the technology changes so does the manner in which

crime is committed (Nuth 2008). It is therefore to be expected that police services aspiring to ensure safety and security of its citizens would be adopting some form of technology in crime investigation, community engagement and fighting activities (Chan 2001). This paper focuses on the adoption of technology within the South African police services with specific consideration to assessing how the drivers of change (imperatives) influence the technology acceptance or rejection by the police.

The availability and accessibility of ICT are considered prerequisites for successful economic development and effective governance (Kiessling 2007). Effective governance is attained through transformation of government operations and a reinforced capacity to service the needs of society by using ICT to facilitate e-government initiatives (AlAwadhi & Morris 2009). The key challenge, however facing the South African Government, is poor adoption of ICT by its institutions to support e-government (Ebrahim & Irani 2005). These challenges require that capacity, the relevant structures and processes be in place to avert eroding benefits of adopting ICT (Mamaghani 2010).

The present SAPS was formed during the amalgamation of police agencies and similar agencies into the new SAPS (Geyer 2008). This new SAPS aimed at the development of an institution capable of providing security to citizens consistent with human rights and the rule of law (Geyer 2008). The SAPS focal areas and strategic priorities have been identified in the strategic plan for 2010-2014 and annual performance plans of 2010-2011.

Literature Review

The motivation for organisations and the government to eradicate inefficiencies, address corruption, and improve the overall service delivery, requires investment in technology. When governments understand the determinants of acceptance of technology, strategies for IT implementation can be channelled to improve performance of organisations (Hamner & Qazi 2009).

Electronic-Governance (e-Government)

In a developing world, ICT has been identified as important for the social and economic reformation and in helping create an inclusive information society (Farelo & Morris 2006). The use of ICT in e-government initiatives allows effective communications and integration between different departments and

information to be accessed in providing services to the citizens of a country (Ebrahim & Irani 2005).

Pardo and Gil-García (2005) highlight IT success factors in organisations (sectors), that are fundamental in implementing e-government initiatives. They identified success factors in the development of an ICT strategy. The first is about ensuring that systems are integrated and contain quality. System usefulness and ease of use is the second factor. The third is ensuring managerial support (also Kamal, Weerakkody & Iran 2011). The fourth and fifth factors, are ensuring that an environment conducive to ICT adoption is developed through policy and institutional reforms, respectively.

Service Delivery and e-Government in South Africa

The South African government has established IT policies and framework to enable the development of e-government (Ebrahim & Irani 2005). This framework is supported by agencies such as the State Information Technology Agency (SITA). The SA service mandate is guided by principles that emphasise servicing stakeholder needs (Ebrahim & Irani 2005). They, in exploring SA challenges, found that ICT is still not used adequately. These are perpetuated by constraints in the availability of electricity and its cost, the poor integration (with no central information portal) for government agencies, and poor utilisation of resources.

In order to understand and explain how and why people respond towards technology and the decisions they make in using or rejecting it, researchers have since the 19th century develop frameworks and models to achieve this (Huh, Kim & Law 2009). Technology models try to address two key issues, that is determining reasons for one individual to choose to adopt a technology while others do not, and establishing the social context influencing the decision to adopt (Straub 2009).

Venkatesh *et al.* (2003) realised that there are many technology acceptance models that complicated the choice of which model best describes technology acceptance. In their study they identified models which have been developed up to 2003. In any organisation therefore, implementation of technology needs to consider the attitudes between the categories of employees and the related relevant models, in order to optimise the success of its adoption (Greenfield & Rohde 2009).

Organisational Performance and ICT Adoption

Within the South African police services trends in crime and technological advances in ICT have influenced the need for performance and accountability, in order to support service delivery (Nuth 2008). Gil-Garcia and Martinez-Moyano (2007) argue that attitude and behaviour are influenced by shared norms. These norms or organisational rules, according to them, contribute toward solutions to simplify decision making and managing risk when problems prevail.

In SA, the challenge is that of establishing a balance between meeting the social development and supporting development of technology use (Langmia 2005). It is this challenge that is contributing to the slow ICT growth and development. Other contributory factors to poor ICT growth, and poor service levels, are political corruption, poor education levels/literacy, poor management of risk and infrastructure development (Mamaghani 2010).

Police Services Operating Context in General

The introduction of technology has a role in: (i) making criminal offences possible; (ii) creating criminal offences; and/or (iii) transforming modern crime (Nuth 2008: 438). Crime is defined as those activities that break law of the land and are subject to official punishment (Longe *et al.* 2009: 162)).

Some of the ICT tools and technologies which police are adopting to address these limitations have ranged from electronic surveillance to monitor crime activities, e-mail sifters, and phone communications interceptors (Savona & Mignone 2004). According to Rauch (2000), the justice system indicate fragmentation of the system and lack of exploitation of ICT to facilitate document and information sharing and expedition of processes within the police services (Rauch 2000).

Police organisations are information intensive and intelligence led (Bouwman & van de Wijngaert 2009: 186). By matching ICT to the tasks, the factors of TAM and the context within which a suitable fit is attained, can be achieved (Bouwman & van de Wijngaert 2009). These police tasks can be grouped into categories, namely: incidence-response tasks and neighbourhood policing based tasks (Bouwman & van de Wijngaert 2009). On the other hand, unstructured, urgent and ad hoc tasks would relate to incidence response tasks wherein the process of problem solving is critical (Bouwman & van de Wijngaert 2009). In the study by Hu *et al.* (2011), the social context, the facilitation factors, and the perceived value adding and ease of use, were some

of the factors identified. The degree to which each of these factors influences decision making, is influenced by the need for time saving and performance improvement which may be attained (Hu *et al.* 2011).

Research Questions

The question remains about what factors influence the police in the decision making to accept or reject use of ICT in combating crime.

- i. To what extent is ICT considered important by the SA police service in law-enforcement management, and in improving service delivery and supporting e-governance initiatives?
- ii. What are the crime combating technology strategies that are used within the police service that influence the decision to reject/accept technology adoption?
- iii. How important is information quality to the SA police in influencing the decision making of technology adoption in dealing with law-enforcement?
- iv. How does the work context, nature of tasks, management support, training, education, gender, age, experience, social setting within the police service influence the decision to adopt technology in support of e-government initiatives?

Research Methodology

The methodology to be used in this study were quantitative in nature. The questionnaire consisted of two sections, around ICT adoption or rejection decision making within the SAPS. In SA, there are nine provinces, with 1114 police stations as at 2011 (South African Police Service 2010). This study used the Northwest province as a sample, and randomly selected 83 police stations of the cluster. The Northwest represents 7.5% of the population which is about 11596 police across the province. Using Krejcie and Morgan (1970: 608), the sample size was determined as 373.

Table 1: Validation of the representativeness of the population by the selected sample

	Recommended sample questionnaires
Sample size	S=372
standard error	0.025906388
% sample standard error	2.59%
Lower population parameter	44.92%
Upper population parameter	55.08%
% margin of error	5.08%
Confidence interval	44.92% and 55.08%

Research Results, Analysis and Discussion

There were 310 questionnaires distributed, and 283 responses were received back. The samples of 310 and 283 were tested for representativeness. It was therefore deduced that the sample size of 283, is between 44.17% and 55.83% with a margin of error of 5.83%. There is a 19.84% probability that responses will not be valid, but 80.16% probability that they will be valid based on the sample size of 283.

Table 2: Validation of the representativeness of the population by the response sample

	Recommended sample questionnaires	Distributed sample questionnaires	Actual valid responses (sample) returned questionnaires
sample size	s = 372	s = 310	s = 283
standard error $e_p = \sqrt{P(1-P)/n} =$	0.025906388	0.028398092	0.029721915
% sample standard error $e_p =$	2.59%	2.84%	2.97%
lower population parameter $= P - k_c e_p$	44.92%	44.43%	44.17%
upper population parameter $= P + k_c e_p$	55.08%	55.57%	55.83%
% margin of error(variability)	5.08%	5.57%	5.83%
Confidence interval	44.92% and 55.08%	44.43% and 55.57%	44.17% and 55.83%
Standard deviation: (372,310,283)	45.63		
Probability of outcomes due to error or chance in sample size 283 (z value -0.84735)			19.84%
Probability of valid outcomes in sample size 283 (z value -0.84735)			80.16%

Variable Classification for Analysis

Variable 1: ICT Emphasis

The variable, V1, encompasses the respondent's perceptions and opinions around, the extent of policy definitions and operational framework within the SAPS that embrace ICT.

***Q1:** To what extent is ICT considered important by the SA police service in crime and law-enforcement management, and in supporting e-governance initiatives?*

Variable 1 includes 7 ITEMS. ICT Emphasis is classified as an independent variable because the level will influence behaviour towards ICT (Sun & Zhang 2006).

Variable 2: ICT Tools

ICT Tools entails technology tools such as mobile devices that could be used to integrate various technology platforms.

***Q2:** What are the crime combating technology strategies that are used within the police service which influence the decision to reject accept technology adoption?*

Variable 2 included 1 ITEM. Assigning *ICT Tools* to multiple response statements would violate measurement rules and lead to incorrect interpretation. ICT Tools is classified as an independent variable because the type of tool will influence its adoption.

Variable 3: ICT Crime Fight Support

ICT Crime Fight Support, is a variable that aims to establish the extent to which police's daily tasks and roles depend on the timing of information that is exchanged as a result of using ICT.

***Q3:** How important is information quality (its usefulness) and timing to (on-time) the SA police in influencing the decision making of technology adoption in dealing with crime and law-enforcement?*

Variable 3 includes 4 ITEMS. ICT Crime Fight Support is classified as an independent variable because the usefulness of ICT tool in supporting the work of police will influence ultimate behaviour towards adoption of ICT (Venkatesh *et al.* 2003; Sun & Zhang 2006).

Variable 4: ICT Perceived Value

The ICT Perceived Value is an independent variable that refers to the perceptions, attitudes and beliefs held by SAPS employees about the value of using ICT. ICT Perceived Value resembles ‘subjective norm’, defined by Venkatesh *et al.* (2003: 63) as a construct.

Q4: How does the work context, nature of tasks, management support, training, education, gender, age, and experience, social setting within the police service influences the decision to adopt technology in support of e-government initiatives in service delivery?

Variable 4 includes 9 ITEMS.

Behavioural Intention (BI)

Behavioural Intention (BI) is defined as a person’s subjective probability to perform a specified behaviour (Yi *et al.* 2006: 352). Venkatesh *et al.* (2003) established that the behaviour towards using a technology was found to be influenced by the behavioural intention to use it.

Descriptive Analysis: Biographical

Of the 283 respondents, the age group dispersion consists of 64% between 21-30 years, 26.5% are in between 31 -40 years. According to AfriMAP (2005), the entry-level qualifications for the SAPS are a senior certificate qualification, fluent in English and one other SA language, driver’s license, and no previous criminal record.

Venkatesh *et al.* (2003) found that younger employees placed importance on extrinsic rewards. The 31-40 years could be representative of those settling into a career and looking to grow experience and awaiting promotions. Within the 283 respondents, 71.70% were males.

The survey did not make any discrimination against or preference over a specific gender, the result is considered a fair representation of the SAPS gender distribution. The range between 1-6 working years making up 91.4%

and 2.2% of those with more than 10 years coincides with the age distribution and is representative within the SAPS. This finding is consistent with the retention rates in the police service (Bruce & Gould 2009/ Rauch & Van der Spuy 2006).

Of the 283 respondents, 73.1% are senior-commissioned rank. Rauch and Van der Spuy (2006) recorded that post-apartheid transformation saw some changes. In the SAPS mostly around the senior levels to align the representativeness of this rank to the SA population (Rauch & Van der Spuy 2006). The 283 respondents consist of 95.8% African and 1.4% coloured. The ethnicity distribution is representative of the South African population distribution wherein African's are in the majority, and being the most employed within police services. This finding supports Rauch and Van der Spuy (2006). Of the 283 respondents, 69.31% are mainly from urban areas. According to Rauch and Van der Spuy (2006: 54), this placed urban citizens at an advantage over rural citizens particularly around exposure to ICT (Farelo & Morris 2006: 3).

Respondents' Education Levels and ICT Knowledge

In the 283 respondents, 48% have a diploma or grade 12 certification, and 48% have some form of postgraduate certification. This highlights the fact that there are police that have education qualification higher than matric, contrary to what was expected according to the findings in AfriMAP (2005). This biographic distribution measured the understanding of the meaning of ICT by individual respondents. Evidence of poor ICT adoption in SA, particularly by government institutions such as the police was recorded (Ebrahim & Irani 2005).

Of the 283 respondents 94.2% overall are always aware of ICT. Sun and Zhang (2006) advocate that users who are aware of ICT tools, would usually be motivated to enlist more users, and promotes the intention to use it as well. The results coincide with the biographic distribution that illustrates that respondents are educated and should be able to use ICT within their environment.

Inferential Analysis

ICT Emphasis vs. ICT Tools, ICT Crime Fight Support and ICT Perceived Value

The extent of the emphasis of ICT importance cannot be explained by the type

of ICT tool(s) being used for the specific situation. Studies found support for full mediation of the effect of facilitating conditions on intention by perceived ease of use (Venkatesh *et al.* 2003). Given the SAPS's mandatory environment, the non-significance statistical correlation between ICT Tool and ICT Emphasis are consistent with Venkatesh *et al.*'s (2003) predictions.

Discussion

Pearson's coefficient, denoted as 'r', was used in the analysis to research variables defined, that is, ICT Emphasis, ICT Tools, ICT Crime Fight Support and ICT Perceived Value. The extent of the emphasis of ICT importance cannot be explained by the type of ICT Tool being used for the specific situation.

T-test analysis: Research Variables vs. Biographical measures

In this analysis, the hypothesis represents the alternate, and the null hypotheses being evaluated is:

H₀: The demographic factor under test has a negative effect (no effect) on the research variables influencing the behaviour to accept ICT or reject it, based on the differences in the expressed opinions of the demographic factor.

The alternate propositions per demographic factor are as follows:

- a) H1: Gender has a positive effect on the research variables influencing the behaviour to accept ICT or reject it.
- b) H2: Location has a positive effect on the research variables influencing the behaviour to accept ICT or reject it.
- c) H3: Education has a positive effect on the research variables influencing the behaviour to accept ICT or reject it.

Gender Group

The T-test results for gender shows the p significance values are 0.169, 0.695, 0.236, and 0.614 for ICT Emphasis, ICT Tools, ICT Crime Fight Support and ICT Perceived Value and these values are above 0.05. It reveals statistically there is NO significance difference between different gender groups (male and females) perceptions towards the research variables. The implication is that,

males and females' respondents have similar type of perceptions towards how they perceive ICT within the SAPS. And finally, regarding ICT's contribution towards social status within the SAPS is similar for males and females. This result is in contradiction to empirical findings by Venkatesh *et al.* (2003) and Sun and Zhang (2006).

Education

Matric, post-graduate and diploma qualified respondents have similar type of perceptions towards emphasis of ICT's importance and its perceived value towards its contribution to social status. This finding is consistent with Sun and Zhang (2006) stipulations around the effect of knowledge as facilitating innovation, but only when individuals can excise the choice of tools, not the case within the SAPS. On the contrary, the respondents seem to have conflicting perceptions about the type of ICT tool (ICT Tools) used to complement work performance and the timing and usefulness of the information exchanged (ICT Crime Fight Support) as indicated by the p significance values of 0.041 and 0.003 respectively. This finding supports Sun and Zhang (2006) with regards to the level of education of individuals. If individuals are able to assimilate and interpret new information, the process will produce different technology usage decisions.

ANOVA Tests

ANOVA tests were selected as they handle interval type data within the current study (Diamantopoulos & Schlegelmich 2000).

H₀: The demographic factor under test has a negative effect (no effect) on the research variables influencing the behaviour to accept ICT or reject it, based on the differences in the expressed opinions of the demographic factor.

Age Groups vs. Research Variables

The ANOVA test reveal there is a statistically significance difference in perceptions of different age groups towards the research variables ICT Emphasis, ICT Tools and ICT Crime Fight Support. Sun and Zhang (2006) empirically established that younger workers placed importance on extrinsic

reward and are inclined in placing more emphasis on perceived usefulness of a tool. Perceived ease of use was discovered to be a stronger determinant of acceptance of technology and the need to affiliate with an increase in age (Sun & Zhang 2006). The result is consistent with the one that age have a moderating effect on the perceived ease of use (ICT Tool) and perceived usefulness (ICT Crime Fight Support) of the tool, and on facilitating conditions (ICT emphasis) enabling adoption.

This result means that the police with different number of working years (experience) have significant different perceptions towards the perceived ease of use of the type of ICT tool (ICT tools) and perceived usefulness of the tool (ICT Crime Fight support). According to Sun and Zhang (2006) when individuals believe that an organisational and technical infrastructure exists to support use of the system, will use their work experience to alleviate the ease of use and to improve usefulness. On the contrary, there is no statistically difference (with p value of $0.841 > 0.05$) amongst the different levels of working experience (number of working years) with regards to the perceived value of ICT. This is consistent with this theory by Sun and Zhang (2006).

Rank in the SAPS vs. Research Variables

The ANOVA test results reveal a p significance value of 0.026 (< 0.05) which indicates a significance difference in perceptions held by the different ranks with regards to ICT Crime Fight Support. The p significance values for ICT tools, ICT emphasis and ICT perceived value are 0.158, 0.199 and 0.291 all of which are greater than 0.05.

The p significance value of 0.026 with regards to effect of Rank, means that there are differences in management levels in how they view contribution of timely and useful information exchanged using ICT towards improved performance. This result is consistent with Sun and Zhang (2006) and Venkatesh *et al.*'s (2003) findings. They confirmed that at the introduction of a technology, experienced workers tend to be influenced by the usefulness of the tool rather than the ease of use.

The p values of 0.158, 0.199 and 0.291 with regards to effect of Rank, indicate that no difference in the perceptions or opinions held by the different management levels with regards to effects of ICT Emphasis, ICT Tools, and ICT Crime Fight Support. According to the South African Police Services (2010) annual plan, the key priority areas are requiring information

accumulation and management, and also require publication of crime statistical reports to as a measure of the SAPS's performance.

Understanding ICT vs. Research Variables

The ANOVA test results in **Error! Reference source not found.** reveal a p significance value of 0.922, 0.137, 0.309 and 0.973 (all > 0.05) which indicates no statistically significance difference in perceptions held by the different respondents with regards to ICT emphasis, ICT tools, ICT Crime Fight Support and ICT perceived value. The result affirms the earlier biographical analysis which indicated that 91.7% of the respondents have understanding about the meaning of ICT but need guidance into adoption decisions. Applying the findings from Sun and Zhang (2006), SAPS individuals with limited and no understanding of ICT, does not moderate the effects of variables in determining the decision to accept or reject ICT.

ANOVA: Awareness of ICT tools in Markets vs. Research Variables

The ANOVA test results reveal a p significance value of 0.001 for ICT Tools and 0.000 for ICT Crime Fight Support, which are both < 0.05 , respectively. The p significance values are 0.396 for ICT emphasis and 0.981 for ICT perceived value respectively, both values being greater than 0.05. The p value for V2 and V3 indicates a statistically significance difference in perceptions held by the different respondents with regards to ICT Tools and ICT Crime Fight Support. This means those respondents with awareness of ICT tools within their environment will likely be influenced by ease of use of ICT tool and its usefulness. Straub (2009) describes that the adoption decision process in five stages.

Comparison Dispersion: Age Groups Perceptions vs. Research Variables

The comparison dispersion results for age were observed for research variables ICT Emphasis, ICT Tools, and ICT Crime Fight Support and these are discussed below:

ICT Adoption Model to Support eGovernment in Service Delivery

- a) The different age groups agree in the majority that ICT is considered important by senior management within SAPS. The majority (greater than 80%) per age group seem to agree that expenditure is visible.
- b) Within the age group 31-40 years, the majority (across all ages > 50%) think that ICT is discussed sometimes and only less than 30% think almost always.
- c) The different age groups seem to on an ad-hoc basis use ICT mainly for analysing and preventing crime, as opposed to law-enforcement and crime detection. The specific exception is with regards to age group 51-60 years.
- d) There is 73.8 % (21-30yrs); 68 % (31-40yrs); 70 % (41-50yrs) and 50% (51-60yrs) respectively, of the different age groups can do without on-time and useful (quality) information, but have some appreciation for its contribution (if made available) in helping perform their work.
- e) The majority that think education plays a key role in ICT use.
- f) Within the age group 31-40 years, 22.7% do not think that using ICT has any positive contribution towards their social status and affiliation, in contrast with the majority (greater than 60% within same group, and across all other groups) that think it has positive effect.
- g) Almost 80% across all age groups will accept using ICT if it is easy to use, and will reject it if it's not easy to use, with only 24% of age groups 31-40 years accepting it on the basis that it's not easy to use but is helpful.

Comparison Dispersion Location (Area of Origin) Groups Perceptions vs. Research Variables

The comparison dispersion results for location (rural or urban) were observed for variables ICT Tools and ICT Crime Fight Support and these are discussed below:

- a) The rural and urban respondents use similar tools, but 64.6% will use ICT tools for analysing crime. These results indicate that rural police seem to have a reliance on ICT as a tool for analysing (investigating) crime data inherently due to constraints in travel/access to areas and limited community based and visible policing.

- b) There is about 25% of urban respondents that will accept the use of ICT tools, even if it's not easy to use, but can help in their work environment.

Comparison Dispersion Education Groups Perceptions vs. Research Variables

The comparison dispersion for education level attained, were observed for research variables ICT Tools and ICT Crime Fight Support and these are discussed below:

- a) There is 54.5% of diploma/grade-12, 59.7% post grad and degree and 33.3% of those with none of these qualifications, which use ICT tools mainly for analysing crime. Furthermore, 26.5% of diploma/grade 19.4% post graduate and degree, and 33.3% of those with none of these qualifications use ICT tools to prevent crime respectively.
- b) About 20% of respondents with a diploma and/or grade-12, and 13.3% of those with a post graduate degree. The respondents with a diploma and, or grade-12 (70% and 73.4% respectively) and 60% of those without qualification respectively, need ICT only sometimes.
- c) Around 55.4% of the respondents with diploma and grade-12, and 71.9% of the post graduate degree and 70% of those with other qualifications, agree that they will accept ICT if it's easy to use even though it does not help them much in their work.

Comparison Dispersion Number of Years in SAPS Groups Perceptions vs. Research Variables

The comparison dispersion for education level attained, were observed for research variables ICT Tools and ICT Crime Fight Support and these are discussed below:

- a) An overall average of 69% across the working number of years believe that they only sometimes do not need on-time and useful information.
- b) An average of 63.8% of the respondents across all the number of working years' groups agree that they will accept ICT if it is easy to use even if it does not help much in doing their work.

Comparison Dispersion of Different Rank in SAPS Groups Perceptions vs. Research Variables

Variable 3: ICT Crime Fight Support

- a) More than 90% across each rank of respondents agree that ICT is important for crime fighting. In the senior management rank, general's use 2% internet, 1% use email, 2% cell-phones, 4% use smart-phones. 4% brigadiers use the Internet, 1% email, and 3.1% use laptops.
- b) In the middle management, 12.5% captains use cell phones, 6.7% colonel use none of the readily available ICT tools, and the remainder of respondents use almost most of the available ICT tools in their work. For junior management, 10% uses Internet and 10% use email.
- c) An average of 52% across all ranks use tools for analysis, and 26% use the tools to prevent crime respectively. About 13.5% on average, of senior management (generals and brigadiers) use ICT tool for detecting crime.

On the other hand, 12% of middle management uses the tools 'almost always' for the purposes in contrast with an average of 59% that use it sometimes, in comparison with an average of 4% of those that never use it. In management, 44% 'almost always' use the tools for the aforementioned purposes.

- d) An average of 17% of senior management (22% generals and 13% brigadiers) don't always need on-time and useful information in contrast to average of 73% (70% generals and 77% brigadier) that sometimes don't need on-time and useful information, and average of 2% that never do.
- e) An average of 93% of senior management, agree that their work depends on timely and useful data. In comparison with an average of 23% of middle management that strongly agree and average of 63.98% that agree that their work depends on timely and useful information.
- f) An overall 63% of senior management agrees that they will accept using ICT if it is easy to use even though it may not help much in their work. 70% of middle management share this same view.

These comparison dispersion results further point to the fact that, rank in the SAPS (senior, middle and junior management levels) does have influence on the research variable ICT Crime Fight Support) as a determinant of behaviour to accept or reject adoption of ICT.

Reliability Test: ICT Emphasis

Reliability test of the questionnaire continuous research statements in reveal Cronbach alpha value is 0.750, with 7 test items (statements) used, with case validity of 94.3%. The result indicates that the research instrument's (questionnaire) questions as applicable to the extent to which the importance of ICT is emphasised, has a fairly good internal consistency and reliability. This result therefore indicates that the variation in the SAPS respondent's opinions about the importance of ICT emphasis by management as measured on the Likert scale is reliable and can be accepted as a valid instrument confirming ICT.

Reliability Test: ICT Crime Fight Support

Reliability test of the questionnaire continuous research statements reveal Cronbach alpha value is 0.737, with 4 test items (statements) used, with case validity of 92.2%. The result indicates that the research instrument's (questionnaire) questions as applicable to the extent to which timing of information and usefulness(quality) of this information as a result of using ICT contributes towards on the job performance improvement, has a fairly good internal consistency and reliability. This result indicates that the variation in the SAPS respondent's opinions about the timing of information and usefulness (quality) of the information due to using ICT in helping improve work performance is reliable. Therefore, it confirms that ICT Crime Fight Support (perceived usefulness) is a determinant of the behaviour towards decision by individual police to accept or reject adoption of ICT within the SAPS.

Reliability Test: ICT Perceived Value

Reliability test of the questionnaire continuous research statements reveal the Cronbach alpha value is 0.818, with 9 test items (statements) used, with case validity of 90.1%. This alpha result is too high or close to (0.9 the maximum recommended) which suggests that some items (statements) are redundant as they are testing the same question(s) but in a different guise. Reliability analysis case for ICT tools was not possible as it violated the assumptions as suggested by Tavakol and Dennick (2011), in that, the number of test items

(statements, was not enough) was too small the test would violate the assumption of tau-equivalence and will underestimate reliability.

The Proposed SAPS ICT Adoption Model

The technology adoption model for understanding the SAPS ICT adoption (based on the aforementioned detailed analysis results and interpretations), which is considered consistent with the various TAM studies and literature outcomes, is proposed below as illustrated in **Error! Reference source not found.** The SAPS proposed ICT adoption model factors resembles the proposed integrated model by Sun and Zhang (2006: 65) and Venkatesh *et al.* (2003: 447) respectively. The subjective norm as a construct defined by Venkatesh *et al.* (2003) is related to the ICT Perceived value, and Perceived ease-of-use and Perceived usefulness constructs are related to the ICT Tools and ICT Crime fight support respectively.

Furthermore, another distinct finding illustrated by the SAPS adoption model is that, the extent to which timely and useful (quality) information is perceived valuable and therefore most critical to carrying out police work is dependent on moderating factors such that, there will be varying degrees of its relevance within the SAPS. This finding is in contrast to the findings by Colvin and Goh (2005) wherein timely and useful (quality) information was considered relevant to carry out work. The model suggests that moderating factors influence most of the relationships and therefore is consistent with suggestions from previous studies that these be considered when studying user technology acceptance.

Recommendations to SAPS leadership and Stakeholders

The SAPS and its stakeholders, need to recognise and understand that, according to best practice researches conducted on organisational change by Chan (2001), and Reichert (2001) respectively, that changes within any organisation are driven by three main imperatives. These imperatives are, namely: need to become effective and efficient through complementary processes; the needs to satisfy the external and internal stakeholder changing requirements; and the needs to respond to demands due to policy changes. The expectation therefore upon SAPS leadership is that, with the changing levels of crime being committed, through use of technology, crime preventions

should also adopt such technologies, and that new style of police management is required to meet the changing needs of the environment and those of the stakeholders which police are servicing.

It is on this basis that the following recommendations for managerial consideration are proposed, in making the requisite change towards efficient and effective policing:

- a) Policy making and investment initiatives should be extended towards infrastructural development in the rural areas to enable effective police work. This should entail deployment of satellite mobile stations which will increase and support information exchange and quality of exchanged information, between residents and police using mobile communications (including use of cell-phones). Furthermore, the lessons learnt and community policing framework adopted by urban police should be extended and deployed in rural areas to complement these ICT infrastructural developments.
- b) A forum of 'ICT adoption champions' consisting of senior managers in the SAPS and those in government, should be established to focus on creating role models that will act as ambassadors of ICT adoption within the public sector. These champions will be encouraged to use new ICT technology and 'show and tell or walk the talk' to the middle and junior management the said technology emphasising adoption benefits for the workplace. This initiative will help create awareness and demonstrate leadership commitment towards ICT adoption within the changing environment.
- c) There is a need to exploit the benefits of ICT information exchange timing and usefulness (quality), and to bridge the gap between the senior management who prefers ease of use over usefulness and the middle and junior management that prefer usefulness over ease of use of a tool. Efforts must be made to encourage (incentivize) senior management to spend time in the field and share their experience with field police (middle and junior management). Simultaneously middle and junior management can be offered an opportunity to get exposure to crime management at senior management. This dual approach will facilitate rekindling the appreciation by these management levels of

relying on easy to use tools that provide useful and timely information in crime management. The benefit is that, proper evidence collection (quality information) in the field can support upstream crime management activities usually by senior management to aid in saving the time for analysis (investigative) work and optimize the success rate of crime management and prosecutions.

- d) Training initiatives must be established to orientate all levels of management around ICT developments and new tools that place less emphasis on fighting crime (using aggressive) type tools such as guns (artillery) and emphasis on the importance of other police tasks such as crime analysis (case, investigative), proactive monitoring (detection and prevention). Senior management must take the lead to embrace such an approach and stakeholders in government to develop alternative complementary measures of successfully crime and law-enforcement management to support the initiative.
- e) A recognising that ICT adoption will allow a migration from provincial based policing to national policing which can also be extended to exploit global safety and security initiatives around the world. To achieve this would require that a shift be made (by policy makers, government and police ministry in measurement of policing performance) in publishing crime statistics with the focus on crime prevention, and move towards publication of successful cases solved and prosecution statistics at provincial and national levels, instead.

The aforementioned managerial considerations are only a part of using finding from the SAPS adoption model to work toward gaining effective policing strategies using UCT in contributing towards e-government and service delivery improvements.

The next section proposes some of the opportunities the current research creates for future studies.

Future Research

The current research has highlighted some contributions to the technology

acceptance models body of knowledge, however, the following are some of the opportunities which can be explored for further future research.

- a) To what extent ICT adoption increases with increasing service delivery needs within the South African police remains unexplored.
- b) A longitudinal study may have to be conducted to test and validate the extent of contribution of ICT adoption in support of service delivery and e-government development for the different the government departments within the public sector. The study(s) will confirm whether with increasing adoption, e-governance is also develops naturally towards better service delivery.
- c) The exploratory power of the proposed SAPS model needs to be understood and quantified, and the model extended for verification to policing in other developing countries within Africa.

The concluding remarks with regard to the research are drawn in the next section.

Conclusion

The research aimed at establishing factors which influence the decision making of the SAPS to accept or reject adoption of ICT in support of e-governance for improved service delivery. Secondly, by establishing these influencing factors, the understanding of the adoption model applicable to the police within the public sector in a developing world was proposed. Making use of a survey questionnaire, the objectives of the research were addressed through four questions and the associated variables (constructs).

The analysis results indicate that demographics of the sample were predominately males, from senior and middle management. However, gender does not play a significant role in influencing the decisions by individuals to accept or reject ICT within the SAPS. The t-test and ANOVA results have confirmed the usefulness and relevance of moderating factors in helping determine the influencing factors in adoption of technology models. The Cronbach Alpha tests confirmed that this research analysis and outcome is reliable and has satisfactory internal validity to allow certain useful conclusions and recommendations to be drawn about factors influencing ICT adoption within the SAPS.

An ICT adoption model for the SAPS was derived, based the analysis results and on technology acceptance determinant models proposed by Sun and Zhang (2006: 65) and Venkatesh, *et al.* (2003: 447) which propose the inclusion of context and moderating factors respectively. Six moderating factors were identified as part of the derived model. The number of years, age and location seem to have pronounced influences as moderating factors on all the research variables (constructs) except upon ICT perceived value. Education and awareness have influence on ICT tools (perceived ease of use) and ICT Crime fight support (perceived usefulness). Rank as a moderating factor has influence only on the ICT emphasis (working environment).

In addressing the research questions, the following key findings were revealed:

- a) This result confirms that the context and management environment of an organisation such as the SAPS plays a significant role in influencing the decision making of the individuals to accept or reject adoption of ICT.
- b) Senior management would accept the tool for the sake of its ease-of-use than usefulness as they rely more on their experience (to make up for missing information) whereas the middle to junior management would emphasise usefulness (timely and useful information when actively dealing with a crime scene (in the field)).
- c) Majority, about 83% of respondents, confirm the contribution of ICT towards their social affiliation and status.
- d) Gender plays no role in the influencing decision in the SAPS.
- e) With an increase in the levels of experience, there would likely be less reliance on timely (on-time) and useful (quality) information, as other sources of information are exploited by police.

The significance of the research is that it confirms the influence of the management and the mandatory nature of the SAPS environment on adoption decisions by individual police. The relevance of ICT Tools (ease of use) and ICT Crime fight support (perceived usefulness) as the determinants of adoption

decision was established. However, information timing and usefulness (quality) is not emphasised as important in helping work performance by the SAPS as opposed to findings by Colvin and Goh (2005), and Hu, *et al.* (2011).

Further research opportunities were highlighted, and recommendations for managerial consideration proposed, which advocate the following:

- a) Transfer of knowledge and infrastructural development of from urban to rural areas to help policing in those areas.
- b) Establishing a forum of leadership champions who act as ambassadors of ICT adoption.
- c) The need to bridge the gap with regards to ease of use and usefulness of tools for information usage.
- d) Training of all levels of management to refocus on non-aggressive crime management and moving towards ICT adoption.
- e) Change in policy makers and management to look at alternative measures of successful crime management to exploit expansion of ICT from provincial to national to global integration.

This research has highlighted the need for management to recognise the need for change, and by beginning to exploit the benefits of ICT adoption to help eliminate the disintegration between the various criminal and justice system departments.

Furthermore, in so doing, this will help improve crime and law-enforcement management in support of e-government and better service delivery within the public sector in SA as a developing country.

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ICT Adoption Model to Support eGovernment in Service Delivery

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