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Integrating Biometrics into Police Information Management System: A Case of Zambia Police

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***Abstract*—The business processes in the security wings of most developing countries are not automated. This results in loss of documentation, difficulties in looking up documents and tedious reporting. In this study, a baseline study was carried out to ascertain the levels of formal education, Information and Communications Technology (ICT) skills and ICT tools utilization within the Zambia Police Service. Results showed that 47% have graduated from college, 32% completed high school and 21% had attained graduate or postgraduate degrees. In addition, 24% had received basic computer training. The survey also revealed that 39% of the respondents use their personal email for work related communications. The study also aimed at establishing the major business processes. Using the business process results from the baseline study, a model was developed. The model was used to develop a web-based prototype by integrating fingerprint biometrics. Captured fingerprint images were pre-processed using wavelet scalar quantization (WSQ) algorithm, the minutiae were extracted and a template generated using Delaunay algorithm. The developed system showed improved business process through automation.**

***Index Terms*—Biometrics, ICT, information management system, police.**

1. INTRODUCTION

The Zambia Police Service, like most third world countries, currently operates using paper based mechanisms. This results in volatility of evidence in the case where important documents are lost. In addition to this, there is loss of traceability, transparency and accountability. The capture and storage of biometric data is also done using paper systems. This makes comparison of biometric data less efficient in comparison to automated processes. Although this has been in use for a long time, the operations can be greatly enhanced through electronic means.

In this study, we propose a software prototype for the Zambia Police Service for automating some of their business processes. To this effect, a number of business processes were identified through a series of interviews with police officers. The identified business processes were the basis of the developed software prototype.

Secondly, a baseline survey was carried out that aimed to gauge the institutional capacity for the police to manage an Information System (IS). The levels of education within the police was determined as well as their Information and Communications Technology (ICT) skills. Additionally, information about how ICTs are used in their work

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environments was collected.

1. LITERATURE REVIEW

*A. Background Information*

There has been a recent increase in the usage of ICT in various sectors of the economies in the third world countries. Some of these sectors include Finance, Education and Health among others [1]-[3]. One area that is still not widely exploited is the security wings. This may be due to the sensitivity of the data involved.

The use of manual mechanisms in the police poses a number of challenges that are common to most third world countries. These challenges include low capacity for case tracking, lack of searchable crime databases, lack of detection of unauthorized evidence tampering and retrospective reporting that can be used for decision making and crime profiling [4]. In addition, challenges include management of paper documents and filing which may result in data loss, unauthorized access and damage [5].

Some of the benefits of using ICT include improved service delivery [6]. Another is lower operation costs over time [7]. Other benefits include centralized and easy access to information that can easily be used for decision making, efficiency in operations [4] and lower chances of losing data with proper backup mechanisms in place.

Despite these benefits, there are some challenges in implementing ICTs. One big challenge is the significant initial cost of deploying a technology and sometimes maintenance [7]. This often requires acquiring new equipment and accompanying software. The software may come with long term software contracts. One other challenge is human resource resistance to change [7]. Due to the fact that the workforce will have to use the new technology, it follows that they should be willing to adopt new technologies. However, this is not always the case.

Information Management Systems (IMS) are some of the most commonly used methods of managing business processes within big organizations. A number of systems already exist that are aimed at helping police institutions in managing information. However, due to the sensitivity of police operations, custom made applications are often preferred to commercial of-the-shelf products. A number of existing Information systems are discussed in the next section. The IMS has to be developed based on the business needs of the organization that will use it. Using the developed business processes, a model or architecture can then be developed from which the application will then be developed [8]. By carefully analyzing the needs of the organization in

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