# THE USE OF THE AUTOMATED FINGERPRINT IDENTIFICATION SYSTEM TO IMPROVE THE QUALITY OF SERVICE RENDERED BY THE SOUTH AFRICAN POLICE SERVICE ON THE EAST RAND

BY

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Submitted in accordance with the requirements for the degree of

MAGISTER TECHNOLOGIAE

In the subject of

POLICE SCIENCE

At the

UNIVERSITY OF SOUTH AFRICA

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NOVEMBER 2012

**ACKNOWLEDGEMENTS**

Glory to God in the highest and peace to his people on earth. Blessed be his name for upon him is where I cast all of my burdens. For their support and contributions to this research, I want to acknowledge and thank the following distinguished people:

- Professor D.T Masiloane for his leadership as my promoter and Chair of Department.

- Ms. Ingrid Sinclair for helping me reshape my topic and for being my friend, colleague and mentor, as well as Mr. Setlhomamaru Dintwe for his advice.

- Mr. Vinesh Basdeo for his encouragement and support.

- Ms. Angel Mabudusha for making some of her resources available to me; these have helped me conduct this research.

- Warrant Officer Moloi from Vosloorus SAPS and Captain Adonis from LCRC in Sommerset West, for their meaningful contributions to this research.

- All my colleagues at UNISA, College of Law, School of Criminal Justice, the Department of Police Practice for their support.

I would never have been able to complete this research without the support of my family. My thanks and appreciation goes to my parents, wife, daughter and son for their understanding. Such support could only have been crafted in profound love and selflessness. I would also like to express my gratitude to the research office of the SAPS, Gauteng, for allowing me to conduct this research. My deepest and sincere appreciation also goes to the Unisa, who as my employer since 2009, has financed the various training ventures that I have embarked upon up to this point. I would also like to offers a special thanks to my wife, Sibongile, for having tolerated me during all those times when I had to invest time and our family's financial resources in my studies. I am truly humbled by her support.

**DEDICATION**

This research is dedicated to all my family members and, in a very special way, to all those men and women in blue who remain in pursuit of safety and security for all and whilst in the service of our country, have lost their lives in order to preserve the democracy that we fought for so dearly. May our God keep them and may he rest their souls.

**TITLE:** **THE USE OF THE AUTOMATED FINGERPRINT IDENTIFICATION SYSTEM TO IMPROVE THE QUALITY OF SERVICE RENDERED BY THE SOUTH AFRICAN POLICE SERVICE IN THE EAST RAND**


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## SUMMARY


The globalisation process that drives the progression and trans-national nature of crime requires that the police should use sophisticated and/or state-of-the art technologies to help them to combat criminality. The use of technology by the police is thus viewed as one of the appropriate responses to deal with the threats posed by crime. In an attempt to ascertain the significance of technology in police work, this research examined the impact that the use of biometric technology such as the Automated Fingerprint Identification System, has had on the quality of services rendered by the South African Police Service. Following the police's task of identifying criminal fingerprints, the problem encountered in this research was that, ever since the introduction of the Automated Fingerprint Identification System, no research had been conducted to assess the impact thereof on the level and quality of services rendered by the South African Police Service. This problem was further intensified by the fact that there was no framework to assess the impact that the utilisation of the Automated Fingerprint Identification System has had on police work in South Africa. Consequently, the problems that were identified in this research compromised not only the quality of services rendered by the police, but also the safety and security within communities.

The findings in this research showed that the utilisation of biometric technologies such as the Automated Fingerprint Identification System have helped the police to accurately identify and arrest criminal suspects. However, some of the conclusions reached suggested that the quantitative aspect of the utilisation of biometric systems and the related portable apparatuses within the South African Police Service was emphasised more than the qualitative aspect thereof. The emphasis was evident in the statistics regarding the use of the Automated Fingerprint Identification System, which focused primarily on police productivity and to a lesser degree on accountability related issues.

This study espoused a qualitative paradigm and the investigations in the research were focused on the East Rand policing precinct. The participants who informed this research were selected from the research population using random and purposive sampling techniques. In the same way, the data that informed this research was collected using semi-structured interviews and an in-depth review of the literature on policing and its utilisation of the different technologies. The research espoused social constructivism and phenomenology as the philosophical worldviews of choice to form constructivist phenomenology and to attain theoretical triangulation. Moreover, evaluation research and a case study were espoused as the research designs of choice, to attain methodological triangulation. The various triangulation techniques espoused in this research project were critical in attaining quality assurance in terms of the research methodology applied. In the same way, a myriad of qualitative techniques such as dependability, transferability, confimability and credibility were also employed in order to ensure that the integrity of the data that was collected in this study remained intact. Finally, the data that was collected to inform this research was analysed using the qualitative content analysis technique. Similarly, the measures taken to ensure that the safety of the research participants was delineated in this same research report.

**Key Terms:** Globalisation; Crime; Biometric; Service Delivery; Dactyloscopy; Automated Fingerprint Identification System.

**Student Number: 3076-814-4**

**DECLARATION**

I hereby declare that the conception and execution of this dissertation, which was submitted in fulfillment of requirements for the degree Magister Technologie in Policing, at the University of South Africa, is my own work. All of the sources that I have consulted and quoted in-text have been acknowledged in a comprehensive list of references attached herewith, at the end of this research report.

_____ Date_____

**Mpho Mark Matlala**

## TABLES AND FIGURES

## ACRONYMS

| | |
|---|---|
| **AFIS** | Automated Fingerprint Identification System |
| **ANC** | African National Congress |
| **APRM** | African Peer Review Mechanism |
| **ARP** | Accounting for Resources and Priorities |
| **ASGISA** | Accelerated Shared Growth Initiative of South Africa |
| **AU** | African Union |
| **AVL** | Automated Vehicle Location |
| **CAS** | Case Administration System |
| **CCTV** | Close Circuit Television |
| **CPF** | Community Police Forum |
| **CRC** | Criminal Record Centre |
| **CRFSS** | Criminal Records and Forensic Services |
| **CRIM** | Criminal Records Identification System |
| **DNA** | Deoxyribonucleic Acid |
| **EU** | European Union |
| **EUPM** | European Union Police Mission |
| **FES** | Fingerprint Enrolment System |
| **FIFA** | Federation of International Football Associations |
| **FIPS** | Fingerprint Identification Profile System |
| **GIS** | Geographic Information System |
| **GPS** | Global Positioning Satellite |
| **HANIS** | Home Affairs National Identification System |
| **HIIDS** | Handheld Interagency Identification Detection System |
| **HRS** | Human Resource Strategy |
| **ICD** | Independent Complaints Directorate |
| **ICJS** | Integrated Criminal Justice System |
| **ICT** | Information Communication Technology |
| **IDC** | Industrial Development Corporation |
| **INTERPOL** | International Police Organisation |
| **IPID** | Independent Police Investigative Directorate |

| | |
|---|---|
| **ITRS** | Information Technology Resource Strategy |
| **JCPSC** | Justice, Crime Prevention & Security Cluster |
| **JIPSA** | Joint Initiative on Priority Skills Acquisition |
| **LCRC** | Local Criminal Record Centre |
| **LIMS** | Laboratory Information Management System |
| **MCD** | Magnetic Circular Dichroism |
| **NATIS** | National Transport Identification System |
| **NATO** | North Atlantic Treaty Organisation |
| **NGO** | Non-Governmental Organisation |
| **NPC** | National Planning Commission |
| **NPR** | National Population Register |
| **OAU** | Organisation of African Unity |
| **PC** | Personal Computer |
| **PFMA** | Public Finance Management Act |
| **PIN** | Personal Identification Number |
| **POP** | Problem Oriented Policing |
| **SADC** | Southern African Development Community |
| **SADCRPCO** | Southern African Development Community Regional Police Chiefs Organisation |
| **SAPS** | South African Police Service |
| **USA PATRIOT** | Uniting and Strengthening America by Providing Appropriate Tools Required to Interrupt and Obstruct Terrorism |
| **UN** | United Nations |
| **WPTPS** | White Paper on Transforming Public Service Delivery |

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# CHAPTER 1: GENERAL ORIENTATION

## 1.1 INTRODUCTION

The use of technologies by the South African Police Service needs to be evaluated in order to ascertain whether they have any significant impact on service delivery. An important question that needs to be answered is on the matter of how the use of various technologies expedites the task of the police (LeBeuf 2000:1). The focus of this research was thus to explore what the impact of the Automated Fingerprint Identification System had been on the level and quality of services rendered by the South African Police Service. Colton (1979:18) is of the opinion that even if technologies were successfully implemented, there is still a need to determine their effectiveness. It was Colton's assertion that necessitated this research, in order to verify whether the implementation and use of the Automated Fingerprint Identification System had enhanced the level and quality of services provided by the South African Police Service.

Various scholars (Colton 1979; Clarke & Dawson 1999; Hughes & Love 2004) have argued that studies aimed at evaluating the implementation and management of technologies, are useful in improving the level and quality of services rendered by the police. These last named scholars further suggested that evaluations have contributed to the development of policies and practices within the Integrated Criminal Justice System (ICJS). According to Hughes & Love (2004:610), there is a need for police managers to ensure that organisational strategies are well aligned for the implementation and management of technologies. In this regard, the South African Police Service is guided by the Information Technology Resource Strategy (ITRS), which stipulates how state institutions should use their technology (South Africa 2002).

In its quest to speed up the processing of fingerprints, the South African Police Service purchased the Automated Fingerprint Identification System (AFIS). This biometric technology was procured from a French biometric company, with assisted funding from the Industrial Development Corporation (IDC). Primarily, law enforcement agencies worldwide use the Automated Fingerprint Identification Systems to identify latent prints.

The most important part of this automated fingerprinting process is the identification of persons who are suspected of having committed crimes. At the secondary and tertiary levels, the Automated Fingerprint Identification System is also used by private companies for access control and for the identification of non-criminal fingerprints.

The Automated Fingerprint Identification System records fingerprints using an optical scanner and stores them as digital images. A qualified technician will enter the latent prints into the system and the Automated Fingerprint Identification System will search its files and produce a list of candidate matches. A trained evaluator then compares the fingerprints to the candidate's and determines whether any of them are a positive match. For law enforcement agencies, the matching fingerprints will in the end, help in the identification of particular individuals and link them to specific crime scenes or criminal acts. In South Africa, the implementation and use of the Automated Fingerprint Identification System by the police has greatly enhanced the criminal justice process by facilitating the speedy and increased production of previous conviction reports (Anonymous 2000: No Page Number).

## 1.2 BACKGROUND TO THE STUDY

Law enforcement agencies worldwide have a common purpose of delivering efficient and effective services to the public (Wolvaard 2007:3). In the same way, the function of the South African Police Service is to create conditions of safety and security by rendering efficient and effective services, and continuously improving the level and quality of those services (South African Police Service 2006:iv). The values of the South African Police Service, which include a set of principles that all public servants should adhere to in order to make public services more responsive and accountable to the needs of the public, are enshrined in the White Paper on Transforming Public Service Delivery. This paper was published by the Department of Public Service and Administration in October 1997, and highlights the need for strategies to promote the provision of qualitative and equitable services to communities (South Africa 1997:1).

One of the ways in which the police can improve on their service delivery efforts, is by introducing well researched policies that are intended to facilitate the implementation,

utilisation and management of the technology that could expedite their operations. Accordingly, the duty to ensure the effective operation of biometric technologies (such as the Automated Fingerprint Identification System) resides with the Criminal Record Centre (CRC) of the South African Police Service. The Criminal Record Center of the South African Police Service consists of Local Criminal Record Centers (LCRC), which are primarily guided by their Interim Policy on the Business of the Local Criminal Record Centers (South African Police Service 2004:No Page Number; South African Police Service 2012:110). The main objective of the Interim Policy on the Business of the Local Criminal Record Centers is to promote highly efficient and effective services to the Integrated Criminal Justice System in South Africa. This policy also deals with the proper processing of personal information and the production of previous conviction reports by police officials (South African Police Service 2004: No Page Number). Similarly, the issue of how other directives such as the police's promotion policy has impacted on their use of biometric technologies, such as the Automated Fingerprint Identification System, was equally critical and was therefore also briefly interrogated.

### 1.2.1 The Automation of Fingerprinting within the SAPS

Several computerised biometric systems are in use worldwide. These systems are also used by law enforcement officials to facilitate and expedite the identification of the physiological features of individuals. Facial scanners, retinal scanners and voice recognition tools are a few examples of some of the most advanced biometric identification technologies that are currently available to law enforcement agencies. Law enforcement agencies thus use biometric systems to increase their conviction rates in court, to identify and to capture crime suspects (eTV 2008). During 2008, more than 600 suspects were on the wanted list of the South African Police Service after they had been identified by their fingerprints (*Beeld* 2008; *Pretoria News* 2008; The *Star* 2008).

In an attempt to enhance the level and quality of safety and security within communities, the South African Police Service identified the Automated Fingerprint Identification System (AFIS), as the technology that could help them to achieve this goal. The Automated Fingerprint Identification System is biometric technology that was introduced in South Africa in 2002, to enable police officials to identify criminals through the use of

finger and palm print scanning. According to van der Westhuizen (1996:254), biometric identification technologies are capable of the automatic plotting, classification, codifying, searching and computerising of the ridge characteristics of finger or palm prints. Since the main function of the Criminal Record Center is the management of criminal records and the utilisation of sophisticated techniques to recover evidence from crime scenes, through specialised investigation processes and the scientific collection of exhibits (Du Toit 2007: No Page Number; Omar 2008:29; South African Police Service 2011:99; South African Police Service 2012:110), the use of biometric technologies therefore proved to be an optimistic move towards digitising fingerprinting processes and elevating the level and quality of services provided by the South African Police Service.

#### 1.2.1.1 The Search for Criminal Fingerprints

The search for fingerprints on the Automated Fingerprint Identification System is done in 92 Local Criminal Record Centers, which are located in all provinces of South Africa (Du Toit 2007: No Page Number; Omar 2008:34; South African Police Service 2011:99; South African Police Service 2012:110). The Local Criminal Record Centers comprise of the Fingerprint Identification Profile System (FIPS) section that manages and processes fingerprints for profiling and keeping track of criminals and their activities (South African Police Service 2004:34). The Fingerprint Identification Profile System section further consists of the image processing group that does the fingerprint scanning and data capturing, as well as the data processing group which is responsible for capturing data into the Automated Fingerprint Identification System database (Radzilani 2008). The creation of these different sections within the organisation not only facilitated the efficient operation of the Automated Fingerprint Identification System, but also created new employment opportunities within the South African Police Service.

#### 1.2.1.2 The Value of the Automated Fingerprint Identification System

The introduction of the Automated Fingerprint Identification System at the Criminal Record Center and at the Local Criminal Record Centers has been recognised by the Integrated Criminal Justice System board as a priority in addressing the blockages within the criminal justice system in South Africa (Du Toit 2007:No Page Number).

According to the South African Police Service (2011:99), the Automated Fingerprint Identification System has since been rehabilitated to an Oracle database, with the aim of stabilising its environment. This rehabilitation process involved the upgrading of the technology by installing the latest certified hardware. There is no doubt that this type of upgrade could go a long way in terms of addressing the pertinent technical deficits that have led to the blockages that can be ascribed to the use of the manual fingerprint classification system, prior to the implementation by the South African Police Service, of biometric technologies such as the Automated Fingerprint Identification System.

### 1.2.2 The Manual Fingerprint Classification System

Most of the improvements in community safety and security have been ascribed to the use of technologies such as the Automated Fingerprint Identification System, which has replaced manual classification processes which were laborious and time consuming, in terms of the processing and storage of fingerprints (Leadbetter 1999:2; Bio-Metrica 2011: No Page Number; Zalman 2011). Some of the deficiencies that could be linked to these manual processes have led to poor prosecutions. Similarly, the manual classification of fingerprints has, to a large extent, compromised the very level and quality of safety and security services rendered by the South African Police Service. The manual fingerprint classification system dates back to ancient times and, until the dawn of technology, the system had been used as an important identity authentication tool. For instance, the Chinese used manual fingerprinting as far back as 3 B.C. for business transactions and for identity authentication on legal documents (Sullivan 1977:40; van der Westhuizen 1996:240; Anonymous 2012 c). The manual fingerprint system was later used by law enforcement agencies for criminal identifications (Korzeniowski 2007:1). Traditionally, the manual classification and comparison of fingerprints was one of the most reliable methods to have ever been used by the police.

#### 1.2.2.1 The Reliability of the Manual Fingerprint Classification System

The reliability of the manual fingerprint classification system was derived from the fact that fingerprints have unique features that are necessary for the effective identification of criminal suspects. The characteristics of fingerprints are uniqueness, universality,

reproducibility, classifiability and invariability (Marais 1992:169; van der Westhuizen 1993:205; Anonymous 2012 c). The manual fingerprint classification system is a highly sophisticated process wherein experts used a number of techniques to compare and classify fingerprints. Marais (1992:170) indicated that some of the ways in which comparisons and classifications were done involved in-depth examinations of the ridge characteristics of the core and delta; the beginning and end of the ridge; the long ridge; the lake and islands; as well as the bifurcation and dots of the fingerprints. Marais further indicated that, during the manual classification of fingerprints, experts would categorise fingerprints into specific patterns such as the arch, loop and whorl, and they would also apply dactyloscopic examinations to compare and classify latent prints.

According to van der Westhuizen (1993:215), dactyloscopic examinations refer to the comparison of ridge characteristics of the different fingerprint impressions, in order to determine whether they occupy similar positions and areas. Van der Westhuizen further asserts that, during dactyloscopic examinations, identifications were done by viewing the ridge characteristics of fingerprints, taking into consideration their frequency and unit relationship, as well as the impression itself. Similarly, Hoover (2008:1) indicated that dactyloscopy also involves the cleaning of fingers in benzene or ether, the drying thereof and the lifting of an imprint by rolling the finger on ink and placing it on prepared cards. Hoover further pointed out that dactyloscopy makes examinations to constitute full inspections of fingerprints, when they are eventually stored and dealt with.

#### 1.2.2.2 Limitations of the Manual Fingerprint Identification System

Although the manual classification of fingerprints is a highly sophisticated process, the introduction of new technology has partially outdated its course in policing. The following are some of the deficiencies linked to the manual fingerprinting system:

- The maintenance of large collections of fingerprints was always an arduous and time-consuming exercise (Anonymous 2000; Moses 2011:4). According to Leadbetter (1999:2), the manual fingerprint classification systems placed great demands on the police's resources in that experts processed large collections of fingerprint cards and latent finger marks manually. A classical

example was when fingerprint experts in the South African Police Service had to manually search through 4, 5 million sets of fingerprints (Anonymous 2000; Du Toit 2007:No Page Number ; Polity 2010: No Page Number).

- The classification of fingerprints using manual searches also became a blockage in the Integrated Criminal Justice System (Du Toit 2007: No Page Number). The slower production of conviction reports by the police delayed prosecutions and lengthened the time taken for cases to be finalised. The delays further led to increases in the number of awaiting trial inmates, which also strained operations in the Department of Correctional Services.

- Very few police agencies maintained accurate and accessible fingerprints (Moses 2011:10). According to Su (2006: 233), the accuracy was influenced by factors such as human errors and weariness, as the process of manually comparing and classifying fingerprints took long. The inaccuracies in manual fingerprinting systems may also have resulted in hardened criminals being released as a result of misidentifications (Du Toit 2007: No Page Number).

- The delays caused by the manual fingerprints comparison process was also influenced by the filing system of the South African Police Service, which was not done according to any specific classification order (Leadbetter 1999:2).

- It took 2 years of training for recruits to qualify as productive fingerprint experts, a timeframe which was too long (Du Toit 2007: No Page Number).

- The cost of training experts manual fingerprinting was exorbitant. Omar (2008:31) indicated that the cost of training one expert for the Criminal Records and Forensic Science Services ranged from R330 000 to R500 000. In certain fields, the training costs escalated to R1 000 000 (eTV 2008).

The deficiencies that have been associated with the manual fingerprint classification system have consequently forced the South African Police Service to investigate the

automation of their fingerprinting process. This ensuing investigation eventually led to the identification of the Automated Fingerprint Identification System as a possible solution to the problem. According to Bio-Metrica (2011), the Automated Fingerprint Identification System is inclusive in the creation and maintenance of large fingerprint data. The procurement of the Automated Fingerprint Identification System by the South African Police Service was in line with the policy requirements, as stipulated in the Information Technology Resource Strategy (South Africa 2002: No Page Number). This was also a strategic move, aimed at ensuring that the South African Police Service becomes a very competitive player in an increasingly information-driven global society.

#### 1.2.2.3 The Emergence of Biometric Technologies in Police Work

In as much as dactyloscopy remains indispensible in law enforcement (Hoover 2008:1), the use of modern biometric technologies is not new. The police have been using biometric identification technologies since the 1950s (Zalman 2011: No Page Number) and this was to counter some of the shortfalls linked with dactyloscopy, which employs manual fingerprint classifications. For example, due to the complexity of manual fingerprint classification processes, it took the South African Police Service approximately 40 working days to compare and classify fingerprints; a process that could have been finalised within a week, had they been using fingerprint technology (Anonymous 2000: No Page Number). The ever-increasing collections of criminal fingerprints have therefore led to the various limitations that can be associated with the daunting processes that have been associated with manual fingerprinting processes.

The introduction of biometric technologies has had a positive effect on fingerprinting processes within law enforcement agencies worldwide. However, ascertaining some of the effects from the use of biometric identification technologies requires that each police agency evaluates its own technological interventions and makes its own findings. Bio-Metrica (2011: No Page Number) has in the same regard, acclaimed technology like the Automated Fingerprint Identification System as *"a dactyloscopic system of a new generation"*. This website (Bio-Metrica) also asserted that the Automated Fingerprint Identification System typically applies sophisticated technical and methodological solutions to support ten-print databases ranging from thousands to millions of palm and

fingerprints, at local and national levels. However, it would be ignorant of the police to completely abandon the traditional practice of dactyloscopy. The reason for not abandoning dactyloscopy is that technologies are fallible and, in instances where they malfunction, experts could temporarily revert to manual processes. What this implies is that even in this modern era that is so technologically-driven, dactyloscopy still remains relevant and useful in the law enforcement function of criminal fingerprint identifications.

### 1.2.3 Contemporary Issues on the Use of AFIS in Police Work

The Automated Fingerprint Identification System has been used by various law enforcement agencies for more than twenty-five years (Rejman-Greene 2001:115). According to Jamieson, Stephens and Kumar (2005:2), the application of biometric technologies such as the Automated Fingerprint Identification System is also expanding rapidly to other areas outside of the law enforcement domain. In this regard, Jamieson and others have warned that this rapid expansion of biometric technologies and the rush to capitalise on their benefits, may well result in their widespread failure to meet expectations over the long term. However, Rejman-Greene (2001:115) disagrees with the argument by Jamieson and others, and asserts that there is currently sound insight into how biometric identification technologies can be utilised to produce the best possible results. Within the policing domain itself, biometric identification technologies can thus be used to enhance the very level and quality of safety and security services.

Despite the contentions made by Rejman-Greene (2001) and Jamieson *et al.*( 2005 ), the criminal identifications facilitated through the use of the Automated Fingerprint Identification System have added more value to proving criminal cases in court. This success is facilitated by the fact that the Automated Fingerprint Identification System uses distinctive physical human features such as fingerprints and palm prints, to ascertain human identity (Rejman-Greene 2001:115). This capability has enabled the police, not only to identify the perpetrators of a crime, but also to link them to a specific crime. Rejman-Greene further argued that biometric technologies offer an alternative approach to authentications as they are also capable of identifying individuals through their facial and retinal features. With its characteristic multiple deployments, the use of

the Automated Fingerprint Identification System could enable the police to apprehend more criminal elements and to facilitate evidence that could secure increased convictions through effective prosecutions. There is no doubt that such success could also go a long way in allaying fears and instilling a sense of security in the community.

### 1.2.4 The Implementation of AFIS within the South African Police Service

The police's Criminal Record Center has been managing a manual fingerprint system since 1925, with the Local Criminal Record Centers managing localised collections from crime scenes, since 1900 (Du Toit 2007:No Page Number). As previously mentioned, it was the various limitations associated with the manual fingerprint processes that led to investigations on the possibility of automation. Of course, this move towards digitising led to the South African Police Service procuring the Automated Fingerprint Identification System. This process was approved by cabinet in 1996. In January 1999, the South African Police Service then procured the Automated Fingerprint Identification System and this was followed by preparations for the setting-up of its infrastructure, so that the technology could become operational. According to Du Toit (2007: No Page Number), the Automated Fingerprint Identification System was implemented by the South African Police Service in 7 phases, from November 2000 to August 2002. The following were therefore the implementation phases of this biometric technology:

- **Phase 1:** Preparation and repairing, bar coding and alphanumeric data capturing of 4,5 million sets of fingerprints (45 million images) from national fingerprint cards.

- **Phase 2:** Customisation of software according to the requirements of the South African Police Service and the integration of the Automated Fingerprint Identification System into the Criminal Record Identification System.

- **Phase 3:** Converting fingerprint card images into electronic format.

- **Phase 4:** Loading 45 million fingerprint images onto the Automated Fingerprint Identification System databases.
- **Phase 5:** Installation and implementation of the central system's hardware, software and database in a secure site in Pretoria, which was done in February 2002.

- **Phase 6:** Training of 564 personnel that consisted of 8 system administrators, 338 operators, 206 expert operators as well as 12 trainers for the Automated Fingerprint Identification System, which was done from March to July 2002.

- **Phase 7:** The implementation of 118 Automated Fingerprint Identification System workstations at 35 decentralised Local Criminal Record Centers all over South Africa within 6 months; from March to August 2002.

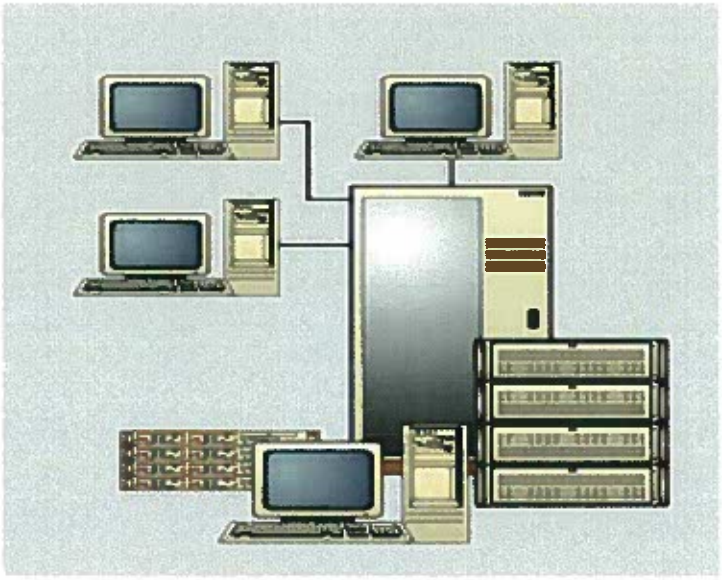
The Automated Fingerprint Identification System was a success from its inception. The productivity levels that have been attained by the police, after the implementation and use of the Automated Fingerprint Identification System, attested to its effectiveness (Du Toit 2007: No Page Number). The Automated Fingerprint Identification System uses points of measurable uniqueness to determine the identity of a fingerprint and stores this information on a chip (Jamieson *et al.* 2005:1; Bio-Metrica 2011; Zalman 2011). Such automation is not only a move towards being innovative and competitive in crime combating, but is also in alignment with e-business. The term e-business refers to the use of electronic means and platforms to conduct the organisation's business (Laudon & Laudon 2004:23; Kotler & Keller 2006:493; Polity 2010; Moses 2011:13).

#### 1.2.4.1 Components of the Automated Fingerprint Identification System

The typical Automated Fingerprint Identification System network consists of the various components that enable the electronic or digitised fingerprint identifications process. The following are the most common components of the Automated Fingerprint Identification System: server cluster; disks array; data archiving module; matching

block; network equipment; the system administrator workstation; the input or registration workstation; the criminal examination workstation; the control and query workstation; the identification workstation; as well as the communication equipment together with regional and remote workstations (Bio-Metrica 2011: No Page Number). Within the South African Police Service, the Automated Fingerprint Identification System network is connected nationally from the Criminal Record Center, to the Provincial and Local criminal Record Centers across the country (Du Toit 2007: No Page Number). Figure 1 is a representation of the Automated Fingerprint Identification System components:

**Figure 1: AFIS Components**



**Source:** Bio-Metrica (2011: No Page Number)

Biometric technologies come across as having the most reliable databases. According to Bio-Metrica (2011: No Page Number), the Automated Fingerprint Identification System has a cluster of double-processor servers. This website (Bio-Metrica) further asserts that such a feature provides very high reliability and operational efficiency, in terms of production speeds. The double-processors also ensure that biometric systems continue to work when other servers have failed. What is implied by this is that

technology like the Automated Fingerprint Identification System has a built-in back-up mode, which is useful in ensuring that evidential fingerprint data is always secure.

#### 1.2.4.2 Aligning Police Fingerprinting Processes with e-Governance

The automation of any processes by state institutions amounts to an effort towards aligning with the concept of electronic governance or e-governance. All public institutions in South Africa are also obliged to embrace the concept of e-governance (South Africa 2007:5). The concept of e-governance was aimed at modernising public services and making them more responsive to the needs of the public. In a notice published in the *Government Gazette* on 17 January 2008, the office of the Presidency defined e-governance as the use of technologies in state institutions, for the purpose of improving their internal functioning and the quality of the services they provide (South Africa 2007:6). It was thus this alignment with e-governance that also necessitated this research, in order to assess whether the use of the Automated Fingerprint Identification System by the South African Police Service had indeed attained the envisaged results.

Rejman-Greene (2001:115) recommended that continued research is required to further offer a sound understanding of biometric technologies. Therefore, research on the use of the Automated Fingerprint Identification System, in terms of how the technology factored in improving the level and quality of services, could prove to be important in addressing the service delivery bottlenecks and crime prevention challenges faced by the South African Police Service. Through research, the various challenges linked to the application of technologies in police work can be brought to light, studied and be better understood. Understanding the use of biometric technologies could also assist police agencies in better positioning themselves in terms of re-aligning and integrating the implementation, use and management of technologies in accordance with government policies. This strategic positioning could further enable police agencies to work in line with globally acceptable standards, thereby allowing them to effectively deal with present and future challenges within the policing environment. The challenges that have been associated with the utilisation of the Automated Fingerprint Identification System in the South African Police Service are outlined in the ensuing discussion.

### 1.2.4.3 Challenges in the Use of AFIS by the South African Police Service

The use of the Automated Fingerprint Identification System by the South African Police Service has a number of challenges that are largely related to the socio-cultural context within which policing occurs. Some of the issues relate broadly to the brutal law enforcement practices, including the use of technologies in a manner that does not take into account the cultural diversity that is characteristic of South African society. The effective utilisation of technologies is dependent on the management of both the internal and external environment within which the police operate. Laudon & Laudon (2004:13) noted that whilst some organisations could never operate without technology, the key features in any organisation have indeed always been its people, structure, operating procedures, as well as its politics and culture. Police agencies also rely on technologies to help them drive developments (Sinclair & Matlala 2011:47). For the police to succeed in their use of technology, they need to understand the challenges that are linked with its usage. The following are some of the challenges linked with the use of the Automated Fingerprint Identification System by the South African Police Service:

- **Field Command Structure:** The Local Criminal Record Centers have more members in the rank of Warrant Officer compared to Sergeants and Constables. This was evident from the Local Criminal Record Center in Springs where there were 32 Warrant Officers, 3 Sergeants and 27 Constables. According to Radzilani (2008), this type of rank inflation is not only unique to certain areas, but is a national phenomenon. In terms of the police's operational requirements, the Sergeants and Constables are street operatives and Warrant Officers are, in fact, field supervisors. The inflation at the rank of Warrant Officer has effectively complicated the chain of command in the field (Legget 2002:68). In some instances, teams of police officers who are led by Warrant Officers are comprised of other Warrant Officers, who are very senior to the team leader, by virtue of appointment. Such a quandary therefore complicates the leadership in terms of the chain of command, as there has always been a culture of rank consciousness in the police. Legget (2002:70) persuasively argued that without a clear sense of command, accountability in the field of operations would be completely lost.

- **Loss of Expertise:** Many highly skilled scientists have left South Africa to work abroad. In the Western Cape alone, a total of 49 years worth of experience has been lost since the year 2000 because of the total personnel numbers that have eventually left the employ of the South African Police Service (Omar 2008:34).

- **Low salaries:** The low salaries paid to graduate experts working at the Criminal Record Center have also caused an exodus of police personnel (Omar 2008:35). In a bid to retain staff, the divisional commissioner who is responsible for the South African Police Service's Criminal Record and Forensic Science Services introduced a scarce skills policy, which made provision for personnel with special expertise to receive a special allowance of about R1000 a month (South African Police Service 2005: 27; Omar 2008:34). The allusions and impact of this policy will be dealt with in the section dealing with issues on scarce skills.

- **Promotion policy:** The promotion policy of the South African Police Service is a concern, as it has also contributed to the loss of critical skills and expertise at the Criminal Record Center. According to Omar (2008:34), personnel are required to apply to other divisions, in order to progress to a more senior rank; the result of this is that these members have to be retrained for the new job when they are appointed. The effect of the promotion policy of the South African Police Service is that expertise in the Criminal Record Center and Local Criminal Record Center are either lost or experts remain in the same designation for many years, which could encourage them to look for better work opportunities outside of the police.

- **Training cost:** The collective cost of training administrators, trainers, operators and expert operators for biometric technology such as the Automated Fingerprint Identification System is extremely exorbitant for the South African Police Service, especially if the trainee does not pass the examination over the training period.

- **Centralisation:** Another factor that could affect the effective application of the Automated Fingerprint Identification System is the centralisation of personnel with practical knowledge at national offices. This tendency towards centralisation

could leave provincial Local Criminal Record Centers with less people that have field knowledge, which would have an adverse effect on the effective utilisation of the Automated Fingerprint Identification System and on the services delivered by the South African Police Service. More recently, during November 2010, the South African Police Service took a further decision to centralise the support capacity of the Forensic Services (South African Police Service 2011:102).

- **Availability of funds:** The scarce financial resources needed to upgrade the Automated Fingerprint Information System also affect its effectiveness. According to Radzilani (2008), the memory of the Automated Fingerprint Identification System was affected by the ever-increasing collections of fingerprints. This fingerprint expert argued that the non-upgrading of systems could lead to collapses, which could also cause huge loses in fingerprint data, delays in the finalisation of cases in court as well as exorbitant costs for retrieving data. The upgrading of the South African Police Service's Automated Fingerprint Identification System hardware, in 2010, attests to the commitment to ever-expedite their fingerprinting processes (South African Police Service 2011:99). Prior to 2010, the Automated Fingerprint Identification System infrastructure required approximately R600 million for upgrading, which could only last for about 2 years (Radzilani 2008). This last named fingerprint expert further asserts that the upgrading of this biometric technology previously caused the police to suspend the scanning of fingerprints for daily arrests, so as to conserve what was then contained in its systems memory, which was at the risk of collapsing. Whether the upgrading of Automated Fingerprint Identification System hardware will prove to be sustainable, is also an issue that will require further research.

- **Connectivity links:** Lack of inter-departmental connectivity for the Automated Fingerprint Identification System has adversely affected its effectiveness. The fact that the police's Automated Fingerprint Identification System does not communicate with similar fingerprinting databases in the Department of Transport and in the Department of Home Affairs is a concern (Radzilani 2008). This lack of inter-connectivity has led to persons wanted for crimes evading arrest.

> However, with the drafting of the criminal law forensic bill and the subsequent endorsement of some of its sections, such connectivity could become a possibility. What is of importance is how the standardization of procedures for the storing and processing of fingerprints in the different state departments is going to be dealt with. Similarly, inter-departmental connectivity is necessary as suspects can be identified and arrested when they visit other state departments for non-criminal transactions such as the processing of driver's licenses, public driver's permits and identity documents (Radzilani 2008: No page Number).

The application of modern, efficient and effective state-of-the-art technology is one of the most critical elements in the continued fight against criminality; therefore an investment made in this area by the South African Police Service, could benefit communities (Anonymous 2000: No Page Number). The scanning of fingerprints and the identification of individuals is also necessary when inmates are received for detention in correctional facilities. It is equally important that other state institutions such as the Department of Correctional Services should also acquire computerised fingerprint databases that can be connected with the South African Police Service's Automated Fingerprint Identification System databases. Such inter-connectivity amongst state institutions could also facilitate a cohesive and concerted approach towards criminal fingerprint identification processes within the public service.

### 1.2.5 Benefits of Using AFIS in Police Work

Much criticism relating to delays in obtaining information to address criminal justice backlogs has been levelled against South Africa's Criminal Record Center over the years (Sunday Times 2006; Carte Blanche 2006; Saturday Star 2007; eTV 2008). It is, however, encouraging that statistics show that while backlogs were substantial from 2001 and before, the situation has since improved, following the introduction of the Automated Fingerprint Identification System (Table 1). It is certain that an assortment of shortcomings which arose from the use of the manual fingerprint classification system compelled the Criminal Record Centre to consider the automation of processes. Table 1, below, shows the impact that the use of the Automated Fingerprint Identification

System has had on productivity rates between 2001 and 2002. These figures were measured on the average number of previous conviction reports produced in 35 days, following the receipt of the criminal search (SAPS 76), using manual fingerprinting classification in 2001, and after using the Automated Fingerprint Identification System in 2002. Table 1 provides the statistics on the productivity rates that are referred to here:

**Table 1: Production Reports of the Automated Fingerprint Identification System**

| Service | 2001 | 2002 | Increase |
|---|---|---|---|
| Previous conviction reports | 163 369 | 299 076 | 83 % |
| Criminal searches performed | 723 832 | 921 083 | 27 % |
| Non-criminal searches | 412 802 | 535 363 | 30 % |
| Criminal identifications | 215 724 | 329 641 | 53 % |
| Non-criminal identifications | 29 439 | 62 099 | 110 % |
| Scene of crime fingerprint identifications | 12 952 | 16 558 | 28 % |
| **Total number of fingerprint searches** | **1 136 633** | **1 456 446** | **28 %** |

**Source:** Du Toit (2007: No Page Number)

#### 1.2.5.1 Using AFIS to Streamline Processes in Police Work

The use of the Automated Fingerprint Identification System by the police has also been described as a giant leap forward, in the approach to crime investigation (Anonymous 2000; Bio-Metrica 2011; Sinclair & Matlala 2011:57). Although most of the benefits that have evolved from the police's use of this biometric identification system relate to the ability of the technology to produce significant quantities of conviction reports (Leadbetter 1999:2), such capabilities have also assisted the police in streamlining their services and processes. The following are therefore some of the functionalities that can be linked with the use of the Automated Fingerprint Identification System in police work:

- **Rapid crime information flow:** The introduction of the Automated Fingerprint Identification System can be seen as part of the Business Process Re-engineering (BPR) process. This is because the use of the technology aids the flow of crime information and the speedy finalisation of investigations (Anonymous 2000). According to Laudon and Laudon (2004:383), Business Process Re-engineering is powerful organisational change that is applied to analyse, simplify and redesign organisational operations using technologies.

- **Enhancing the effectiveness of field operations:** The portability of the Morphotouch, which is a portable handheld apparatus of the Automated Fingerprint Identification System, further enables uniformed police officers to scan and ultimately match large numbers of fingerprints during field operations such as road blocks, with those of persons who are wanted for criminal activities.

- **Increased search capacity**: The implementation of the Automated fingerprint Identification System by the South African Police Service not only yielded faster response times, but also increased searches on criminal fingerprints, which further augmented the detection rate (Anonymous 2000: No Page Number; Bio-Metrica 2011: No Page Number; South African Police Service 2011:100).

- **Increased storage capacity:** The Automated Fingerprint Identification System supports millions of ten-print databases through modern technical and methodological solutions (Bio-Metrica 2011). Such capabilities imply that biometric technologies enable the police to access more data on fingerprints.

- **Convenient installation:** The Automated Fingerprint Identification System installs on any standard Personal Computer (PC) and is also user-friendly, as the technology is fairly uncomplicated for personnel to operate (Bio-Metrica 2011).

The Automated Fingerprint Identification System is also inclusive of the creation and maintenance of fingerprints. Some of its functionalities include providing real-time data, aiding prompt identifications of the detained and deceased, as well as people who

cannot identify themselves (Anonymous 2000: No Page Number; Bio-Metrica 2011: No Page Number; Zalman 2011: No Page Number). The fact that one staff member can process large quantities of fingerprints on a small workstation attests to the ability of biometric technologies to save space, time and resources. Figure 2, below, is a depiction of what an Automated Fingerprint Identification System workstation looks like:

**Figure 2: The AFIS Workstation**

**Source:** Bio-Metrica (2011: No Page Number)

The Automated Fingerprint Identification System workstation allows a single police officer to process high volumes of fingerprint information on less power (Anonymous 2000: No Page Number; Bio-Metrica 2011: No Page Number; Zalman 2011: No Page Number). Such efficiency further attests to the value of biometric technologies in facilitating police operations. In order to ascertain what the full impact of biometric systems has been, on the level and quality of police services, the contribution of associated portable equipment like the Morphotouch also needs to be determined. Notably, portable biometric apparatuses serve as tools by which members of the public can witness the operationalisation of the Automated Fingerprint Identification System by the South African Police Service. Table 2, below, shows the production figures on data that was generated between 2001 and 2002, using the Morphotouch machine:

**Table 2: Finger and Palm Print Identifications between 2001 and 2002**

| Searches performed | Wanted ID's | Warrants of arrest |
|---|---|---|
| 6 900 | 45 | 63 |
| 6 388 | 63 | 133 |
| 1 498 | 6 | 9 |
| 1 110 | 20 | 24 |
| **Total: 15 896** | **97** | **229** |

**Source:** Du Toit (2007: No Page Number)

The various technologies could become effective if the police used them in an efficient manner. One of the ways to achieve such a goal is by streamlining criminal fingerprinting processes in law enforcement agencies. For example, police agencies can use other biometric identification technologies, such as retinal scanners, in their fight against very serious crimes, like global terrorism and organised crime (Zalman 2011). Similarly, the South African Police Service can also benefit from their application of the various other portable biometric apparatuses like the Magnetic Circular Dichroism (MCD), the Morpho-Rapid and the Morphotouch, which they already have. In addition to the benefits previously highlighted, the application of technologies such as the Automated Fingerprint Identification System in policing also offers the following:

- **Improved service delivery to the Integrated Criminal Justice System:** The application of biometric technology such as the Automated Fingerprint Identification System to produce previous conviction reports was an improvement in the criminal justice system. This is because awaiting trial prisoners are subsequently incarcerated for a relatively shorter period. Furthermore, fewer court cases need to be postponed and the prosecution is able to be more effective in opposing bail. According to Du Toit (2007: No Page Number), the use of the Automated Fingerprint Identification System also facilitates the speedier availability of information and the identification of wanted suspects.

- **Improved service delivery to the community:** Du Toit (2007: No Page Number) further asserts that the introduction of technologies such as the Automated Fingerprint Identification System has also enabled the South African Police Service to process applications for firearm licenses and clearance certificates for security officers within relatively shorter timeframes. Furthermore, the Automated Fingerprint Identification System has enabled the processing of public drivers' permits, pre-employment clearances and behavior certificates, including police clearances for migration and travel purposes.

- **Establishment of a national database for crime scene fingerprints:** The use of the Automated Fingerprint Identification System has enabled the police to create and access fingerprint information on a national database. According to Du Toit (2007: No Page Number), access to fingerprint information has contributed to more criminals being identified and arrested by the police.

- **Increased accuracy and productivity:** The introduction of the Automated Fingerprint Identification System has further enabled the police to search minute fingerprint details in a more effective fashion (Du Toit 2007: No Page Number). Such capabilities have effectively reduced the human errors that had been consistent with the manual fingerprint classification system of dactyloscopy.

- **Reduced training period:** The training of expert operators for the Automated Fingerprint Identification System takes only 2 weeks (Du Toit 2007: No Page Number), which is relatively short in comparison to the training for experts in the manual fingerprint classification process which took months or years to finish.

- **Reduced training costs:** The training costs of personnel for competency in becoming expert operators for the Automated Fingerprint Identification System is relatively reasonable. For the South African Police Service, the total costs for workshops and training personnel to become qualified operators has cascaded from R80 600 in the financial year 2001/2002, to approximately R656 600 during 2002/2003 (Du Toit 2007:No Page Number). However, this figure is much lower in compared to the cost of training an expert in manual fingerprint classification.

- **Electronic transfer of fingerprints:** The use of technology such as the Automated Fingerprint Identification System also encourages cooperation among different countries' police agencies and Interpol, which could prove helpful in dealing with global and regional crime (Du Toit 2007: No Page Number).

- **Effective crime scene services**: The electronic transfer of fingerprints has enabled the police to identify fingerprints lifted from the scene-of-crime, thus contributing to the recovery of clues (South African Police Service 2011:100).

- **Faster response times:** The preface of the Automated Fingerprint Identification System ensures that the police are more responsive to the challenges in the criminal justice system (Table 3). The Automated Fingerprint Identification System can be configured to provide results on fingerprint searches in 24-hours, compared to the manual system that took longer to process fingerprints and to provide feedback (Anonymous 2000: No Page Number; Du Toit 2007:No Page Number; Bio-Metrica 2011: No page Number).

- **High reliability:** The Automated Fingerprint Identification System produces high quality images; this adds value to the evidence attained (Bio-Metrica 2011).

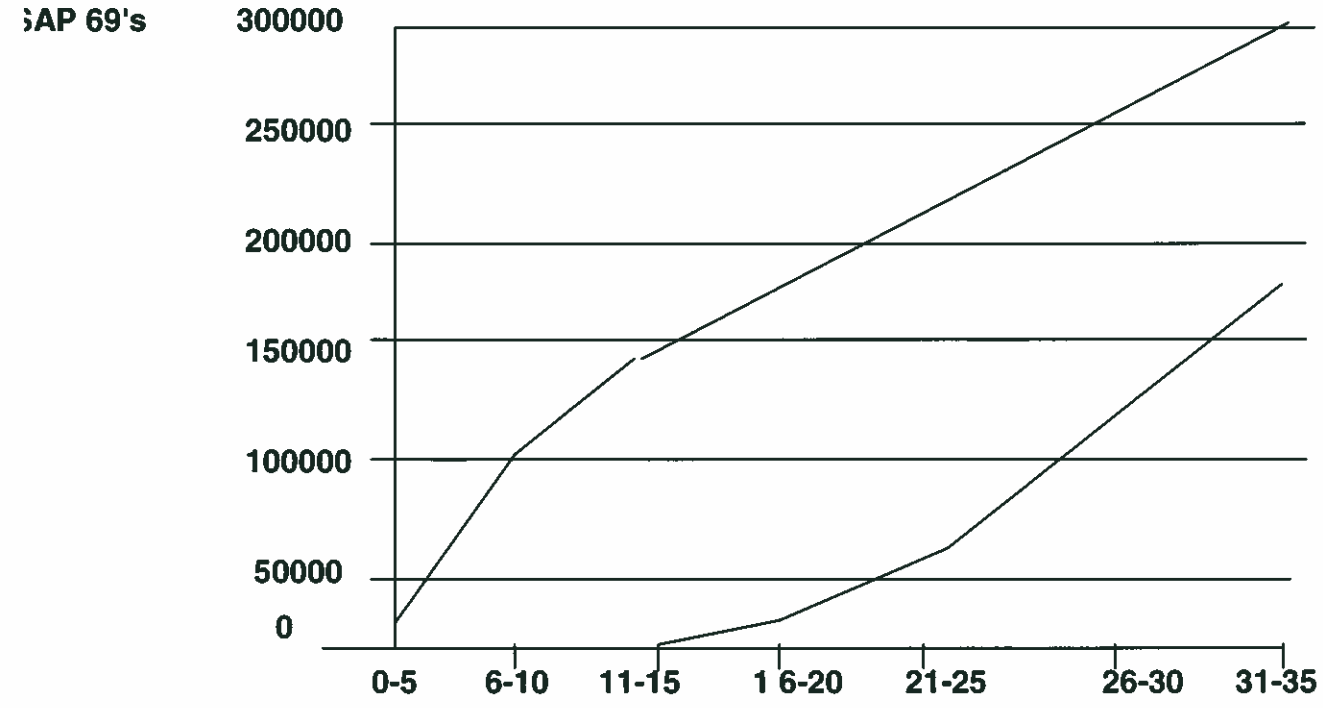
- **Increased flexibility:** The Automated fingerprint Identification System enables interconnectivity, complies with standards in most countries around the world and has unlimited capacity in terms of expansion possibilities (Bio-Metrica 2011).

- **High security:** Biometric technologies generally provide multi-level data integrity and access protection (Bio-Metrica 2011). This feature causes technologies such as the Automated Fingerprint Identification System to remain secured.

The main attraction for the use of biometric technologies is the high productivity and reliability rates that it inspires. For the police, this has ensured increased production on conviction reports, compared to when they used the manual system. Similarly, some of the key features of the Automated Fingerprint Identification System include the input of

ten-print cards using inkless fingerprinting devices, as well as the input of latent prints using photographs or transparent dactyloscopic films, in order to produce very high quality fingerprint information (Anonymous 2000: No Page Number; Bio-Metrica 2011: No Page Number; Zalman 2011: No Page Number). The inputs into the Automated Fingerprint Identification System can be done using both flatbed scanners and video scanners that are capable of drawing data from any connected, but similar database. South African Police Service automated criminal suspects identifications could in future be greatly enhanced from the acquisition of other advanced biometric technologies used for facial identification, retinal scanning and voice recognition. Table 3 shows a comparison of the response rates between the manual and automated processes:

**Table 3: Comparison of Response Rates between Manual and Automated Fingerprint Identification System for January 2001 to December 2002**




**Source:** Du Toit (2007: No Page Number)

The upper axis on the graph above indicates previous conviction reports (SAP 69) production margins after having used the Automated Fingerprint Identification System, while the lower axis represents the production figures after using the manual fingerprint classification system. The data generated in Table 3, above, is also related to fingerprint evidence on contact and property-related crimes (South African Police Service 2009:60). Such capabilities thus attest to the value added through biometric technologies towards enhancing public safety. The Automated Fingerprint Identification System was also applied in respect of identifications on commercial crimes that were dependent on police action. Therefore, the Automated Fingerprint Identification System was not only used for managing crime scenes, for evidence management, and for the presentation of evidence in court, but also to generate data on the history of crimes.

### 1.2.6 The Evolution of AFIS in the South African Police Service

In an attempt to further improve the operational efficiency and effectiveness of the Automated Fingerprint Identification System database, the South African Police Service implemented the Fingerprint Enrolment System (FES) for the digital enrolment of fingerprints in 150 sites (South African Police Service 2009:60). This initiative led to the improved processing of palm prints and fingerprints as the high quality images produced were supplied as evidential material to the role players within the criminal justice system. However, before 2002, the Criminal Record Center (CRC) also performed commercial fingerprint searches on behalf of the Industrial Development Corporation (IDC), which was the owner of the Automated Fingerprint Identification System, by virtue of the debt owed by the police, in respect of their procurement of the technology. Auspiciously, an agreement between the South African Police Service, the Industrial Development Corporation and a private company was signed in 2008. In terms of this agreement, the concerned private company agreed to take over the commercial fingerprint searches on behalf of the Industrial Development Corporation. This venture led to the outsourcing of commercial fingerprints from the South African Police Service. What is important is that this outsourcing process led to the South African Police Service saving a staggering R120 million a year, which was money fittingly paid as revenue to the Industrial Development Corporation (IDC), as the then owner of the Automated Fingerprint Identification System (South African Police Service 2009:204).

The outsourcing deal also meant that the South African Police Service acquired the full ownership rights to the Automated Fingerprint Identification System. Likewise, this outsourcing process was very critical in that it further promoted public-private partnerships. Not only did the South African Police Service make huge cost savings in the process, but personnel at the Criminal Record Center were also relieved of extra workloads. There is no doubt that the reduced workloads allowed staff to focus more of their attention on the criminal searches of fingerprints, therefore channelling their use of the Automated Fingerprint Identification System towards the core business of the police. The 16 973 cases processed by the police's Criminal Record Center, which consisted of 1 181 797 criminal fingerprints and 564 143 conviction reports identified and confirmed in 2009-2010, attest to the increased usage of the Automated Fingerprint Identification System for increased criminal identifications (South African Police Service 2010:109).

The comparative statistics presented in all of the tables that have been outlined in this chapter, have also suggested that the use of the Automated Fingerprint Identification System continues to enhance not only the fingerprint identification prowess of the police, but their service delivery efforts as well. The 2010-2011 statistics, which show that the number of previous conviction reports produced registered an 18% increase from 2008-2009, therefore attest to this envisaged progress (South African Police Service 2011:99). Whether improved production figures actually translate to an elevation in the level and quality of services rendered by the South Africa Police Service is an issue that still needs to be verified. This research project thus serves this purpose.

In this research, the production figures refer to the statistical information related to the use of technology. Some of the emerging discourses related to fingerprint production figures relate directly to the reliability of the statistical data that has been generated. Similarly, employing statistics as an accurate measure of productivity, especially were service delivery is a central factor, is an extremely controversial issue. The fact that statistics are often gathered with no uniform standard and they are usually analysed using different software, are some of the contentious issues in this regard. Table 4, below, further shows the ever improving use of the Automated Fingerprint Identification System in the South African Police Service; this data was amassed in the 2008-2009:

**Table 4: Finger and Palm Print Identifications between 2008 and 2009**

| MORPHOTOUCH | AUTOMATED FINGERPRINT IDENTIFICATION SYSTEM |
|---|---|
| 7 642 OPERATIONS HELD | 135 678 CRIME SCENE FINGERPRINT IDENTIFICATIONS MADE |
| 11 345 IDENTIFICATIONS | 5 550 PALM PRINT IDENTIFICATIONS MADE |
| 245 569 ARRESTS MADE | 11 659 FINGERPRINT IDENTIFICATIONS MADE |

**Source:** South African Police Service (2009:122)

The figures in Table 4, above, show further improvements in 2008 and 2009, compared to 2001-2002. Such improved productivity further attests to the value of biometric technologies in policing. The most vital principle that supports identifications through fingerprints has been unchanged since the early 1900s. This *status quo* was maintained until the dawn of technology, which of course brought about radical changes to the field. These changes have also been evident in the fingerprinting processes by the South African Police Service that has since witnessed greater productivity margins than when they still used the manual fingerprint classification system. Yet, production figures only speak to the quantitative aspect and not the qualitative facets of service delivery. Production figures are certainly not the only determinant in measuring the level and quality of services offered. Table 5, below, shows more improved margins.

**Table 5: Finger and Palm Print Identifications between 2009 and 2010**

| MORPHOTOUCH | AUTOMATED FINGERPRINT IDENTIFICATION SYSTEM |
|---|---|
| 15 599 OPERATIONS HELD | 1 181 797 ENQUIRIES RECEIVED FOR FINGERPRINT IDENTIFICATIONS |
| 155 479 PEOPLE TESTED | 5 160 PALM PRINT IDENTIFICATIONS MADE |
| 6 867 WANTED IDENTIFICATIONS MADE | 9 835 FINGERPRINT IDENTIFICATIONS MADE |

**Source:** South African Police Service (2010:109)

Despite the improvements brought about through the introduction and application of technologies such as the Automated Fingerprint Identification System, the Criminal Record Center of the South African Police Service continued to experience several challenges. To recapitulate, the high cost of training, the lower staff salaries, the high staff turnovers, as well as the problems related to the collection of evidence at crime scenes, were some of the challenges that continued to persist (Omar 2008:29). The retention and attraction of skilled personnel such as fingerprint and other forensic science experts, in various fields, also threatened the operational efficiency and thus the operational effectiveness of the South African Police Service's Criminal Record Center.

### 1.2.7 Retention of scarce skills in the South African Police Service

Various measures such as the Accelerated and Shared Growth Initiative for South Africa (ASGISA), the Joint Initiative on Priority Skills Acquisition (JIPSA), the Human Resource Strategy, the Scarce Skills Retention Policy, the Skills Development Act 97 of 1998, the Skills Development Levies Act 9 of 1999 and the National Skills Development Strategy of 2001, amongst others, have been introduced by government as part of a comprehensive plan to retain and develop scarce skills across all economic sectors in South Africa (South Africa 2001: No Page Number; South Africa 1998: No Page Number; South Africa 1999: No Page Number; Kay & Fretwell 2003:24; Samuel & Chipunza 2009:414; Breier & Erasmus 2009:1). These measures were introduced to help organisations, including the Criminal Records and Forensic Science Services of the South African Police Service, to develop and retain fingerprint experts who are essential to the efficient utilisation of the Automated Fingerprint Identification System.

Both the Accelerated and Shared Growth Initiative for South Africa and the Joint Initiative on Priority Skills Acquisition policies have identified skills shortage as a major obstacle that inhibits South Africa in achieving its MDGs or what is commonly referred to as the Millennium Development Goals (Anonymous 2007 a: No Page Number). For the South African Police Service, this related to, the loss of fingerprint experts, among others. One of the objectives of the Accelerated and Shared Growth Initiative for South Africa was to conduct an audit on scarce skills, which culminated in the publication of the National Master Scarce Skills List. This list was used to ascertain and account for

skills that are not only limited, but the shortage of which impacted negatively on the economic growth in South Africa (Breier & Erasmus 2009:1). In the same way, it is critical for any country to identify which skills need to be developed, which skills need to be acquired, and how best to develop those that have already been obtained.

The South African Police Service's strategic plan for 2005 – 2010 has been aligned to the objectives of the Accelerated and Shared Growth Initiative for South Africa (ASGISA). The implication of this alignment was the recruitment of skilled labor into the employ of the South African Police Service (South African Police Service 2005:34). Similarly, during 2008, learnerships were awarded to approximately 40 individuals to be trained as experts in various fields in order to capacitate the human resources of the Criminal Record Center and to bridge the skills shortage in the South African Police Service (eTV 2008). This targeted recruitment could assist the Criminal Record Center to attract more fingerprint experts which could, ultimately, further optimize the application of the Automated Fingerprint Identification System. Whether this intervention to acquire skills did in fact yield any positive results, is an issue that would require further research and a thorough skills audit by the South African Police Service.

The South African government takes keen interest in re-skilling the country, so as to attain stability in all sectors of life. According to Kay and Fretwell (2003:24), the Human Resource Strategy that was launched by the office of the State President to maximize the potential of all South Africans, in February 2001, was another tool that could assist the Criminal Record Center of the South African Police Service to develop and retain experts. Kay and Fretwell further assert that potential could be maximised by acquiring skills and values that will enable all South Africans to work productively and improve the quality of life for all. Law enforcement agencies also have a duty to render adequate and high quality safety and security services to communities, including contributions towards building a better life for all (Ngobeni 2004). Breier and Erasmus (2009:1) have strongly contended that skills shortages within the Republic of South Africa have had an adverse impact on the ability of the government to improve the quality of life for all.

In line with the Presidential strategy, and in an attempt to respond to the skills shortage problem, the South African Police Service also designed a Human Resource Strategy.

This strategy was designed to develop and sustain the in-service training needs aimed at supporting the organizational priorities of the South African Police Service (South African Police Service 2005:34). Accordingly, the continued training of fingerprint experts at the Criminal Record Center of the South African Police Service could also contribute to the responsiveness of the police in dealing with the social needs of fighting crime through the efficient and effective application of technologies such as the Automated Fingerprint Identification System. Thus, the continued training of forensic and fingerprint experts could also serve as motivation as it could foster a perception amongst personnel that the employer takes keen interest in their personal development.

Continued in-service training is also tantamount to honing skills that have already been acquired. According to Kay and Fretwell (2003:24), the strategic objectives of human resource strategies also include improvements on the supply of quality skills, especially scarce ones, which are more responsive to the social and economic needs of society. The implementation of the human resource strategy by the police was therefore a step in the right direction, as it supports the retention of highly skilled labor. The retention of skilled labor therefore serves as an extremely critical aspect, not only in mitigating skills shortages, but in also capacitating and enabling state institutions to strategically direct their plans to elevate the very level and quality of services rendered to the public.

The South African Police Service does need to effectively deal with the issue of skills shortages. This goal could be attained by implementing interventions which are aimed at retaining skilled personnel, like fingerprint experts. Omar (2008:35) recommended that the Criminal Record Center and Forensic Science Service need to increase their human resource capacity, design posts in a more attractive way, introduce market related salaries, implement an effective promotion policy and prioritize career development. Omar further asserts that the police could ensure that more experienced personnel are attracted and retained through the introduction and implementation of various policies and procedures that create favorable conditions for expert personnel to remain within the employ of the Criminal Records and Forensic Science Services itself.

## 1.3 PROBLEM STATEMENT

Poor service delivery has been identified by the African Peer Review Mechanism (APRM) as one of the areas that South Africa needed to deal with, as it was perceived as adversely affecting the quality of governance (Mkhabela 2007:8). This discovery included police performance. The speedy finalisation of cases and court proceedings is influenced by the availability of records on previous convictions. The production of these records falls under the ambit of the Criminal Record Centre of the South African Police Service. Prior to the introduction of the Automated Fingerprint Identification System, experts at the Criminal Record Centres analysed fingerprints manually using dactyloscopic examinations. This process was complicated and took longer for the results to be obtained. Similarly, the delays had an adverse effect on the entire criminal justice system. The adverse effects on the fingerprinting processes within the South African Police Service were therefore categorised into the following critical areas:

- It made it difficult for the police to accurately identify wanted suspects in roadblocks. In the manual processes, identifications were done primarily by matching the facial outlook of the suspected person to that of the circulated identikit or photograph in the police's possession. The limitations that was inherent in the manual method, such as the practicality of circulating the identikits or photographs of wanted persons, as well as the human error of misidentification, had a negative impact on the effectiveness of the police.

- It delayed the finalisation of investigations, where the prints lifted at the crime scene should be matched with those of the suspects. This delay had two major impacts on criminal justice. Firstly, it created delays in the arrest of the suspects, which increased the possibility of suspects fleeing and evading prosecution. It also increased the number of dockets handled by detectives, which negatively affected their effectiveness (South Africa 1998: No Page Number). Secondly, if suspects were arrested, their court cases could not be finalised in time.

- It delayed the sentencing of convicted persons as their previous conviction records, which were required in sentencing, were always late. This created backlogs for the prosecution and increased the number of awaiting trial inmates. If the inmates were released, the possibility of them skipping bail was greater.

Since the introduction of the Automated Fingerprint Identification System, no research was conducted to assess its impact on the level and quality of services offered by the South African Police Service. Evaluations were thus critical in determining whether the implementation of this biometric technology had addressed the service delivery challenges that the South African Police Service had encountered, when they still classified fingerprints manually. What this implies is that this research ventured into an unexplored field, particularly in terms of the evaluation of the use of the Automated Fingerprint Identification System, specifically in the context of policing in South Africa.

## 1.4 THE RESEARCH QUESTION

The first step in research is to identify the problem and then delineate it into specific research questions that are relevant to the problem of the research or the subject under investigation (Welman & Kruger 2001:11; Brynard & Hanekom 2006:16; Hofstee 2006:85). The main objective for identifying and delineating the research question is to provide guidance for the research. Thus, in order to help direct, inform and focus this research, a specific question was posed. According to Hofstee (2006: 85), a research question is posed when the researcher does not have sufficient knowledge about the topic or the problem that is being investigated. Hofstee also presented a strong argument in asserting that the main purpose of a research question is to aid the formulation of a thesis statement. With the thesis statement already implied in many of the arguments made throughout, the question driving this research project was:

- To what extent has the use of the Automated Fingerprint Identification System improved the level and quality of services rendered by the South African Police Service?

## 1.5 RESEARCH OBJECTIVES

The aim of this research was to achieve the following key objectives:

- To determine the impact of the Automated Fingerprint Identification System on the level and quality of services rendered by the South African Police Service.

- To identify the factors that hampered the efficient and effective utilisation of the Automated Fingerprint System.

- To develop a conceptual framework that can be used to measure the impact of the Automated Fingerprint Identification System.

- To make recommendations based on the findings, to the management of the South African Police Service, about the improvements that can be effected with regarded to the future usage of the Automated Fingerprint Identification System.

## 1.6 DELIMITATIONS OF THE RESEARCH

This research was premised upon the qualitative paradigm. Naturally, the research aimed to investigate the impact that the use of biometric technology such as the Automated Fingerprint Identification System has had on improving the level and quality of services rendered by the South African Police Service, in the East Rand area of Gauteng. However, as the research unfolded, it became evident that the sample that was drawn would not yield in-depth findings. This was because there was a relatively small sample of participants who were trained as experts and, as such, sufficiently knowledgeable on the application of the Automated Fingerprint Identification System.

Based on these findings, the researcher also realised that there were only a few police officials at stations around the East Rand, who were formally trained to use the available portable Automated Fingerprint Identification System apparatuses, like the Morphotouch, Morpho-Rapid and the Magnetic Circular Dichroism (MCD). The South

African Police Service has, through its Strategic Plan for 2010-2014, also acknowledged that increasing the capacity and professionalism of personnel was an organisational imperative, even though the increases in capacity alone have also led to backlogs in training (South African Police Service 2010:15). Such unforeseen eventualities have also limited the extent to which the findings in this research could be generalised.

Generalisations refer to the drawing of inferences, in order to develop concepts and theories, so that data can be applied empirically to a wider population (Babbie 1995:302; Mason 2002:36; Miller & Brewer 2003:126; Flick; von Kadorff; & Steinke 2004:150). In the same way, generalisations are aimed at attaining representivity of the sample in relation to the research population. However, the aim in qualitative research is not so much to attain representivity, as it is to contextualise rich and descriptive data to a specific case being studied. Various scholars (Hallway & Jefferson 2000:122; White & Marsh 2006:36; Srnka & Koeszegi 2007:34) have pointed out that the object of qualitative research is to attain transferability and not generalisability. These scholars have also argued that qualitative research can develop concepts and hypotheses. This assertion explains the development of a conceptual framework in this study. The conceptual framework that was developed in this research was contextualised to, but not necessarily limited to, measuring the utilisation of the Automated Fingerprint identification System by the South African Police Service in the East Rand alone. In fact, the conceptual framework in this research can also be applied in measuring the achievements of biometric technological intervention, by any state institution.

## 1.7 DEFINITION OF TERMS

The following are the key theoretical concepts used in this research:

### 1.7.1 Automated Fingerprint Identification System

The Automated Fingerprint Identification System is biometric technology with devices that measure human physiological features, like fingerprints, to verify identity (Rejman-Greene 2001:116; Jamieson et al 2005:16:254). This technology has central capabilities to search for criminal and commercial fingerprints (Du Toit 2007: No Page

Number). The Automated Fingerprint Identification System also uses digital imaging to obtain, store and analyse fingerprint data, whilst automated fingerprinting refers to the matching of known fingerprints against a database of familiar and unknown fingerprint images. In its narrow sense, a fingerprint is an impression left by the friction ridges of a finger and in a wider sense it refers to traces of impressions from the hand (Marais 1992:22).

### 1.7.2 Service delivery

Service delivery is an approach that puts pressure on behaviors, systems, procedures, and attitudes within public service institutions, redirecting them in favour of the customer (South Africa 1997:12). Fox & Meyer (1995:118) defined service delivery as the provision of public activities, benefits and satisfactions that are both tangible goods and intangible services. In this research, service delivery consists of the sum of all customer-oriented activities that are carried out by state institutions, in order to fully meet the needs and expectations of customers, who are members of the community.

## 1.8 SIGNIFICANCE OF THE RESEARCH

The findings in this research will demonstrate, to the management of the South African Police Service, what the impact of the use of the Automated Fingerprint Identification System has been on the level and quality of services already offered. This research will also identify the pertinent challenges that hampered the efficient and effective usage of the Automated Fingerprint Identification System and indicate the possibilities of overcoming these challenges. This research project will also contribute towards and build on the existing body of knowledge which would in turn be available for other scholars to conduct further explorations. The research will therefore indicate areas that demand further research.

## 1.9 CHAPTER OVERVIEWS

This section is intended to provide a clear outline of how the research developed from beginning to end. This section thus delineates the chapters in this research, according

to the order in which they appeared. According to Hofstee (2006:90), the section on chapter overviews is no platform for substantiations or contentions on issues from the research, but a place for stating what has been covered in each of the chapters and which order is followed in each chapter. Hofstee further indicates that the introductory chapter is usually not covered in this section. This omission is based on the assumption that by the time readers get to this overviews section, they will have already acquainted themselves with the contents of the first chapter. In this research the first chapter is titled the General Orientation. The chapter layout for this research report is as follows:

**Chapter 2: Literature Review.** This chapter provides a broad contextual review of the literature on the topic being investigated. Therefore, the chapter provides the reader with a comprehensive picture of the utilisation of the Automated Fingerprint Identification System and service delivery issues as relevant to the law enforcement environment, by moving from the general to the specifics thereof.

**Chapter 3: Research Design.** This chapter puts forward a discussion of the approach, design, demarcation, limitations, methods and techniques used, including how the integrity of the data was preserved. In addition, this chapter delineates the paradigmatic perspective espoused in this research project.

**Chapter 4: Findings.** This chapter provides an analysis, interpretation and discussion of the empirical data and the literature relevant to the research, in order to make sense of the phenomenon being studied.

**Chapter 5: Recommendations and Conclusion.** This is the final chapter of the research in which recommendations are made in order to address the shortfalls that have been identified through the research findings. The recommendations in this research are intended to ensure the efficient and effective use of biometric identification technologies such as the Automated Fingerprint Identification System. In addition, the chapter will recommend the implementation of some of the ideas to improve on the level and quality of services rendered by the South African Police Service.

## 1.10 CONCLUSION

The South African Police Service is responsible for implementing, using, managing and evaluating the impact of the technological resources at their disposal. The Automated Fingerprint Identification System is one such biometric technology that is used to identify individuals by means of fingerprint scanning. This biometric technology is also implemented to maximise the efficiency and accuracy of fingerprint information, which might have been compromised when the South African Police Service used the manual fingerprint classification system of dactyloscopy. The limitations of the manual fingerprint classification system highlighted possible explanations as to why the South African Police Service introduced the Automated Fingerprint Identification System. For the South African Police Service to attain the required levels of effectiveness in their use of the Automated Fingerprint Identification System, they need to thoroughly investigate the challenges encountered during the utilisation of this biometric identification system and to carefully consider probable solutions to problems that are linked with its usage.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 INTRODUCTION

Technology is essential in enabling the police to provide safety and security to all South Africans. A classical example of the safety and security services offered is the telephone emergency reporting system center in Midrand that is used to expedite crime reporting and to summon police assistance on a 24-hour basis. This system enables the police to enhance the level and quality of its services to the public. Service delivery is critical to the functions of all public institutions in South Africa. The 2009 appointment, by President Jacob Zuma, of the National Planning Commission (NPC) and the Monitoring and Evaluation Minister attests to a commitment by government to monitor and evaluate performance and the provision of equitable services to the public. In this regard, it is evident that any police agency needs to report on the services it offers. This feedback on services will include reporting on the technologies applied.

Within law enforcement agencies, technology is applied to enhance the success of operations by providing the ability to direct the activities of the different role players (Komatchus & Hicks 2004:62; Lebeya 2007:2; United Nations 2007:11; Streefkerk; van Esch-Bussemakers & Neerincx 2008:102). This coordination in police work is attained through the diversified application of technologies to cover as many stakeholders and as wide a spectrum of activities aimed at enhancing community policing and crime prevention. The police can apply technology to communicate with officials and community patrol groups, monitor the movement of vehicles and locate areas where victims of crime require assistance. Technology offers the ability to harness the necessary means to combat crime; this is confirmed by Wright, Ward and Burgers (2005:1) who argue that the success of technology depends on its widespread uses.

The police are supported by a broad range of technologies that are not only used for combating crime, but for administrative purposes too. The Case Administration System (CAS) and Laboratory Information Management System (LIMS) are some of the technologies, on hand, that the South African Police Service utilises to further support

their criminal investigative role (South Africa 2002:No page Number). Some of the technologies, such as the Automated Fingerprint Identification System, are intended to augment the police's criminal fingerprints identification capabilities. To reap the purported rewards, the police have to overcome some of the challenges that are linked with the use of technology (Hughes & Love 2004:610). One such challenge is aligning the technology with the strategic direction of the organisation. To this end, the South African Police Service is supported by the Information Technology Resource Strategy and its Strategic Plan for 2005-2010. These directives compel the police to implement policies and practices that are aimed at attaining their organisational strategic objectives (South Africa 2002:16; South African Police Service 2005; Strategic Plan 2005/2010).

The police can achieve their strategic objectives if they streamline the technology at their disposal to meet the required service delivery needs. Such an accomplishment will include, for instance, the optimal use of biometric identification technologies for fingerprinting purposes. The Automated Fingerprint Identification System can therefore become an effective tool if it is used to enhance the operational effectiveness of the police and to respond to the needs of the community. In order for the South African Police Service to attain the required results, they should not only know the type of skills required for the optimal use of technologies, but they should also realise the philosophical and legal implications linked with the use of technology in policing.

## 2.2 THE USE OF TECHNOLOGY IN POLICING

Information Communications Technology (ICT) has impacted on all aspects of our daily lives and these impacts stretch into the realm of policing. Policing as a social function is not immune to the effects of technology that have impacted on the social, political and economic spheres of human existence (Dale 1999:13; Deem 2001:7; Bloss 2007:211; Sinclair & Matlala 2011:49). Because law enforcement agencies are information driven, they too rely on information for the successful management of crime. Combating criminality in modern times could therefore not be effectively attained without the proper application of state-of-the-art and highly advanced technologies in law enforcement.

The changes that came about as a result of the implementation and utilisation of technologies have made it easier for police agencies to manage information more effectively and to combat criminality at local and trans-national levels. Technological changes in policing are driven by the desire to satisfy information demands (Chan 2001:14; United Nations 2007:183; Mafstroski & Lum 2008:488; Nissan 2008:45; Streefkerk *et al.* 2008:101). At the same time, these advancements also assist globalisation and competitiveness (Turban; Mclean & Wetherbe 1999:7; Suarez-Orozco & Qin-Hilliard 2004:1; Wen 2009:3024). Advancements in technology have created a digital revolution which turned the world into a global village where the flow of information is much easier and communication is less costly (Laudon & Laudon 2004:486; Shih 2004:719; Kotler & Keller 2006:13; Nissan 2008:46; Wen 2009:3024).

Policing has also enjoyed the benefits that can be derived from globalisation and the advancements in technology. Technological advancement refers to Internet connectivity, intranets, advances in the speed of computers and innovation in software (Brynjolfsson & Yang 1996:3; Brynjolfsson & Hitt 2000:34; Shih 2004:719; Moodley 2005:1; Wen 2009:3025). It is this speed and innovation that is associated with technology that has effectively assisted organisations to become more efficient and competitive. There is no doubt that globalisation and technology have had some major effects on how law enforcement agencies conduct their crime combating operations and this has in the overall, clearly impacted on how they conduct their daily business.

### 2.2.1 The Effects of Globalisation and Technology in Police Work

Globalisation and technology have made it easier for law enforcement agencies to exchange information related to crime and to apprehend suspected criminals. Even though globalisation may have enhanced many aspects of life (Dale 1999:3) it has also brought about challenges within the global policing environment. Some of the challenges relate to the worldwide safety of individuals and states alike, which continue to be threatened by criminality. Various scholars (Arsovska & Verduyn 2007:227; Bloss 2007:211; Nuth 2008:437; Turner & Kelly 2008:184; Weinstein 2008:22) persuasively contend that increases in the endangerment of public safety came about as a result of the trans-national nature of crime that is to this day facilitated through globalisation. For

instance, one of the most common and worrying factors is that the increased worldwide sharing of information that came about as a result of globalisation has created conditions where syndicated criminal tactics are imported from one country to another.

The global exchange of information, whether criminal or otherwise, that came about as a result of globalisation is also being assisted through the utilisation of technologies. However, for globalisation to successfully facilitate criminality many factors have to be in place; this associated requirement could offer the police leverage on the situation, particularly through their use of technologies (Morselli; Turcotte & Tenti 2011:184). The success and effectiveness of organisations depends on their ability to operate globally (Brynjolfsson & Yang 1996:39; Kirk 2002:1; Laudon & Laudon 2004:5). Law enforcement agencies have realised that the transnational nature of crime inhibits their effectiveness. The establishment of the International Police Organisation (Interpol) to expedite the effectiveness of the police demonstrates a commitment to tackling crime across the globe (Barnett & Coleman 2005:603; Lebeya 2007:3; Interpol 2008:13).

The police could successfully deal with crime if they combined their utilisation of technologies with other tactics. Fingerprinting is one of those tactics that police officials can apply to enhance their crime combating capabilities (Manning 1992:368; Interpol 2008:5; South African Police Service 2012:110). To increase their efficiency in dealing with crime and to further augment their criminal identification capacity, the South African Police Service has also employed upgraded biometric technology (the Automated Fingerprint Identification System), with latest state-of-the-art hardware in order to capture criminal fingerprints and palm prints onto its databases (Du Toit 2007: No Page Number; South African Police Service 2008:74; Bio-Metrica 2011: No Page Number). Various sources (Anonymous 2000; Scarborough, Henning & Denchman 2006:530; Maltoni, Maio, Jain & Prabhakar 2009:xi) have indicated that biometric systems enable the police to search for fingerprint data from other agencies' databases. This interconnectivity makes technologies such as the Automated Fingerprint Identification System an important tool in fighting crime. However, if the police are to become globally competitive, they need to align their use of technology with those philosophies that inform approaches which inspire ethical conduct and the adoption of best practices.

### 2.2.2 A Philosophical Approach to the Use of Technology in Policing

Most law enforcement agencies have adopted Community Policing as the assumption behind their approach and practices. The South African Police Service is one of those agencies that have also adopted social development and improved Community Policing as their organisational imperatives (South African Police Service 2009:37). Despite such adoptions, law enforcement agencies in South Africa continue to employ technologies in a way that violates the rights of individuals (Adonis 2012: No Page Number). For example, police personnel within the South African Police Service continue to subject some members of the community to illegal fingerprint scanning using technologies like the Morpho-touch (portable Automated Fingerprint Identification System apparatus). In a democratic and developmental state, like South Africa, it should be a norm that the utilisation of technologies by the police should always complement the principles enshrined in Community Policing and in democratic policing.

Current policing models like Community Policing which have been adopted by some law enforcement agencies in Africa were imported from the west. Western models have, however, failed to fully address problems within the African policing context (Enslin & Horsthemke 2004:546). The police in South Africa could benefit by reflecting on African philosophies such as *ubuntu*. Such reflection can enable the police to understand the societal dynamics within a multi-cultural context. Such reflection could enable police practice to become not only culture-sensitive, but also to encourage the police to use technologies in a more humane way. The move towards aligning policing with African philosophies exemplifies a move towards promoting humanness and a shared vision of creating an environment that promotes the values of social justice. The social justice values in this research are explored through the human rights lens. The emphasis on social justice values, human rights and community policing has also been fully inculcated in the values enshrined in the constitution of the Republic of South Africa.

Although Community Policing remains one of the best philosophical and strategic vehicles to have ever been instituted in police work, it has failed to deliver the expected outcomes of a transformed police service, particularly in South Africa (Pelser 1999: No Page Number). A greater part of this failure to attain a transformed police service can

be attributed to a disconcerting colonial and apartheid past that ended in 1994, through a negotiated democratic process. To further elucidate, the systems of slavery, colonialism and apartheid have gradually demonised the cultural values of some of the racial and ethnic groups within South African society. In the same way, this gradual demonisation of society has also resulted in a culture of violence and, for the police in particular, the violence became evident in how they handled suspects in criminal cases.

The internalisation and institutionalisation of violence has dehumanised the entire South African society to a point where many people, and police officers alike, are no longer exercising restraint (Pelser 1999: No Page Number). Police statistics on the reported contact crimes attest to these violent tendencies in South Africa (South African Police Service 2011:5). Any efforts to reverse this vicious cycle therefore requires interventions at the level of culture, with specific emphasis on how people perceive of themselves, as well as their responsibilities in relation to others within the community.

Reversing the damages caused by the demonising systems of colonialism, slavery and apartheid calls for introspection and, therefore, a revisiting of African indigenous epistemologies becomes justified. In South Africa, the approaches to police work need to be re-adapted to ubuntu because- ubuntu promotes reciprocity, inclusivity, humanness and a shared destiny (Karsten & Illa 2005:607). For the police, African philosophies like ubuntu could be re-emphasised as the over-arching rule to community policing. Mamphele Ramphele was cited in Enslin and Horsthemke (2004:257) as having recapitulated the relationship between ubuntu and other philosophies as follows:

> [Ubuntu as a philosophical approach to social relationships must stand alongside other approaches and be judged on the value it can add to better human relations in our complex society. ... We have to have the humility to acknowledge that we are not inventing unique problems in this country, nor are we inventing new solutions]

In as much as the infusion of ubuntu with community policing encompasses the use of technology by the police, such infusion should promote good police-community relations. Such infusion also raises questions as to how the police in South Africa can

re-align their use of technologies in a way that strengthens relations with the community. Sinclair and Matlala (2011:47) argue that relations could be fortified if the police actively involve the community in decision-making regarding their business.

### 2.2.3 Humanising Law Enforcement in South Africa

In multi-cultural societies like South Africa, the re-accentuation of an African philosophy such as ubuntu - as a superlative rule to community policing - could go a long way in humanising practices in police work. This is because ubuntu knows no gender, cultural, traditional or racial boundaries, as it advocates humanness and equity (Enslin & Horsthemke 2004:257). The re-adoption of ubuntu as the supreme rule in community policing could go a long way in influencing the behaviors of police officers and the community alike. Such positive influences could result in the various technologies also being used by the police in a manner that is respectful of individual and human rights in general. To achieve such a goal, the South African Police Service needs a paradigm shift that will re-align the thinking of staff and encourage them to draw from indigenous knowledge systems, without discarding those approaches from other parts of the world. Such a shift could also promote the required professionalism in the police service.

The centrality of the question on re-aligning policing approaches with African philosophies was motivated by the fact that there is no single answer to humanising police work anywhere in the world (Woolpert 1980:68; Matlala & Sinclair 2012: No Page Number). A multi-disciplinary approach is required in dealing with challenges in policing. In addition, a socio-cultural approach could become a viable solution in providing some of the answers to the question of humanising policing in South Africa. This assertion also comes against the background that many people in South Africa continue to subscribe to their traditional and cultural values (Karsten & Ella 2005:607).

Police agencies could have a better approach to law enforcement if they understood the social value systems that inform the cultural behaviours and practices within a particular community. In South Africa, such comprehensions could promote an environment where the police begin to use technologies in a way that is sensitive to individuals. Such an approach could also contribute to the creation of a setting where the police

deal with people in a way that respects an individual's traditional values and contributes to the promotion of social justice in communities. The ideal for effective policing in South Africa can be achieved by adopting practices that promote respect for the fundamental human rights of all people. This feat could be achieved by drawing from African indigenous knowledge systems. Drawing from African indigenous knowledge systems could help the police to act in a more humane and culture-sensitive manner.

From a philosophical perspective, the use of technology provides a variety of interesting themes in law enforcement, both as a science and as a practice. This view has also been supported by Sorensen and Pica (2005:127) who describe the use of technologies as an entrepreneurial revolution in police work. The introduction of intelligence-led policing and forensic sciences, all of which can employ technology to enhance the effectiveness of the police, attests to this entrepreneurship in policing. Despite the associated entrepreneurship, scholars like Manning (1992:386); Nissan (2008:21); and Streefkerk *et al.* (2008:102) still contend that the police largely apply technology as a reactive, rather than a proactive, crime-control measure. This implies that the technology that is utilised by police officials is only effective in tracing the offenders.

Balkin (2008:15) is, however, reluctant to subscribe to this notion of the police using technology solely as a reactive tactic. This author argues that the police can also apply technology in a much more proactive manner. A classical example of how the police have applied technology in a proactive fashion is the close circuit cameras that were placed in and around stadia during the 2010 Federation of International Football Associations (FIFA) Soccer World Cup, including the 2009 Confederations Cup in South Africa. According to Sinclair and Matlala (2011:54), the cameras in stadia where matches of the 2010 Soccer World Cup were being played were installed to deter vandalism and any other prospective criminal behavior. It is important that the police can apply a mixed methodology of proactive and reactive strategies to deal with crime. Mixed methodologies are useful in increasing the ability of the police to combat crime.

In order to effectively deal with crime, the police need to continuously seek more imaginative ways of using the technology at their disposal. The establishment of collaborative networks has proved to be an innovation in recent policing history. Lebeya

(2007:2) goes as far as asserting that the challenges created by transnational crimes have forced the police to become more innovative, adaptable and to co-operate with each other, just as criminal syndicates do. To this day, crime groups have been active for about 200 years, which includes the period during which countries' borders were not even secured (Morselli *et al.* 2011:186). The innovative use of technology could become one of the critical success factors in dealing with crime in and across borders.

### 2.2.4 The State of Policing and the Use of Technology in Africa

Despite the relatable benefits, most law enforcement agencies in sub-Saharan Africa are still unable to optimise their use technology in the fight against crime (South African Police Service 2009:35). Such shortfalls are brought about through the inability to properly employ technologies - including the adoption of philosophies and approaches to law enforcement that have no relevance to the communities being served (Baker 2008:68). The inability to use technology in an optimal fashion is also due to the poverty that has forced most police agencies in sub-Saharan Africa to operate on very scarce resources (Baker 2008:33). This lack of resources diminishes the ability of police agencies to contribute towards attaining peace, stability and the betterment of the lives of the communities they served. In fact, the failure to enhance the safety and security needs of society implies that law enforcement agencies have failed in becoming agents for social change, a function which is crucial to attaining quality services.

Technology has proven to be a powerful tool for social change. The easy flow of information and the globalisation of crime, to which technology also serves as a catalyst, are testimony to these influences on the social environment. Within the policing environment, one of the most critical issues related to the use of technology is capacity (Kamau 2009:138). It is not always clear whether certain African police agencies are sufficiently equipped to use technology in a way that could have a positive influence on social order. Literature sources (Manning 1996:211; Mafstroski & Lum 2008:491; Nissan 2008:31; Wen 2009:3034) have pointed out that technology has had positive effects on organisations. One of the ways in which this has happened is that technology has changed the way in which police managers issue instructions to personnel. Instead of face-to-face verbal and paper-based instructions, the police now

use a range of technologies to transmit electronic messages to patrol officials. Classical examples are electronic pagers, two-way radios, cellular phones, emails and other wireless applications that are used to transmit messages to operatives in the field.

### 2.2.5 A Paradigm Shift in the Use of Technology in Law Enforcement

The utilisation of technology in police work does require a paradigm that can also encourage the deeper and more intellectual understanding of related and contemporary issues within the policing environment. Although literature (Lal 1999:11; Balkin 2008:16; Interpol 2008:5; Streefkerk *et al.* 2008:103) may have indicated that technology has helped the police to ensure that aid is dispensed timeously to citizens, such assistance should also be dispensed in a humane manner and in the spirit of ubuntu. Such a paradigm shift will not only augment the level and quality of services rendered, but could also be used as a vehicle to re-write the atrocious history of some of the approaches and orchestrate a move towards Africanising policing in South Africa. In South Africa, the legacies of colonialism, slavery and apartheid need to be reversed.

This shift in paradigm also requires that law enforcement agencies in Africa have a shared vision of attaining secure environments through their use of technologies. Many African countries have a history of human rights violations by police officials. Police brutality in South Africa alone, has been in the spotlight following regular media reports on the killings and beatings of suspects in custody. Police brutality in South Africa is reflected in the many cases being investigated by the Independent Police Investigative Directorate (IPID). Bruce (2002:4) described police brutality as the absolute abuse of power, violent acts by police personnel in and outside of their work, and their excessive application of force. Although there are no confirmed reports since 1994, on the use of technology in the brutalisation of individuals by the police, the torture and electrocution of suspects by members of the former security branch of the South African Police force bears testimony to the illicit usage of technologies by the police (Shaw 2000: No Page Number). All forms of brutality by police officials have since been globally outlawed.

The brutalisation of individuals by police officials is an extremely sensitive issue, both in South Africa and elsewhere across the globe. Dealing with such horrendous practices

also requires efforts aimed at addressing the negative sub-cultures that exist within some police agencies. In fact, police agencies that are marred with accusations of political meddling and brutalisation could adopt the best human rights practices, including practices on the effective and justifiable application of technologies, from other police agencies in the international policing landscape, that are known to have the best track records in this regard. Sinclair and Matlala (2011:47) argue that promoting accountability and regional cooperation by security staff could promote the required professionalism that has evaded some agencies within the law enforcement profession.

### 2.2.6 The Use of Technology to Promote Professionalism in Police Work

Technology has helped the police to improve their work. Wireless technologies (cellular phones and laptops), which have the ability to facilitate connections, have gained popularity in many organisations. The police generally use some of these technologies to communicate and support field officials in their work (Sellen & Harper 2003:4; Adam 2005:1; Balkin 2008:2; Streefkerk *et al.* 2008:101). It is this communication and technological support that is required to assist in coordinating police operations aimed at effectively combating crime. The utilisation of the various technologies could strengthen the capability of law enforcement agencies, including the ability to improve the efficiency and quality of services rendered (Anonymous 2000: No Page Number).

The use of technology in police work dates back to the 1850s and has advanced since then (Bellis 2011). In addition, globalisation and technology have helped police agencies to adopt best practices from one another. This exchange of knowledge has caused the emergence of cooperative police networks. These networks require, among other things, the training of police personnel to ensure that officers are suitably skilled to use technologies in a manner that is aimed at successfully carrying out a shared vision of combating crime (Pillay 2004:599; Du Preez 2009:57; South African Police Service 2009:35). The application of the various technologies has also laid a solid basis for professionalism in policing. Whether professionalism has contributed to enhanced services is an issue that requires each police agency or regional network to study, monitor and assess their own interventions, including the impact of technologies used.

## 2.3 THE USE OF TECHNOLOGY TO ENHANCE COOPERATIVE POLICING

It is crucial to understand what world governments hoped to achieve by promoting police cooperation. Global bodies have forged political alliances amongst world governments and have also offered humanitarian aid where needed (Celador 2007:1; Bomberg, Peterson & Stubb 2008:7; Friedrichs 2008:3; South African Police Service 2008:141; Lavenex & Wichmann 2009:90). The mission undertaken by the South African Police Service in Dafur is an example of how policing partnerships contributed to humanitarian processes in Africa. There is no doubt that the role of technology in vital humanitarian missions could never be over-emphasised. Sinclair and Matlala (2011:49) contend that technology supports the tenets on which cooperative policing resides.

In order to align itself with global policing standards, South Africa also signed memorandums of understanding on cooperation with other countries such as Malta, the Kingdom of the Netherlands, Uganda and the African Union. Among many other aspects, the protocols signed are aimed at ensuring democracy, including assisting with law enforcement and electoral security (South African Police Service 2008:ix). Examples of other organisations that also promote mutual partnerships, global peace and security include the United Nations (UN) and the North Atlantic Treaty Organisation (NATO). These global bodies are also aimed at monitoring compliance with the Global Governance System and sustainable economic growth (Pillay 2004:588; Du Preez 2009:63; Lavenex & Wichmann 2009:95; South African Police Service 2009:35). Without technology, the formation of global bodies and police cooperation could have also been retarded. The knock-on effect that would have been caused by the delay in forming cooperative networks could have had adverse effects on the social, political and economic spheres of life. For the police, these effects would have meant limited capabilities in combating cross-border crime. Van der Spuy (1997: No page Number) summarises police cooperation by asserting that it is a source of dynamism for the institutionalisation of new ideas and methods, including the mobilisation of resources.

Of course the mobilisation of police resources also includes their utilisation of the various technologies at their disposal. However, the use of technology and police cooperation is not really without its own troubles. Some of the most debated issues in

police cooperation relate to the peace, stability and security that remains elusive, especially in some regions of Sub-Saharan Africa. Crime poses very serious threats to the peace and stability of any nation and therefore increased cooperation amongst different police agencies is viable in facilitating and enhancing peace and stability (Ngoma 2003:25; Zhao, Bi, Chen, Zeng, Lin & Chau 2006:616; South Africa 2007:450; Interpol 2008:67). However, the use of technology in many African police agencies remains a challenge. In order to identify and understand the policing-technology challenges in Africa, this research made comparisons with other regions, whose organisational capabilities in this regard could be used as a benchmark for South Africa.

### 2.3.1 Comparing Regional Law Enforcement in Africa and Europe

The European Union (EU) is one such partnership whose members such as England, France, Italy, Germany and Portugal, have long taken the initiative to foster regional peace and economic growth. In an effort to rid Europe of the effects of crime, the European Union Police Mission (EUPM) was formed with the primary aim of fostering effective cross-border policing (Roy 2005:473; Keohane 2008:127; Lavenex & Wichmann 2009:88). The establishment of this police mission attests to the commitment by European authorities to safeguard their citizenry. There is no doubt that regional initiatives that have been adopted in law enforcement have also assisted the use of technologies by member states' police agencies. However, the European integration which has led to free borders among member states, has also proved to be problematic, especially in keeping-up with the mobility of organised crime syndicates who are forever seeking new markets to exploit (Morselli, Turcotte & Tenti 2011:174).

Bloss (2007:208) argues that despite facilitating highly effective policing in Europe, the acceptability of certain technologies was always a thorny issue. Questions have often been raised over the acceptability of how certain technologies were being used in policing; this was due to the ever-evolving legalities and the move towards democratising police work. Bloss (2007:209) further argued that human rights issues have been at the center of debates on how technologies were being used by law enforcement staff. Other technologies being used by the police in Europe and other parts of the world include the polygraph and cameras (Bellis 2011: No Page Number).

Some of the technologies that are available in the market are however no longer used in police work as their credibility has often been questioned. An example of one such technology is the polygraph. Evidence produced from the polygraph remains unacceptable as evidence for criminal court proceedings in many countries. The many questions posed regarding operator accreditations and presumptuous tendencies imposed on evidence produced using polygraph machines in court attests to its unreliability (United Nations 2006:17). It is important that regional bodies create an atmosphere that is conducive to the effective utilisation of technologies in law enforcement; this includes developing common protocols for cross-border operations.

In order to create a suitable environment for effective policing, Europe began with a series of events that were used as platforms to sign governance agreements and to legislate (Roy 2005:471). These events were the Schengen agreements (1985-1990), the Treaty establishing the Constitution for Europe during 2004, the Tampere European Council in 1999, the Maastricht Treaty, The Hague Programme of 2004 and the 2009 Lisbon Treaty (Monar 2006:496; Elsen 2008:13; Keohane 2008:141). Much of the processes that paved the way for police cooperation in Europe began around 1976 (McLaughlin 1992:481), which makes their organisation more advanced in comparison to Africa. According to Nmehielle (2008:414), Africa only began processes on regional cooperation in law enforcement, after the replacement of the Organisation for African Unity (OAU), by the current African Union. The process was not without challenges.

Notably, the fact that there is not yet a single constitution that outlines clear policing guidelines for the African Union, or any regional body, hampers the effectiveness of police agencies and their service delivery efforts. The acceptance of a single constitution remains a controversial subject as it involves complex issues of institutional independence (Pillay 2004:598). Most African governments are reluctant to give away their powers as this could interfere with national legislation (Keohane 2008:129). Efforts to consolidate cooperation within the regional law enforcement fraternity, particularly within the Southern African Development (SADC) region, have also led to a more careful approach (South African Police Service 2009:35). The approach has, however,

left regional police agencies in limbo as there has been less joint cross-border crime combating operational activity in the Southern African Development Community.

Msutu (2001) indicates that the last joint law enforcement initiative in the Southern African Development Community region was Operation Makhulu in July and August of 2000; this is an operation which was conducted in Botswana, South Africa, Lesotho, Mozambique, Namibia and Zimbabwe. Morselli *et al.* (2011:174) point out that law enforcement operations and efforts have the inadvertent effect of generating empty spaces in the criminal economy. These authors also argue that the extent and precise impact of law enforcement efforts will depend on the type of tactics applied. There is no doubt that fingerprinting processes, supported through the application of biometric technologies, such as Automated Fingerprint Identification System, could close the space for criminals and their illicit activities. However, to succeed in combating crime, law enforcement agencies need to strengthen their relations and collaborative efforts.

### 2.3.2 The State of Police Cooperation in the SADC Region

Like the rest of Africa, countries in the Southern African Development Community also lack in development and cooperative policing in comparison to Europe (Van der Spuy 2008:244). Some of the benefits that can be derived from regional policing is that cooperation could contribute to the protection of democracy and freedom (Nunn 2001:12; Van der Spuy 2008:244; Du Preez 2009:89; Lavenex & Wichmann 2009:84); this is a goal which c only be attained if the police applies the technologies at their disposal in a more integrated way. In fact, freedom and security could never be absolutely guaranteed as long as there are still countries like the United States of America who continue to refuse to fall under the jurisdiction of the International Criminal Court (ICC) of justice (Hamalengwa 2012:407). This is the court that is responsible for the prosecution of those suspects who hold higher political offices in their countries. There is no doubt that technology like the Automated Fingerprint Identification System could enhance the value of prosecutions in investigations against major political figures.

To elucidate on just how far police cooperation in the Southern African Development Community compares with Europe, it is noteworthy to highlight that activities in the

European Union were divided into three pillars during the signing of the Maastricht Treaty, as far back as 1992. Pillar 3 of this treaty, particularly, encourages law enforcement cooperation and the effective combating of cross-border criminality among member states (Bomberg *et al.* 2008:5; Friedrichs 2008:19; von Lampe 2008:9). Any form of inter-agency cooperation in law enforcement is solely on the basis of collective bargaining and implementation amongst all member states' police agencies. Drawing lessons from the European Union's policing model could only benefit the shared responsibility of improving regional police service delivery. The establishment of the Southern African Development Community (SADC) was thus a step in the right direction (Pillay 2004:590; Van der Spuy 2008:243; South African Police Service 2009:35).

Within the Southern African Development Community itself, cooperation has also manifested itself in the development of institutional protocols, the signing of extradition treaties and joint cross-border police operations (Ngoma 2003:25; Interpol 2008:11; Van der Spuy 2008:243). Regional collaborations are able to place greater focus on dealing with cross-border criminality, through the establishment of cooperation and developing mutually valuable activities, structures and methods. Similarly, alliances among law enforcement agencies have impacted positively on regional safety and security services in Southern Africa. The cross-border operation of 1997 (codenamed V4), where the police recovered 1575 stolen vehicles and arrested many suspected criminals in South Africa, Zambia, Zimbabwe and Mozambique for a variety of offences, attests to the value of police collaborations (Gastrow 2001:1; Msutu 2001; Irish 2005:1; Van der Spuy 2008:248). If used optimally, biometric technologies such as the Morphotouch could become critical in the identification of fingerprints during cross-border police operations.

There is no doubt that law enforcement operations, aimed at combating criminality, could also add value to other economic sectors. For example, a lot of the stolen property that has been recovered by the police during their crime fighting operations often saves insurance companies huge sums of money that could have accrued as the result of claims. At the same time, successful crime combating operations will probably send out a very strong message to the criminal underworld that the police are up to the task and will stop at nothing to fight criminality in the region. For the South African Police Service, the failure to engage in regional policing activities amounts to a failure to

carry out its official mandate and therefore dishonoring its obligations to the Southern African Development Community (South African Police Service 2008:48). The different political, constitutional, and economic policies and programs that have been instituted throughout the various Southern African Development Community member states, however, suggest that the region is far from homogeneous (Gastrow 2000:245).

Another challenge in policing relates to the fact that the Southern African Development Community has not yet reached a stage where a single police agency is formed. This continues to make regional policing a cumbersome exercise and it affects the use of technologies in a negative way (Gastrow 2000). Some of the other challenges emanate from the bureaucracy that is encountered in organising cross-border operations as participating law enforcement agencies are regularised by different national regulatory frameworks (Gastrow 2000). These differences have also inhibited the planning and organisation of police operations, as the execution of powers and the interpretation of statutes amongst participating agencies is different. The types of challenges in the policing milieu within Southern Africa are also exacerbated by the non-standardisation of laws and training, which means that staff from the different member state agencies will utilise technologies in a non-standardised fashion (Pearson & Chaitevzi 2012:5).

### 2.3.3 The Value of Regional Police Cooperation

Within the Southern African Development Community, cooperation in the law enforcement fraternity has contributed to a shared vision on regional security. However, criminal groups are also self-organising, emergent and interact in cross-border, cross-market, and cross-industry settings (Morselli *et al.* 2011:167), which is generally also challenge in global policing. In order to deal with such criminal networking, the police need to use technologies in an innovative way. Moreover, dealing with crime requires some strong political will amongst the member states of a region. An example of how regional cooperation at a political level became a success was the September 1998 deployment of South Africa and Botswana military forces to safeguard the democracy that was threatened by the attempted *coup de tat* in Lesotho (Van der Spuy 2008:245).

Since the intervention in Lesotho, Southern African Development Community member states have not only sought political talks, but have also shown more commitment to enhancing regional policing. There is no doubt that various technologies also factored in facilitating the accomplishment of security in the region. Various authors (West 2004:25; Sorensen & Pica 2005:128; Zhao *et al.* 2006:616; Van der Spuy 2008:253) have argued that technology equips police agencies with new operational tactics that can support intra-agency collaborations which aimed to reduce crime and anarchy. Technology has enabled police agencies to transcend their crime fighting abilities beyond spatial boundaries by bridging physical distance barriers (West 2004:16; Moodley 2005:6; Streefkerk *et al.* 2008:102; du Preez 2009:52; Wen 2009:3025). The move towards employing technologies to support regional policing collaborations is a move towards integration into an increasingly technologically-driven information society.

Whilst developing regions may lack basic access to technologies, its coverage however continues to grow more rapidly. The use of cellular mobile phones is a classical example of this growth. Police agencies use most of the technologies to communicate plans for crime combating strategies. Msutu (2001) outlined some of the benefits that are linked with regional police cooperation, which are also reflected in the Southern African Regional Police Chiefs' Organization (SARPCCO) mandate as follows:

- Promoting, strengthening and perpetuation of police cooperation;
- Preparing and disseminating crime related information;
- Regular reviews on crime management strategies;
- Responding to the changing national and regional needs and priorities;
- Ensure the joint and efficient operation and management of criminal records;
- Making recommendations to governments of member states on matters that affect policing in the region;

- Facilitating regional police training and strategies, taking into account the needs and performance of the regional police services and;

- Conducting suitable operations that are aimed at promoting police co-operation and collaboration as dictated by regional circumstances.

Although inter law enforcement agency cooperation does offer some very attractive benefits, the relatable challenges within the Southern African Development Community (SADC) region remain insurmountable (Van der Spuy 1997: No page Number). Whilst the researcher recognises that some of the countries in Southern Africa may possess the necessary technical resources or infrastructure to enhance policing within their own borders, there are still those states that have neither the knowledge nor the experience to harness technology in police work. In fact, Van der Spuy (1997: No Page Number) noted the underdevelopment of police agencies, the mobilisation of resources across states and the organisational capacity of police agencies in the Southern African Development Community, as some of the many daunting challenges experienced.

### 2.3.4 Challenges in Police Cooperation in the SADC Region

The complex interaction between law enforcement and technology in the Southern African Development Community still remains poorly understood (Gastrow 2000:246). Such a deficiency therefore necessitates the need for scientific investigations. Despite the success linked to regional cooperative networks, law enforcement agencies in Southern Africa still face a number of serious challenges that they need to overcome before they can improve their services. Notably, the Southern African Development Community visualised the development of a regional database for the police and the standardisation of immigration protocols as some of its looming challenges (Ngoma 2003:25; Lebeya 2007:122; Van der Spuy 2008:247). Such shortfalls continue to inhibit the level and quality of safety and security services offered at border posts, including the creation of a huge gap in crime intelligence (Van der Spuy 2008: No Page Number).

The shortfalls in cooperative policing contribute to the inefficiency of law enforcement in the region. Among the shortfalls, is also the fact that regional fingerprint technologies do not speak to one another, which poses a challenge as different data, especially on criminal profiling, creates an opportunity for wanted suspects to evade arrest once they have crossed borders. The institutional competency of some of the law enforcement agencies in Southern Africa is also a huge concern. Literature (van der Waldt & Du Toit 1997:340; Brynjolfsson & Hitt 2000:26; Msutu 2001; Irish 2005:10) indicates that many of the challenges in regional policing relate primarily to co-ordination, management and leadership, the availability of resources as well as the use of various technologies.

The manipulation of the Zimbabwean police to focus on the harassment of opposition party leaders is also another example of how poor leadership can diminish co-ordination, accountability, and eventually result in the police losing sight of their core mandate to the public. Various authors (Willems 1974:151; Manning 1996:352; Pica & Sorensen 2004:1; Gottschalk 2006:1; Sinclair & Matlala 2011:47) argue that the police could overcome most of these challenges if they put the technology that they have to good use. Putting technology to good use implies upholding the norm for good institutional practices in law enforcement. Good institutional practices are critical in that they also imply good corporate governance. Such efficiency could further enable the police to provide the required services that are best suited to the specific needs of a particular community. Within the African context, police agencies need to use technologies in a very sensitive way. The use of technology should always be informed by the approach adopted to police the different socio-cultural groups in the community.

Various authors (Uzumeri 1997:21; Brynjolfsson & Hitt 2000:35; Nissan 2008:45; Wen 2009:3025; Sinclair & Matlala 2011:51) have argued that technologies could be used to customise services. Classical examples of how technology was used to customise services were in post-conflict Nicaragua, Uganda, Sierra Leone and Liberia. These countries were in desperate need of rebuilding their family and community structures. According to Machel (2000:48), the police used Information Communication Technology and photographs to help reunite families that were separated by war. Such Initiatives also require a multi-agency approach. This means that the police need to cooperate

with Non-Governmental Organisations (NGOs) and the military, in order to standardise their approach and practices and, in so doing, to work towards one common goal.

Collaborations between law enforcement agencies have also proved to be successful in humanitarian initiatives that are desperately required in many parts of Sub-Saharan Africa. In fact, following the Arab Spring, the police in countries such as Libya and Egypt could also use the various technologies to ensure that people are identified and that information is kept in databases. This initiative could later enable the police to help communities trace the whereabouts of their next-of-kin, during the post conflict reconstruction and development. Biometric technologies such as the Automated Fingerprint Identification System could become crucial in aiding these identifications.

The police in Africa also need to apply different technologies in a way that promotes corporate governance. The values of good governance speak to good practices and effective management. The effective management assumes a critical role of guiding the police towards aligning their use of technology with policy, as well as the accepted norms and standards in policing. The type of effectiveness that could be attained through cooperative policing dealt with in this section could not be possible without the use of technological aids such telephones and the internet. At the same time, the police also need to use the technology that they have in a way that promotes accountability and transparency, since this could also augment their very public image and integrity.

## 2.4 THE USE OF TECHNOLOGY TO PROMOTE POLICE ACCOUNTABILITY

Literature indicates that over and above the intended purposes, police agencies also apply technology for attaining organisational accountability. For example, the British police use public complaints systems for external reporting and surveillance systems for internal monitoring to ensure that their employees act honestly and adhere to institutional protocols, as well as to facilitate public oversight on the conduct of police officers (Campbell 2004:698; Sorensen & Pica 2005:127; Taylor 2005:1416; Wen 2009:3025). Whether technology does assist police agencies in achieving specific levels of accountability is debatable; this is because of all the variables that factor into the police's use of technologies in their work. Notably, issues such as fraud and

corruption have featured prominently as factors that could plot the demise of police accountability and inhibit their service delivery efforts (South African Police Service 2008:49; Faull 2009:3; Gould 2009:2; Webb 2009:7; Sinclair & Matlala 2011:51).

According to Kenny and Musatova (2010:3), red flags can be used to uncover fraud and corruption within an organization. Red flags include monitoring employee lifestyle changes, significant debt, credit problems, behavior changes, refusal to take leave, refusal to provide information to auditors and excessive checking accounts (Gregoriou & Lhabitant 2008:2; Fuerman 2009:3; Kenny & Musatova 2010:6; DiNapoli 2011:5). Besides technologies such as the ones used by the British, other police agencies could also develop their own red flags, including the ones aimed at safeguarding the technologies used. The development of such pro-active mechanisms could go a long way in the early detection of behavior that predisposes technologies to illicit practices, thereby eliminating the organisational security risk factors for the technologies used.

In this regard, the South African Police Service can also use the Public Finance Management Act 1 of 1999, the Information Technology Resource Strategy (ITRS) and their Policy on the Business of the Local Criminal Record Center, as guidelines to determine whether databases of technologies such as Automated Fingerprint Identification System are exposed to any illicit uses, including fraud and corruption. These regulatory tools can suffice as benchmarks to decide which red flags to apply for the early detection and prevention of fraud, corruption or any unlawful access to databases. Such proactive measures could be valuable in further establishing measurable service delivery pointers. Service delivery pointers can be used in maximising efforts towards attaining improved performance within all public institutions.

### 2.4.1 Assessing Police Performance in South Africa

The move towards accountability has laid the foundation for assessment processes aimed at measuring police performance. The police have a duty to report on their performance; this includes their application of various technologies used in crime combating activities. In his 2009 state of the nation address, President Jacob Zuma insisted on the implementation of performance contracts for all senior personnel in

strategic positions within the public service (Mail & Guardian 2009; SABC 2009; Polity 2009). Measuring performance could significantly aid in sustaining and augmenting the levels of accountability, fostering ever-improving performance and dealing with some of the service delivery challenges experienced in policing (Samuel & Chipunza 2009:412).

One of the ways in which performance could be measured is by producing statistics on policing activities and their use of technologies. Neyroud (2008:340) agrees that recording crime statistics and collecting data on the use of police resources could be one way in which organisational performance can be assessed. Neyroud further asserts that the use of crime statistics attest to the implementation of a multi-disciplinary management approach that can also assist in measuring police accountability. According to Wen (2009:3024), technologies provide significant data collection and control information tools. Apart from facilitating traces of the criminal's identity, technology also enables the police to monitor their own personnel and therefore also contributes to accountability and integrated performance management processes.

The performance management referred to in this research covers the on-going, or formative, evaluation of the police's levels of accountability and service delivery efforts. It should however not be misunderstood to mean that police accountability can be attained solely by gathering information on crime statistics. Helen Zille – the premier the Western Cape Province - provides a précis on assessment in performance as follows:

> [... and mid-term is a crucial point for honest self-appraisal for in-depth self-reflection to see whether you have made the progress you wanted to make according to your plan, to be deeply self-critical to a just cause where you have gone wrong and to get it right by the end of the term] (SABC 2, 2012)

Police performance cannot be holistically measured without taking into account the availability of data, as well as the attitudes and perceptions of personnel who use the various technologies. Measuring police performance also requires an in-depth understanding of the predominant challenges and cultures that have been internalised and institutionalised over time, within the various police agencies across the global spectrum. However, the police need to use technologies in a way that is transparent.

### 2.4.2 Challenges in Assessing Police Performance in South Africa

Organisational culture is one of the strongest challenges that inhibit the attaining of accountability in law enforcement agencies, particularly in South Africa. Generally, the police are not prepared to provide information. This conservative practice is ironically one of the reasons why institutions like the Community Police Forums (CPF) are unable to evaluate the level and quality of services offered by the police. Various authors (Cochran & Bromley 2003:90; Paoline 2003:202; Brown 2007:211; Gottschalk & Gudmunsen 2009:170) agree that the police are generally reluctant to give information.

Another issue that could also hamper performance in terms of assessments in service delivery within the law enforcement domain is the intense reliance on statistical information. To elaborate, crime statistics are an unreliable measure for police performance. Some of the discrepancies encountered in assessing police performance relates to the under-reporting of crime, the contrasts in comparisons between police and other state institutions' statistics, poor data, including the unavailability of the same data to support police statistics (Burger 2009:3; Araia 2009:22; Silber & Geffen 2009:38).

There is also the issue of the non-reconceptualisation of the service delivery parameters, which has also made it impossible for police performance to be meaningfully measured. Sinclair and Matlala (2011:51) argue that if the police are to become effective, they must have sufficient capacity to appreciate the implications of using technology. For the South African Police Service, the term service delivery has not been adequately re-defined, at least not in the context of the use of technology. This has meant, among other things, the absence of a unit standard against which performance in terms of improving the level and quality of services can be measured. Helen Zille further connected the issue of performance evaluation in the public services sector, with issues such as strategic and operational planning, by stating as follows:

> But of course, you can't do that if you didn't know where you were going to begin with, or where you intended to go, if you didn't have a plan with measurable outcomes and systems and structures and performance evaluation mechanisms to determine progress (SABC 2, 2012).

### 2.4.3 The Use of Technology to Promote Transparency in Police Work

Assessing technological performance in police work also pertains to issues of transparency. Various authors (Campbell 2004:699; West 2004:17; Taylor 2005:1422; Abrahams & Newton-Reid 2008:9) confirm that the police do not only use technology to promote accountability but transparency too. In South Africa, transparency is fostered through the public's right of access to information held by the state (South Africa 1996; South Africa 2000; South African Police Service 2008:154). However, the enactment of South Africa's proposed Protection of State Information Bill could eventually result in the state legally withholding information from the public (Anonymous 2011: No Page Number), which also implies that data on technologies used could also become scarce.

The move to classify data could hinder transparency in public institutions. Whether technologies have helped the police to be more accountable, improve their performance, be more transparent, contribute to good governance and improve on the level and quality of their services is an issue that requires each agency to study and validate any claims. One of the questions related to the legitimacy of police work is: why should the police be transparent and accountable? There are probably a number of possible answers to this question. However, the main justification for accountability would be the costs incurred as a result of law enforcement agencies spending tax payers' monies to procure technologies and sustain their operations. From 2009 to 2010, the South African government allocated R71 billion to the criminal justice system (Webb 2009:7), which encompassed funding for the police and their utilisation of technology. This spending amounted to about ten percent of the total national budget.

Accountability and transparency are based on a perspective that has its philosophical underpinnings in the Accounting for Resources and Priorities (ARP) paradigm, which was developed by Brian J. Taylor. The mandate for this paradigm emanates from sound financial systems that encourage high quality accounting practices and procedures within public institutions (South Africa 1997:28; Taylor 2005:1422; South African Police Service 2008:148). There is no doubt that the police also require such underpinnings to account and be transparent. Accounting systems refer to databases that were implemented to monitor expenditure in state institutions. Some of the

systems used in South Africa include the Supply Chain Management that uses the LOGIS software, Accounting that uses the BAS and Safetynet software, as well as the Business Intelligence Platform (Quist, Certan, & Dendura 2008:46). These highly sophisticated systems have also helped the South African Police Service to properly manage finances, when they procured the Automated Fingerprint Identification System.

The enactment of the Public Finance Management Act (PFMA) was another commitment by the South African government to encourage sound financial management in all its public institutions (South Africa 1999; Ahmad, Albino-War & Singh 2005:3; United Nations 2007:185). In explicating the role of government in relation to the operationalisation of policies and legislation, Helen Zille articulated that:

> ... being in government has a whole set of different challenges; the greatest of which is to turn a vision, a set of values and principles, into policies that are implementable as a plan, to produce measurable outcomes to advance the welfare of all the people (SABC 2, 2012).

The Accounting for Resources and Priorities is also a paradigm that emphasises checks and balances, promoting the accountable, transparent and responsible use of resources. The ever-increasing public outcry and demand for better services, against the backdrop of very scarce resources, were some of the issues that led to increased demands for financial accountability and transparency within public institutions (Taylor 2005:1422; United Nations 2007: 84; South African Police Service 2008:105). What can be inferred from this is that the South African Police Service is obliged to use the Public Finance Management Act as a guideline to account for monies spent for the procurement of technologies like the Automated Fingerprint Identification System. There is no doubt that accountability related to expenditures by state institutions also includes technological security mechanisms that aim to protect the credibility of data.

### 2.4.4 Security Issues Related to the Use of Technology by the Police

The information in police databases needs to be secluded by ensuring that only authorised users gain access thereto. Various authors (Holbl, Welzer & Brumen 2007;

Vu, Proctor, Bhargav-Spantzel, Tai, Cook & Schultz 2007; Jakobsson & Myers 2008) have argued that usernames and passwords can be applied as the preferred authentication method to protect technological databases. Passwords, however, are also not infallible. Research has revealed that passwords are a weak method of authentication since they can be cracked by just taking a wild guess (Jamieson, Stephens & Kumar 2005:1; Holbl *et al.* 2007:1945; Vu *et al.* 2007:744). It is important that technologies such as the Automated Fingerprint Identification System are reliable as they can use a combination of passwords and fingerprint scanning to grant operator access. Maltoni, Maio, Jain and Prabhakar (2009) argue that biometric technologies provide high levels of reliability and security since they do not use the traditional credentials-based system. Traditional credentials-based systems refer to the use of a Personal Identification Number (PIN) to gain access to databases (Roberts 2005:13).

Biometric identification technologies have improved access security for databases in that they also use a variety of authentication protocols all at once. Among the protocols is a combination of password, personal identification numbers with fingerprints, facial recognition, retinal scan, voice recognition and signature verification (Roberts 2005:8). Technologies such as the Automated Fingerprint Identification System will therefore have high levels of security. These features largely ensure the safeguarding of the integrity of the data in police databases. The different arguments on password security cast doubt as to whether the security in many other technologies, such as computers used by the police, can be sufficiently protected. Even though passwords were initially used to ensure the security of databases, they have also posed some very serious threats to the security of the same technologies that they were initially intended to safeguard. These threats came as a result of the susceptibility that could arise from lax human behavior in the handling and keeping of passwords confidential and protected.

The issue of how the police monitor the use of passwords by staff provides for much discourse. There is still no clear indication as to whether police managers are fully committed to monitoring the use of passwords by their subordinates, in order to ensure stricter control measures aimed at protecting the technological databases (South African Police Service 2009:34). To illustrate, personnel could loosely exchange passwords with one another without being noticed. Such practices could lead to an

unauthorized person accessing the password and sensitive information contained in police databases. Security bridges on biometric identification technologies could entail the illegal tempering with fingerprint data and the falsification of criminal evidence.

### 2.4.5 The Reliability of Biometric Fingerprinting Systems

Fingerprint evidence is considered by most courts, to be highly reliable due to the use of modern biometric technologies such as the Automated Fingerprint Identification System. Various authors (Jamieson *et al. 2005:2;* Maltoni *et al* 2009; Bio-Metrica 2011) have confirmed that biometric systems are linked to high reliability rates in the identification of human features. Theoretically, the utilisation of fingerprinting or retinal scanning to authorise user access to databases could be a safe option in the elimination of fraudulent access, provided that all biometric systems were programmed to this effect. The missed identifications that are pertinent with biometric identification technologies (Du Toit 2007; Jamieson *et al.* 2005:2; Das 2006:5; Jakobsson & Myers 2008), however, cast some doubt on whether fingerprint scanning instead of passwords, could suffice as the ultimate authentication method to eliminate some of the security risks involved. In order to address the issue of security breaches, police agencies could apply fraud detection technology or implement authentication protocols (Ahmad *et al.* 2005:5; United Nations 2007:26; Jakobsson & Myers 2008:47). To this effect, the South African Police Service is supported by the Policy Document on the Business of the Local Criminal Record Center (South African Police Service, 2004: No page Number). This policy intends to regulate the use of passwords and security on all technologies.

Although the South African Police Service usually screens users to ensure that databases are protected, curbing illicit behavior remains a challenge. Fraud, corruption and ill discipline continue to be a problem (South African Police Service 2009:35). Jamieson *et al.* (2005:1) argue that biometric technologies are currently not designed to do background checks on users. Such shortfalls could render the evidential value of the information in police databases worthless in court. The lack of the evidential worth of information kept in police databases could result in courts having to release criminals from custody. This could raise questions in public circles regarding the legitimacy of policing technologies. There is no doubt that poor security could further hinder the

overall effectiveness of police agencies, which could also result in poor service delivery. Similarly, the police can benefit from progressions made in technological security and utilise these to gain greater trust and acceptance, as well as to ensure their legitimacy (West 2004:15; Jamieson *et al.* 2005:2; Abrahams & Newton-Reid 2008:10).

## 2.5 THE USE OF TECHNOLOGY BY THE SOUTH AFRICAN POLICE SERVICE

Police agencies use technology to tackle problems and to enhance the living standards of communities (Deflem 2002:454; Moodley 2005:2; Ferrara, Marenson, Svenson, Svenson, Hidalgo, Molano & Madsen 2008:171; Keohane 2008:131). In South Africa, addressing problems in the community reflects an unavoidable leaning towards a problem-solving and service-oriented approach. The gravity of the crime problem and the ever-increasing demands for services by the public, are some of the daunting factors that necessitated a methodical move towards a problem-solving approach in policing (South Africa 1997:20; South African Police Service 2003:21; Nuth 2008:437). The move towards enhancing service delivery has forced the South African Police Service to align their use of the various technologies with high performance outputs.

### 2.5.1 Problem-Solving in Police Work

Problem-solving resides within the ambits of the Problem Oriented Policing (POP) approach that was started during the 1970s by researchers, police professionals and policy makers. The research conducted then showed that there were confines in the strategies used by police agencies and it thus identified the need for a systematic problem-solving strategy. Problem-Oriented Policing is the brainchild of Herman Goldstein and the emphasis of this model is premised on the fact that law enforcement issues should be subjected to more rigorous analysis, in order to prevent crime and to identify and solve problems in the policing milieu (Leigh, Read & Tilley 1996:2; Scott 2000:1; Braga 2002:1). These authors further argue that the Problem Oriented Policing model places value on being proactive; using a holistic approach to the criminal justice system; engaging other stakeholders; professionalising police agencies as well as emphasising the implementation, monitoring and evaluation of the strategies applied.

Given the values that are entrenched in Problem-Oriented-Policing, it is clear that the use of the Automated Fingerprint Identification System by the South African Police Service could also benefit from such an approach. This is because the Problem-Oriented Policing model, also known as the SARA model, uses indicators such as *Scanning*, *Analysis*, *Response* and *Assessment,* to systematically address problems in police work, and to continuously revisit and evaluate strategies (Leigh *et al.* 1996:17; Scott 2000:45; Braga 2002:14). The indicators of the SARA model are however not discussed in detail in this research. What is important is that Problem Oriented Policing not only provides the police with a tool that can enable them to systematically deal with challenges, but also illustrates the interplay between the variables that lead to crime or other relatable policing problems, in a Problem Analysis Triangle (Figure 3), as follows:

**Figure 3: The Problem Analysis Triangle**


**Source:** Anonymous (2012: No Page Number)

The Problem Analysis Triangle depicted above suggests that the removal of one of the three elements from the outside of the triangle could eliminate the problem, in this instance, the problem is crime. In this research, this triangle also implies that police service delivery can be centered as the problem. This means that the use of the Automated Fingerprint Identification System and all the other variables that factor into the elevation of the level and quality of services offered by the South African Police Service can also be grouped together, in order to form the three other elements outside of the triangle. The Problem Analysis Triangle therefore assists innovative thinking regarding recurring problems in police work (Anonymous 2012: No Page Number).

### 2.5.2 Service Delivery in the South African Police Service

Service delivery is a highly topical issue in South Africa, as citizens rely on public institutions to provide them with quality services. To this effect, the South African Police Service is supported by the White Paper on Transforming Public Service Delivery, General Notice 1459 of 1997, the White Paper on Safety and Security (1998), the Information Technology Resource Strategy and their strategic plan for 2005-2010. These policy guidelines have not only forced the police to align their use of technologies such as Automated Fingerprint Identification System to their strategic objectives, but have also forced them to understand the doctrines that underpin the national policy framework for the provision of public services in the Republic of South Africa (South Africa 1997:2; South Africa 1998; South Africa 2002: No page Number; South African Police Service 2005: No Page Number; South African Police Service 2012:110). In South Africa, the eight *Batho Pele* principles of *consultation; redress; service standards; access; courtesy; information; transparency* and *value for money*, offer service delivery guidelines for all state institutions (South Africa 1997). These principles have been cascaded from all levels of government for them to be contextualised and operationalised in accordance with the mandate of each state department. In this way, it makes sense that research on interventions within state institutions should also draw from existing regulatory frameworks as part of the unit standard for the evaluation.

### 2.5.3 The Use of Technology to Combat Vehicle Trafficking in South Africa

International Police Organisation statistics have shown that South Africa accounted for about 96 to 98 percent of stolen vehicles that were smuggled in the Southern African Development Community region, in 1995 (Msutu 2001: No Page Number; South African Police Service 2002:No Page Number; Irish 2005:1). In an attempt to deal with vehicle theft and the cross-border trafficking thereof, the South African Police Service, in partnership with private companies, used microdot technology. The microdot is a device that uses polymer and carries a unique identification number (Wright, Ward & Burgers 2005:1). The devices are sprayed with paint onto a car, giving it unique identity marks that are inerasable, making it easy for the police to identify, which has resulted in

a decline in the number of stolen cars in South Africa (South African Police Service 2008:138; South African Police Service 2009:132; South African Police Service 2011:3).

Since its introduction, the relatively affordable microdot has reduced car theft in South Africa by between 50 and 60% (Wright *et al.* 2005:1). The success of technology in police work is indicative of the fact that the police can attain increased effectiveness if they continue to build on public-private partnerships. In order to achieve the required levels of operational effectiveness, the South African Police Service also needs to develop an understanding of the impact of technologies on their working environment. Police managers need to understand how the various technologies have really impacted on the level and quality of safety and security, so that they are able to make informed decisions about the future direction concerning crime combating strategies applied.

Some of the most sophisticated technologies used by the South Africa Police Service include the Geographic Information System (GIS), computers, two-way radios and the Automated Vehicle Locator (AVL) (Jeong 2004:13; Herbert 2006:413; Sinclair & Matlala 2011:51). These technologies are primarily used in communication, crime mapping and locating officers and vehicles in relation to crime scenes. Various authors (Jeong 2004:14; Herbert 2006:415; South African Police Service 2008:75; du Preez 2009:51) agree that tracking technology can be used to expedite the issuing of instructions to police personnel on patrol and is critical in facilitating the timely dispatching of police assistance to victims of crime and; for law enforcement agencies, the use of technology is also crucial in the retention of information on compliance with institutional protocols.

The technologies outlined in this section do not provide an exhaustive list of what the South African Police Service uses, but exemplifies some of what is available and applied to support crime prevention initiatives. The use of technologies in police work is of course not without specific challenges. Some of the challenges that law enforcement agencies have encountered in their utilisation of various technologies relate not only to attaining the skills needed for the effective use thereof, but also to the knowledge and understanding of the legalities related to the use of technology in police work. It is important that the challenges linked to the utilisation of technology underscores the need for the police in South Africa, to improve their skills (Sinclair & Matlala 2011:51).

### 2.5.4 Challenges Related to the Use of Technology by the SAPS

The South African Police Service is facing a number of challenges concerning their use of technology. Notably: the lack of experts, inadequate training (Nunn 2001:11; South Africa 2007:451; Whittle 2009:21) and the introduction of outdated technologies are some of these daunting challenges (Schmitz & Kihato 2001:49; Mitra & Gupta 2008:287; Radzilani 2008). Using outdated technologies, in particular, could raise questions about the appropriateness of the choices made by the management of the South African Police Service to support e-governance processes. Research shows that state departments could better address most of these challenges if they improved their technology infrastructure (South Africa 2007:468; Abrahams & Newton-Reid 2008:29; Nuth 2008:441; Wen 2009:3034). Just as South Africa has integrated into an increasingly technology-driven society, the police also need to improve on their infrastructure (South African Police Service 2008:49). Such a move is decisive since technology has the ability to connect police agencies to their function of crime control.

Some of the challenges faced by the South African Police Services relate mostly to the underutilisation of the various technologies and other resources at their disposal (Radzilani 2008: No Page Number). This shortfall could negatively affect the police's operational effectiveness and their accountability. Abrahams and Newton Reid (2008:11) persuasively argues that using resources optimally exhibits the seriousness of state institutions, in terms of taking responsibility in spending public funds. The fact that the South African Police Service has a number of portable Automated Fingerprint Identification System apparatuses, like the Morpho-Rapid, that are not fully utilised, illustrates poor management in terms of the optimisation of the available organisational resources (Radzilani 2008: No Page Number; Adonis 2012: no Page Number).

In comparison to other countries, South Africa still has a long way to go in terms of optimising its technological operations. Ghana and Sweden, for example, have set benchmarks in that they have networked all their computers to connect the different state departments and to exchange data (West 2004:17). Various authors (Lal 1999:9; West 2004:18; Nuth 2008:438; du Preez 2009:32) agree that state institutions could use technology to expedite communications and to keep costs low. Although South Africa

has recently begun to draft legislation that will facilitate inter-departmental connectivity, until the enactment of the Criminal Law Forensic Procedures Amendment Bill, the cost of operating fingerprint technology will remain exorbitant due to the fact that public institutional databases do not speak to one another (Adonis 2012: No Page Number).

This lack of communication is set against a background of having over 31 million images of fingerprints contained in other state institutions' databases (DefenseWeb 2009:1). To illustrate this, the Department of Home Affairs uses the Home Affairs National Identification System (HANIS) and the Department of Transport uses the electronic National Traffic System (NATIS) database. Both these databases have large volumes of non-criminal fingerprints, photographs and the biographical information of individuals (DefenceWeb 2009:1). However, both the databases are not linked with the South African Police Service's own Automated Fingerprint Identification System. Access to other state institutions' technological databases could help alleviate the overwhelming criminal identifications of fingerprints faced by the South African Police Service. This lack of inter-departmental connectivity between the institutional technological databases compromises the level and quality of service delivery. Such shortfalls could also increase the likelihood of crime suspects evading arrest; this results in longer turn-around times in the administration of justice. The longer turn-around times could also increase the work burden for the already overloaded police detectives.

Another significant challenge related to database connectivity is the consolidation of operating costs between the different state institutions. When databases are not inter-connected, it means that each institution incurs separate costs. These costs will also be on databases that perform a common task. This type of operation makes very little economic sense. The current model used in South Africa, to carry operating costs for fingerprint databases, is as a result of legislative constraints. The crux of the matter is that unconnected technological operations do not provide full value for money. The effective use of technology is critical to solving crime as this could also facilitate adequate responses by the police. Technologies could also prove to be beneficial in national security. When the police make more arrests, crime and the fear thereof decrease (South Africa 1998: No Page Number). Effectively, dealing with crime also ensures that the security of the state is not at risk. The transnational nature of crime

requires that the police treat every complaint seriously. According to Sullivan and Bunker (2002:40), crime is the new form of terrorism that also requires the effective use of technologies by the police, in order to bring it under control. Terrorism needs to be sufficiently controlled and mitigated as it instills significant fear in the citizenry.

## 2.6 THE USE OF TECHNOLOGY TO COMBAT GLOBAL TERRORISM

Terrorism exists globally and the number of terrorist groups is difficult to uncover (Griset & Mahan 2003:46; Roy 2005:475; Balkin 2008:9). Terrorists use crime to undermine stability and governance. The covert nature of terrorist networks makes it difficult for the police to detect or even proactively deal with the terror attacks. The police can use biometric technologies like the Automated Fingerprint Identification System as a counter-terrorism tool (Carafano 2005:3; Woodward 2005:30; Ackerman 2011). Figure 4, below, shows the United States forces that killed Osama bin Laden in Pakistan, who were accompanied by forensic experts who used machines like retinal scanners to ensure that they killed the right man (Ackerman 2011: No Page Number).

**Figure 4:** The Handheld Interagency Identification Detection System (HIIDS)

**Source:** Ackerman (2011: No Page Number)

Unlike crime in general, terrorism often poses a unique challenge and this is because of its flexible, transnational and networked nature (Sullivan & Bunker 2002:40; Roy 2005:475; Bloss 2007:219; Balkin 2008:9; Ackerman 2011). Modern terrorists have evolved into highly erratic groups. The terrorist *modus operandi* was adopted to reinforce violent campaigns. Since the 9/11 attacks on the United States, global security has been placed in the spot-light. In an attempt to curb more terror attacks, the police in the United States have screened individuals using technologies to collect biographical and biometric data (Triplett 2001:1; Sandler & Enders 2004:312; Bloss 2007:209; Broeders & Engersen 2007:1592; Ackerman 2011: No Page Number). There is no doubt that the use of biometric technologies such as the Automated Fingerprint Identification System is significant in bolstering counter-terrorism police operations. Much of the debates on counter-terrorism have been focused on the protection of human rights and feasibility issues. Issues like expenditure, oversight, the violation of civil liberties and the use of technology are some of the most debated issues (Humm 2004:1; Roy 2005:465; Balkin 2008:1). Unlike the debate on human rights, the use of technology in counter-terrorism has not been sufficiently mooted. Figure 5, below, shows American and Afghan soldiers on counter-insurgency patrol in Marjah. In joint initiatives such as these it is evident that there is little indication of skills transfer between the forces, which could see Afghanistan vulnerable after America's withdrawal.

**Figure 5:** U.S Marines and Afghan Soldiers Patrol, February 2010

**Source:** Wikipedia (2011: No Page Number)

The international community seems to have accepted the narrow notion of the police using counter-terrorism tactics, including various technologies, to humiliate and segregate certain individuals. The one case referred to in this instance is the enactment of the Uniting and Strengthening America by Providing Appropriate Tools Required to Interrupt and Obstruct Terrorism (USA PATRIOT), Public Law 107-56 of 2001. This legislation allows United States law enforcement officers to profile persons based on an assumption that they could plot terror related attacks (United States of America 2001; Griset & Mahan 2003:46; Balkin 2008:10). Effectively, this law authorises the police to use technologies to collect data from young Arab males who are Muslim, for criminal profiling, simply because members of Alqaeda network are allied to the Islamic religion.

In reality, discriminatory legislation often sparks controversy, especially for a country such as the United States who would like the world to believe that it is championing global democracy, non-discriminatory practices and respect for human rights (Anderson 2011:227). Following the *Draconian* manner in which their counter-terrorist law was formulated, calls were made to amend or repeal the United States counter-terrorism law (Chang 2001:142; van Bergen 2002:1; Roy 2005:465). The term *Draconian*, derives from the name *Drakon*, who was a 7$^{th}$ Century B.C, Athenian legislator who believed in harsh laws and the severe enforcement thereof (Thompson 1995:409). Justifiably so, race and religion are very subjective and rather humiliating discriminative indicators for any country or its law enforcement agencies to apply as reasons to subject individuals to criminal profiling. Using some of the technologies that are available in the market to discriminate against individuals is also an unethical practice in law enforcement.

Law enforcement agencies, together with the military in assistance, are expected to spearhead counter-terrorism strategies used. Effectively, counter-terrorism strategies, which are generally covert in nature, have narrowed the flow of financial resources for terrorist groups (Sanderson 2004:46; Roy 2005:475; Balkin 2008:16). This limitation has effectively forced terrorist most networks to increasingly divert their operations to organised crime activities. However, there exists a major concern regarding the covert nature of counterterrorism strategies used by some world superpowers (Parker 2012:9). The clandestine nature of operations carried out by the United States forces, pose serious questions in addressing the issue of eradicating terrorist groups. The case

referred to as an example of this is once again the 2011 killing of Osama Bin Laden, in Pakistan. Such operations have proved to have failed to rid the concerned country of terrorist networks and Somalia thus still serves as a classical example in this regard.

In most cases where world superpowers have resigned themselves to foreign military intrusion, the majority of the affected countries have been left in chaos, with a daunting task of rebuilding the infrastructure that was destroyed by the adverse spoils of the war against terrorism (Boyle & Schmid 2012:29). The state of the economy, safety and security in Somalia, bears testimony to the devastating effects of foreign military intrusion by the United States, something that was experienced in countries such as Libya. A prolonged terror campaign in the horn of Africa has resulted in the rebirth of sea pirating in Somalia. The immediate intent of terrorism is to use syndicated organised criminal activities to terrorise, scare, provoke, disorientate, subvert, coerce, force and demoralise a target population or conflict party, with intent to cause insecurity (Boyle & Schmid 2012:52). Boyle and Schmid also strongly contended that terrorist operations are reinforced by attaining publicity, extorting ransom money and submitting states to their demands by mobilising or immobilising some sectors of the public itself.

### 2.6.1 The Use of Technology in Fighting Organised Crime

Organised crime involves criminal activities that occur in many jurisdictions (Shaw & Gastro 2001:250; Klippin & Harrison 2003:8; Monar 2006:496; Block 2008:74; South African Police Service 2008:5). In order to enhance their ability to deal with organised crime, the police also need to use modern technologies, share intelligence, secure evidence, seek cross-border partners, and track down suspected criminals. Technologies such as the Automated Fingerprint Identification System, with the capability of identifying the fingerprints of suspected criminals, could enhance the aptitude of police agencies in perusing and arresting crime syndicate members. Due to its multi-jurisdictional nature, organised crime also adds to the complexities that inhibit crime prevention, as the likelihood of their link with global terrorism cannot be ruled out.

Over and above their known actions, organised crime syndicates are also responsible for the illegal trade in firearms, trans-national grand fraud, the cross-border smuggling of

stolen motor vehicles, armed robbery, human trafficking, and the international trade in drugs (Nmehielle 2003:415; Shaw & Gastrow 2001:253; Monar 2006:496; Brady 2007:1; Cockayne & Pfister 2008:25; Morselli, Turcotte & Tenti 2011:180). Some of the well known syndicates around the world are the Turkish Mafia, Nigerian cartels, the Yakuza, the Triads and the Indian criminal groups. These crime syndicates are also suspected of using banks in the United Arab Emirates to launder large proceeds of cash from illegal gold and diamond smuggling, to finance terrorist groups and operations (Adamoli, Nicola, Savona & Zoffi 1998:18; Molina 1999:12; Sanderson 2004:1).

In a manner similar to terrorism, organised crime operations have also resulted in gross human rights abuses and illegal entrants into foreign markets, which could spark racial tensions, resulting in xenophobic attacks, similar to those experienced in South Africa in 2008. The aftermath of such ethnic conflict can damage the image of a country since such countries become less attractive to tourism and foreign investment, effectively having adverse effects on its overall economy. Police agencies could use the technologies that are available to gather intelligence to help them limit the opportunity for organised crime activities (Bloss 2007:212; Brady 2007:2; Ferrara, Martenson, Svenson, Svenson, Hidalgo, Molano & Madsen 2008:171; Morselli *et al.* 2011:178).

One of the reasons why organised crime is a major threat to global economies is the fact that, in many jurisdictions, police involvement cannot be ruled out (Anderson 2012:213). The Balkan area in Eastern Europe is a classical example of this. The most common means to infiltrate the police is via wireless networks or even through corrupt officers who would illegally supply information from police databases (Anderson 2010:227). In fact, police managers need to take a very strong stance against corruption. Managers who fail to act against corruption are indirectly legitimising it (Atkinson 2007:55; South African Police Service 2008:159; Faull 2009:4). If not properly dealt with, corruption could create an even greater challenge to policing. Sinclair and Matlala (2011:57) argue that political instability and the lack of infrastructure are some of the factors that contribute to the challenges in dealing with crime in Africa.

The many challenges experienced in policing makes poor countries fancy markets for setting-up bases for organised crime operations. Most poor countries have neither the

skills, nor the technology nor the financial resources to help them deal with the complexities of organised crime. Cyber crimes, in particular, are among the major challenges. If not properly policed, organised crime could spill over from poor countries into their more affluent neighbouring countries that already face the daunting task of dealing with this problem. Stovin and Davies (2008:499) argue that the police should focus resources on dealing with organised crime, where they are most needed. Given their affordability, the user friendliness and easy installation processes of biometric technologies, such as the portable Automated Fingerprint Identification System apparatuses, could also prove to be beneficial in terms of the distribution of resources.

### 2.6.2 The Use of Technology to Combat Drug Trafficking in Mexico

Drug cartels in Mexico have been blamed for killing more than 6,300 people since January 2008 and more than 1,000 in the first two months of 2009 (Peetz 2008:16; Johnson 2009:1; Cook, Cukier & Krause 2009:15). To help Mexico deal with this problem, the United States government acquired improved and non-lethal technology that can be used to immobilise drug traffickers and their vessels (Korte 2009:1). However, Morselli *et al.* (2011:179) argue that drug dealers depend very little on physical mobility; instead, they rely on uncomplicated network extensions to do their trade. This implies that the use of non-lethal technologies could help the police arrest the mules who transport the drugs, but seldom the kingpins themselves. Nevertheless, the utilisation of non-lethal technologies remains a move in the right direction as some of the captured mules could provide information that can be utilised as reliable intelligence on the drug lords, their entire organisational network and operations.

The drug trade in Mexico is largely targeted for markets in the United States of America. It was the mass demand, including the move to keep criminal networks formidable, and countless trafficking routes that have exacerbated the problem of drug trafficking in America (Morselli *et al* 2011:184). There is no doubt that the distribution and sale of narcotic drugs such as cocaine, heroin, cannabis and many other types of illicit narcotics, have had a negative impact on both the United States and Mexico, in terms of escalating many social ills, such as substance abuse and dependency, which often

result in fatalities in communities. In fact, illegal drugs also cost the economy because they are unregulated and are thus a trade which involves significant tax evasion.

Law enforcement agencies can use a variety of technologies to respond to perceived threats from drugs and crime and some of the technologies also aim to assist the police to effectively manage their criminal investigations. Similarly, the police have applied technologies such as case management software to track investigations in drug trafficking cases (Brophy 2008:258). Whether the use of the various technologies has been effective in helping police agencies in Mexico and the United States to combat drug trafficking, is something that is yet to be demonstrated. Some of the technologies used are intended to enhance and safeguard communications systems applied by police officers for gathering information on illegal drug operations (Brophy 2008:258).

Making resources available for law enforcement activities requires substantial finances. Similarly, in 2008-2009, the government of the United States of America contributed about of $1,4 billion towards procuring equipment and technology to deal with the drug problem in Mexico, which also included the training of police officers (Johnson 2009:1). Despite such financial support from the White House, efforts to combat drug trafficking in Mexico have actually yielded mixed results. The 2003 arrest of Osiel Cardenas Guilen, who was a kingpin in the Gulf cartel, after months of being placed under surveillance using state-of-the-art technology to track him down, was one such case. This drug lord was still able to direct his cartel's drug operations from a prison cell, until his extradition to the United States in 2007 (Brophy 2008:249). Even if custody does not suffice in terms of discouraging drug traffickers from their illicit and lucrative trade, the application of technology in police work still remains an essential crime fighting tool.

#### 2.6.2.1 Funding the Mexican Fight against Drugs

What is interesting about funding the war on drugs in Mexico is that even though the amount allocated by the White House to Mexico seems too large, there is no evidence to suggest that other socio-economic spheres in the United States could suffer as a result of such spending. In fact, the spending seems justifiable, especially when one considers that the drug trafficking business has the tendency to escalate money

laundering and other crimes (Brady 2007:5; Brophy 2008:255; Cockayne & Pfister 2008:25; South African Police Service 2008:48; Cook *et al.* 2009:12; Morselli *et al.* 2011:188). Although the funding seems to be for a good cause, it appears that Mexico is only being funded to prevent a spillover of the drug problem into the United States. However, in contrast to this, there are poor countries that are more concerned about development, including bread and butter issues, and are less concerned about counter-terrorism funding from rich nations (Boyle & Schmid 2012:34). Some of the countries are not even primarily concerned about technology as they lack even the basic resources to feed their own citizens, let alone deal with syndicated drug trafficking. The famine in 2011, as a result of severe drought in Sudan, attests to some of the challenges faced by Sub-Saharan African countries. If expenditure such as that incurred by the Americans for the war on drugs in Mexico was to be incurred by any poor or developing economy, solely for combating drug trafficking, this could have an adverse effect on the overall economic wellbeing of that country. Poor countries are in fact unable to afford the luxuries of high expenditure aimed at dealing with illicit drugs.

Poor economies are typified by the disarticulation of a credible authority, lax security, less enforcement, high impunity, poorly regulated economic sectors, overlaps between upper and underworld actors, especially political figures, low skills trade, low technology, low professionalisation, high unemployment figures, disenfranchised workers, lack of conventional products and services, the emergence of black markets and private protection needs (Morselli *et al.* 2011:178). These are the very traits that allow organised crime activities like drug trafficking to thrive. Unlike their richer counterparts, police agencies in poor nations do not have resources in abundance so they constantly have to optimise their utilisation of limited resources, including technologies, in order to cover as much crime combating operations. This type of challenge has resulted in police resources, including technologies, being strained.

## 2.7 THE REGULATORY FRAMEWORK FOR THE USE OF FINGERPRINTING TECHNOLOGIES WITHIN THE SOUTH AFRICAN POLICE SERVICE

Within the South African Police Service, the use of biometric identification technologies is regulated through institutional policies and legislation. Although there are shortfalls in

some of the laws, these do not necessarily inhibit the South African Police Service from applying technologies such as the Automated Fingerprint Identification System more efficiently, in order to effectively deal with crime. Yet, the legislative shortfalls continue to place a strain on the level and quality of services rendered. Much of the problematic policy issues have been integrated in earlier discussions in this study, but an important aspect regarding service delivery is that organisations that use technology to bolster their operations should have clear guidelines that are capable of maintaining an equilibrium between an individual's rights and the wider interests of society (Laudon & Laudon 2004:13; South Africa 1996:1245; South Africa 1997:10; Isaac 2009:8).

The Constitution of the Republic of South Africa (Act 108 of 1996), the South African Police Service Act (Act 68 of 1995) and the Criminal Procedure Act (Act 51 of 1977) are some of the laws that form the backbone of the policing regulatory framework in South Africa. These laws guide police officials in terms of how the various technologies should be applied. For the South African Police Service to legitimise their use of technologies such as the Automated Fingerprint Identification System and its portable apparatuses, so as to improve service delivery, they have to comply with the legal implications. Part of what the police do with fingerprinting technologies is to collect evidence for forensic analysis and for the purpose of presenting it in a court of law.

The Criminal Procedure Act (Act 51 of 1977) is the law that gives permission for the South African Police Service to collect fingerprint images. To further complement their collection of evidence, both Act 51 of 1977 and the South African Police Service Act (Act 68 of 1995) further empower the police to enter premises, search or fingerprint and to arrest persons who are suspected of having committed any crime (South Africa 1977; Nel & Bezuidenhout 2000:56; Joubert 2001:229). These rights are further consolidated in section 36 of the Constitution of the Republic of South Africa (Act 108 of 1996), which allows the police to limit individual rights, subject to specific conditions (South Africa 1996). This means that the police are practically vested with myriad powers, which indirectly opens opportunities for possible abuses of individual rights. Law enforcement officials have no reason to illicitly violate the rights of individuals. The use of technologies like the Automated Fingerprint Identification System and its portable apparatuses needs to be subjected to rigorous debate. Such discourse is critical in

creating an awareness of issues linked to the abuse of power and the violation of individual rights by police officials. The powers and responsibilities of the South African Police Service, in relation to their use of biometric technologies, are outlined below.

### 2.7.1 Powers and Responsibilities of the South African Police Service

The functions and duties of the South African Police Service are to prevent and combat crime, to investigate crime and to uphold and enforce the law (South Africa 1995; South Africa 1996; South African Police Service 2008). These functions are the core business of the police. Law enforcement agencies worldwide can use various technologies as tools to attain improved service delivery, which is a deliverable organisational objective. In South Africa, the scope of police powers with regard to their use of technologies is however marred with controversies, mainly due to the lack of public and scholarly debate on issues such as invasion of privacy, police brutality and the excessive use of force; all of these continue to escalate problems that already exist within society (Anderson 2010:213). The conservative and protective nature of police personnel does not encourage much reporting, in terms of the misuse of power by police officials. In fact, the enactment of the proposed Protection of State Information Bill could regulate the type of information that the police can release to the public (Anonymous 2011: No page Number); it could also adversely impact on the public oversight role and on evaluation processes for the technologies used. One of the reasons why police officials would misuse power is to gain control over individuals or things. According to Pillay (2004:599), public institutions have become resistant out of fear of losing their independence. Losing independence should, however, not be used as an excuse to promote continued police brutality. The police in South Africa need not fear for their independence as they have a mandate to arrest anyone who interferes with them during the execution of their work (South Africa 1977; South Africa 1995; South Africa 1996).

### 2.7.2 The Legality of the Automated Fingerprint Identification System

Most of the troubling issues on the use of technology in police work revolve around police powers *versus* individual rights. There is significant debate amongst criminal justice scholars about the impact of technologies on civil rights (Vittal 2001; Deflem

2002; Komatchus and Hicks 2004; Jamieson *et al* 2005; Korzeniowski 2007). These scholars have also argued on the legalities of using biometric technologies, such as the Automated Fingerprint Identification System, for collecting evidence and most of the arguments are based on whether such applications do or do not violate individual rights.

In the South African context, individual rights are protected by the Constitution (Act 108 of 1996). Some of the debates in the use of technology by police agencies relate o the retention of fingerprint images of persons convicted of relatively minor offences in databases (Isaac 2009:24). Such controversial issues require the careful scrutiny of policing scholars and legislators alike. Other issues that constitute current debates on the use of biometric identification technologies relate to whether persons who have completed their prison sentences should still have their fingerprints stored in police databases and whether this is reasonable and justifiable. Policing practitioners, like Vittal (2001:2), assert that the application of technology by the police would not be much of a problem to law-abiding citizens who are not indulging in any illicit activities, since they have no need to fear it. This assertion is also supported by Deflem (2002:468) as well as Komatchus and Hicks (2004:61) who strongly argue in favor of the implementation of modern and sophisticated technologies that enhance opportunities for the police to cooperate beyond national borders, over the rights of individuals.

In contrast, scholars like Korzeniowski (2007:3) persuasively contend that the utilisation of biometric identification technologies is too intrusive, especially when applied on an innocent individual. In fact, Korzeniowski speaks to the assertion that there are people who will find it difficult to accept the application of fingerprint identification technologies unless such application is duly authorised by law. It is however an acceptable legal norm that individual rights are not absolute and can also be limited (South Africa 1996; Nel & Bezuidenhout 2000:104; South African Police Service 2008:85). The use of technology would not be a problem if some police officers did not try to bargain from some of the legal flaws, by becoming hard-handed and instilling fear in individuals. Nevertheless, technology was never intended to be a menacing tool in police work.

As previously outlined, the utilisation biometric technology such as the Automated Fingerprint Identification System by the police entails limitations on individual rights. The

rights that can be violated through the police's utilisation of biometric technology include one's right to privacy and dignity (Isaac 2009:9). Such violations also raise serious questions regarding issues such as the freedoms that can be enjoyed in a democracy. The South African Police Service is allowed to limit individual rights if this is deemed reasonable and justifiable (South Africa 1996; Nel & Bezeidenhout 2000:105; Joubert 2001:23). Police officials, who fail to observe such legal implications, even when using biometric technologies such as the Automated Fingerprint Identification System, can be held liable in a criminal or civil court and can be charged, internally, with misconduct (South Africa 1977; Joubert 2001; 27; South African Police Service 2008:245).

### 2.7.3 The Operational Framework for Criminal Fingerprinting in South Africa

The Criminal Procedure Act (Act 51 of 1977) sets the framework for the ascertainment of bodily features. Sections 37 and 40 of this legislation identifies persons who may be subjected to fingerprinting procedures by police officials and outlines the circumstances under which this can be done (South Africa 1977; Nel & Bezuidenhout 2000:253; Joubert 2001:274). In order to protect individuals whose rights may be violated, irrespective of whether technology is used or not, the Constitution of the Republic of South Africa outlaws all forms of evidence that is obtained outside of its scope (South Africa 1996; Nel & Bezuidenhout 2000:362; Joubert 2001:268). Such duly authorised prescriptions limit the way in which police officials can apply technologies in their work.

In fact, much of the debates on the use of modern technologies to support processes in the criminal justice system also relate to how accurate and reliable biometric technologies can be, as well as how their field applications are policed, in order to minimise errors. The misidentifications that are so often linked with biometric identification systems such as the Automated Fingerprint identification System could result in wrongful prosecution, translating into gross human rights abuses by the state. Generally, biometric systems have for a long time been accepted as effective in terms of adducing very reliable fingerprint evidence. The high levels of quality linked with fingerprint data produced by the Automated Fingerprint Identification System attest to this effectiveness (Anonymous 2000: No Page Number; Maio, Maltoni, Cappelli, Wayman & Jain 2000:2; Jamieson *et al.* 2005:1; Bio-Metrica 2011: No page Number).

Most courts also generally accept evidence produced from technologies such as the Automated Fingerprint Identification Systems (Rejman-Greene 2001:118; Nunn 2001:15; Du Toit 2004). However, there are a number of shortfalls in some of the laws that sanctions the South African Police Service when they subject individuals to fingerprinting. Some of these shortfalls relate to making it easy for the police to build rich sources of information to refer to, for future investigations. An analysis of the Criminal Procedure Act (Act 51 of 1977) has shown that there are legislative constraints that make it difficult for the South African Police Service to scan fingerprints (DefenseWeb 2009:1). This quandary also made it difficult for the South African Police Service to optimise their application of the Automated Fingerprint Identification System. Some of the shortfalls that inhibit the effective utilisation of technologies in police work have already been noted in Chapter 1 of this research report. The following are some of the additional factors that also inhibit the operational ability of the Automated Fingerprint Identification System, particularly within the South African Police Service:

- Section 37(5) of the Criminal Procedure Act forces the South African Police Service's personnel to dispose of fingerprint images kept in the databases of technologies such as the Automated Fingerprint Identification System, once a person had been acquitted in a court of law (South Africa 1977). This predicament hinders criminal profiling processes and makes it difficult for the police to identify persons using fingerprints that they lifted from the scene of crime. In fact, this disposal ensures that very limited fingerprint data is kept in police databases, especially if the alleged perpetrator was not an ex-convict.

- South African legislation also gives more power to the police to subject individuals to fingerprinting without first obtaining a warrant (South Africa 1977; South Africa 2009; Whittle 2009:12). The enactment of some of the sections in the proposed Criminal Law (Forensic Procedure) Amendment Bill, also fails to address this concern regarding obtaining a judicial warrant for fingerprinting. Being signatory to international treaties on human rights, the fact that South Africa's legislation on fingerprinting is not aligned to global standards and

acceptable fingerprinting practices, disregards some of the norms that promote the protection of human rights and learning from the best global practices.

The inclusion of the Bill of Rights in South Africa's constitution attests to the view and approach that the entire legal system may have adopted (South Africa 1996). The critical issue here is to interrogate whether South Africa, with its commitment to promoting human rights, is prepared to have its police officials use biometric technologies to subject individuals to unlawful fingerprinting procedures, despite advocating democratic policing. It is crucial that the constitutionality of subjecting individuals to fingerprinting procedures without a warrant be interrogated since this will impact on future practices and the very reputation of the police. In most democracies, it is considered to be the worst form of human rights violation whenever the police act without a warrant. Police officials need to be sensitised about balancing their operational viability and the use of technology, against the values of social justice.

In an attempt to improve the legislation that regulates the use of biometric technologies like the Automated Fingerprint Identification System and the fingerprinting procedures in the South African Police Service, a parliamentary *ad hoc* committee was convened on the 27th of January 2009, to discuss the Criminal Law (Forensic Procedures) Amendment Bill. This follows the realisation by government that the shortfalls in the law impede the operational effectiveness of the police. Although it took longer than anticipated to finalise and enact this forensic procedures legislation, its tabling before parliament was nonetheless a commitment to enhance the crime fighting capability of the South African Police Service, its utilisation of technologies such as the Automated Fingerprint Identification System and, as such, it is considered a very firm step.

### 2.7.4 The Criminal Law (Forensic Procedures) Amendment Bill

Literature indicates that South Africa has partially adopted approaches from other jurisdictions, albeit with minor differences, to refine legislation that legalises the police's use of technologies in fingerprinting processes (DefenseWeb 2009:1). Countries such as England, Wales, Netherlands, France, Malta, the United States of America, as well as Germany all have forensic legislation in effect. However, in all these countries,

police officials would either require informed consent or a judicial warrant to subject individuals to fingerprinting procedures and, in some instances, the police are strictly allowed to store fingerprints in certain classified offences only (Isaac 2009:27). Yet, this is not the case with the proposed Criminal Law (Forensic Procedures) Amendment Bill.

The Criminal Law (Forensic Procedures) Amendment Bill was tabled before parliament in 2009 and has a number of key objectives outlined. For example, in its preamble, this bill sets out the objectives and broadens the forensic investigative powers of the police with the primary focus being to amend related laws and to regulate the ascertainment of bodily features by the police. Effectively, the enactment of the Criminal Law (Forensic Procedures) Amendment Bill will make fingerprinting obligatory for all persons (DefenseWeb 2009:1; Isaac 2009:2; South Africa 2009). Without protecting innocent individuals the key question is: what then is the rationale for the Criminal Law (Forensic Procedure) Amendment Bill, if it still fails to address the existing legal constraints that have always been typical of South African legislation on fingerprinting processes?

#### 2.7.4.1 The Disadvantages of the Forensic Bill

Contrary to international standards, the proposed forensic bill will come at a cost to the country's reputation on issues related to respect for human rights. The police in South Africa are already tainted with accusations of brutality (Frankel 1980:490; Haysom 1989:139; Bruce 2002:26; Whyte 2011:14). The tabling of this forensic bill before parliament, even though it does attest to a commitment by government to enhance the country's forensic investigative capabilities, still failed to align practices in police work with acceptable norms within the global policing milieu. Acceptable standards in policing will include acquiring judicial warrants or individual consent for fingerprinting persons, even when using technologies such as the Automated Fingerprint Identification System. In fact, most police agencies are increasingly moving towards building a good reputation, especially in their application of fingerprinting technologies. A classical example of best practices in policing can be found in Washington, where police officials are prohibited from releasing biometric data without a court order (Herbert 2006:453).

South Africa's non-alignment with such practices questions the country's commitment to upholding international procedural law and procedural justice norms. The eventual enactment of the entire Criminal Law (Forensic Procedure) Amendment Bill will thus mean that legislation in South Africa will still favor police agencies over the individual. What can be inferred by this is that the bill still confers a lot more power on the South African Police Service than they previously had. The imbalances in the bill are thus evident in its authorising of the police to infinitely retain fingerprints in Automated Fingerprint Identification System databases. It is significant that this draft legislation does not include mechanisms to balance the powers and responsibilities of the police, whilst also guarding against potential violations on individual rights (Whittle 2009:21).

Human rights violations using fingerprinting technology is already a common occurrence in South Africa. Many of the Morphotouch operations by the police are conducted without proper authorisation. However, police officials are able to invoke section 13 (8) of the South African Police Service Act (Act 58 of 1995) to obtain such authorisation in a moment's notice (South Africa 1995). Such inattention not only makes the use of technologies such as the Automated Fingerprint Identification System illegitimate, but could also compromise police accountability. Over and above the power to scan and store fingerprint images into their biometric databases, the proposed forensic bill also allows the police to pull up fingerprint information and to conduct speculative searches on any individual (Isaac 2009:21). The key debate here is whether such powers erode informed individual consent. Part of what legitimises police conduct, especially where there is no reasonable suspicion or judicial warrant issued, is the informed consent of the person whose rights are being limited. The enactment of this bill will thus imply that the police can use technologies such as the Automated Fingerprint Identification System to illegally fingerprint individuals, which could also amount to police harassment. The enactment of the Criminal Law (Forensic Procedure) Amendment Bill will also not address issues pertaining to the standardisation of fingerprinting in state institutions.

Standardisation in fingerprinting processes is critical as the information produced is considered to be evidence and, as such, will have to be tested for validity and reliability in a court of law. The manner in which fingerprints are currently collected and loaded onto various biometric identification systems by various state departments in South

Africa has limitations, some of which have already been discussed in Chapter 1 of this study. Isaac (2009:2) agrees that the enactment of the Criminal Law (Forensic Procedures) Amendment Bill will not address the issue of standardisation in the storing and processing of fingerprinting images in databases across the various state institutions in the Republic of South Africa. Such failure raises questions as to who is going to be accountable for maintaining the integrity of the data in the different databases and further complicates criminal fingerprint identifications for the police.

Although it can be argued that the Criminal Law (Forensic Procedures) Amendment Bill is imbalanced, as it favours the authorities more than it does individual rights, its enactment is still a step in the right direction, as it will bolster the forensic investigative capacity of the South African Police Service. One of the ways in which this bill will benefit the South African Police Service is by facilitating the much needed interconnectivity between the different state departments' fingerprint databases. The police need to discover and comprehend the continuum in their crime prevention efforts and meticulously adhere to global standards in terms of promoting human rights (Nunn 2001:20; South Africa 1996; Ehlers & Tait 2009:23; Polity 2010: No Page Number).

#### 2.7.4.2 The Advantages of the Forensic Bill

In June 2010, parts of the proposed Criminal Law (Forensic Procedures) Amendment Bill were approved and came into effect. This meant, among other things, that the police were effectively able to access the Home Affairs National Identification System (Hanis) and the National Traffic Information System (Natis) databases from the Department of Home Affairs and the Department of Transport (Polity 2010: No Page Number). During a Parliamentary debate, the Minister of Justice, Jeff Radebe, argued that the move to authorise such access was also intended to deal with shortcomings in fingerprint and Deoxyribonucleic Acid (DNA) evidence. The Minister also avowed the fact that such evidence constitutes what he termed "the two pivotal aspects of forensic crime fighting". Radebe further maintained that the criminal justice system review office, through an analysis of statistics, established that in 52,5% of cases in 2006/07 and in 46,2% in 2007/08, the perpetrators could not be traced and a further 11,3% of cases in

2006/07 and 13% in 2007/08 were withdrawn before they reached court (Polity 2010: No page Number). The approval of some parts of the proposed forensic legislation could go a long way in ensuring that criminal cases are well prosecuted in court.

The interplay between policing activities and respect for human rights is not only complex, but is also an extremely politically sensitive issue. Police officials also need to appreciate that, although individual rights are not absolute, limitations thereto have to be within the strict confines of the law. Section 36 of the Constitution of the Republic of South Africa therefore set out the circumstances under which the rights of an individual may be limited by the police. In the same way, the use of technologies such as the Automated Fingerprint Identification System could never be exempted from any such regulation. In addition, the enactment of the forensic procedures bill will also empower the South African Police Service to keep fingerprints in their databases *ad infinitum* (South Africa 2009). This will enable the police to broaden their forensic investigative capacity as they will no longer have to destroy fingerprints after court acquittals. This implies that the eventual enactment of the Criminal Law (Forensic Procedures) Amendment Bill into law will effectively allow the police to have larger pools of data to search from (DefenseWeb 2009:1; Isaac 2009:1; Whittle 2009:22). According to Polity (2010: No Page Number), the Criminal Law (Forensic Procedure) Amendment Bill contains very strict defenses and penalties to ensure that fingerprints are collected, stored and utilised to detect crime, identify missing persons and unidentified human remains, or conduct prosecutions. This, according to Minister Jeff Radebe, implies that sufficient care had been exercised to strike a fair balance between the rights to dignity, privacy and the legitimate demands by the public that police officials should always follow an objective approach in preventing, combating and investigating crime.

Since the enactment of parts of this forensic amendment bill will also facilitate accessibility to other state institutions' fingerprint databases, this will also mean that the South African Police Service will have to expand on their existing Automated Fingerprint Identification System database and improve its capacity. This will not only include acquiring the latest state-of-the-art technology, but also the recruitment of suitably

qualified experts and streamlining the police's training needs, in order to continuously enhance their provision of investigative services. The proposed forensic procedures bill aims to address shortcomings by ensuring that the police can access the fingerprint databases of other state departments (Polity 2010: No Page Number). The bill also intends to enable the police to retain the fingerprints and photographs of persons charged or convicted with a crime. If the South African Police Service is to access and use data in other institutions' databases, then it is critical that state institutions standardise the collection, storage and processing thereof. Tainted data implies that technologies like the Automated Fingerprint Identification System will become ineffective as the information produced by it will have no evidential value. Without proper evidence, many of the criminal cases could effectively be withdrawn from court.

## 2.8 CONCLUSION

The use of the Automated Fingerprint Identification System enables law enforcement agencies from different countries to work together in arresting suspects and, as such, it could increase their efficiency and effectiveness. The emphasis, in this research, is on the police's utilisation biometric systems such as the Automated Fingerprint Identification System within the prescripts of the law so that the collected data does not lose its evidential value. Such a goal could only be attained if the police know and understand the circumstances under which biometric systems can be utilised and are also able to re-align their approach and practices in a way that is reflective of the cultural and traditional dynamics within the communities being served. In a similar manner, police officials need to understand the philosophies that underpin their role within a particular socio-political setup. By re-adopting African philosophies like ubuntu, the police can promote accountability, transparency and a more humanised approach that upholds the values of social justice and, in particular, respect for human rights.

## CHAPTER 3: RESEARCH DESIGN

### 3.1 INTRODUCTION

The aim of this research was to assess the impact that the use of the Automated Fingerprint Identification System has had on the level and quality of services rendered by the South African Police Service. Research requires apt planning, structuring, as well as investigation and reporting on the findings thereof; this means that good ethics is a prerequisite in all research. Research ethics is noticeable in the methods and techniques used. Brynard and Hanekom (1997:28) argued that in order to comply with ethics, research needs to be objective, valid and truthful. Despite the claim to the ethical way in which this research was led, this chapter outlines the methods and techniques used in this research. Discussions in this chapter were focused on the research approach and design used, as well as on the validation for the selection of the approach and design. The methods employed to collect, record, preserve the data and to ensure that the integrity of the data stayed intact are also delineated in this chapter.

To make sense out of the collected but often abstract data and to ensure that this research remained empirical, all data was construed using qualitative techniques. The term empirical refers to the drawing of conclusions using facts from information that is based on people's experiences (Miller & Brewer 2003:91; Kumar 2005:8; Maxfield & Babbie 2008:6). The empirical feature in this research was visible during the data collection and analysis phases of the research. Data analysis was crucial in enabling the researcher to synthesise information in order to source answers for the research question whilst the same research question further facilitated the detection of relevant participants from the research population. Krippendorff (2004:32) agrees that research that is motivated by an exact question moves rapidly from sampling to finding answers.

In the quest for answers to the question in this research, the researcher had to interact with research participants and this happened during interviews. These personal interactions also led to some inadvertent discoveries, which are discussed in the subsequent chapters of this dissertation. White and Marsh (2006:34) contend that

qualitative data is open to accidental findings. Furthermore, the human element that was encountered in the interactions in this research also enabled the researcher to become acquainted with the participants and to appreciate some of the challenges that they faced in their work. It was this human element that influenced the researcher to conduct this research in an ethical fashion. In this regard, all of the steps taken to ensure the safety of all the participants, the limitations uncovered in this research, the sampling procedures, as well as the paradigmatic perspectives behind the approach, design, methods and techniques used, are also delineated in this chapter. The research applied mixed methodologies within the qualitative paradigm at the level of the design and the methods used for collecting data, which was critical in facilitating triangulation in this research. Triangulation refers to the joint use of different investigators, data sources, methods and theories in research (Creswell 1994:174).

## 3.2 THE RESEARCH APPROACH

The use of technology in improving the level and quality of police services is a critical issue that also has a direct impact on the level and quality of safety and security within communities. Investigating a social event such as police service delivery is complex and requires that researchers espouse appropriate research paradigms. The intricacy linked with social events has always entailed that researchers gather data using in-depth investigations. Such data could only be sourced from persons who are directly linked with the phenomenon being studied. To achieve this goal, this research espoused a qualitative research paradigm. Qualitative research refers to a flexible approach that produces rich and descriptive data from people's own experiences (Bryan 1984:79; Brynard & Hanekom 1997:29; Hoepfl 1997:49; Ruane 2005:12; Babbie 2007:24). The experiences referred to in this research relate to how police personnel derive meanings from the world in which they operate. In the case of this study, the explorations referred to were on the use of the Automated Fingerprint Identification System by the South African Police Service. Research on the use of this last named biometric fingerprinting technology was critical because it identified the service delivery bottlenecks and limitations linked with the use of the same technology in police work.

### 3.2.1 Limitations of the Qualitative Approach

Although the espoused qualitative research paradigm was appropriate for this research, the espousal thereof was, however, not a smooth sailing exercise. In order to ascertain what its confines are and to identify any probable flaws, research needs to report on its limitations (Creswell 1994:110). The limitations linked with the qualitative paradigm in this research are highlighted in this chapter, in order to determine exclusions from the research, as well as to allay fears and to scientifically qualify the research. One of the challenges that can be linked with qualitative research is that the findings thereof are open to an array of interpretations and are highly subjective (Creswell 1994:110).

The subjectivity associated with the qualitative research paradigm also justifies the reporting on the limitations in this research. Various authors (Lincoln & Guba 1994:109; Hoepfl 1997:49; De Vos 1998:240) agree that qualitative research is based on the fact that individuals are unique and that each individual will have a sundry outlook on the world. The subjectivity linked with qualitative research may have limited this research in that the findings thereof could not be broadly generalised. Alternatively, the subjectivity in the qualitative research paradigm does not necessarily imply that the findings are generally invalid. In fact, the findings in this research are contextualised, to the use of the Automated Fingerprint Identification System by the South African Police Service in the East Rand. This suggests that from the findings in this research, there are valuable lessons, that other policing precincts from outside of the East Rand, can learn and apply in order to make policing more responsive to the public.

### 3.2.2 The Logic of Generalisations *versus* the Logic of Contextualisation

Generalisations refer to the drawing of inferences for the purpose of developing concepts and theories, so that data can be applied empirically to a wider population (Babbie 1995:302; Mason 2002:36; Miller & Brewer 2003:126; Flick *et al.* 2004:150). Generalisations are thus aimed at attaining representivity of the sample in relation to the research population. Although representivity is vital to sampling, the aim in qualitative research is however not to attain representivity, but to contextualise rich and descriptive data to a specific case being studied, irrespective of the fact that qualitative research

can also develop concepts and hypotheses. Various scholars (Hallway & Jefferson 2000:122; White & Marsh 2006:36; Srnka & Koeszegi 2007:34) argue that the object of qualitative research is to attain transferability and not generalisability. Transferability implies that qualitative findings can also be broadly applied. If qualitative findings can be applied, then they too can be contextualised to the entire organisation or to a specific program or intervention being assessed, within the context of that one organisation being the unit of analysis. The purpose of this research is thus to broadly contextualise the findings on the use of the Automated Fingerprint Identification System to the entire South African Police Service in the East Rand.

### 3.2.3 The Inductive Reasoning Process

Interrogating empirical data enabled the drawing of informed inferences about specific and general practices pertaining to the use of technology in policing. Various authors (Bryman 1984:82; Welman & Kruger 2001:180; Mason 2002:2) argue that success in drawing inferences is aided by inductive logic. Drawing inferences in this research was part of the process by which all collected data was synthesised. This process enabled the researcher to explain how the South African Police Service used the Automated Fingerprint Identification System and to explain some of the linked dynamics with more clarity. White and Marsh (2006:27) assert that the notion of inductive inferences is critical since it allows researchers to move from text to answering research questions.

The answers in this research were obtained during the analysis of texts from interview transcripts. However, one of the key concerns in this research was to understand the impact that globalisation has had on policing in South Africa. It was equally critical for the researcher to understand what the role of the different technologies was, in the globalisation of policing and in enhancing the crime combating competence of the police. By qualitatively analysing literature, the researcher was thus able to understand how technology served as a catalyst in both the globalisation and enhancement of policing crime. Using a qualitative paradigm unlocked the type of findings that allowed the researcher to understand some of the perceptions that the research participants held on issues such as accountability, innovation and approaches to law enforcement.

### 3.2.4 The Value of the Qualitative Paradigm

In justifying the value of the qualitative approach espoused in this research, the researcher subscribed to Mason's (2002:1) notion that a qualitative paradigm enables explorations on an array of dimensions. Similarly, the data unearthed in this research facilitated the identification of service delivery bottlenecks caused by the inefficient utilisation of biometric technology such as the Automated Fingerprint Identification System by the South African Police Service. The findings in this research therefore enabled the integration of new ways which the management of the police could apply to address the challenges. However, this research was not in any way portentous of the fact that it may have explored all of the variables that featured in the use of technologies in law enforcement. Such an exposition would require more extensive research.

What is important in this study is that the research exposes some of the challenges that inhibit service delivery and the utilisation of biometric technologies by the police. The researcher selected qualitative research because it is lithe enough to facilitate the espousal of diverse research methods and techniques that take humanity into account. The not only eclectic, but also ethical use of data collection, analysis and sampling procedures justified the espousal of a qualitative paradigm. Whilst scholars (Bryman 1984:78; Mouton 1996:5; Brynard & Hanekom 1997:29; Hoepfl 1997:48) concur that qualitative research is flexible, they have also pointed out that it also facilitates the understanding of social events. This could not have been attained using quantitative methods such as statistics or objectivity as they fail to account for what people go through in their natural environment, and so lack the required human touch.

### 3.2.5 Researcher Biases

Like the research participants, the researcher too may have erred during the inductive reasoning process. In the same way, erroneous computations by the researcher may also have subjected this research to prejudices. These errors may have been initiated from the fact that the researcher is a former police official and, as such, is familiar with service delivery issues and the use of the Automated Fingerprint Identification System within the South African Police Service. The biases in this research were particularly

noticeable during the interpretation of the data and could have been formed by the researcher's own expectations; this means that some of the biases may have originated from the researcher's outlook of what the police should have been doing and how they should have gone about doing it. Auspiciously, qualitative research allows for the mitigation of mistakes. Krippendorff (2004:36) engaged with this issue on the mitigation of mistakes and firmly asserted that while inductive inferences appear to be inconclusive, they too still have a certain probability of being accurate. This implies that any inherent biases in this research will not inevitably invalidate the findings thereof.

## 3.3 THE RESEARCH DESIGN

The approach espoused by this research aided the adoption of apt investigation techniques, or research design. Social research follows a path in which the approach determines the empirical methods to be used. The research methods subsequently determine the techniques to be used. This causal chain finally compels researchers to adopt specific research designs. A research design is a set of guidelines followed when trying to address a specific research problem (Marshall & Rossman 1989:54; Mouton 1996:107; Denzin & Lincoln 2003:36). Evaluating the use of the Automated Fingerprint Identification System in policing also requires the espousal of an apt research design.

The problem that informed this research was that the South African Police Service in the East Rand seemed to have failed to optimise their utilisation of the Automated Fingerprint Identification System to elevate the level and quality of services rendered. Addressing such a challenge required that this technological program be assessed and to verify if its implementation and use had attained the desired results. The non-optimal use of technologies could impact negatively on the level and quality of services, as well as on the image of the police; this means that the negative perceptions that may arise from poor service delivery could also spoil the forever sensitive balance of relations between the police and the communities served. For the South African Police Service, such negativity could also defeat the principles enshrined in community policing, which they have adopted as the official approach to practices in law enforcement. In order to facilitate investigations, this research used both evaluation research and a single case study, as the preferred research designs. These designs are delineated below.

### 3.3.1 Evaluation Research

Evaluation research refers to an investigative technique that is used when describing and assessing the value of specific programs within an organisation (Mouton 1996:57; Babbie 1995:9; Reeves 2000:7; Ruane 2005:13). Evaluations can thus be used as an effective tool to advance operations within police agencies by improving their future usage of technologies. The types of evaluations used in this research were process evaluations and the assessment was on-going; in this sense they were of a formative nature. Babbie and Mouton (2001:345) distinguish between summative assessment, which is based on recommending whether a program should be continued or discontinued, and formative assessment which is comprised of on-going evaluations on existing programs. The assessments in this research are aimed at making recommendations on improvements that can be effected for the future usage of the Automated Fingerprint Identification System. Generally, the logic for evaluations is also about understanding the logic of technological interventions. Evaluation research was espoused to ensure that there is methodological compatibility between the approach and design adopted in this research. In justifying such compatibility, various scholars (Babbie 1995:338; Kidder & Judd 1987:396; Krippendorff 2004:19) argue that evaluations are a qualitative investigative strategy. These scholars further assert that qualitative methods have proven successful in organisational program assessments. This research could thus best interrogate the application of the Automated Fingerprint Identification System, by the South African Police Service, by using evaluation research.

### 3.3.2 Case Study

By virtue of assessing the use of the Automated Fingerprint Identification System as a program within the specific context of the South African Police Service in the East Rand, it was implied that this research also espoused a case study as an additional research design. A case study is a qualitative strategy that is used to gather and arrange rich, descriptive and contextual data on a particular person, institution, small group or a particular program (Thompson 1995:202; Babbie & Mouton 2001:280; Anonymous 2012 a). This research used a single case study and, according to Babbie and Mouton (2001:280), a single case study can produce valid scientific results when conducted in

settings where many variables can be measured. The type of case study espoused in this research project was the process evaluation case study, in which the process was the utilisation of the Automated Fingerprint Identification System by the police. In this regard, during the investigations in this research, the collected data also generated a number of variables that can be measured in either qualitative or quantitative post-testing in future research. A case study can be defined as an in-depth enquiry into a single unit (Handel, 1991; Runyan, 1982; Yin, 1994 in Babbie & Mouton 2001:281).

### 3.3.3 Methodological Triangulation of the Research Design

By collectively espousing evaluation research and a single case study, this research was able to strengthen its exploratory and investigative processes, and to attain methodological triangulation. Methodological triangulation refers to the use of more than one investigative strategy in research (Creswell 1994:174; Miller & Brewer 2003:328; Bryman 2007:2). Miller and Brewer (2003:327) strongly agree that using different research methods augments the strengths of the techniques used in qualitative research. The use of the Automated Fingerprint Identification System in improving the level and quality of services provided by the South African Police Service in the East Rand could best be probed using the evaluation and case study research designs.

### 3.3.4 The Subject for the Research

The South African Police Service in the East Rand was selected as the subject of study in this research. This was because, until the initiation of this research, the South African Police Service at national, provincial and local levels was the only agency in South Africa to have applied the Automated Fingerprint Identification System for the criminal search and identification of fingerprints. Marshall and Rossman (1989:54) argue that research designs should include the rationale for choosing research subjects. In this respect, research subjects also need to know why their programs have to be evaluated and how their employees will be engaged. Sharing insights on engagements could contribute to accountability and transparency, as well as display the ethical manner in which the research was handled. Research follows a path in which the adopted

paradigms, designs, methods and techniques have to be anchored in common philosophical premises. Various authors (Mouton 1996:107; Welman & Kruger 2001:460; Denzin & Lincoln 2003:14; Creswell 2009:5) argue that research designs and evaluation research, in particular, connects the theoretical paradigms and methods to the inquiry strategies used. The worldviews in this research are thus outlined below.

## 3.4 THE PARADIGMATIC PERSPECTIVE

While philosophical worldviews in social research generally remain covert, they still need to be exposed. Such an exposure serves to clarify the rationale for the espousal of the research approaches, research methods and research designs (Roux & Barry 2009:1; Creswell 2009:5; Spector, Merrill, Merrienboer, & Driscoll 2008:56). In the same way, this research combined both social constructivism and phenomenology to form constructivist phenomenology as its overarching assumptions. The aim of such a combination was to strengthen the very epistemological foundations of the research.

### 3.4.1 Theoretical Triangulation

The espousal of social constructivism and phenomenology as the philosophical worldviews enabled the researcher to investigate the use of the Automated Fingerprint Identification System by the South African Police Service, by drawing from two theoretical points of reference. This type of investigation aimed to attain theoretical triangulation. Miller and Brewer (2003:327) argue that triangulation augments the potency of approaches in research. The espousal of constructivist phenomenology was also a move to ground this research epistemologically. Both the constructivist and the phenomenological views, including the convergence of the two are thus outlined next.

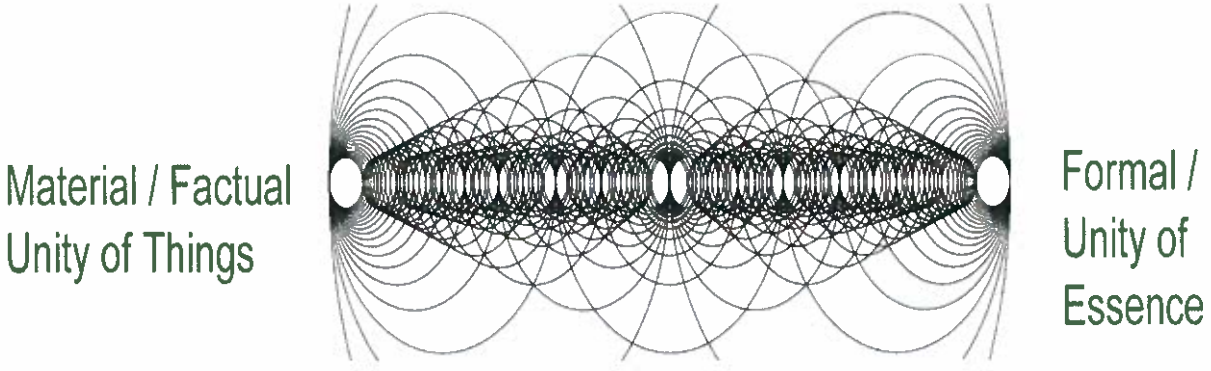
### 3.4.2 A Phenomenological Perspective

For scientific knowledge to translate into meaningful facts about particular events within the social milieu, it needs to have a firm phenomenological grounding. Reason and Bradbury (2001:448) have argued that a critical principle in social research is that novel knowledge must be solely grounded in individual experiences, accompanied by the

connection between the purpose of the research, including the strategies and methods used. The use of the Automated Fingerprint Identification System by the police could be best depicted by drawing from the experiences of its actual users. In the same way, in order to facilitate explanations on the use of technologies such as the Automated Fingerprint Identification System in improving the level and quality of police services, this research adopted phenomenological assumptions. Husserl (1913:1) argued that phenomenology does not deny the existence of the real world, but seeks to describe its gist. This implies that phenomenology does not subscribe to positivist assumptions, but subscribes to the naturalist school of thought, in order to attain philosophical grounding.

Phenomenology as a philosophical worldview is aligned with the qualitative paradigm. To elucidate, in order to depict the typical acts of consciousness, Husserl (1913:1) described the interplay between the phenomenology variables in a schematic representation by assigning two variables, the *Worldly* and *Psychological* spheres. Edmund Husserl also believed that a third variable, that of *Consciousness*, where experiences and intuition factored, was also present. Therefore, the experiences of police personnel who are linked with the utilisation of the Automated Fingerprint Identification System within the South African Police Service, made an insurmountable contribution in terms of informing this research. Figure 6, below, is a visual representation of Husserl's framework of the Two Spheres Model of Phenomenology:

**Figure 6: The Two Spheres Model of Phenomenology**




**Source:** Husserl (1913:2)

This research adopted phenomenology because of its close links to social constructivism. Hazelrigg (1986:S3) persuasively argued that constructivism is a form of phenomenology. The most recent foundations of social constructivism can be traced in the work of Alfred Schutz of the Chicago School of the early twentieth century, and in the work of W. I. Thomas. Hazelrigg further indicates that the genesis of social constructivism is embedded in the history of the social sciences that began after the collapse of conservative evaluations. These evaluations were effected during the 1960s, to facilitate the then agenda for change. The collapse in those evaluations later led to the founding of phenomenology by the German philosopher, Edmund Husserl.

The basic principles of phenomenology can also be found in the post-empiricist climate of the 1960s as well as the hermeneutics or social meanings assumptions (Welman & Kruger 2001:7; Miller & Brewer 2003:227; Roux & Barry 2009:4). This last assertion thus attests to the fact that phenomenology is an anti-positivist approach that upholds the natural scientific method as a norm in human behavioural research, by studying people's perceptions, cognitions, interpretations and beliefs regarding their immediate social setting. In explaining how phenomenologists will carry themselves, a few scholars (Mouton 1996:168; Brynard & Hanekom 1997:29; De Vos 1998:240; Welman & Kruger 2001:181; Creswell 2009:8) have pointed out that phenomenologists are those types of qualitative researchers who will go into natural settings and study the views of participants. These scholars also argue that this course of action is pursued as part of the methods used to try to make sense of the social world. Similarly, the researcher in this project also had to engage with participants in their own settings, in order to explore their experiences and to construct a picture of how South African Police Service personnel used technology such as the Automated Fingerprint Identification System.

### 3.4.3 A Constructivist Perspective

Social constructivism has methodological underpinnings that suggest that interactions between the researcher, subjects and the themes, form a critical part of the sociological enterprise (Miller & Brewer 2003:41). The utilisation of the Automated Fingerprint Identification System by the police was that very enterprise that is at the center of public discourses on matters relating to service delivery. The *proviso* to realising enhanced

services from using technologies is thus for the police to assent to researchers evaluating their technological programs. It is in this regard that the management of the South African Police Service agreed to this research being conducted. This research espoused constructivism as an impetus for research on the use of the Automated Fingerprint Identification System because it is important for researchers and police agencies alike, to track performances on technological interventions. Amongst other things, evaluations are imperative in determining if technological interventions were a good return on investment and if they contribute to accountability within organisations.

Various research scholars (Bryman 1984:81; Mouton 1996:46; Flick *et al.* 2000:66) have argued that the social constructivist is generally concerned with evaluations. This argument therefore makes social constructivism coherent with the evaluation design and qualitative approach espoused in this research project. According to White and Marsh (2006:38), qualitative researchers seek to locate research findings within pertinent theoretical paradigms. Like the qualitative paradigm espoused in this research, constructivism is also naturalistic, subjective and interpretive (Mouton 1996:46; Brynard & Hanekom 1997:29; Creswell 2009:8). Social constructivists will also attempt to acquire information by carefully searching for the multiple realities of the phenomenon being studied (Flick *et al.* 2000:5; Mason 2002:88; Roux & Barry 2009:3).

Social constructivism was a suitable worldview in this research because the diverse participant encounters aided imagery on the use of the Automated Fingerprint Identification System by the South African Police Service. Proponents of social constructivism, such as Miller and Brewer (2003:41), contend that knowledge is gained from social processes and interaction. This research emphasised the fact that the acquisition of knowledge from social processes and the resultant interactions also facilitate the interpretative trait that is visible within the qualitative paradigm. Adopting constructivism also aided answers to the question posed in this research. In order for the question in this research to be answered, the researcher had to construct data from participant responses. This research, therefore, adopted constructivist assumptions because these promote the advance of pedagogy. In this research, pedagogy refers to education or knowledge. Reason and Bradbury (2001:127) also share these sentiments and argue that constructivism promotes the expansion of shared scholarship. The pro-

education traits that can be associated with social constructivism also facilitate reciprocal learning between the researcher and the research participants. The scholarship traits in this research were also visible in the methods employed to collect the data; this was crucial in the construction of a contextual picture of the use of the Automated Fingerprint Identification System by the South African Police Service.

### 3.4.4 The Convergence of Phenomenology and Social Constructivism

There is a very fine line between social constructivism and phenomenology as philosophical worldviews. In fact, these two philosophies have often been mistaken to mean the same thing, although they have fundamental differences. This research, however, briefly explains the convergence between the two and attempts to establish the links between phenomenology, constructivism and qualitative research. Denzin and Lincoln (2003:293) argue that qualitative inquiries are a place where social researchers would campaign for virtues such as commitment to a specific phenomenon. In the same way, such campaigning would manifest itself in the different philosophical assumptions in the research. The campaign for virtues in research usually manifests itself in the inferences drawn. Husserl was quoted as having argued that phenomenology needs to be free of presuppositions and prejudices if it is to realise a state of untainted or pure awareness (Hazelrigg 1986:S2; Flick *et al.* 2000:67; Miller & Brewer 2003:227). To attain a state of untainted awareness, the inferences drawn in research must be based on observations or on the experiences of individual research participants. Whilst Babbie (1995:18) agrees that inferences should be empirical, he also contends that inferences should be logical. This suggests that drawing logical and inductive inferences is a result of integrating and synthesising collected data in a qualitative way. Various authors (Reason & Bradbury 2001:125; Miller & Brewer 2003:42; Terre Blanche, Durheim & Painter 2006:529) have since confirmed that phenomenology and social constructivism are associated with the qualitative paradigm.

Phenomenology, as a movement, was popularised by Edmund Husserl (1859-1938), who is dubbed the father thereof. Whilst the phenomenology worldview acknowledges the subsistence of the real world and seeks to make sense of it (Husserl 1913:1), constructivism follows subjective meanings and sense attributions that are based on the

descriptions offered by individuals (Creswell 1994:12; Reason & Bradbury 2001:227; Flick, Kardorff & Steinke 2004:5) and assumes a relativist ontology that there are multiple realities; it also follows a subjective epistemology that is derived from the participant's understanding of the event studied (Mouton 1996:46; Denzin & Lincoln 2003:35; Flick *et al.*2004:5; Creswell 2009:8). These authors also contend that both constructivists and phenomenologists are interested in exploring the accustomed habits of individuals in their setting and the edifice of social reality itself. Both social constructivism and phenomenological worldviews draw from the experiences of individuals who are involved in the event being studied, in a subjective and descriptive way. However, social constructivism is more concerned with the holistic studying of the bigger event by drawing from as much individual experiences, whilst the phenomenological worldview will focus on the qualitative analysis of text to describe the event, and then supplementing this with a few individual experiences. The philosophical worldviews adopted in this research have, to a significant extent, supported the research methods applied. The next section outlines the methodology in this research.

## 3.5 RESEARCH METHODOLOGY

The importance of research is closely related to the search for knowledge and the understanding of phenomena (Brynard & Hanekom 1997:1). In the search for scientific knowledge, researchers usually adopt specific methods for sampling, data collection and analysing the collected data. Methods are essential because they explain how the research came to a specific conclusion. The most common research methods include observations, surveys, interviews and focus groups. Research methods refer to a set of rules and procedures which are applied to guide the systematic gathering of information that was applied for evaluating, accepting, rejecting and replicating the research results (Miller & Brewer 2003:192; Krippendorff 2004:18; Hofstee 2006:107; Roux & Barry 2009:2). The next section therefore outlines why this research project was carried out.

### 3.5.1 The Purpose of the Research

Research is carried out for the purpose of examining a specific question. Krippendorff (2004:31) argues that research questions can be answered by drawing inferences from

phenomena, meanings, consequences or particular exploits. The aim of this research was to determine the impact of the Automated Fingerprint Identification System on the level and quality of services rendered by the South African Police Service in the East Rand, to identify the factors that hampered the efficient and effective use thereof, as well as to develop a conceptual framework that can be used to measure the impact of the Automated Fingerprint Identification System. There was never any doubt that pursuing the line of inquiry, as outlined in this section, would force the researcher to draw from the experience-based annotations of the research participants who utilised the Automated Fingerprint Identification System in their work and, in this way, also ensure that the research remains empirical. Various scholars (Krippendorff 2004:32; Kumar 2005:8; Roux & Barry 2009:3) agree that seeking answers to research questions is one way of ensuring that research that has been conducted is grounded empirically.

The motivation for this research was premised on assisting the police to effectively apply the biometric technology at their disposal, in order to improve the level and quality of services offered. These envisaged advancements would manifest in increases in the level and quality of services offered, which includes police accountability and the innovative use of resources. If the police were to implement the insights gained from the findings of this study, they could significantly use these to re-engineer their use of the Automated Fingerprint Identification System. Brynard and Hanekom (1997:1) argue that research imparts scientific facts that can be applied for establishing new methods that can also enable organisations to use their resources in an optimal way. In an attempt to obtain facts, the research sourced participants from the population using three sampling procedures. The population and sampling procedures are outlined next.

### 3.5.2 Population and Sampling

The population in this research was police officials in the East Rand. These officials are South African Police Service personnel who use the Automated Fingerprint Identification System in their work. A population can be described as objects, events, phenomena, activities or cases that are being studied for the purpose of establishing new facts about certain practices or events (Brynard & Hanekom 1997:43; Roberts 1997:55; Welman & Kruger 2001:46). In order to obtain relevant data, participants are

usually drawn from the bigger population into smaller groups or samples. One of the reasons why researchers would select smaller cases from bigger groups is to limit annotations to manageable subsets (Creswell 1994:120; Babbie 1995:188; Miller & Brewer 2003:128; Krippendorff 2004:84). A sample is a small, but representative subset of the population (Kidder & Judd 1987:35; Brynard & Hanekom 1997:43; Welman & Kruger 2001:46; Trochim 2006). In this research, random and purposive sampling techniques were applied to source participants from the research population.

#### 3.5.2.1 Random Sampling

This research initially applied the random sampling technique to source the Morpho-touch (portable Automated Fingerprint Identification System apparatus) operators from the South African Police Service in the East Rand. Random sampling is a systematic process wherein each participant has an equal chance of being selected (Creswell 1994:126; Babbie 1995:188; Welman & Kruger 2001:47; Flick *et al.* 2004:168). The random sample in this research comprised of 8 participants, 4 from the Detective Services and 4 from the Crime Prevention components of the various police stations.

#### 3.5.2.2 Purposive Sampling

The other participants were chosen using purposive sampling. According to Babbie (1995:287), purposive sampling is used to generate a greater understanding of the subject being studied. Purposive sampling refers to a non-probability procedure which is used to deliberately decide on the units of analysis (Babbie 1995:225; Maxwell 1997:87; Ritchie, Lewis & Elam 2003:79; Teddlie & Yu 2007:77). An interesting aspect about the definition of purposive sampling is the use of the term *units of analysis*. In social research the use of this term to refer to participants is tantamount to labelling people as entities other than human. Part of the ongoing discourses amongst scholars in social research is purely premised on objections to referring to human beings as units of analysis. The unit of analysis in this research was the South African Police Service and what was being analysed was one of its technological interventions, namely the use of the Automated Fingerprint Identification System. The purposive sample consisted of 5 managers who are all South African Police Service personnel. The purposive sample

thus consisted of 5 Commanders, 2 from the Crime Prevention, 2 from the Detective Services and 1 from the Local Criminal Record Center in the East Rand.

#### 3.5.2.3 Composition of the East Rand Policing Precinct

The East Rand consists of thirty five (35) police stations that have been divided into 4 clusters. Each cluster has an accounting station and these are Germiston, Katlehong, Tsakane and Springs. Each of the stations in each cluster submits consolidated reports to the accounting station, which then submits a consolidated report to the cluster commander. The commanders in each cluster consolidate their reports and then submit these to the provincial commissioner of the South African Police Service. All 4 clusters were included in the sample and 1 manager from the crime prevention and detective component of the accounting stations, including 1 manager from the Local Criminal Record Center, were purposively selected as part of the sample. These managers were included in the sample by virtue of them heading the components in an accounting station; this meant they would be in possession of consolidated reports on the use of Morphotouch from all the other stations, particularly those in their respective clusters. The manager from the Local Criminal Record Center was selected on the basis of having access to rich data on the operation of the Automated Fingerprint Identification System in the East Rand. The sampling in this research was also designed in such a manner that data had to be sourced from Morphotouch operators. The operators were randomly sourced from the various police stations in the East Rand and the stations were also randomly selected. Morphotouch operators were thus chosen from the crime prevention and detective components because they possessed rich and descriptive data on the utilisation of portable Automated Fingerprint Identification System machines.

## 3.6 METHODS OF DATA COLLECTION

Qualitative researchers usually collect data on a solitary factor or research question by using several sources of information and they do this, according to White and Marsh (2006:38), with a clear comprehension that the type of findings premised on multiple sources can be transferred with greater poise. This research used interviews and a literature review to collect data. The interviews in this research were used as the

primary data collection tools and the literature review was a secondary device. Jarrat (1996:13) argues that sources present broader breadths of data and current facts. The sources in this research were therefore classified into primary and secondary levels, based on their novelty and immediacy to their very point of origin (Montesh 2007:35). The unavailability of data sources to inform this research would have made this project impossible to carry out. Brynard and Hanekom (1997:27) summarise the issue of data scarcity by arguing that, without data, it would not even be impossible for researchers to widen their views or add something new to the existing body of facts. Data collection therefore involves the use of specific research methods and techniques. Some of the most commonly known and widely employed methods of data collection include observations, case studies and questionnaires. Mouton (1996:38), however, alerts researchers to the fact that the data collection methods used, should be appropriate to the task at hand. This research used semi-structured interviews, observations and an in-depth review of literature on the use of technology in policing. Various scholars (Babbie 1995:268; Mason 2002:62; Miller & Brewer 2003:167) have argued that interviews and literature reviews are effective when jointly used in qualitative research.

### 3.6.1 Semi-Structured Interviews

Srnka and Koeszegi (2007:38) contend that data collection in qualitative research should follow a systematic approach that also consists of well structured plans, clearly defined stages, and clear rules that need to be followed. These authors further maintain that following a systematic approach and a plan is aimed at attaining reliability on the research findings. This research thus espoused semi-structured interviews with all of the participants and in all of the sampling methods used. Semi-structured interviews are a versatile dialogue technique that uses guides to collect data from persons who are directly linked to the phenomenon being studied (Jarratt 1996:14; Mouton 1996:36; Welman & Kruger 2001:161; Lewis-Beck, Bryman & Liao 2004:10). Interviews are useful in the collection of empirical data. The empirical data that was collected in this research pertains to explorations of how, where, when and why the police use the Automated Fingerprint Identification System, including exploring the factors that hinders it's that very usage. Miller and Brewer (2003:167) argue that using semi-structured interviews also galvanises the obtaining of in-depth data. Miller and Brewer further

assert that semi-structured interviews allow participants to build their own responses. What can be inferred from this is that interviews allow participants to be free to answer based on their own settings, strengths and at their own time. Such flexibility implies that interviews will impose less pressure on participants and, thus, create a relaxed mood.

The interviews that were conducted in this research had a positive impact on the quality of answers and the credibility of the research findings themselves. Because of the direct involvement with all of the research participants, using interviews also allowed the researcher to obtain *bona fide* answers from original sources. Montesh (2007:37) pointed out that interviews generally serve as a reliable communiqué and an effective tool for primary data collection. Using semi-structured interviews thus enabled the researcher to also form trust-based relations with most, if not all, of the research participants. Relations based on trust were specifically important in ensuring that all research participants turned-up for interviews and that they also provided honest answers, although that is something that remains difficult to ascertain. However, the fact that all the information gained from each of the interviews could be corroborated against the other interviews, attests to the honesty of the answers given. In this regard, the interview schedule (Annexure A) that was used in this research is attached hereto.

#### 3.6.1.1 Limitations of Interviews

Despite its associated successes, the data collection process in this research also proved to be challenging; this was due to the shortfalls that can be linked with interviews. During the interviews in this research, the managerial positions held by some of the selected research participants proved to be problematic, as there were occasional disruptions. Some of these disruptions could be associated with issues ranging from labour disputes, noise by personnel passing through corridors, to the answering of telephone calls. At times, the participants had to excuse themselves in the middle of the interview in order to respond to either administrative or operational requirements. As a result, some of the interviews had to be rescheduled, delayed or stopped. This was costly in terms of time and other resources; however, it did not derail the purpose of this research as follow-up appointments proved to be more successful.

Another obscurity encountered during the interviews conducted for the purpose of this research was that the detectives in both the random and purposive sample were extremely difficult to secure appointments with and many of them would not even agree to take part in the research. From a scholarly perspective, this type of behaviour could be attributed to the police's culture of being secretive. The police generally have a tendency of being mistrustful of persons from outside of their domain. Various authors (Cochran & Bromley 2003:90; Paoline 2003:202; Brown 2007:211; Gottschalk & Gudmunsen 2009:170) have contended that police officials are forever cynical, secretive and highly suspicious of everyone. These authors ascribe this mistrust to the fact that law enforcement officials operate in a dangerous occupational environment. Paoline (2003:202) strongly echoes the mistrustful sentiments by the police and explicitly notes that:

> [. . . It is the nature of the policeman's situation that his conception of order emphasises regularity and predictability. It is, therefore, a conception shaped by persistent suspicion]

The mistrustful nature of police officials occasionally prolonged the data collection process in this research project. Despite the difficulties encountered in this research, an extensive review of national and international literature on the use of technology in police work further aided the data collection process. Creswell (1994:20) argues that a literature review will not only exhibit other research findings, but it will also lay a solid foundation for ongoing discourse about the topic or subject that is being researched.

### 3.6.2 Literature Review

Creswell (1994:21) argued that qualitative researchers use literature inductively and in line with methodological assumptions in a research project. In the same way, a literature review was employed in this research as a secondary data collection method. By examining both national and international literature on the use of technology by the police, the researcher was able to understand the challenges that pertain to the use of the Automated Fingerprint Identification System. In fact, not only did some of the questions in this research obtain answers, but a number of conclusions that were

outlined in the final chapter of this research, were also facilitated through data that was sourced from literature sources. Hofstee (2006:106) strongly asserts that the methods of data collection do in fact facilitate conclusions on a specific problem of the research.

A literature review serves as an indispensable part of data collection in research. The purpose of a literature review is to inform researchers on what the current train of thought is on a particular subject (Marshall & Brossman 1989:34; Brynard & Hanekom 1997:31; Hofstee 2006:91; Montesh 2007:33). The literature sources used to inform this research broadened the researcher's understanding of how law enforcement agencies worldwide, applied their technological interventions to deal with the challenges posed by transnational and cross-border organised crime. This reliance on literature also facilitated comparisons, specifically in terms of how the police in South Africa dealt with issues of criminality and accountability. Such comparisons were important, given that within the African context the utilisation of technologies in police work is a relatively under-researched field. Jarratt (1996:13) contends that consulting sources of the literature enhances the many key dimensions of the phenomenon being studied.

## 3.7 QUALITY ASSURANCE IN THE RESEARCH

In order for the research to maintain high standards of credibility, the dissertation or research report should also explain how the researcher assured quality. In this research, quality assurance refers to measures taken to ensure the degree to which the project complied with the scientific standards in social research. Kotler and Keller (2006:146) define quality as the totality of features of a product that bear on its ability to satisfy the implied or stated needs. Similarly, all of the measures taken to guarantee the quality of this research are delineated in the ensuing discussion.

### 3.7.1 Recording Data

Creswell (1994:148) asserts that data collection includes the creation of multiple procedures that are applied for the purpose of recording all of the information that was collected for the purpose of informing a research project. Correspondingly, the researcher employed a digital recorder to capture all interview recordings in this

research. This information was labeled and then safely stored on a disc and on a computer program; it was later transcribed for the purpose of analysis. Welman & Kruger (2001:189) agree that the material on all research needs to be kept in safety.

### 3.7.2 Pilot study

A pilot study in this research was conducted before the actual data collection process. The pilot study in this research was done in order to assess the phrasing and suitability of the questions contained in the interview schedule. The purpose of this pilot exercise was to refine and re-articulate any of the questions in the interview schedule. The re-articulation of questions was critical in ensuring that the correct questions were posed to the correct category of research participants. This effectively ensured that quality answers were sourced to inform this research. Getting quality answers was also critical in aiding the data analysis process in this research. Therefore, the purpose of the pilot study was also for the sake of the quality assurance of the data collection tool used.

### 3.7.3 Editing the Research

This dissertation was edited for language and grammar by a privately contracted expert. In the same way, the editing was also done by the supervisor at the University of South Africa for content and for the technical prowess of this research report.

## 3.8 DATA ANALYSIS

After collection, data needs to be analysed so that it is transformed into meaningful evidence. Evidence is critical in that it provides valuable insights and answers to the questions asked. Data analysis was dependent on obtaining large and consolidated amounts of data that need to be interpreted (Creswell 1994:153; Welman & Kruger 2001:183; van As & van Schalkwyk 2004:167). Qualitative research uses eclectic tactics with no right or wrong way of analysing the collected data. Some of the methods used include analysing text, visuals or speech. Text refers to narratives of findings on the phenomenon (Krippendorff 2004:24; Hofstee 2006:117; White & Marsh 2006:36) and this includes transcribed interview scripts which contain the descriptive accounts of

participants. In order to process the data, this research employed qualitative content analysis. Miles and Huberman (1994:153) assert that qualitative data produces rich descriptions and explanations on processes that unfolded in phenomena being studied.

### 3.8.1 Qualitative Content Analysis

Qualitative content analysis refers to the systematic use of a repertoire of tactics to analyse text and to draw replicable and valid inferences from data (Miller & Brewer 2003:43; Krippendorff 2004:18; White & Marsh 2006:22). While approaches to content analysis can be used in mixed methodologies, they were used within the confines of a qualitative paradigm in this research. Qualitative approaches to content analysis are preset in symbolic interactionism, critical scholarship, ethno-methodology, the Marxist approach, British cultural studies, as well as literary and feminist theories (Krippendorff 2004:17). White and Marsh (2006:34) argue that content analysis flows from a humanistic tradition; this means that analysing content is a qualitative technique.

This research used qualitative content analysis because, like the qualitative paradigm, qualitative content analysis is flexible. The fact that qualitative content analysis collectively uses a number of tactics to generate findings and place them into context, attests to its suitability. Qualitative content analysis is used with the aim of depicting findings from all kinds of verbal and communication data that is based on participant experiences. According to Miller & Brewer (2003:43), qualitative content analysis will assess words and terms to describe text. Applying qualitative content analysis also allowed the researcher to extract answers to the research questions. Krippendorff (2004:32) argued that qualitative content analysts will apply questions to achieve more efficiency and empirical grounding for their research projects. In this regard, all of the steps used during the data analysis phase of this research are delineated below.

#### 3.8.1.1 The Data Unitisation Process

In the initial stage of data analysis, qualitative researchers will unitise all of the data collected from interviews. Data unitisation refers to the selection of the units of analysis and the isolation of material into coding units for the sole purpose of forming categories

and connecting relations in such a way that they are recalled as units, as opposed to individual entities (White & Marsh 2006:29; Srnka & Koeszegi 2007:36; Kahl & Bingham 2010:27). During the unitisation process, the data collected from interviews was broken down into smaller but manageable units, so that it can be interpreted and further reported on. In fact, the unitisation and coding processes in this research were conducted simultaneously and this was meant to support the generation of new ideas.

#### 3.8.1.2 The Coding Process

Coding is the classification of text according to some conceptual framework and is an indispensible operation in qualitative content analysis (Creswell 1994:154; Babbie 1995:311; Miller & Brewer 2003:45). The codes in this research were used for the production of core constructs from textual data. Some of the codes were derived from literature and some from the transcribed interview manuscripts; these were either imposed or empirically generated. Srnka and Koeszegi (2007:36) agree that words or statements can be used as units of analysis and that content analysis facilitates the production of core constructs from textual data. The coding in this research was generated by clustering particular phrases from the interviews and conceptualising them into descriptive words. The coding process was therefore manually conducted, in that the process conducted without the help of any analytical software. In this regard, the codes generated in this research were never assigned values since the research was empirical and therefore never required any quantification. Furthermore, it was also not necessary for this research to make any classifications based on race, gender or any personal attributes. The only classification in the coding was on the basis of their point of origin, which is either from literature sources or transcribed interviews. According to Welman and Kruger (2001:200), the purpose in the coding process is to identify variables that are to be analysed at a later stage. Subsequent to the coding process, the researcher synthesised all of the data, structured the description and analysis thereof and then classified the codes into specific categories and into relevant themes.

#### 3.8.1.3 The Categorisation Process

Categorisation requires that the researcher fully comprehends the real world constraints under which the data was produced. Categorisation refers to the assignment of texts to predefined categories based on their content (Creswell 1994:154; Babbie 1995:312; Lewis, Yang, Rose & Li 2004:362). In this regard, the researcher grouped the identified codes into categories; this process was done manually, without the assistance of computerised or analytical software. The coding and categorisation in this research were also applied so that the researcher can analyse, synthesise and then make sense of all the data. The categorisation process in particular was used so that the researcher is able to identify possible themes that may have emerged from the data.

#### 3.8.1.4 The Clustering of the Research Themes

According to Srnka and Koeszegi (2007:37), because the categories in research can be constructed in a hierarchical form, they contribute to higher reliability in social research. The analysis, synthesis and interpretation of the codes, categories and themes that emerged from this research are discussed in detail, in the ensuing chapter on the research findings. According to Welman and Kruger (2001:216), researchers are obliged to release their findings to the public domain for scrutiny, so that they can be critically evaluated by the scientific community. It is equally important for research to outline the processes followed to ensure that the integrity of the collected data was sufficiently protected. Issues pertaining to data validity and reliability are outlined next.

## 3.9 DATA VALIDITY AND RELIABILITY

The value of any research needs to be evaluated. One of the ways to achieve such evaluations is by testing for rigor to determine the integrity of the data collected to inform the research. Determining such rigor therefore involves testing for the validity and reliability of the collected data. Validity and reliability are however quantitative constructs. This assertion is supported by van As & van Schalkwyk (2004:63) who argue that trustworthiness and authenticity have been established as viable standards of measuring validity and reliability in qualitative research. Mason (2002:88) further

confirmed that qualitative findings apply criteria other than validity and reliability. Validity refers to the extent to which a measuring instrument will measure what was intended (Lewis-Beck *et al.* 2004:1177). Qualitative researchers use concepts such as trustworthiness, consistency, neutrality, dependability, confirmability, transferability, as well as applicability, as measures to test for rigor in the data (Krefting 1991:3; Mason 2002:89; Miller & Brewer 2003:126; van As & van Schalkwyk 2004:63). Defending the integrity of the data in this research was critical. In the same way, issues on the integrity of the data collected to inform this research were outlined in the section below.

### 3.9.1 Rigor in Qualitative Research

The data collection process in qualitative research entails gathering raw data in an unstructured way. This is one of the reasons why this research used semi-structured interviews as the preferred data collection tool. Examples of raw data are the tape recordings or transcripts of conversations from interviews in this research. In this respect, one of the ways in which qualitative researchers ensure reliability is by maintaining meticulous records of interviews and by documenting the data analysis process in detail. In an attempt to attain validity, qualitative researchers will listen attentively during interviews, record data in time and in an accurate manner, include all data in the final report, be sincere in terms of reporting, seek feedback from participants, report in a balanced fashion and write the report in an accurate manner (Krefting 1991:8; Key 1997; Creswell & Miller 2000:124). This was the case in this research project. The criteria for establishing rigor in this research are therefore outlined below.

#### 3.9.1.1 Credibility

Credibility is the equivalent of internal validity in quantitative research and is used to establish truth and value in qualitative research. Some of the criteria for credibility involve prolonged and varied field experience, reflexivity, member-checking, triangulation and peer review (Krefting 1991:8; Key 1997; Creswell & Miller 2000:127). In this research, the researcher made sure that the analysed reports from interviews were sent to the participants, in order for them to validate whether there were no

misrepresentations of their ideas. In an attempt to increase credibility, this research also complied with the requirements for theoretical and methodological triangulation processes; this information was outlined in previous discussions in this chapter.

#### 3.9.1.2 Dependability

Dependability is the equivalent of external validity in quantitative research and is used to establish consistency in qualitative research. Some of the criteria used to determine dependability will involve audits and dense descriptions (Krefting 1991:8; Key 1997; Creswell & Miller 2000:127). In the same way, this research attained in-depth descriptions on the use of the Automated Fingerprint Identification System by the South African Police Service. The fact that the different experiences and accounts arising from interviews with participants could be inter-corroborated and could be connected to data in the literature sources, attests to the consistency in this research.

#### 3.9.1.3 Confirmability

Confirmability is the equivalent of internal validity in quantitative research and is used to attain neutrality in qualitative research. Although qualitative research is subjective, there will be truth in some of the inferences made. Some of the criteria used to establish confirmability relates to confimability audits, triangulation and reflexivity (Krefting 1991:8; Key 1997; Creswell & Miller 2000:127). The fact that the research methodology employed was triangulated at various levels attests to this research having attained confirmability. The type of triangulation evident in the literature review chapter of this research, not only addressed the triangulation of data sources, but also helped the research to attain crystallisation because, in certain instances, four or more references were used in a sentence. Reporting on the limitations in this research also facilitated neutrality, which is essential in attaining confirmability in research.

#### 3.9.1.4 Transferability

Transferability speaks largely to external validity in quantitative research and it is a construct used to establish applicability in qualitative research. Some of the criteria

used to establish transferability is a nominated sample, the comparison of a sample to demographic data, as well as the provision of dense descriptions (Krefting 1991:8; Key 1997; Creswell & Miller 2000:127). This research already offered dense descriptions on the application of the Automated Fingerprint Identification System by the South African Police Service in the East Rand. By virtue of the fact that the sample included only South African Police Service personnel who are linked with the use of technology such as the Automated Fingerprint Identification System, this research attained applicability. This is because the research was always intended to contextualise the utilisation of biometric technology to the South African Police Service, since this is the only law enforcement agency in the country that uses the Automated Fingerprint Identification System for the identification of criminal fingerprints and for evidential purposes.

## 3.10 ETHICAL CONSIDERATIONS

A vital code in social research ethics is to defend the safety of the research participants. Whilst consensus has not yet been reached on what really denotes ethics in research, scholars (Babbie 1995:448; Mouton 1996:10; May 2001:59) have ascribed ethics to conduct that forms apt moral behaviour, in terms of what is right and in the interests of the research participants. One of the most topical issues in social research relates to the question of ethical reviews *versus* academic freedom. Most critics have contended that ethical reviews in research could erode academic freedom, which is doubtful. Terre Blanche *et al.* (2006:63) have since argued that there is an evolving emphasis on ethical accentuation in social science research and ongoing assessment of related processes. In fact, research that is exempt from reviews could lose its credibility.

### 3.10.1 Unethical Research

Unethical practices in research have their historical settings in some bloodcurdling practices in Europe. Past explanations of unethical conduct have credited the growth thereof to the atrocities caused by Nazi medical researchers in Germany during World War II, who used human beings as subjects for their medical testing (Terre Blanche *et al.* 2006:61). In order to prevent such atrocities, a global and mandatory approach to ethical reviews in social research is necessary. This means that social researchers

need an international oversight body to monitor their compliance with ethics. Policies that regulate the behaviour of researchers have proved successful in promoting ethical conduct in research and, therefore, regularising actions through a global professional body could also go a long way in curbing abuses by researchers. According to Hofstee (2006:118), reporting on ethical procedures outlines how the research complied with institutional protocols or guidelines. Similarly, this research was conducted in line with the University of South Africa's Policy on Research Ethics (2007). The honest reporting on the application of the research methods and techniques applied, as well as the fact that permission was sought from the management of the South African Police Service and from all of the participants, also attests to the ethical manner in which the research was conducted. None of the research participants were exposed to harmful practices.

### 3.10.2 Privacy Issues

It is undisputable that scientific research is a dynamic process that sometimes entails the invasion of people's lives. One of the most contentious issues in social research relates to invasions, by researchers, on the privacy of research participants. Privacy can be an issue of law, even when such invasions are in moderation of social research. For instance, the Constitution of the Republic of South Africa (Act 108 of 1996) affirms the right of every person not to have their privacy unduly violated (South Africa 1996). What is inferred is that any researcher who in any way, violates a research participant's right to privacy, will not only be acting in an unethical manner, but will also be in direct violation of the law itself. However, an interesting argument about privacy is that, whilst researchers might grapple with these issues from a moral outlook, legislators will view it from a political perspective. Similarly, lawyers will most likely adopt a legal stance on privacy, which means that litigation may well arise from any associated violations.

The one paradox about the legalities in and around ethics in social research is the chronic possibility of social researchers themselves manipulating the very legal systems that were aimed at protecting the rights of individuals, by claiming their own rights of access to information. To ensure compliance with ethics in research and to avoid violating individual privacy, researchers should refrain from engaging with individuals by using the available legal tools to force people into participation in research. Instead,

approaching participants should be humane. Various authors (Babbie 1995:448; Miller & brewer 2003:95; Flick, Kardorff & Steinke 2004:334; Terre Blanche *et al.* 2006:62) argue that ethical responsibility is critical during all stages of the research. In this research, no participant was made to disclose data of a personal nature, no privacies were violated and informed and voluntary consent was sought from all the participants.

### 3.10.3 Informed Consent

The principle of informed consent is considered to be superlative when enrolling individuals as participants into a social research project. Perhaps the most concise description of informed consent is one offered by Berg (1998): "Informed consent means the knowing consent of individuals to participate as an exercise of their choice, free from fraud, deceit, duress, or similar unfair inducement or manipulation" (David & Sutton 2004:18). The researcher disclosed, in full, to all of the participants, what the aim of this research project was, which methods were going to be used during the course of the study, what the planned results were and how the data was going to be utilised. This disclosure was put in writing for the participants and the researcher verbally clarified some of the details prior to the interviews. In this respect, Miller and Brewer (2003:96) contend that researchers should provide articulate and precise facts that will make participants understand what the research they are involved in entails.

### 3.10.4 Voluntary Consent

Voluntary consent is the principal norm for the promotion of the relationship between the researcher and the research participants. According to Miller and Brewer (2003:96), a key principle in social research is that participation in any form of research must be on a voluntary basis. Similarly, the researcher advised all research participants of their right to withdraw from participation in the study at any stage or given time, should they wish to do so. It is in this way that consent forms were given to all research participants to sign. However, the forms were never a binding contract that would force people to provide information once they have signed on the dotted line. Instead, all research participants were informed that withdrawal was always an option. A copy of the consent form used in this study is therefore attached to this dissertation (Annexure B).

### 3.10.5 Anonymity and Confidentiality

As a measure to obtain voluntary and informed consent, the researcher ensured that the identities of the participants were protected. The researcher only referred to interview numbers and phrases, without using any names. Furthermore, the interview numbers were never matched with any of the participant's names or responses. Miller and Brewer (2003:97) argue that anonymity and confidentiality are imperative ethical considerations when reporting on findings in a social research project.

### 3.10.6 No Harm to Participants

Miller and Brewer (2003:97) further argue that social researchers should never allow physical or mental harm to befall any of the research participants. In addition to the fact that the nature of questions in this research did not force people to disclose any personal information that could have otherwise been demeaning or evoked any psychological harm, the interviews in this research were never prolonged to a point of inflicting psychological harm on the participants. All participants were also interviewed in a safe environment that did not expose them to any physical harm. The questions in the interviews pertained solely to the use of the Automated Fingerprint Identification System by the South African Police Service in the East Rand, and did not attempt to solicit any sensitive organisational information. As a measure to further safeguard all of the research participants, the researcher also offered his contact details to the participants so that they could follow-up on their participation and the research results.

### 3.10.7 The Academic Community

Unethical research not only has damaging effects on the research participants; apart from damaging the very reputation of the person conducting the research, unethical behavior in social research also has an adverse impact on the entire academic and/or scientific community. In an attempt to establish a moral benchmark aimed at preserving the very professional integrity of the research fraternity, renowned scholars, Miller & Brewer (2003:98), provide the following guidelines for researchers to adhere to:

- **Research should reveal shortcomings**: The discussions in this chapter on the various limitations attested to the research being done in an ethical way. The discussions in this research revealed the researchers shortcomings and the limitations associated with the methods and techniques used.

- **Honest Reporting**: The fact that the researcher provided contact details to the participants and that the dissertation was made public also attests to this research having been made available for replication. In qualitative research, replication serves as a safeguarding mechanism against the falsification of data. Moreover, a copy of the dissertation will also be given to the South African Police Service and, in this way, transparency will be promoted.

- **Personal Bias**: The researcher refrained from criticising other researchers based on polemical personal bias. The researcher also frankly reported on his own biases.

- **Plagiarism**: The acknowledgements attached to all of the sources used in the writing of this dissertation attests to the fact that none of the work was plagiarised. The lack of plagiarism in this research contributed to the ethical manner in which this study was conducted. Furthermore, a declaration of authenticity was signed in this report, so as to confirm the originality of the research itself.

The ethical guidelines that have been outlined in this chapter are also in line with the University of South Africa's Policy on Research Ethics. The policy guidelines in the former prohibit plagiarism, piracy and fabrications, but equally promote issues such as consent, privacy, anonymity and confidentiality (Unisa 2007:4). The observation of the guidelines thus also attests to the ethical manner in which the research was conducted. According to Miller and Brewer (2003:99), the purpose of ethics in social research is to protect researchers, their work and the research participants from harmful practices.

## 3.11 CONCLUSION

Social research offers an approach to concurrence and tentative realism. This implies that researchers should adhere to specific criteria. The criteria in research are evident in the methods and techniques applied. In qualitative research, in particular, the methods and techniques employed will further determine whether the assertions made will have logical and empirical support. Such support therefore determines the ethical implications against which the research was conducted. In this research, the approach, design, methods and techniques used, were designed to be in uniformity with some of the pertinent worldviews within the qualitative paradigm. This type of compatibility further facilitated answers to the question of the application of Automated Fingerprint Identification System by the South African Police Service. In the same way, sourcing answers to the question driving in this research entailed practicing good ethics in research and safeguarding the integrity of the data collected to inform this research.

## CHAPTER 4: FINDINGS

### 4.1 INTRODUCTION

Globalisation, which drives the advancement and trans-national nature of crime, requires that the police use state-of-the-art and more sophisticated technologies to help them deal with the challenge of crime. Biometric technologies are amongst some of the tools which are used to help the police in their task of identifying criminal fingerprints and other physiological features of persons. In this light, the impact of the Automated Fingerprint Identification System on fingerprinting processes within the South African Police Services also needs to be studied and understood so that challenges can be identified and solutions can be applied. Explorations on biometric technologies are useful in ascertaining whether the use thereof has enhanced the level and quality of services offered by the South African Police Service in the East Rand precinct.

Explorations of the use of technology such as the Automated Fingerprint Identification System are critical in that they expedite the process of dealing with some of the linked service delivery bottlenecks within the South African Police Service. These bottlenecks effectively compromise the level and quality of the policing services rendered. The explorations in this research also unlocked some of the answers as to how the South African Police Service can elevate and/or optimise their performance. There is no doubt that an accountable and innovative approach to the utilisation of technology, the Automated Fingerprint Identification System in particular, is vital in enhancing police strategies, which include the provision of high quality services to all communities.

High quality services, especially in safety and security, are critical in the creation of social order and prosperity in other spheres of life. The problem in this regard was that ever since its introduction, no research was done to assess the impact that the use of the Automated Fingerprint Identification System has had on the level and quality of services rendered by the South African Police Service. This problem was further intensified by the absence of a framework for the police to evaluate the effectiveness of technological interventions by the police. There is no doubt that without an evaluation framework, it would be difficult for the South African Police Service to fully determine

whether the implementation of technologies such as the Automated Fingerprint Identification System was a good return on investment. Without an evaluation framework, it will become extremely difficult to determine whether the implementation of technology such as the Automated Fingerprint Identification System had fully addressed the service delivery challenges encountered prior to the implementation of the Automated Fingerprint Identification System, when the South African Police Service used the manual fingerprint classification system that used dactyloscopic examinations.

In order to acquire relevant information on the utilisation of the Automated Fingerprint Identification System by the South African Police Service, the research conducted required a scientific approach. *"Science is built up of facts, as a house is built of stones, but an accumulation of facts is no more a science, than a heap of stones is a house"* (Hofstee 2006:147). What this implies is that the data amassed for the research needed to be synthesised so that sense could be made of it and the findings could be used to resolve real-life problems. The findings on how the utilisation of the Automated Fingerprint Identification System, factors in terms of the provision of services by the South African Police Service in the East Rand precinct, are outlined in this chapter.

The findings also lead to the research question being answered by drawing from the empirical data. Most of the data collected to inform this research was related to the production of statistics on the utilisation of the Automated Fingerprint Identification System by the South African Police Service, which data is quantitative. However, the same data overlooked aspects of accountability, which relates to qualitative aspects of service delivery. The data relevant to these qualitative aspects of police service delivery was therefore obtained from the literature sources. In an attempt to further inform this research, other evidence was obtained *via* interviews which were transcribed verbatim and the data thereof analysed using qualitative techniques. Qualitative research enables the researcher to make sense of the codes, categories and themes that emerged from this research. An overview of the interviews and the notation employed for the referencing thereof, are therefore subsequently delineated here.

## 4.2 AN OVERVIEW OF THE INTERVIEWS

The interviews in this research were transcribed and the data was coded line-by-line, in order to identify significant meanings from the phrases that were uttered by the participants. Such phrases were considered by of significance to this research. The coded meanings of the phrases were grouped into categories and later into themes. The interviews in this research were conducted in accordance with the ethical considerations that were explained in the previous chapter. The data collection and analysis processes were done simultaneously and during the analysis of the interview transcripts, trustworthiness was achieved by addressing the credibility and the transferability issues related to the data. Thirteen participants were interviewed, with the shortest interview having lasted for 2 minutes and 37 seconds, whilst the longest lasted 1 hour, 02 minutes and 11 seconds. Of the interviews with the 15 participants that were included in the original sample, two of the interviews were excluded from the data as the information was based on hearsay. All of the research participants appeared to have been in a relaxed mood during the interviews and the recordings thereof. There was no difficulty experienced in establishing a rapport with the interviewees as most of them confirmed that they were elated with the research project and that they found the Automated Fingerprint Identification System and its role in service delivery interesting and topical, especially since they are police officials themselves, who are involved with the use of this biometric technology in their work.

Before the commencement of the interviews, the researcher disclosed the aim and objectives of the research and presented the consent form (Annexure B) attached hereto, which the researcher read and explained to all the interviewees before their signing thereof. The signing of the consent forms attests to the willingness of all who were interviewed, to participate in and to inform this research project. Most of the interviews were conducted in the interviewees' offices at their workplaces; this further showed the willingness of interviewees to participate in informing this research.

### 4.2.1 The Notation for the Referencing of Interviews

All interviews in this research were referred to in-text, using a numerical notation and no names were linked to any of the interviews. The referencing notation was necessary to ensure that confidentiality and anonymity were maintained. The notation for the referencing of the interviews also intended to ensure compliance with the ethical concerns highlighted in the preceding chapter of this research. Referencing implies acknowledging the source from which ideas were derived. The primary role of referencing is to avoid plagiarism. Due to the ethical requirements, the interviews conducted in this research were excluded from the list of references at the end of this report and only the interview schedule (Annexure A) was attached hereto. The referencing method for the interviews in this research comprised of a numerical sequence. An example of this notation is as follows: (12-6:17). In this regard, the first digit (12), is the interview number, the second digit (6) is the page number on the transcribed interview manuscript itself, upon which a quote appears, whilst the third digit (17), is the line number in the manuscript, on which a particular phrase appears.

## 4.3 ANALYSIS OF PRIMARY DATA

One of the most exigent features in conducting qualitative research is embedded in analysing the empirical data that has been collected from interviews and literature sources. Data analysis processes, qualitative content analysis in particular, involves the creation of codes, the clustering of categories and, subsequently, the creation of specific themes that can be discussed and used as a platform for the creation of new ideas (Trochim 2006: No Page Number). Creating and clustering data eventually translates into the generation of new scientific knowledge. This chapter outlined how the analytical codes in this research were extracted from the interviews. The same codes were applied to break down the original data in this research, to re-conceptualise it and to re-arrange the same data in new ways; this process is known as data unitisation. The unitisation and coding are delineated in the next section of this chapter.

### 4.3.1 Data Unitisation and Coding

In this research, the data unitisation and coding processes were carried out simultaneously. Specific phrases from the interviews conducted in this research were clustered and re-conceptualised into a single meaning. Data unitisation and processing was necessary for the identification of the codes used in this research. Data unitisation was necessary in the generation of the analytical codes for this research. The following were the analytical codes that have been identified in this research:

- **Effectiveness:** This code has been associated with the use of the Automated Fingerprint Identification System in that at least four of the interviewees confirmed that this biometric technology adds value to police operations and to service delivery, whilst only one disputed the effectiveness of the technology. The following was the evidence:

*"I say it's good"* (1-1:9); *"Yes, it impacts on service delivery"* (2-1:19); *"The technology is very good"* (7-4:23); *"I think it helps"* (8-2:7); *"It's not that effective"* (6-2:6); *"It's really good"* (9-1:9)

- **Authorisation:** There was unanimous agreement by interviewees that the police require authorisation to legitimise their application of portable Automated Fingerprint Identification System apparatuses like the Morphotouch, as is evident from the following:

*"We have a section 13 (8) authorisation"* (1-3:6); *"We have permission that is called section 13 (8) which is a roadblock"* (8-1:20); *"They must apply for the Morphotouch"* (4-2:3); *"We apply for operations"* (6-1:22); "*Yes, there is an application that you fill in"* (2-1:25); *"Their information must be registered at the Provincial office for them to use the machine"* (3-2:15); *"Yes, we do need permission"* (11-1:1); *"Authorisation at roadblocks to use the Morphotouch"* (14-5:23).

- **Capacity:** Evidence also revealed that portable fingerprint technology needs to have its capacity increased to support its efficiency and effectiveness. Some of the interviewees thus had the following to say, specifically on the limited capacity of the Morphotouch:

*"It can take up to 40 000 wanted persons"* (1-3:20); *"Most of the time this thing becomes full"* (2-1:8); *"It must go back to the LCRC for downloading"* (3-1:25); *"I don't think the whole national list can be updated"* (4-1:13)

- **Training:** The South African Police Service requires some formal training in the use of the Morphotouch. This requirement was confirmed in some of interviews conducted. However, one interviewee was of the opinion that very few people are trained as Morphotouch operators and another alluded to the fact that operators train one another. The empirical evidence from the interviews conducted attest to the assertions made in this regard. The following were some of the quotes from the empirical evidence:

*"They must undergo certain training"* (3-2:13); *"Yes, you would have to undergo training"* (8-3:7); *"Yes, there is internal training to use the Morphotouch"* (5-1:24); *"There are only a few people trained to operate it"* (2-1:13); *"They try to train one another"* (7-3:1)

- **Resources:** The lack of resources, especially portable technology that supports the efficient and effective application of the Automated Fingerprint Identification System was identified as an inhibiting factor in terms of police service delivery. Although most interviewees alluded to the fact that there is a lack of Morphotouch machines in the South African Police Service, one interviewee highlighted the need for the introduction of modernised technologies, whilst another pointed out the lack of internal support in obtaining the machines. The following quotes therefore serve as evidence to support these claims:

*"We request it but we don't always get it"* (7-1:9); *"Because the other four stations do not have the Morphotouch"* (1-2:3); *"There are few Morphotouch in the country"* (5-1:13); *"There are a few of them"* (3-2:13); *"Yes, more modernised technology"* (6-3:12); *"We are running short of this Morphotouch"* (2-1:12); *'We've got one Morphotouch at the police station"* (12-1:1)

- **Application:** The South African Police Service uses the Automated Fingerprint Identification System for combating crime through the associated digitised

criminal identification capability. The identifications relate primarily to fingerprinting arrested persons, possibly sought criminal suspects and the production of previous conviction reports. Most of the interviewees agreed that biometric identification technologies such as the Morphotouch are also user-friendly as is evident from the data collected to inform this research project. The following was therefore the empirical evidence unearthed:

*"They use it to check prisoners in the cells"* (1-1:19); *"They use it to fingerprint people"* (2-1:10); *"It helps with the fingerprinting and the previous records on cases"* (5-2:12); *"It helps more with crime prevention"* (7-1:20); *"We use Morphotouch during large scale operations"* (8-2:9); *I think it's very user-friendly"* (8-1:10)

- **Efficiency:** The Automated Fingerprint Identification System has proved to be a technology that is highly efficient and effective in terms of fingerprint identification. The empirical data shows that portable biometric apparatuses are easy to use and can produce the required results much faster. These claims are based on the following evidence from the interviews conducted with the research participants:

*"You'll be able to determine whether you are on the wanted list"* (1-1:10); *"It's easy to trace the most wanted suspect"* (2-3:11); *"You are in a position to actually arrest somebody"* (3-4:4); *"You get the information within minutes"* (5-3:20); *"I think the turnaround time is a lot quicker"* (7-2:16)

- **Security:** Biometric technologies are also said to have good features to guard against illicit infiltrations. Although few interviewees confirmed the security associated with operating technologies such as the Morphotouch, literature sources have also consistently confirmed the security aspect. The following was the evidence unearthed:

*"So, there's a safeguard in there"* (1-9:1); *"The machine is quite secure"* (14-4:27); *"The system has got security measures in place"* (15-1:16)

- **Support:** There is generally little operational support offered to Morphotouch operators by the police's Local Criminal Record Center, although the problem is not much of an issue in bigger stations, as was evident from the following:

*"At times they do, at times you can't get hold of them"* (2-2:21); *"These stations must assist them"* (1-2:5); *"We don't get enough support"* (6-2:16)

- **Acceptability:** There is no consensus amongst interviewees as to whether the use of the Morphotouch by the South African Police Service is accepted by all members of the community. The following data served as support for this claim:

*"They don't have a problem because we ask them professionally"* (2-3:8); *"People normally get scared"* (3-4:2); *"I haven't come across people who resisted"* (5-3:11); *"They say we are doing a good job when using these machines"* (6-2:24)

### 4.3.2 The Imposed Codes

The following were the codes that were imposed from the literature in this research:

- **Pro-activeness:** This code has been imposed in this research particularly because it links with the *Application* code already outlined. In their fight against crime, the South African Police Service also uses various technologies in crime prevention operations. Pro-activeness relates to the deterring effect that the use of the Morphotouch could have on members of the community, possibly, persons who might potentially commit a crime.

- **Re-activeness:** This code has been imposed in this research because the police also use biometric identification technology to respond to a crime that has already been committed. The scanning and identification of suspects using the Morphotouch, followed by their subsequent arrest, attests to the reactive use of biometric technology in policing.

- **Values:** This code was imposed because the South African Police Service subscribes to a set of values (like the *Batho Pele* principles) that all public servants should adhere to in order to make their services more responsive to the needs of the community.

- **Traditions:** This code was imposed because the use of technologies in police work happens within multi-cultural organisational dimensions that follow specific ways of doing things, which ways may also influence how police officers perform in their work.

The data coding and unitisation processes were critical in this research in that they facilitated the creation of the categories. The categories were therefore formed by clustering the codes. In turn, the clustering was vital in aiding the findings in this research. This is because the findings brought about novel facts on the use of the Automated Fingerprint identification System by the South African Police Service. These were the same facts that caused bottlenecks in police service delivery. Similarly, the categories in this research are delineated in ensuing discussions.

## 4.4 CATEGORIES OF THE RESEARCH

The discussion of the categories focused primarily on the synthesising of data, in order to generate primary findings for the research. Research categories are inductively derived from the data that was collected to inform the research. Effectively, the categorisation process implies the systematic grouping of abstract data in order to produce knowledge. This research espoused emic categorisation, which is the type of a categorisation process that utilises the observation of text from documentation. In the case of this research project, the interview transcripts and the literature sources were the documentation analysed. Six categories were identified in this research and these were *Regulation, Performance, Productivity, Professionalism, Strategy* and *Culture.*

### 4.4.1 Category 1: Regulation

The category *Regulation* was formed by clustering the codes *Authorisation, Security, Policy* and *Acceptability.* The findings in this research revealed that the South African Police Service needs to operate within a specific regulatory framework in order to legitimise their use of portable Automated Fingerprint Identification System apparatuses. In fact, the majority of the interviewees agreed that police officers require authorisation in terms of section 13 (8) of the South African Police Service Act (Act 68 of 1995) in order to legitimise most of their actions (1-3:6; 2-1:25; 3-2:15; 4-2:3; 6-1:22; 8-1:20). Yet, there are times when the police violate individual rights by conducting random fingerprinting using the Morphotouch machinery without proper authorisation, a judicial warrant, informed consent or even reasonable suspicion. This assertion was best captured through the following phrase from one of the interviews:

*"You will have a situation where police action takes place on the spur of the moment"* (1-3:8)

By implication, it can be deduced that police action that occurs on the spur of the moment will also include the unauthorised use of tools such as the Morphotouch, to fingerprint individuals during stop and search operations. This is a problem that is exacerbated by the fact that police managers do not necessarily provide authorisation in terms of section 13 (8) of the South African Police Service Act (Act 68 of 1995), despite the fact that such authorisation can be granted at a moment's notice at station level, by any manager. There is a general perception amongst members of the South African Police Service that authorisation is only required during a formal operation such as roadblocks (1-2:5; 8-1:20; 6-1:20). Furthermore, there is uncertainty amongst police personnel as to who should be issuing what type of authorisation and for what type of operation. This uncertainty has also led to the unlawful use of the Morphotouch.

During one of the interviews (8-1:17), the interviewee was of the opinion that the police do not necessarily require any permission to use the Morphotouch. This interviewee further mentioned that the only permission that is required is that it is signed by the Provincial Commissioner (8-1:18). Assertions such as the former are indicative of uncertainty as the Provincial Commissioner is responsible for the issuing of

authorisation in terms of section 13 (7) of the South African Police Service Act (Act 68 of 1995), which is a search warrant, specifically for large scale search operations on premises and/or residences, including any persons or any other article or object found therein. In fact, section 13 (8) of the South African Police Service Act serves as a tool to aid the legitimisation of the day-to-day small scale operations such as stop and searches, including fingerprint scanning, other than for the purposes of arrest and detention. The findings have also showed that the Automated Fingerprint Identification System generally operates on a secured database (1-9:1) and that there is a concerted effort by the management of the South African Police Service to ensure stricter control mechanisms over personnel, in order to protect all of their technological databases, including the Automated Fingerprint Identification System (South African Police Service 2009:34). Various literature sources (Jamieson, Stephens & Kumar 2005:1; Roberts 2005:13; Maltoni, Maio, Jain & Prabhakar 2009:xi) further confirmed that biometric technologies generally have high levels of security. It is important that the level of security linked with technology such as the Automated Fingerprint Identification System has enabled law enforcement agencies to ensure that crucial information related to criminal intelligence is kept safely and that the evidential value thereof is preserved.

The findings in this research also showed that people generally accept being fingerprinted by the police (1-4:24; 2-3:8; 5-3:11; 6-2:24). Although some do get scared of the technology, they comply still (3-4:2). Whether people get scared of the technology itself or the police, the crux of the matter is that the police are taking advantage of the fact that many people may not be aware of the legalities regarding fingerprint scanning. The legalities mostly apply to cases where the police do random stop-and-searches without authorisation. Because of their limited human rights education, some members of the public are not even aware that the police are violating their civil rights, which certainly does not justify these rights being violated by the police.

### 4.4.2 Category 2: Performance

The category *Performance* was formed by clustering the codes *Application and Efficiency.* The findings in this research showed that the South African Police Service uses the Automated Fingerprint Identification System to fingerprint detainees in police

cells in order to check if they are wanted for other criminal cases, and to produce conviction reports (1-1:19; 3-1:12; 5-2:12). In addition, the South African Police Service uses technologies such as the Morphotouch to fingerprint people during crime prevention and criminal investigation operations (2-1:10; 7-1:20:8-1:10). The research further established that the use of the Automated Fingerprint Identification System has drastically improved the turnaround time of the results of fingerprint inquiries within the South African Police Service (5-3:20; 7-2:16), which has resulted in more arrests of persons suspected of having committed criminal acts (1-1:10; 2-3:11; 3-4:4).

### 4.4.3 Category 3: Productivity

The category *Productivity* consisted of the codes *Capacity* and *Effectiveness*. Research findings have shown that although the use of the Automated Fingerprint Identification System did improve the quality of fingerprinting within the South African Police Service, there are still issues related to the limited capacity of machinery such as the Morphotouch. Such a shortfall results in wanted criminal suspects not being detected during police operations. Apart from evading arrest or detection, the limited capacity of the Morphotouch also requires that police officers scan one individual's fingerprints on numerous machines during a single operation, in order to increase their chances of detection. For ordinary law abiding citizens such processes are time-consuming and compromise the levels and quality of services rendered. In fact, although it may be that people are grateful for a police presence during crime prevention operations, they may not accept having to stand in long queues, waiting for their fingerprints to be scanned.

### 4.4.4 Category 4: Professionalism

*Professionalism* came about as a result of grouping the codes *Resources* and *Training.* The findings in this research have revealed that the South African Police Service do learn from the best practices in the global policing environment. The automation of the fingerprinting process, as facilitated through the implementation and use of the Automated Fingerprint Identification System, attested to this professionalisation. However, the training on the use of portable apparatuses such as the Morphotouch requires some attention. This is because there are personnel that train one another (7-

3:1), in an effort to increase the number of operators in their stations. Moreover, there are other available portable biometric apparatuses such as the Morpho-Rapid and the Magnetic Circular Dichroism (MCD), which have been relatively under-utilised by South Africa Police Service personnel in their work (Adonis 2012:No Page Number).

### 4.4.5 Category 5: Strategy

The category *Strategy* encompassed the codes *Pro-activeness* and *Re-activeness*. The South African Police Service uses portable Automated Fingerprint Identification System apparatuses in both their pro-active and re-active strategies. For instance, the fingerprint processing at the Criminal Record center will be re-active. Such processing will be in response to feedback on fingerprint information pertaining to a crime that has already been committed. At the same time, the use of portable apparatuses like the Morphotouch will also have a deterrent effect on would-be criminals. This is because biometric technology such as the Morphotouch is largely used by the South African Police Service within the public space and this is during crime prevention operations.

### 4.4.6 Category 6: Culture

The category *Culture* encompasses the codes *Values* and *Traditions*. One of the most critical aspects in service delivery pertains to aligning practices with organisational policies. Such alignment is also vital in laying the foundation for ethics or a value system that informs traditions within law enforcement agencies. For the South African Police Service, the internal culture largely dictates how personnel perceive of their service delivery mandate, in relation to the use of technologies. The effective use of technologies such as the Automated Fingerprint Identification System depends not only on the manner in which things are done within an organisation, is also greatly influenced by external value systems. For law enforcement agencies to become more responsive to the needs of the public, they need to apply technologies in a manner that continuously upholds the value system of the society at large, as well as adapt internal traditions to the ethical standards that are generally acceptable to society at large.

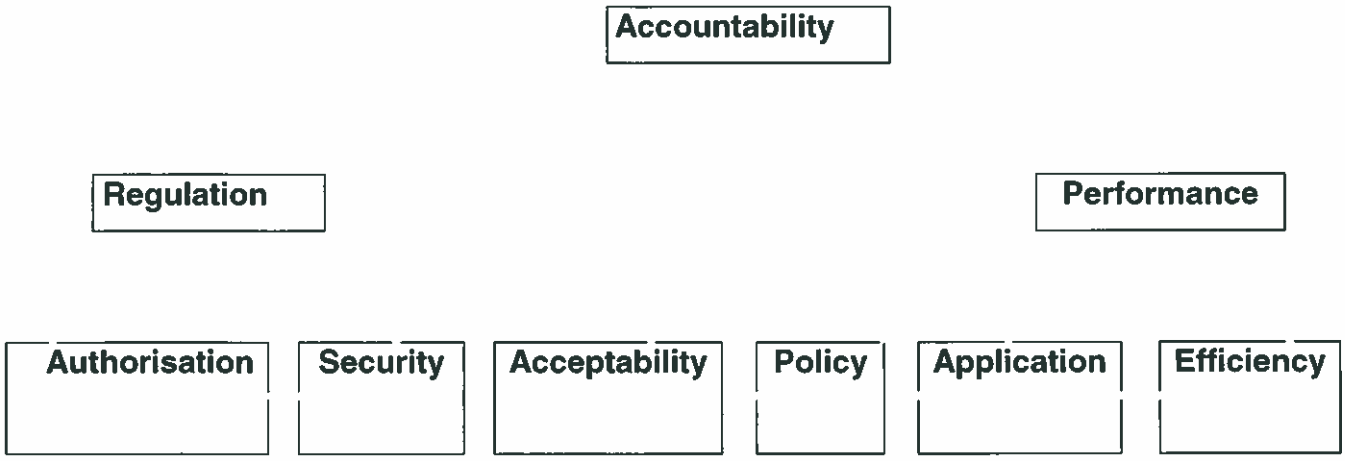
## 4.5 THE THEMES OF THE RESEARCH

The discussion on the themes in this research focuses on synthesising all the data, in order to generate secondary findings. The themes that emerged from this research therefore enabled the researcher to analyse data that did not readily fit into the existing analytical categories, in the previous section. There were three themes that emerged from this research and the themes were *Accountability, Innovation* and *Approach.* In the same way, the themes in this research were useful in making sense of the collected data on the use of the Automated Fingerprint Identification System by the police. Each of the themes in this research was outlined in the sections that followed.

### 4.5.1 Theme 1: Accountability

The theme *Accountability* was formed by clustering the categories *Regulation* and *Performance.* The research findings have already revealed that police personnel do not apply for authorisation when using portable apparatuses like the Morphotouch, which impacts negatively on accountability. In addition, the South African Police Service did not conduct assessments on their use of the Automated Fingerprint Identification System or any of their service delivery initiatives, except reporting on crime statistics and their productivity figures. The failure to conduct these linked assessments constitutes poor performance and a lack of accountability by management. In the same way, reporting solely on productivity statistics constitutes bias and these shortfalls impact negatively on police accountability and the efficiency of technologies used. Alternatively, the fallacy that the use of machines like the Morphotouch are generally accepted by most members of the public, does not necessarily imply that the police should be using these without authorisation, as this also impacts negatively on accountability. Although many of the interviewees believe that a police officer does need to be duly authorised before using the Morphotouch, such a belief is nonetheless displaced. This is because many of the interviewees view such authorisation only in terms of internal processes of being trained and being authorised to use the machine and not in terms of the law of general application that authorises the use of portable biometric apparatuses on individuals, in a more accountable fashion. Figure 7, below, is therefore an adaptation of the variables that factored in the theme *Accountability*:

**Figure 7: The Theme Accountability**



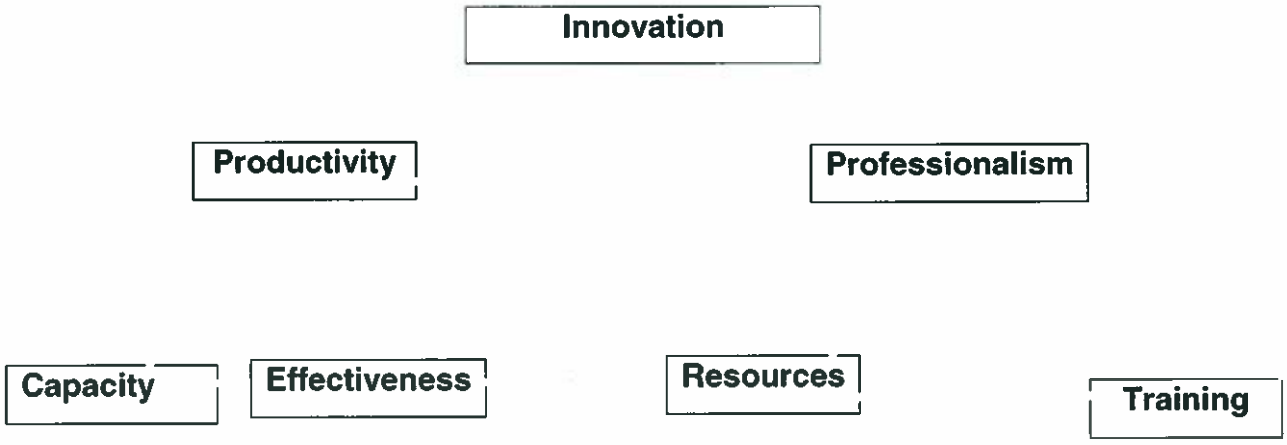

What the adaptation depicts is that, for the police to legitimise their performances and to deliver quality services, crime combating technologies need to be used in a highly efficient manner that also promotes accountability. This means that the technologies used should not only be secured, but they should also be used in a manner that conforms to policies and legislation. In this regard, the utilisation of technology by police officials should be done in a manner that is generally acceptable to communities.

### 4.5.2 Theme 2: Innovation

The theme *Innovation* comprised of the categories *Productivity* and *Professionalism.* One of the improvements that can be attributed to the utilisation of biometric technology such as the Automated Fingerprint Identification System by the South African Police Service is the turn-around time for the production of conviction reports that have improved drastically. Biometric technologies have, in general, enabled the South African Police Service to collect and analyse increased quantities of criminal finger and palm impressions. However, the fact that portable biometric apparatuses such as the Morphotouch have limited storage continues to have a negative impact on the police's crime combating capabilities and on the level and quality of the services offered. The situation where the level and quality of services rendered by the police are compromised in any way requires police managers to always seek innovative ways

around obstacles. What the findings in this research have also revealed is that the South African Police Service, as an organisation, takes *Professionalism* very seriously. In this respect, the automation of fingerprinting processes displayed efforts by the South African Police Service to learn and adopt from other best practices from around the global policing milieu. Similarly, learning from best practices implies that the South African Police Service continues to be a learning organisation that always strives to improve its practices, in order to adequately deal with challenges within the policing environment in the country and to respond to the needs of the different communities. Below is a depiction of an adaptation of the research theme *Innovation:*

**Figure 8: The Theme Innovation**




What *Innovation* really implies is that the proper re-conceptualisation of the related concepts such as the acquisition, adaptation, dissemination and utilisation of resources, needs to be constantly revisited and evaluated. Such an exercise is therefore vital, if the South African Police Service is to continually evolve into a better performing organisation, with higher levels of quality in terms of service delivery outputs. The term "evolve" refers to constant change that encompasses always seeking creative and new ways for improving on the planning, monitoring and evaluation of performance within an organisation. For the South African Police Service, this also means regularly assessing the application of biometric technologies such as the Automated Fingerprint Identification System and learning, in a variety of aspects in policing, from those police agencies around the globe that are more successful in their service delivery initiatives.

### 4.5.3 Theme 3: Approach

The theme *Approach* comprises of the categories *Culture* and *Strategy.* Literature sources have already shown that the South African Police Service have adopted community policing as the philosophy that informs their approach to law enforcement. This approach therefore also informs police conduct during the execution of their crime combating strategies, which also guides the use of technologies such as the Automated Fingerprint Identification System in police work. By subscribing to the notion of being responsive to the needs of the communities, the South African Police Service has in fact proved to subscribe to a particular philosophy that is informed by specific values and traditions, which also informs the policing strategies used. Figure 9, below, is a depiction of an adaptation of the theme *Approach*:

**Figure 9: The Theme Approach**


The adaptation of the theme *Approach,* simply implies that although law enforcement agencies utilise crime combating strategies that are both preventative and reactive in nature, the organisational value system should also inform police officers' conduct when they deal with members of the community. Such inclusions will also entail the application of various resources, including technologies that need to be applied in a manner that upholds and respects the cultural values of society. In fact, policing strategies that are not culture-sensitive will often be met with rejection by members of the different communities and could therefore prove to be futile in the long run.

## 4.6 THE IMPACT OF AFIS ON SERVICES PROVIDED BY THE SAPS

The use of the Automated Fingerprint Identification System has added value to operations within the South African Police Service. Notably, the high figures of arrests made by the police using the Morphotouch, the increased and accurate identification of fingerprints lifted from crime scenes and the increased number of conviction reports produced, using the Automated Fingerprint Identification System databases, attests to the value added. The findings in this research have shown that when fingerprint evidence is obtained faster, the investigation of cases by police detectives is also enhanced. In the same way, the findings in this research have proved that some South African Police Service personnel - particularly those in the East Rand - were not utilising other portable Automated Fingerprint Identification System tools like the Morpho-Rapid and the Magnetic Circular Dichroism (MCD), which are already at their disposal. Compared to these portable tools, the police in the East Rand use the Morphotouch most frequently. In an attempt to answer the question in this research, the research findings were classified into the specific and general findings, as outlined below.

### 4.6.1 Specific Findings

This study's research question intended to gauge the extent to which the Automated Fingerprint Identification System had improved the level and quality of services by the South African Police Service in the East Rand. The research findings have shown that:

- Before the implementation of the Automated Fingerprint Identification System, it was difficult for the police to accurately identify criminal suspects as they could only match the suspect's facial features to the circulated identikit or photograph in their possession.

- With the introduction of the Automated Fingerprint Identification System, the use of associated portable apparatuses such as the Morphotouch enhance identifications of suspected criminals by eliminating the human errors linked with

the manual fingerprint classification system of dactyloscopic examinations that the police traditionally employed.

- The time taken for police officials to identify fingerprints is significantly reduced through the utilisation of the Automated Fingerprint Identification System and allied portable biometric apparatuses like the Morphotouch. For instance, the fingerprint scanning of criminal suspects who were already in police custody, which is primarily intended to produce previous conviction reports that are useful in informing court decisions during the processing of bail applications and during the sentencing of convicted persons, could not be easily attained through manual fingerprinting because of the amount of time taken by South African Police Service fingerprint experts to manually produce such reports.

- Before the Automated Fingerprint Identification System, the use of manual fingerprinting processes by the South African Police Service delayed the finalisation of investigations, where finger impressions or palm prints lifted at a crime scene needed to be matched with those of the possible criminal suspect. This increased the number of dockets handled by detectives and, if suspects were arrested, cases could also not be finalised in time; this created backlogs for the prosecution and increased the number of awaiting trial detainees. These delays meant that the use of manual fingerprinting processes by the police impacted negatively on the entire criminal justice process in South Africa.

- The use of the manual fingerprinting process by the South African Police Service also delayed arrests since it was difficult for staff to attain on-the-spot identifications, in the absence of portable apparatuses like the Morphotouch.

Following the research question posed, the first objective in this research was to determine the impact that the Automated Fingerprint Identification System has had on the level and quality of services rendered by the South African Police Service. With regard to the same question, the findings in this research have revealed the following:

- The use of the Automated Fingerprint Identification System by the South African Police has facilitated accurate criminal identifications that police officials have come to rely upon, which has led to criminal elements being arrested and removed from the community and contributed to the solving of crimes throughout the East Rand precinct.

The second objective in this research was to identify factors that hamper the efficient and effective utilisation of the Automated Fingerprint Identification System by South African Police Service personnel in the East Rand. Most of the research participants described poor management, technical issues and negligence as part of the current and/or impending challenges in the use of the Morphotouch apparatus. The findings in this research show that:

- Morphotouch operators only completed the relevant operational registers if there was a positive match and an arrest was made. This presented an inaccurate picture of the use of the Morphotouch, in relation to the number of searches conducted using the technology.

- The fact that portable apparatuses like the Morphotouch operate on wireless connections is one of those factors that hampers the optimal use of the Automated Fingerprint Identification System by the South African Police Service in the East Rand. These connections are sometimes lost due to poor network connectivity, especially in poor weather conditions or when the network itself is overloaded. As a result, the police are unable to obtain a reading when scanning fingerprints on the Morphotouch and could not determine whether a person was a sought after suspect. There is no doubt that such shortfalls also hinder the operational efficiency of South African Police Service personnel.

### 4.6.2 General Findings

The one general finding in this research was that, despite the Automated Fingerprint Identification System having been successfully implemented by the South African Police

Service, there is no framework to evaluate its effectiveness and to measure how the technology factors in improving police service delivery. The absence of an evaluation framework underscores the need to promote on-going or formative assessments on technological programs aimed at enhancing the quality of services rendered by the police. Such assessments would also include the re-conceptualisation and contextualisation of the term service delivery, as well as defining the performance parameters linked to the utilisation of the Automated Fingerprint Identification System.

## 4.7 CONCLUSION

Although the research found sufficient evidence to support the view that the use of the Automated Fingerprint Identification System did add value to operations within the South African Police Service, there were exceptions. These exceptions were related to the fact that the research showed little evidence to support the qualitative aspect of police service delivery. For instance, the evidence pointed to productivity figures that relate to the quantitative aspects of the use of biometric technologies. However, the research also showed very little evidence to support an emphasis on aspects such as authorisation, which pertains to accountability issues and to the qualitative aspects of service delivery. The findings in this research thus suggest that, although the question on the impact that the Automated Fingerprint Identification System has had on the level and quality of services rendered by the South African Police Service, was adequately answered, the development of an evaluation framework could go significantly facilitate on-going assessments of the technology. Such a framework could also ensure that the qualitative aspect of service delivery is inculcated into the measurement system that can assist managers in the South African Police Service to determine clear performance indicators for the use of the Automated Fingerprint Identification System.

## CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

### 5.1 INTRODUCTION

The fourth and final objective of this research was to make recommendations, based on the research findings, to the management of the South African Police Service about improvements that can be effected on the utilisation of the Automated Fingerprint Identification System. In this regard, recommendations on interventions aimed at mitigating the problems that hindered the effective utilisation of the Automated Fingerprint Identification System by the South African Police Service are delineated in this chapter. The same recommendations also encompass suggestions for future research, and suggestions on a framework that can be used to measure the impact that the utilisation of the Automated Fingerprint Identification System has had on the level and quality of services rendered by the South African Police Service.

The problem that informed this research was that, ever since the introduction of the Automated Fingerprint Identification System, no research has been conducted to determine the impact thereof on the level and quality of services provided by the South African Police Service. Poor service delivery within the public sector has been identified by the African Peer Review Mechanism (APRM) as one of the areas that South Africa needed to attend to, as it was adversely impacting on the quality of governance (Mkhabela 2007:8). The police are part of the public service and, as such, they also have a duty to contribute in terms of maintaining high standards and quality in safety and security services. The speedy production of fingerprint reports that also expedite investigations in cases and the finalisation of court proceedings, are some of the expectations that the police are supposed to fulfill. Such measures could make the South African Police Service more responsive to the needs of the community and to contributing towards the overall quality of governance; these are processes which were, in part, facilitated through by effective use of technologies such as the Automated Fingerprint Identification System.

Before the introduction of the Automated Fingerprint Identification System, experts at the Criminal Record Centre did fingerprint classifications manually by using

dactyloscopic examinations. The effect of this manual system was that it took longer for the results to be obtained. The manual classification of fingerprints caused delays in the entire South African criminal justice system in that court cases could not be finalised in time. Ever since the introduction of the Automated Fingerprint Identification System, operations at the Criminal Record Center of the South African Police Service have also improved drastically. The findings in this research show that the use of the Automated Fingerprint Identification System increased fingerprint identifications and the production of previous conviction reports. Whilst the implementation of the Automated Fingerprint Identification System did address most of the challenges encountered, in comparison to when the South African Police Service used the manual fingerprint classification system, the findings in this research have also suggested that the quality linked with the utilisation of the Automated Fingerprint Identification System in improving efficiency in safety and security services, still had a long way to go. As a point of departure, a summary of the findings in this research is subsequently outlined below.

## 5.2 SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the summary of findings captured in this section is not to repeat the research findings mentioned in the previous chapter, but to revisit the main findings in this research. The summary that outlined below is divided into the findings related to the research question and those related to each of the first three objectives of this research. Each category that has been outlined below is therefore accompanied by discussions on the conclusions and recommendations.

### 5.2.1 The Research Question

The research question of this study intended to explore the extent to which the Automated Fingerprint Identification System had improved the level and quality of services rendered by the South African Police Service. Although the research findings have shown that the use of portable Automated Fingerprint Identification System tools, such as the Morphotouch, facilitated the increased on-the-spot fingerprint identifications of crime suspects, including their arrests, minimised human errors linked to manual fingerprint identifications, and improved the turn-around time for the finalisation of police

investigations, the main finding in this research is that before the implementation of the Automated Fingerprint Identification System, it was difficult for the police to accurately identify a suspect as they could only match the suspect's facial features to that of a circulated identikit or a photograph in the possession of the police.

The conclusion with regard to this research question is that the implementation of the Automated Fingerprint Identification System by the South African Police Service has heralded the dawn of a more sophisticated approach to fingerprinting in police work, in comparison to the manual fingerprint processes that employed dactyloscopic examinations. The use of the Automated Fingerprint Identification System has enabled the South African Police Service not only to accurately identify fingerprints, but to also digitally and securely store them. The automation of fingerprinting processes has thus created a better way for the police to collect, store and process criminal fingerprints. Such automation has further enabled the police to not only meet the needs of the criminal justice system in South Africa, specifically the need to speedily produce previous conviction reports, but it has also addressed some of the safety and security concerns of communities by enabling the police to identify and arrest criminal elements.

Despite the fact that fingerprinting processes are the most reliable means of identification in forensic science, the modernisation and automation thereof should, however, not mark the end of manual fingerprinting processes. This line of reasoning is based on the fact that biometric technologies, like any other technology, can suffer system failures and when systems are down, the police can lose data and valuable time. Although the police can retrieve most, if not all, of the lost data such retrievals can take a long time. In the event that the time taken to retrieve lost data is longer than anticipated, fingerprint experts can use the manual fingerprint classification system that employs dactyloscopy, to mitigate some of the failures arising from the malfunctioning of biometric technologies such as the Automated Fingerprint Identification System. The recommendation is therefore that the South African Police Service continues training fingerprint experts in the manual fingerprint classification processes of dactyloscopy.

### 5.2.2 The First Research Objective

The first objective of this research project was to determine the impact that the Automated Fingerprint Identification System has had on the level and quality of services rendered by the South African Police Service. The research findings have confirmed that the utilisation of the Automated Fingerprint Identification System, by the South African Police Service, has facilitated the accurate criminal identifications of fingerprints by police officials. The increased scene-of-crime fingerprint identifications, increased arrests following on-the-spot fingerprint identifications using the Morphotouch, and the increased production of previous conviction reports, thus attest to the positive impact arising from the use of the Automated Fingerprint Identification System by the police.

Given the capability of the Automated Fingerprint Identification System to accurately identify criminal fingerprints, it can be concluded that the use of biometric technologies such as the Automated Fingerprint Identification System not only helped the South African Police Service to match previously unsolved crimes, but the technology has also enabled police officials to reduce the number of unsolved criminal cases. The ability of biometric technologies that enables police officials to search for leads on unidentified latent prints is therefore also useful in increasing inter-agency communication; this is a capability that has not yet been operationalised within public institutions in South Africa.

Communication between the police's fingerprint databases and the fingerprint databases of other state departments could enhance the professional status of the police. In South Africa, however, such interagency connectivity depends largely on the enactment of relevant legislation. Pending the complete enactment of the Criminal Law (Forensic Procedure) Amendment Bill, which will authorise the interdepartmental connectivity of databases, the South African Police Service needs to engage with other state institutions such as the Department of Home Affairs and the Department of Transport, both of which have automated fingerprint databases. The interconnectivity of fingerprinting systems justifies engagements between the police and other state departments since such interconnectivity will create a link with the police's fingerprint databases and enable other state departments to identify wanted suspects on their premises. Such engagements should, among other things, cover aspects related to

guidelines for the securing of suspects who may have been identified during the processing of applications for identity documents or driver's licences; these are transactions which are traditionally done by the Department of Home Affairs and the Department of Transport respectively and not by the police *per se*. Engaging other state departments could also ensure that systems are in place by the time relevant legislation comes into effect; this could allow the police to focus on other critical policing activities, once the Criminal Law Forensic Procedure Bill is fully enacted.

### 5.2.3 The Second Research Objective

Apart from the legislative constraints, the findings in this research have also identified a number of factors that hampered the efficient use of the Automated Fingerprint Identification System by the police, which are aspects that were uncovered in line with the second objective of this research. The fact that portable apparatuses such as the Morphotouch operate on wireless connections, is one of those factors that hampered the optimal usage of the Automated Fingerprint Identification System by the South African Police Service, because wireless connections are sometimes lost. However, the police can do nothing about lost connections that hinder the efficiency of biometric technologies as this is outside of their control. Despite a number of the linked shortcomings, the utilisation of the Automated Fingerprint Identification System has proved viable in ensuring that the identification prowess of the police is enhanced.

Although the findings in this research have shown that the use of the Automated Fingerprint Identification System has enhanced the operational effectiveness of the South African Police Service, the findings of this research have equally shown that there were Morphotouch operators who only completed the relevant operational registers (SAP 16) if there was a positive match or if an arrest made; this factor also hampered the efficient utilisation of the Automated Fingerprint Identification System. Such indolent practices present an inaccurate picture of the utilisation of the Automated Fingerprint Identification System because not only does the non-completion of operational documentation defeat the accuracy of statistical information on the use of portable biometric tools, such as the Morphotouch, but this also puts the credibility and reliability of all statistical information produced by the South African Police Service into question.

In order for the South African Police Service to attain the required results in elevating the level and quality of services rendered, police managers need to adopt proactive approaches that will ensure that obvious service delivery bottlenecks linked to the use of the Automated Fingerprint Identification System are adequately addressed. Addressing such bottlenecks will not only ensure that the operational efficiency of portable tools such as the Morphotouch is enhanced, but this could also add more of the qualitative aspect to issues such as accountability and police service delivery initiatives. The following are therefore the recommendations of this research project:

- Police managers need to monitor and inspect operational documentation (SAP 16) more regularly and keep an official register to record the number of times portable biometric apparatuses were used by personnel. Such a register also needs to be inspected at regular intervals in accordance with police regulations, to check whether operational documentation is completed and filed properly, and check if portable biometric machines are booked-in at the Local Criminal Record Center for updating the data.

- Operational commanders at the station level need to ensure that operators of portable tools such as the Morphotouch get on-site support with resources such as cell-phones.

- Police managers at the station level should prescribe a standard but compulsory pro-forma of authorisation in terms of section 13 (8) of the South African Police Service Act (Act 68 of 1995), to ensure that Morphotouch operators always have legal authorisation to subject individuals to fingerprint scanning, especially during stop and search operations. This authorisation should also be subjected to proper filing and regular inspections, together with all operational documentation relating to the use of portable biometric apparatuses.

- In the same way, managers at the Local Criminal Record Center also need to disseminate information to stations about other portable Automated Fingerprint

Identification System tools such as the Morpho-Rapid and Magnetic Circular Dichroism (MCD) that are available, and train personnel on how to operate these tools. The training of operators on a variety of portable biometric apparatuses could mitigate the storage capacity limitations linked to any one of the tools used and save on the costs incurred with the upgrading of the storage capacity of the Morphotouch alone. In so doing they will eliminate the underutilisation of police resources that already exist.

- The South African Police Service, in general, could benefit greatly if training on portable Automated Fingerprint Identification System tools could be included as part of the curriculum at the level of basic training, so that every police student can graduate as a qualified portable biometric tool operator. This inclusion could ensure that personnel do not train one another since such practices have an adverse effect on quality assurance in training.

- Furthermore, the Local Criminal Record Center in the East Rand needs to ensure that personnel are always available to give technical support to Morphotouch operators who call in during field operations. This includes, among other things, dedicating a member of staff - even if on a rotational basis - to take phone calls from Morphotouch operators.

- Detective managers also need to fully monitor compliance with the final disposal orders in police dockets, especially in relation to fingerprint evidence. This goal could be effectively attained through regular inspections on dockets to ensure whether the fingerprint form or SAP 96 has been submitted to the Criminal Record Center for the de-activation of fingerprint data from the wanted list of the Automated Fingerprint Identification System, once a person has been acquitted in criminal court proceedings.

Mangers within the South African Police Service need to make use of existing problem solving models to identify and deal with problems in their work. This includes, among other things, conducting impact assessment on police programs at regular intervals.

Moreover, police managers need to set clear guidelines to facilitate the active involvement of external role players such as the Community Policing Forum (CPF), in evaluating the police's service delivery initiatives. If implemented, the recommendations of this research could enable the management of the South African Police Service to improve the efficiency of the Automated Fingerprint Identification System and to enhance innovation and accountability in terms of the use of the same technology.

### 5.2.4 The Third Research Objective

The one general finding in this research was that, despite the Automated Fingerprint Identification System having been successfully implemented by the South African Police Service, there was no framework to measure the impact of this biometric technology on the level and quality of policing services rendered. The absence of an evaluation framework has had adverse impact on police accountability in that police statistics never indicated whether they sought proper authorisation each time they used portable biometric tools, especially during stop and search operations, to subject individuals to fingerprint scanning. The police need to show, through statistics, that they acquired proper authorisation each time they used portable biometric machines to subject individuals to fingerprint scanning, unless the tools were used in situations in which they had informed consent, reasonable suspicion or were authorised by law to do so.

Statistics on the utilisation of portable tools such as the Morphotouch relate primarily to the production of conviction reports and the number of fingerprint searches performed; these relate largely to the quantitative aspect of service delivery and not the qualitative aspect thereof. Despite the fact that the South African Police Service did not have a framework to evaluate the impact that the use of the Automated Fingerprint Identification System has had on the level and quality of the services offered, the qualitative aspect of the use of the Automated Fingerprint Identification System by the police was reflected in the quality of fingerprint images produced, the speedy production of fingerprint data, the enhanced crime scene identifications, including on-the-spot identifications and the arrests made subsequent to these identifications. The development of a framework to measure the utilisation of biometric technologies such as the Automated Fingerprint Identification System was in line with achieving the third

objective in this research. The Service Delivery Nexus (SDN) is the proposed framework that was developed in this research. This framework could assist the police to measure both the quantitative and qualitative aspects of the use of the Automated Fingerprint Identification System by the South African Police Service. The Service Delivery Nexus framework could also enable an element of police accountability, in that the framework could enable measurements specifically related to the use of portable biometric tools. The Service Delivery Nexus is thus subsequently outlined below.

## 5.3 THE SERVICE DELIVERY NEXUS

The Service Delivery Nexus (SDN) as depicted in Figure 10, below, consists of three separate but interrelated worlds, which are indicative of the different levels at which staff in the South African Police Service perform their work. **World 3** in the framework is the level of operations, where staff, police managers and the community usually interact. This is the practical world were plans are implemented. In the context of this research, World 3 is where daily police operations or service delivery initiatives happen. **World 2,** is the level of operational and strategic planning. In World 2, junior and middle managers plan and implement strategies, based on the generic organisational plans set by senior management. This is also the world in which the formative or continued assessment of organisational strategies happens. In the same way, World 2 is where oversight institutions such as the Community Policing Forums (CPF) can engage in assessing police service delivery plans, including the technological programs applied.

**World 1** in the framework is the world of metaphysics, were senior management conceptualise generic plans that need to be operationalsed in **World 2** and **World 3**. In other words, World 1 is the level of philosophical assumptions, were managers choose and reflect upon worldviews that underpin approaches to organisational strategies that have been adopted for service delivery efforts. Senior managers in World 1 are also responsible for the summative or final assessment of interventions that have already been applied, with the aim of making decisions as to whether particular program needs to be continued or terminated. World 1 is thus also the level at which senior managers in the South African Police Service can seek comments or advice from experts in various but allied fields. Such consultations with experts could include growing relations

with partners in academia, private security firms, community leaders and Non Governmental Organisations (NGOs). Figure 10, below, signifies the mobility or flow of data between the various stakeholders involved in service delivery issues; in this figure, mobility is also signified by the arrows pointing upwards and downwards.

**Figure 10: The Service Delivery Nexus**

**World: 1**

| Accountability | Approach | Innovation |
|---|---|---|

**World: 2**

| Regulation | Performance | Strategy | Values | Efficiency |
|---|---|---|---|---|

**World: 3**

| | | | | |
|---|---|---|---|---|
| Consent sought | Operations held | Conviction reports | Consultation | Turn-around time |
| Reasonable suspicion | People Searched | Criminal searches | Courtesy | |
| Authorisations | Arrests made | Wanted identifications | Information | |
| | Identifications made | Warrant of arrests | Redresses | |
| | | Enquiries made | | |

World 3 in the Service Delivery Nexus include all of the indicators that are usually used by the police to measure the use of the Automated Fingerprint Identification System or any of its portable tools. However, the indicators in World 3 also include authorisation, consent, reasonable suspicion and turn-around times for the productivity margins. These indicators are generally not reflected in police statistics on the use of biometric technologies as they indicators speak to the qualitative aspects of the use of technologies such as the Automated Fingerprint Identification System. Authorisation refers to legal permission granted in terms of section 13 (8) of the South African Police Service Act (Act 68 of 1995). This type of authorisation is commonly needed before the police can perform any fingerprint scanning on persons other than those who have been

arrested or those suspected of having been involved in criminal activities. Consent, however, refers to permission granted by the person subjected to fingerprint scanning; this permission is required if the said person is not arrested or detained, or if such a person is not suspected of having committed any criminal act, based on reasonable suspicion. Reasonable suspicion refers to the legal grounds compelling the police to believe that a person whose fingerprints are about to be scanned, may have been involved in crime or could be sought after. In situations where the police do stop-and-search operations and they subject individuals other than those that are arrested or detained to fingerprint scanning using portable Automated Fingerprint Identification System tools such as the Morphotouch, then such activity requires reasonable suspicion or consent from the person whose fingerprints are about to be scanned.

### 5.3.1 The Aim of the Service Delivery Nexus

As previously indicated, the aim of the Service Delivery Nexus is to aid on-going assessments of the use of the Automated Fingerprint Identification System by the police. The word **Nexus** refers to a common network of variables. The use of the service Delivery Nexus could enable police managers to re-conceptualise and contextualise the term service delivery, in terms of how the term relates to the use of biometric technologies such as the Automated Fingerprint Identification System. Using the Service Delivery Nexus could also enable the police to define the performance parameters linked to the use of biometric technologies and to include more qualitative data related to police accountability into their statistics. From a theoretical perspective, the Service Delivery Nexus uses the themes that have been developed in this research to align with the Problem Analysis Triangle from the Problem-Oriented-Policing model. The Problem Analysis Triangle depicts three elements outside of the triangle and is premised on the argument that the removal of any one of the elements from outside of the triangle will eliminate the opportunity for crime. Therefore, the adaptation in Figure 11, below, presupposes that the removal of any of the elements (research themes) from outside of the triangle, would seriously compromise the level and quality of services offered by the police. An adaptation of the Problem Analysis Triangle is as follows:

**Figure 11: Adaptation of the Problem Analysis Triangle**


### 5.3.2 The Operationalisation of the Service Delivery Nexus

The Service Delivery Nexus (SDN) uses a mathematical formula to forecast the level and quality of services rendered when using the Automated Fingerprint Identification System or any of its portable tools. The formulae used for the calculations serve only for estimations and were never intended to provide accurate figures. In the same way, the purpose of the computations in this framework is to provide tangible numerical data for use in forecasting; this means that the formula is solely for identifying areas that require attention, so that specific service delivery bottlenecks can be effectively dealt with. Current computations on the utilisation of biometric technology such as the Automated Fingerprint Identification System within the South African Police Service, focus on previous conviction reports, criminal searches performed, criminal identifications made, crime scene finger/palm print identifications, searches performed, wanted identifications made, warrants of arrest issued and the number of enquiries received. However, very little emphasis is placed on statistics reflecting the turn-around time for all of these activities performed on the Automated Fingerprint Identification System. The turn-around time on activities performed is indicative of efficiency and an important qualitative indicator in the utilisation of biometric technology by police officials.

In this respect, measurements on the police's use of portable tools such as the Morphotouch are largely focused on measures of the operations held, people tested, number of arrests made and identifications made. However, as with the use of the main

databases, statistics on the use of portable biometric apparatuses do not reflect the number of authorisations, in relation to operations held. Moreover, in the event that authorisation was not obtained to subject individuals to fingerprint scanning using the Morphotouch during operations, statistics also fail to show whether consent was sought or if there was a case of reasonable suspicion that compelled the police to subject an individual to fingerprint scanning using portable biometric apparatuses such as the Morphotouch. Similarly, the inclusion of data on authorisations, consent and reasonable suspicion into police statistics will promote transparency and accountability which is an important consideration in respect of the quality of police service delivery.

### 5.3.3 Computations in the Service Delivery Nexus

The formulae in the Service Delivery Nexus framework employ the total sum of all the variables in **World 3** for forecasting. The computations require that one begins with a 100% overall value for service delivery levels. The 100% value is thereafter divided by the sum of all of the variables in **World 3,** in order to ascertain the numerical value for each variable in the ***Nexus***. In the Service Delivery Nexus in Figure 10, above, there are about 17 in **World 3**. In the same way, the formula and calculations using all of the variables in World 3 of the Service Delivery Nexus framework will be as follows:

**STEP 1**

$$IELQS = \frac{100\%}{TNV} \quad TNV = Total$$

- ***IELQS*** is an acronym for the **Initial Estimated Level and Quality of Services** from all of the variables in Worlds 3

- ***TNV*** is an acronym for the **Total Number of Variables**

Given the number of variables in the Service Delivery Nexus in Figure 10, above, the next step will be the calculations for the number of variables; this will be as follows:

**STEP 2**

$$IELQS = \frac{100}{17} = 5.88$$

The answer 5.88 from the formula is thus the value to be assigned to each of the variables. Those sub-variables that are suspected of being problematic, based on factual organisational information, can therefore be subtracted from the total 100%, in order to conduct an individualised forecasting. Similarly, an in-depth investigation of the problematic variable should first be initiated using the **Single Variable Estimate** (***SVE***) formula, which is dealt with later in this section. Each variable in World 3 can thus be independently forecast using the ***SVE*** formula. An important consideration in the operationalisation of the Service Delivery Nexus is that variables that prove to be problematic should first be investigated and assigned estimated values, before an overall and final forecast or ***FELQS*** is done. ***FELQS*** is an acronym for the **Final Estimation on the Level and Quality of Services.** The values assigned must be computed against the initial value of the variable obtained using the formula. For instance, if the initial value of the variable *Courtesy* was 5.88 and, after an in-depth investigation, findings reveal that this variable had been compromised by about 80%, then 80% of 5.88 equal 4.22. Thereafter, the ***FELQS*** based on the total sum of all of the variables in the framework can be calculated for forecasting service delivery.

The forecasting for the individual variable that has already been investigated is called the **Single Variable Estimation *(SVE)*** and is calculated as follows:

**STEP 3**

***SVE*** = ***IELQS of 1V*** - ***NDF*** = **Total**

- ***NDF*** is the acronym for **Number of Deficiencies Found**, which are to be subtracted from the **Initial Estimated Quality of Service of 1 Variable *(IELQS of 1)***, based on an eclectic type of computation, meaning that the forecaster may arbitrarily assign the values used in the subtraction, as long as these are standardised and justified. An example of this is that, if the total value of ***SVE*** is 5.88, the forecaster may decide that every deficiency identified may either account for the value **1** or **0, 5**. To this effect, even smaller fractions such as ¼ may also be used for the purpose of the calculations. An important consideration, however, is that consistency on the assigned value for subtraction needs to be maintained year-on-year in order to maintain the same standards.

The formula for the **Final Estimated Level and Quality of Services *(FELQS)*** is similar to the ***IELQS*** above but is calculated to provide the final forecasting as follows:

**STEP 4**

$$FELQS = \frac{100\%}{TFVV = Total}$$

- ***TFVV*** in the formula above is an acronym representing the **Total Final Value of All Variables**. This means that, in the final forecasting, step 1 of the calculations is repeated with the only difference being that the total final value of all individual variables and/or sub-variables in the Service Delivery Nexus framework are added together, in order to present a more holistic approach to calculations aimed at forecasting the level and quality of services rendered by the police.

The fact that there are not enough variables in **World 3** or that there is not an equal number of variables in the different worlds and categories will not necessarily defeat the forecasting exercise, since the model is adaptable and forecasters can create extra variables that need to be probed. After the calculations for the ***FELQS***, then the standard variation from the total sum can be accompanied by detailed evaluator notes and explanations as to reasons that led to the deviations, which should also include

details on proposed interventions or plans to address the specific shortfalls that have been identified. However, the Services Delivery Nexus (SDN) framework could require further probing using other research methods. Such replication studies could become critical to ensuring that the Service Delivery Nexus is tested and scientifically validated.

## 5.4 THE ADVANTAGES AND DISADVANTAGES OF THE SDN FRAMEWORK

The one advantage that can be associated with the Service Delivery Nexus is that the framework can facilitate forecasting data that can lay a foundation that will enable managers in public institutions, to identify and study, as well as to understand, the problematic areas that cause service delivery bottlenecks. Moreover, the framework can use multiple forecasters in and outside of the organisation. The deployment of multiple forecasters can contribute to the triangulation of processes and the verification of the measurements done. The South African Police Service, in particular, could greatly benefit from the contributions of external stakeholders such as evaluators from the Community Policing Forum (CPF) and other community-based institutions. In contrast, the disadvantages of the Service Delivery Nexus framework are that it could become an extremely protracted exercise, if more than one variable, which will often be the case, needs to be investigated. Still, using the Service Delivery Nexus could prove to be a fruitful exercise in the long run, given the fact that the model also substantiates the Problem-Oriented Policing model, in that it could aid the operationalisation of Scanning, Analysis, Response and Assessment. In the same way, the Service Delivery Nexus is a framework worth being piloted by any state institution that uses the Automated Fingerprint Identification System; it could also be implemented if found to have yielded positive results in the forecasting of the level and quality of services.

## 5.5 SUGGESTIONS FOR FURTHER RESEARCH

The following are suggestions further research:

- The Service Delivery Nexus could benefit from future research to test the reliability of this framework.

- The organisational culture of the South African Police Service also needs to be further researched as the socio-political landscape within which policing happens in South Africa, as it is different from other parts of the world. In order for the police to deal with the associated service delivery challenges, they also need to comprehend issues in the context of the environment within which they operate.

- Impact assessments, specifically on security issues pertaining to the utilisation of technologies such as the Automated Fingerprint Identification System also need to be conducted. Such research could enhance the legitimacy of police actions and accountability within the South African Police Service. The type of assessment referred to in this research is formative or on-going.

- Research to determine some guidelines that will facilitate the active involvement and role of oversight institutions like the Community Policing Forum in assessing police service delivery could also benefit policing practices in South Africa.

## 5.6 SUMMARY OF CONTRIBUTIONS

Conducting this research yielded three major contributions. Despite these contributions, the level and quality of community safety and security could be greatly enhanced, if the South African Police Service were to implement the findings in this research and improve their operational efficiency, especially in the use of biometric fingerprinting technology. Safety and security is central to good governance and other spheres of life. The following is a summary of the main contributions made by this research:

- The research unearthed some of the major bottlenecks within the South African Police Service. These were the blockages that had adverse effects on the efficiency and effectiveness of biometric technology aimed at improving the level and quality of police service delivery. The research enriched knowledge on problems related to the use of the Automated Fingerprint Identification System within the South African Police Service. Such understanding was critical in assisting police officials to deal with pertinent challenges and to eventually improve on the level and quality of the services they offer to communities.

- The research has also contributed to the body of knowledge by having developed a new conceptual framework. The Service Delivery Nexus could enable public institutions to measure and quantify the impacts of programs, including technologies, on the level and quality of services offered. The Service Delivery Nexus could thus be included as part of the future curricula for policing students.

- The research has also made recommendations, to the management of the South African Police service, on the conceptual framework that can be used to measure the use of the Automated Fingerprint Identification System. Some of the suggestions in this research showed a number of possibilities on how the police can overcome some of the problems that have been identified in the use of this biometric technology by the police, including their service delivery initiatives. The most notable contribution in this regard is, however, the fact that the conceptual framework that was developed in this research project provided a formulae for computations, which the police never used before.

## 5.7 CONCLUSION

The service delivery challenges could be effectively dealt with, if the management of the South African Police Service fully embraced Community Policing as their official approach to practices in law enforcement. Embracing this would include being responsive to the needs of the community by re-conceptualising and contextualising the term 'service delivery' itself. This will help define the perimeters for the utilisation of technologies such as the Automated Fingerprint Identification System, in terms of how the same technology should factor into police service delivery. The service delivery perimeters will also facilitate measurements on the level and quality of services offered, which could enable police managers to conduct interval assessments and comparisons on services offered or the technological interventions that have been implemented.

## ANNEXURE A: INTERVIEW SCHEDULE

### Category 1: LCRC Commander

1. How many fingerprints are collected and stored by the police, using AFIS, in comparison to the time when manual fingerprint classification systems were used?

2. How do you secure the integrity of the data contained in AFIS?

3. How much time was taken to produce conviction reports under the manual system in comparison to AFIS?

4. What Challenges do expert operators experience when using AFIS?

5. How has the use of AFIS benefited the LCRC in terms of the number of people who were required to do the work under the manual system in comparison to those required to do it now?

6. Do Morpho-touch operators require special permission to use it during police operations?

7. What support system does your office offer to operators during police operations?

8. How do you reconcile the use of Morpho-touch with individual's rights to privacy?

9. How does the SAPS promotion policy affect the use of AFIS at the LCRC?

10. Did the scarce skills policy assist the LCRC in retaining fingerprint experts?

11. To what extent is the LCRC using learnerships to develop the required skills for the use of AFIS?

12. What else can you tell me about the advantages and disadvantages of using AFIS and Morpho-touch in policing?

**Category 2: Cluster Crime Prevention Heads**

1. When do police officers in your cluster use the Morpho-touch?

2. During police operations, do officers require special permission to use the Morpho-touch?

3. How is this permission different from the one used for police operations?

4. What impact has the use of Morpho-touch had on arrests by the crime prevention components in your cluster?

5. How many Morpho-touch operators do you have in all of the cluster's crime prevention components?

6. Do Morpho-touch operators require specialized training for them to use Morpho-touch, and are all the current operators trained?

7. How does the SAPS promotion policy affect the use of Morpho-touch in the crime prevention components?

8. What else can you tell me about the advantages and disadvantages of using Morph-touch in policing?

**Category 3: Cluster Detective Heads**

1. When do detectives in your cluster use the Morpho-touch?

2. During detective operations, do you require special permission to use the Morpho-touch?

3. What impact has the use of Morpho-touch had on arrests by detectives, during police operations?

4. In terms of the number of cases awaiting fingerprint records, compare the backlog during the manual classification system to the current backlog?

5. How many Morpho-touch operators do you have in the detective components within the cluster?

6. Do Morpho-touch operators require specialized training for them to use Morpho-touch, and are all the current operators trained?

7. How does the SAPS promotion policy affect the use of Morpho-touch in the detective components?

8. What else can you tell me about the advantages and disadvantages of using morph-touch in policing?

**Category 4: Morpho-touch operators**

1. What challenges do you encounter when using the Morpho-touch during police operations?

2. Do you require special permission to use Morpho-touch during police operations?

3. What type of support do you require from the LCRC when using the Morpho-touch during police operations?

4. What services do you receive from the LCRC when using the Morpho-touch during police operations?

5. How is the use of the Morpho-touch perceived and accepted by the public?

6. What else can you tell me about the advantages and disadvantages of using Morph-touch in policing?

## ANNEXURE B: LETTER OF CONSENT

**STUDY TITLE: THE USE OF THE AUTOMATED FINGERPRINT IDENTIFICATION SYSTEM IN ENHANCING THE LEVEL AND QUALITY OF SERVICES BY THE SOUTH AFRICAN POLICE SERVICE**

**M-TECH (POLICING): UNIVERSITY OF SOUTH AFRICA**

**RESEARCHER: Mpho Matlala**

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Mpho Matlala is a Lecturer for Policing in the Department Police Practice, School of Criminal Justice, University of South Africa, studying the abovementioned research title, in accordance with the following:

1. **RESEARCH PURPOSE**: The research is evaluating the use of the AFIS in service delivery by the SAPS.
2. **RESEARCH RISKS**: I understand that my participation in this research may have an emotional effect on myself and may create some anxiety and/or fatigue.
3. **RESEARCH PROCEDURE**: I am aware that the interview may take some time and, as estimated by the researcher, I may be involved for any time between thirty minutes and an hour.
4. **VOLUNTARY CONSENT**: I know that my participation in this research is completely voluntary,
5. **OPTION TO WITHDRAW**: I know that I have the right to withdraw at any time and such withdrawal will not be used against me in any manner.
6. **OPPORTUNITY TO ASK QUESTIONS**: if I have any questions about this research, I know I can ask the researcher. I may reach him on 011 471 2017 or 083 339 4719.
7. **PRIVACY AND CONFIDENTIALITY**: I have been assured by the researcher and the contents of this consent form that my identity will not be revealed while the research is being conducted or when it is published.

**RESPONDENT'S SIGNATURE:** _____ DATE: _____

**RESEARCHER'S SIGNATURE:** _____ DATE: _____

## ANNEXURE C: CERTIFICATE OF EDITING

To Whom it May Concern

Editorial Services for Mr. Mpho Mark Matlala

I, ....., herewith confirm that I have edited the thesis, entitled *The Use of the Automated Fingerprint Identification System to Improve the Quality of Services Rendered by the Police Services in the East Rand*, completed by Mr. Mpho Mark Matlala to be submitted in fulfilment of the requirements for the degree Magister of Technologie in Police Science, at the University of South Africa.

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