THE IMPACT OF MANAGEMENT INFORMATION SYSTEMS (MISS) AS A DRIVER FOR PROMPT AND EFFICIENT PASSPORT PROCESSING: A CASE-STUDY OF LESOTHO AND SOUTH AFRICA (SA)

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ABSTRACT

Globalisation and advancements in technology have, in the recent past, transformed the world into a global village, making trade relations and the mobility of both people and goods a realistic possibility. Regrettably, delays in the processing of key enablers, such as passports and visas can be a hindrance. This paper examines the current status regarding passport management systems in two African countries namely, South Africa (SA) and Lesotho and their adoption of the Management Information System (MISs) as a suitable conduit for mitigation purposes. The application and development of the technology adoption model (specifically TAM) is drawn from the literature review with the focus on its potential application for the innovative technology of a single platform E-passport. A survey was used to randomly collect data from 100 respondents from the passport offices of the two countries. The findings revealed, among other things, that although a SA passport application can take between three to six months to process before the passport is issued, in Lesotho this process can take anything from one to two years. Economic issues are also unavoidable factors that always affect technological developments. The adoption and adherence to the MISs in passport processing will undoubtedly aid policy-makers to eliminate bottlenecks that hinder smooth and speedy economic trade between the two countries.

Keywords: Adoption, Biometrics, E-passport, MISs, Lesotho, South Africa.

INTRODUCTION

A solution to the recurring need of organisations to efficiently and promptly meet the demands of the people they serve can often be provided, with minimal cost and effort, by the timeous and appropriate use of technology (Mihai 2014). Chin *et al*., (2019) rightly assert that efficiency and effectiveness hinges on compliance with corporate governance and derives value for all concerned, especially those clients who are concerned with meeting service delivery expectations. However, the public sector in many developing countries, among them, Lesotho and SA, has not responded to technological developments at the speed that would enable them to benefit from these advances. In the current digital era, the onus is on the human capital who are at the centre of corporate governance to either adapt/adjust to these technological advancements or become redundant. Digital transformation has made a dramatic entry and demands transformation of business processes, operations and structures if the full benefits of new technology are to be realised (Fenech, Baguant & Ivanov, 2019). Regrettably, passport offices are characterised by long queues, an indication that the rapid production and issue of passports is not possible and remains a problem that still needs to be remedied. Travellers regularly make the journey between SA and SADC countries, especially Lesotho, because many Basotho depend upon SA for work and study opportunities. Regulating the movement of people within the Southern African Development Community (SADC) countries has been on its agenda since its inception in 1980 (SADC Protocols n.d.). Recently, the South African Minister of

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Home Affairs (Gigaba 2016:6) made a public announcement that negotiations between Lesotho and SA are presently being held to formulate procedures to end the illegal residence of the 400 000 to 500 000 Basotho nationals currently living in SA. According to the minister, some of the Basotho are in possession of fraudulent SA passports, identity documents and other permits. A grace period has been granted to persuade Lesotho nationals illegally residing in SA to relinguish such documents without free of prosecution.

Given the on-going difficulties of producing passports for both Lesotho and SA citizens (especially the long waits and delays - itself a fertile ground for fraud), the long-term consequences could be dire, especially for the Basotho who mainly use these passports to enable them to work in other countries. This paper is a presentation of an exploration of the impact the use of Management Information Systems (MISs) might have in remedying this situation for SA and Lesotho in particular. It is the researchers' contention that integrating MISs into the production process would reduce costs and maximize efficiency, thereby helping to resolve delays in the production and issuing of passports. It is a well-known fact, however, that effective MISs application requires knowledge and professionalism from managers and operational staff (Brynjolfsson, 1993; Management Association, 2020). Furthermore, Shniekat, Jawabreh and Saleh (2021) maintain that MISs preparation must be enriched with integrative, creative and interactive applications. Re-engineering MIS processes can help to increase performance and efficiency before automating them. Also, the multiplicity of inputs and outputs MISs generates for meaningful activities and processes provides numerous opportunities for business improvement. This paper follows a coherently structured scientific approach in its presentation of the quantitative research findings of the above mentioned exploration of the impact of the implementation of MISs upon the production and issuing of passports in SA and Lesotho.

Management Information Systems (MISs) and Passport Processing In Perspective

It is generally accepted that MISs play a significant role in improving the efficiency of communication processes between different administrative levels. Communication plays an important role in maintaining the flow of work within organizations (Shniekat et al., 2021). While there are many approaches to defining MISs, this paper adopts Basco's (2011) definition that all information systems that include the application of Information Technology (IT) to support essential functions and activities of either private or public sector institutions may be referred to as MISs. The significance of MISs in institutions is that they provide managers with reports and online access to an organisation's current performance and historical records (Laudon & Laudon, 2006). Citizens of countries globally need to travel, to transact business and to engage in the market and, for that reason, Haque (2011) asserts that "in the present world, passport delivery service is one of the essential services in any country". It is unnecessary, time consuming and unprofitable for passport processing to be conducted without the aid of MISs which afford appropriate systems that support the speedy and secure application, processing and the issuing of passports. MISs provide electronic cover delivery and modules that issue passports and inspection to identify authentication. They allow the use of 'smart-card' technology with an up-to-date biometric possibility (Hidglobal.com, 2010).

In Indonesia for example, the Directorate General of Immigration developed a distributed passport issue system with a centralised biometric matching component that delivers fast and accurate processing of passport applications. The system is able to capture data and images at any immigration office across the country and then, automatically, forward them to the headquarters in Jakarta for consolidation and identification (Neurotechnology, 2009). The results are returned to the immigration office with instructions to proceed with the production of passports for eligible citizens. One key aspect of this system is the 'Mega Matcher', which accurately and rapidly enrols applicants and identifies duplicate face and fingerprint records in Indonesia's large database. Mega Matcher is fully automatic, robust and with fault tolerant software that efficiently manages the large workload. It functions with inter-operability and

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flexibility, so that it can easily work with other software and hardware. Mega Matcher provides a cost-effective solution for the processing of passport applications because it operates at a low cost per unit and has few hardware system requirements (Neurotechnology, 2009).

Through e-passport Management Systems, Korea has also seen the value of e-passports. Korea's development of an e-Passport Management System involved the services of an Application Service Provider, LG CNC, that implemented the project in three ways. First: an e-passport integrated information system was established with disaster recovery, 24-hour and 365-day continuity services, and forecasting models of issue. Second: the decentralised enrolment system was implemented in about 250 agencies for convenience. Third: the centralised issue system was introduced to increase security and reduce costs. LG CNS established systems that covered the life-cycle of the e-passport – including manufacture, issue and rejection of applications – with integrated security management and quality/supply management. Korea also implemented a high-season demand estimation model that enables the reflection of different demand levels at different times. The major achievements of this model include decreasing the passport issue period to three days. The number of forged or defect passports is now said to be zero (Hidglobal.com, 2010). Through the issue of e-passports, Korea can join the United States of America (USA)'s Visa Waiver Program (VWP) and enhance the security and reliability of its passports (Hidglobal.com, 2010).

At the forefront of MISs for passport processing are technological developments such as Radio Frequency Identification (RFID) and biometric technologies in a new generation of identity documents, which governments are proposing for entire world security and the ease of identity checks (Mohamed, Hamid & Mohamed, 2009). The International Civil Aviation Organization (ICAO) – an international body that controls specifications for passport standards (David, 2004) – has recommended the use of e-passports in an attempt to respond to the spread of international crime and terrorism threats (Hidglobal.com, 2010). The objective of ICAO is to implement strong authentication through documents that clearly identify their bearers. ICAO stipulates the biometric file formats, organisation and communication protocols used in passports (Mohamed et al., 2009).

State of E-Passport Processing: International Perspective

The automated verification of credentials was first implemented by Malaysia, followed by Australia. Malaysia was the first country to introduce e-passports in 1998 (Haque, 2011; Mohamed, et al., 2009). At international airports citizens with e-passports pass through automated gates that read the thumb print from the chip and compare it to the thumb print pressed on a scanner (Mohamed et al., 2009). The first e-passport had a chip that contained an image of the thumbprint of the passport holder. The second generation e-passports that contained only extracted fingerprint information appeared in 2003. Although the first Malaysian passport predated the ICAO standards, the latest specifications of their passports are based on the guidelines issued by the ICAO, (Mohamed, et al., 2009).

Since 2004 there has been a steady flow of countries issuing e-passports, with the latest being Taiwan, that began to issue 'chip-based' passports in December 2008. While the initial group of e-passport rollouts was reported approaching completion in 2008, current research suggests that there are numerous countries still to convert to the new technology. Many countries have now switched to the physical use of e-passports at borders and the upgrading or replacement of existing identity documents to include more biometrics, such as the fingerprint in what is called Extended Access Control (EAC), or to add new applications, such as 'trusted traveller' (Security Document World, 2008). The USA's passport office processes a normal passport application within 4 to 6 weeks maximum and their website offers helpful information to the applicant, such as processing days, price, documentation necessary for application, reporting a stolen or lost passport. The USA began with the issue of diplomatic e-passports in 2005 and from August 2006 offered delivery of these documents to the general public. The

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USA's Deputy Assistant Secretary of State for passport services announced that the USA expected to issue 13 million passports in 2006, increasing to 17 million in 2008 (Card Technology Today, 2006).

When Canadian citizens apply by mail for a passport, it takes 20 processing days as opposed to 10 working days when an application is made in person at the Canadian passport office (Passport Canada, 2012). Security Document World (2008) has predicted a range of future development projects in the use of e-passports since 2008. In 2008 Canada introduced biometrics in the use of passports with the help of digitised photos. On 12 December 2008, the Croatian Government announced that an e-passport would be introduced from 1 July 2009. On 25 June 2008 the Indian Passport Authority issued its first e-passport to the Indian President. This action was the first phase of deployment of e-passports in India and was initially restricted to Diplomatic Passport holders. It was expected, however, that this service would be made available to ordinary citizens from September 2009 onwards. The Philippines government announced its intentions to implement the issue of biometric passports by the end of 2008. This passport has the same features as passports that were previously issued, with the addition of the page that contains the microchip for the passport. Brazil has also decided to issue e-passports with all ten fingerprints and a facial image encoded on the chip (Card Technology Today, 2006; Sinah, 2011).

SA Perspective

Smith (2011) states that the addition of biometrics in new SA passports has been implemented with some success. The new SA passport includes a micro-chip that stores the owner's fingerprint and other biometric information. While in the old passports a photo was laminated onto a page, the current passport has a photo that is laser-engraved onto the back page. The passport number is also imprinted into the top of every page within the passport, and each page has its own unique makeup using micro threads. Despite these improvements in the actual passport, the application process remains largely manual. A new application requires the applicant to manually submit proof of identity, and two passport photographs. The applicant then leaves his/her application with the Home Affairs Department. The normal passport application takes, on average, ten weeks to process and issue. The researchers contend that it is still not clear what kind of passport is issued in SA and, if the passport is electronic, the extent to which it is electronic is unclear.

Lesotho Perspective

According to recent press reports, the Lesotho government has expressed a strong commitment to introduce e-passports which would be acceptable in SA and internationally. The Lesotho Home Affairs Department reported that it was waiting for quotations from Israel, France, Germany and Malaysia for a possible service provider and a solution. The new system was expected to produce 300 000 passports per year to combat huge backlogs mainly reported from Maseru, Mafeteng and Berea, while Quthing and Mount Moorosi have smaller backlogs because of fewer applicants (Tale, 2011). However, as far as the researchers can ascertain, the passport office in Lesotho had not implemented any new systems at the time of presenting this paper.

Purpose and Research Questions Underpining this Paper

This paper has two main goals, firstly, to determine the real causes for the delay in processing applications and issuing passports in Lesotho and SA, as well as the average time it takes for this practice to be completed. Secondly, it examines the extent to which technology is integral to the entire process. A human factor, i.e. the skill/ability and willingness to implement

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appropriate technologies, is critical for giving an organisation comparative advantage and has proven to be a telling feature towards organisational efficiencies and value add. Part of this study, therefore, is to examine a previously tested theory in a new context (Fillion *et al*., 2015), in this case 'the effective execution of technologies by the human capital to achieve an organisational strategic goal'. It is generally believed that the processing and issuing of passports are manually executed. The result is long queues, slow services, endless backlogs and delays. If MISs was adopted for passport management in Lesotho and SA, there would be gains in efficiency and possibly cost saving. To achieve the main purpose of this paper, the researchers crafted the following research questions for answering.

Research Question 1

RQ1: What is the nature of the current passport processing systems and procedures in SA and Lesotho?
RQ2: What are the possible causes for the delay in the production and issuing of passports in SA and Lesotho?
RQ3: What are the possible and available MISs technologies that could be applicable in addressing the delays in the processing, production and delivery of passports?

THEORETICAL UNDERPINNING

There is a plethora of research (Lai, 2017) on the Theory of Reasonable Action (Ajzen & Fishbein, 1980; Sheppard, Hartwick & Warshaw, 1998); Theory of Planned Behaviour (Ajzen, 1991) and Decomposed Theory of Planned Behaviour, (Taylor & Todd, 1995) but such research mostly concerns products already in the marketplace and includes the view of society (Subjective Norm). In this paper, a Resource-Based View (RBV) and Technology Acceptance Model (TAM) introduced by Fred Davis in 1986 are adopted. The RBV suggests that the resources owned by a company, such as human capital and technological resources, are the main determinants of its value, performance and sustained competitive advantage (Hoffer & Schendel, 1978; Wenerfelt, 1984). An adaptation of TAM is specifically tailored for modelling users' acceptance of information systems or technologies, in this case for the processing of passports by human resources, consequently justifying their strategic value to organisational efficiency.

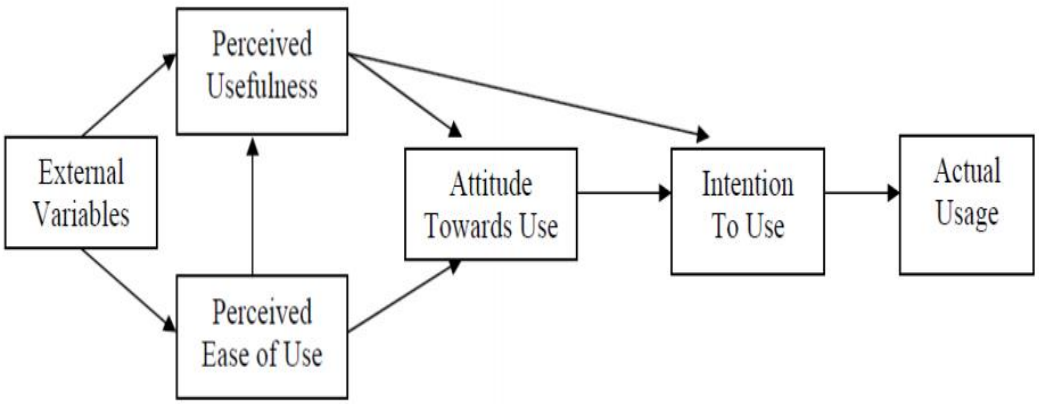

FIGURE 1
ADOPTED: FIRST MODIFIED VERSION OF TAM (DAVIS, BOGOZZI & WARSHAW, 1989)

Lai (2017) alludes that Davis used TAM to explain computer usage behaviour as shown in Figure 1 above. The goal of Davis' (1989) TAM is to explain the general determinants of computer acceptance that lead to explaining users' behaviour across a broad range of end-user computing technologies and user populations. The basic TAM model included and tested two

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specific beliefs: Perceived Usefulness (PU) and Perceived Ease of Use (PEU). PU is defined as the potential user's subjective likelihood that the use of a certain system (e.g: single platform e-payment system for passports) will improve his/her action and PEU refers to the degree to which the potential user expects the target system to be effortless (Davis, 1989). The belief of the person towards a system may be influenced by other factors referred to as external variables in TAM.

Conceptual Framework

In sync with the underlying TAM theory delineated above, Bollard, Kaniyar, Larrea, Singla & Sood (2017) opined that organizations typically use five key capabilities or approaches (referred to as 'levers' from now on) to improve operations that underlie journeys. This paper contents that these levers are significant enablers towards the realisation of expected service in real time for passport processing as indicated in Figure 2 below. Bollard et al., (2017) further unpack each of these levers as follows:

- Digitization is the process of using tools and technology to improve journeys. Digital tools have the capacity to transform customer-facing journeys in powerful ways, often by creating the potential for self-service. Digital can also reshape time-consuming transactional and manual tasks that are part of internal journeys, especially when multiple systems are involved.
- Advanced analytics is the autonomous processing of data using sophisticated tools to discover insights and make recommendations. Such tools provide the intelligence to improve decision making and can especially enhance journeys for which nonlinear thinking is required. For example, insurers with the right data and capabilities in place are greatly accelerating processes in areas such as smart claims triage, fraud management and pricing.
- Intelligent Process Automation (IPA) is an emerging set of new technologies that combines fundamental process redesign with robotic process automation and machine learning. IPA can replace human effort in processes that involve aggregating data from multiple systems or taking a piece of information from a written document and entering it as a standardized data input.
- Business Process Outsourcing (BPO) uses resources outside of the main business to complete specific tasks or functions. It often uses labour arbitrage to improve cost efficiency. This approach typically works best for processes that are manual, are not primarily customer facing, and do not influence or reflect key strategic choices or value propositions. The most common example is back-office processing of documents and correspondence.
- Lean process redesign helps companies streamline processes, eliminate waste, and foster a culture of continuous improvement. This versatile methodology applies well to both short-cycle and long-cycle processes, transactional as well as judgment-based processes, client-facing as well as internal processes (Bollard et al., 2017).

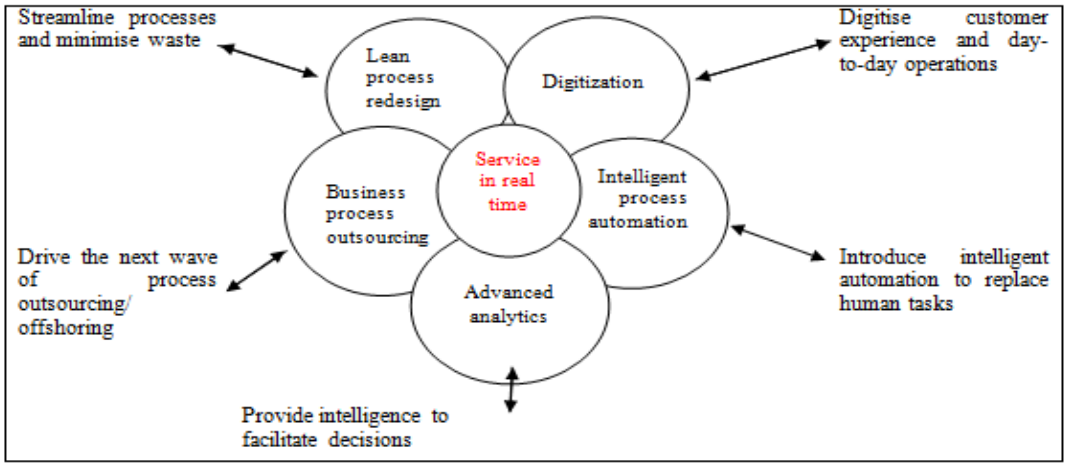

FIGURE 2
FIVE APPROACHES AND CAPABILITIES TO DRIVE THE NEXT-GENERATION OPERATING MODEL

Source: Adapted from Bollard, Kaniyar, Larrea, Singla & Sood (2017)

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There are also automation approaches that can perform higher-level tasks. Examples of such programs include smart workflows (to track the status of the end-to-end process in real time, manage handoffs between different groups, and provide statistical data on bottlenecks), machine learning (to make predictions on their own based on inputs and provide insights on recognized patterns), and cognitive agents (technologies that combine machine learning and natural-language generation to build a virtual workforce capable of executing more sophisticated tasks). [To learn more about such programs see "*Intelligent Process Automation: The engine at the core of the next generation operating model*."]

METHODOLOGY

Research Design and Sampling Size

This paper adopted a positivist research paradigm, a quantitative approach and cross-sectional design in the form of a descriptive and exploratory survey. A probability sampling technique was used in the form of stratified random sampling that affords each member of the population a chance of being selected (Leedy & Ormond, 2010). Creswell (2014) views the stratified random sampling technique as one of the most effective ways of enhancing the study's reliability.

Target Population and Sampling

The sampling population of this paper was drawn from the Home Affairs Department's personnel, i.e. passport unit officials from the two countries namely, SA and Lesotho. Owing to financial and time constraints, four regional offices from both countries were deemed sufficient to generate a response rate for both representivity and the crucial inferences to be drawn from the results. The four regional passport offices for SA were Bloemfontein, Ficksburg, Welkom and Bethlehem, all in the Free State Province. The Lesotho offices were Maseru, Berea, Mafeteng and Mohale's Hoek. Each regional office was assigned a trained assistant, where necessary, to provide clarity and advice to respondents, as well as for the collection of completed questionnaires.

Instrumentation and Data Collection

The self-developed structured questionnaire comprised 20-item Likert-rating scales that measured the participants' views of numerous aspects of MISs adoption in passport application processing and issuing. The questionnaire contained two sections: namely, Section A that related to demographic data and Section B that focused on factual and attitudinal factors aimed at testing the nature of passport processing and attitudes and perception variables of employees and management on the usage of MISs. The questionnaire was distributed to 300 randomly sampled passport officials in Lesotho and the Free State Province of SA after modification of the questionnaire items according to the pilot study's recommendations.

The choice of only closed questions was to maximise the advantage of eliciting a standardised set of responses from all the respondents. This function allows comparisons in data analysis (Blanche, Durrheim & Painter, 2006). A response (return) rate of 40.7 percent was achieved from 300 distributed questionnaires, which is viewed as fairly acceptable (de Vos, Strydom, Delport & Fouchè, 2002).

Data Analysis

The results were statistically interpreted and analysed using the Statistical Product and Service Solution (SPSS) version 6.0 so that a proper theoretical meaning of the results (Isaac,

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2006) could be derived. The Cronbach Alpha coefficient was conducted to determine the reliability, while a pilot study ensured both the content and construct validity of the questionnaire. The pilot study results for all the constructs yielded a Cronbach's Alpha coefficient value of 0.7183, which is above the acceptable standard of 0.7.

Reliability of the Measuring Instrument

The piloted measuring instrument was developed with 15 closed-ended items, meant to test the perceptions as drawn from the views of the passport office staff on the nature of passport application and processing and the presence of technology. Factor analysis was conducted, using principal component extraction and varimax rotation, for loadings of factors (Weimar 2014) to assess the discriminant and convergent validity of the instrument. Cronbach Coefficient Alphas were computed for each of the respondents' response variables, in respect of the entire sample. This research study reported a Cronbach's alpha reliability score of 0.7868, for its pilot study of this 'PAtE' measuring instrument (see Table 1 below).

Limitations of the Study

The study focused exclusively on two developing countries namely South Africa and Lesotho, with their unique but related challenges and circumstances as they endeavour to facilitate and promote free movement of people and goods between their two countries. Although results arguably can be an indicator of pervasive situations in most developing countries in the third world, the inferences made are restricted and limited to the two countries.

ETHICAL ISSUES

The ethical clearance that was sought covered the following issues: (i) permission from the relevant officials of Home Affairs Departments in Lesotho and SA prior to the data being collected, followed by a written letter requesting permission from each Regional Officer; (ii) the full consent of participants was sought and the confidentiality and anonymity of both their departments and their names were guaranteed.

RESULTS AND DISCUSSION

Respondents' Demographic Data

The respondents' demographic data included gender, age, work experience and educational level. The overall results show that Lesotho had the highest response rate of 58 percent (%) compared to 42% for SA. Females were predominant amongst the respondents, i.e. 61% females and 39% males, with age ranging between 21 and 66. SA had the highest percentage of respondents with greater work experience than Lesotho respondents, i.e. 40 to 11% (between 5-10 years) and 25 to 23% respectively (between 10-20 years). From Lesotho, 74% of respondents had post-matriculation qualifications, as compared to only 44% from SA respondents. Of the SA respondents, 51% had matric compared to 15% from Lesotho.

The Nature of Passport Processing Systems in SA and Lesotho.

Through the newest and fully automated passport management systems, many countries have upgraded their passport application and processing systems. The resulting effect has been the reduction of processing time to a few days (Card Technology Today, 2006; Hidglobal.com, 2010; Indian Ministry of Communication and Information technology, 2010; Passport Canada, 2012). Incongruent with these developments, the passport processing in Lesotho and SA is not

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fully automated, revealing a considerable level of scepticism with which technology is viewed, more so in Lesotho than in SA. When the respondents were asked whether the passport application and processing procedures are manual (1); technological (2) or both technological and manual (3), the findings revealed the presence of a combination of manual and technological procedures for both countries. This finding further demonstrates that both countries' procedures fall short of the convenience and security imperatives that are attributed to the newest passport processing developments and e-government at large (Sinah, 2011).

Data capturing

The speed at which data capturing is conducted contributes to reduced queues and forwarding of applications for verification in the most secure and convenient way (Neurotechnology, 2009; Hidglobal.com, 2010; Nayak & Sharma, 2011). Nevertheless, 16% of SA respondents and 24% of Lesotho respondents, indicated that data capturing in their offices is conducted manually, while 26% in SA and 37% in Lesotho indicated that the same procedure is performed using technology. The reason for these uneven percentage groups lies in the fact that the higher percentage groups (58% for SA and 39% for Lesotho) stated that data capturing is performed both manually and technologically. As Figure 3 below shows, the extent to which this procedure is manual is higher in Lesotho (24%) than in SA (16%). This combination of manual and technological data capturing is another major contributor to slow processes.

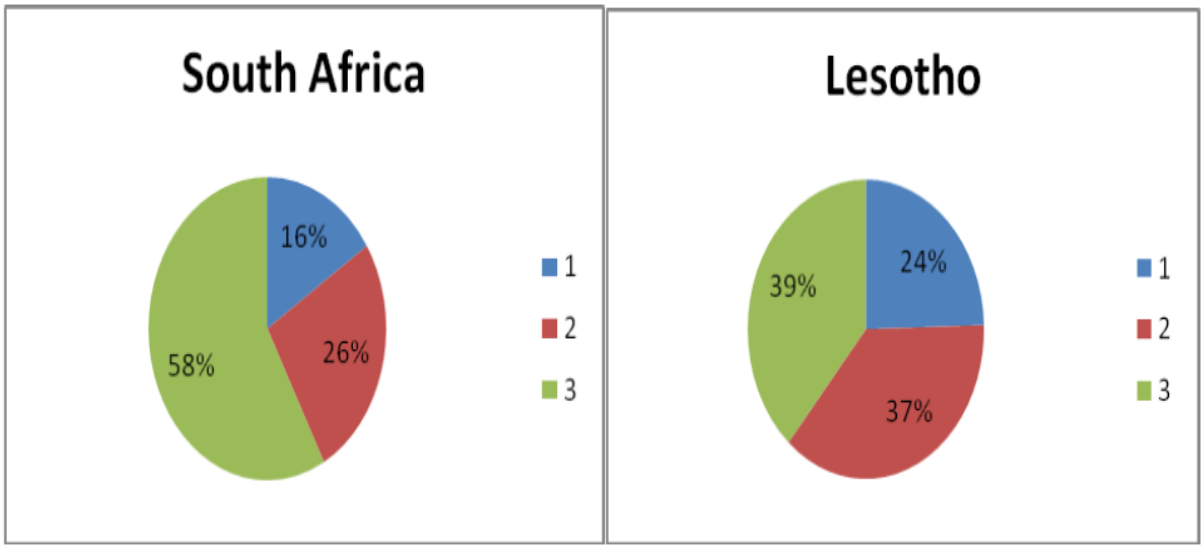

FIGURE 3
DATA CAPTURING IN LESOTHO AND SA

Data Verification

During application, this function verifies the authenticity of an applicant's data through an application called the Passport Live Capture in SA, or Biometric Authentication, a process that was recommended by Lesotho's Auditor General in 2011 (Lesotho: Auditor General, 2011). Eleven percent (11%) of officials in SA and 22% in Lesotho revealed that the function of data verification is performed manually in their offices, while 49% in SA and 53% in Lesotho stated that technology is used to perform this procedure. However, a considerable 40% in SA stated that both technology and manual procedures are used. In this category, Lesotho has 25%.

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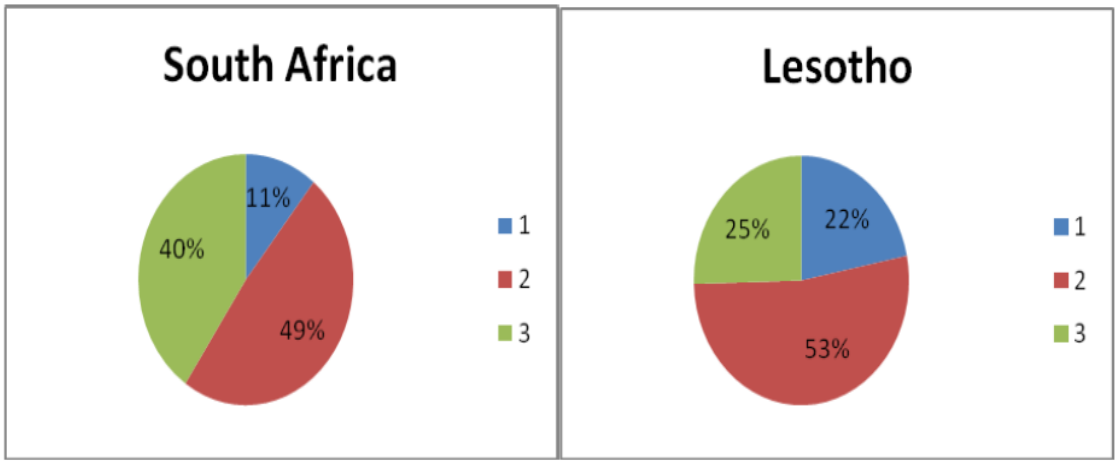

FIGURE 4
DATA VERIFICATION IN LESOTHO AND SA

Finger-Print Taking

Finger-print taking is nowadays conducted through the Passport Live Capture system (SA) or Biometric Authentication System (Lesotho). In SA, most officials (69%) said they perform this procedure using both technology and a manual procedure (see Figure 5 below). This response indicates, therefore, that the Passport Live Capture program is not always functional in SA passport offices and, in fact, that this technology is not installed in some of these offices (see Section 8.3 below) which is why 18% of SA officials' responses fall in the category of manual processing. Only 5% of Lesotho officials' responses fall into the category of both manual and technological procedures, while 57% of them said the procedure is conducted manually and only 38% claim some use of technology for this procedure.

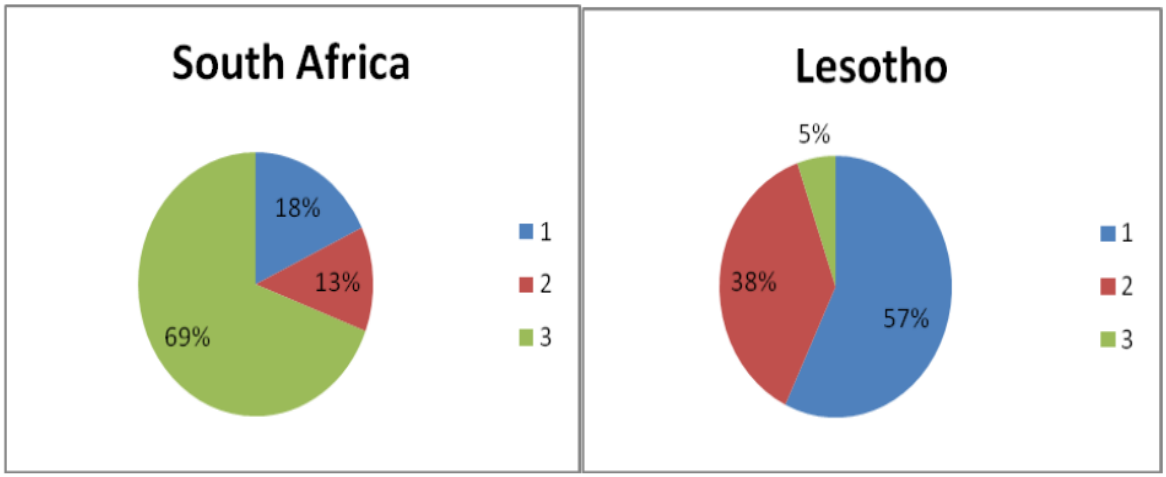

FIGURE 5
FINGER PRINT TAKING IN LESOTHO AND SA

Queue Management

It is clear that Lesotho does not have technology that manages queues for applicants – hence the 88% in the blue portion in Figure 6 below. This fact was witnessed by the researchers during the study. SA uses a system called QUEMATIC, which manages queues from when applicants arrive at the Home Affairs office until they are assisted by the Immigration Officer.

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Some 46% of SA officials acknowledged the existence of Queue Management Technology in SA. However, the fact that 23% of them confirmed the use of manual procedures and 31% indicated the use of a combination of manual and technological methods of controlling queues, is indicative of the fact the Queue Management technology is not always functional.

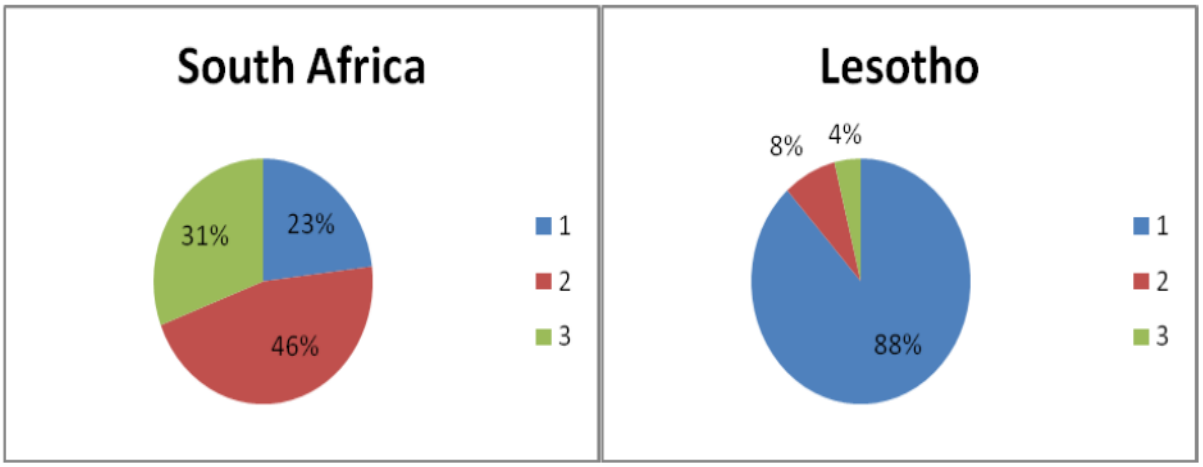

FIGURE 6
QUEUE MANAGEMENT IN LESOTHO AND SA

Application Processing

The Biometric passport system of Indonesia (Neurotechnology, 2009), the integrated E-Passport Management System of Korea (Hidglobal.com, 2010) and the Seva Project of India (Nayak & Sharma, 2011) all process passport applications and issue passports within three working days because their systems are fully automated. Conversely, processing of applications is conducted using both manual and technological procedures in SA. This fact is depicted by the 51% shown in the green area in Figure 7 below. The largest area in Lesotho (45%) suggests that application processing is mostly manual. Therefore, the extent to which passport application procedures are manual is dominant in Lesotho relative to SA, because only 28% of the responses from SA respondents are found in the blue area – indicating manual procedure. Another interesting fact is that 27% of the responses from Lesotho indicated the use of a technological procedure, compared with 21% for SA.

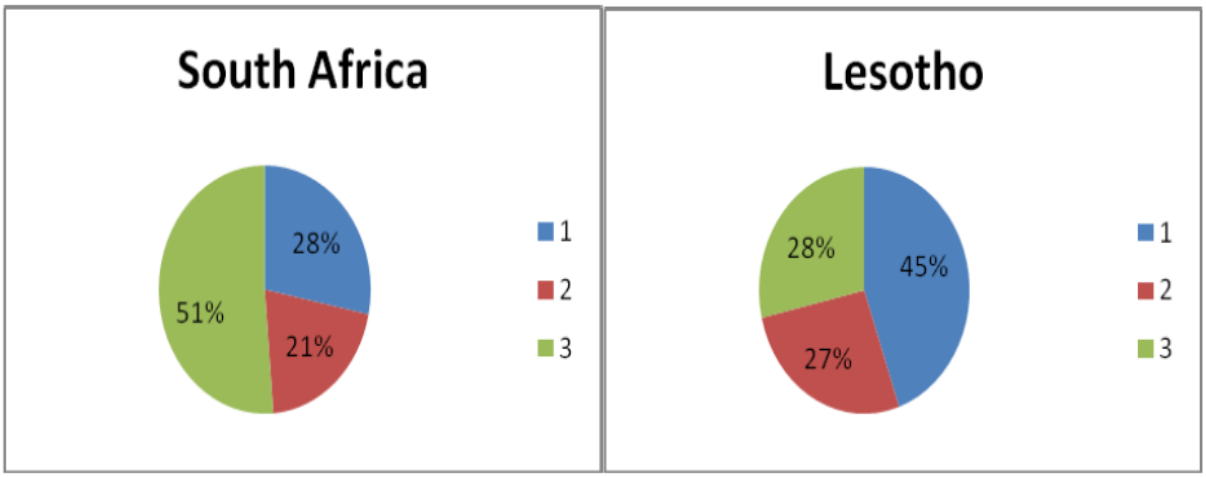

FIGURE 7
APPLICATION PROCESSING IN LESOTHO AND SA

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The survey included a question regarding how long it takes for Lesotho and SA to process and issue a passport on the rating scale of 1 week (1); 2 weeks (2); 3 weeks (3); 1 month (4); 2 months (5), 3 months (6); >6 months (7) and > 1 year (8). Responses indicate that in SA a passport is received within ten days of the application (Traveller24, 2017). A considerable percentage (56%) of SA respondents affirm that it takes at least 2 weeks to produce and issue a passport after application while 17% of SA officials say it takes 1 week. The combined percentage strongly suggests that in SA it takes at least 2 weeks to produce and issue a passport from the date of receiving the application. Conversely, 57% of officials in Lesotho say that it takes over a year to produce and issue a passport. When comparing the highest percentages in Lesotho and SA, there is a difference of about one year. This difference means that when an applicant applies for a passport in Lesotho, (s)he will usually only receive it after a year – while in SA an applicant will usually receive the passport after 2 weeks. The literature shows that SA has incorporated more technology (e.g. smartcard) for passport processing than Lesotho, and it is this adoption that is responsible for the speed of issuing passports in SA compared with Lesotho. The legitimacy of this finding can be confirmed by the fact that at the time of the study, plans to introduce a new system to improve the processing and issuing of passports were under way in Lesotho.

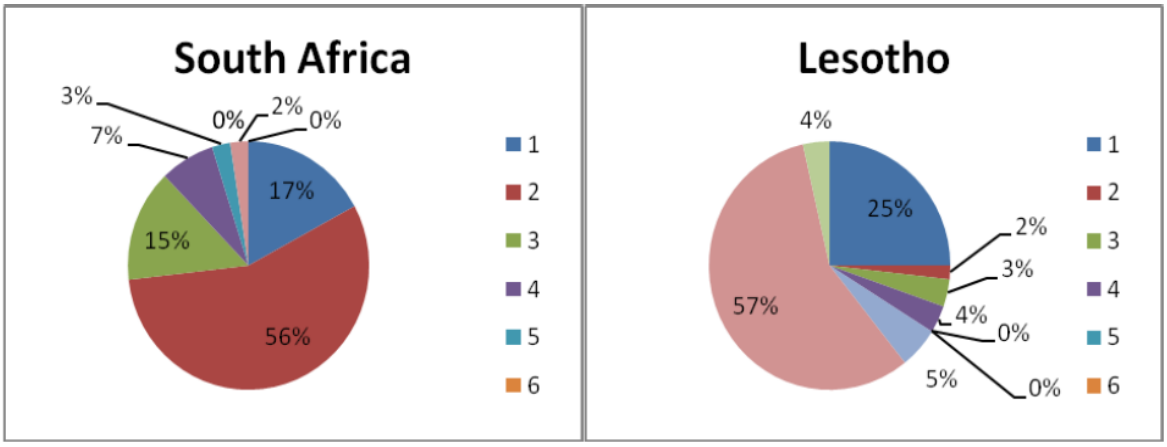

FIGURE 8
TIME FRAME FOR PASSPORT PRODUCTION AND ISSUING IN SA AND LESOTHO

Possible Causes for the Delay in Producing and Issuing Passports in SA and Lesotho

A question was asked in the survey regarding the perceptions of Home Affaires' officials on the degree to which they perceive certain issues to be major causes of delay in passport processing and issuing on the scale of Strongly Agree (1); Agree (2); Neutral (3); Disagree (4) and Strongly Disagree (5). The major factors were ranked according to their level of effect as perceived by the respondents. Various worldwide technological developments in the issuing of passports have highlighted the authentication procedures that prohibit redundancy and fraudulent applications of passports. For example, the 'Mega Matcher' in Indonesia accurately and rapidly enrols applicants and identifies duplicate face and fingerprint records in the country's large database that is said to be fully automatic, robust and fault intolerant software that efficiently manages the large workload (Neurotechnology, 2009). However, as Table 1 above indicates, the issue of redundant or fraudulent applications is a number one problem that contributes to delays in passport processing and issuing for both SA and Lesotho. This finding implies that even though the passport program 'Live Capture' is available in SA, it is not always operational. Moreover, the level of fault intolerance which could prevent the system from

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identifying unacceptable passport applications is questionable. This issue also relates to the fact that other regions, such as the Bethlehem Home Affairs office, do not have the **'**Live Capture' program installed. In that case, a redundant or illegal application will only be discovered at the production unit in Pretoria, while the application centres will continue to grapple with long queues.

The issue of staff shortages which is ranked second can be related to the use of manual procedures that increase the staff's workload, resulting in their feeling overloaded, due to the lack of technology that reduces unnecessary manual tasks. This factor is incongruent with a well-established factor in the field of IT that the installation of information systems within the core business of organisations improves service delivery and fast-tracks services that would otherwise be very slow and full of errors (Loudon & Loudon, 2013). Ranked third is the issue of the internal IT Department. In the case of SA, the study findings reveal that the response to broken systems is relatively fast. However, the fact that respondents perceive this factor as a problem shows that the response rate is unsatisfactory and that their knowledge of passport processing and issuing systems is insufficient. This problem leads to longer waiting periods before the external service provider can resolve the problem. Meanwhile, the problem of 'systems downtime' which negatively affects the normal operations of organisations is related to the proximity of the service provider and the quality of relationship they have with organisations they serve (Loudon & Loudon, 2013; Bidgoli, 2018).

Table 1
POSSIBLE CAUSE FOR PASSPORT DELAYS, I.E. PRODUCTION AND ISSUING

SA	Rankings	Averages	No.	Question
	1	2.79	1b	Redundant applications
	2	2.88	1l	Shortage of staff
	3	2.90	1i	Internal IT Department
Lesotho	**Rankings**	**Average**	**No.**	**Question**
	1	1.93	1b	Redundant applications
	2	1.97	1h	Proximity of IT service provider
	3	2.17	1g	External IT provider
	4	2.34	1c	Speed of passport production systems vs. demand
	5	2.37	1l	Shortage of staff
	6	2.75	1i	Internal IT department
	7	2.79	1e	Systems often broken
	8	2.86	1d	Status of production systems ('newness')

Table 1 (above) shows that there are at least 8 issues that are perceived by Home Affairs' officials to be the main contributors to slow passport production and issuing in Lesotho, the major one being the issue of redundant applications, as is the case in SA. This problem also originates from lack of the passport Live Capture program or the biometric authentication system. As a result, multiple passports are often produced and issued for one individual. Ranked two in the list of problems is the proximity of the service provider. Unlike SA, most Home Affairs' officials in Lesotho agree that that their service provider is located outside the country. When the extent to which this issue is a problem leading to slow production and issuing of passports was probed further, it led to the proximity of the service provider being ranked as problem number third. The study findings revealed that Lesotho's contract with the service provider does not clearly stipulate the acceptable response rate or time limit for repairing broken systems. This contract, thus, falls short of recommendations listed within the reviewed literature that in order to sustain the core business, an organisation needs to establish a good relationship with the service provider through an agreed contract that stipulates clear and fair 'rules of

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engagement' (Loudon & Loudon, 2013; Bidgoli, 2018). Some of the proficiencies available in the latest passport production systems are the abilities to capture high demand seasons for passports in order to proactively mitigate against potential pick-time overloads (Hidglobal.com, 2010:1). However, the problem of demand for passports that outweighs the production rate is ranked fourth in Lesotho, showing that in addition to the slow production of passports, the current system is unable to detect and deal with high demand seasons. Most of the Lesotho respondents agreed that their passport production systems cannot produce in accordance with the demand.

Shortage of staff (ranked fifth) is also a problem in Lesotho, but not to the same degree as in SA. While the same argument can be given that officials' workload can be reduced by technology, the Auditor General Report (Lesotho: Auditor General, 2011:2) also declared that *"there was shortage of staff within the production unit"*. This report established that the production unit was manned by 15 staff members – while it required 34 staff members to meet the planned maximum daily and monthly passport production. According to this report, the planned daily and monthly production was 500 and 7310 passports respectively – but the production unit was producing well below these required numbers. Problem number six is the issue of the internal IT department. As in SA, in Lesotho the internal IT department does not resolve all the technological system related problems which leads to delays while waiting for the systems to be fixed – especially when systems break frequently as shown by problem being ranked at number seven. Ranked eighth is the problem of old systems which concurs with the above-mentioned problem.

The Unique Context of Lesotho Compared with SA

On the surface, it may appear as if SA's passport application processing, production and issuing system is superior to that of Lesotho, but the following discussion reveals other unique contextual issues that need to be considered. First of all, it should be noted that Lesotho is a small country whose economy depends upon that of SA. Most of the decisions that the SA government makes affect Lesotho directly, including the immigration decisions whose influence relate to the fact that Lesotho is completely land-locked within SA. There are no other options for crossing the border from Lesotho for matters such as work, studying and leisure without going to or through SA. Many of Basotho work both formally and informally in SA for better remuneration. Many Basotho who find informal work in SA do so without work permits or other legal documents. To avoid immigration penalties, some of these workers often change their names and apply for new passports. Another source of travel between Lesotho and SA is for study purposes. There are thousands of Basotho who study in South African universities, colleges and high schools. All these considerations confirm that there will always be traffic between Lesotho and SA for various reasons which the economy of the 'Mountain Kingdom' is unable to provide. Furthermore, unlike SA, a passport in Lesotho is used both as a form of identity and for travelling purposes, thus, making it a more highly demanded and important document than a SA passport because in SA an Identity Document (ID) serves as a form of identity, while a passport facilitates travel outside the country. Therefore, before we conclude that SA's passport processing system is superior to that of Lesotho, it must first be considered that in SA a passport is not so much in demand. Furthermore, it must be born in mind that SA's economy is more able to provide for study, work and leisure needs of its citizens which means that a travel document (passport) is less in demand. When all of the above mentioned factors are considered, the researchers' hope that it will be possible to adopt a strategy that solves the passport processing problems of Lesotho in a wholistic way. At the same time the passport production of SA still needs to be assessed in a more comprehensive manner in order to bring about the necessary improvements.

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CONCLUSIONS AND RECOMMENDATIONS

In conclusion, this paper sought to investigate the extent to which the current passport processing procedures in Lesotho and SA have been infused with modern technologies. Both countries under investigation have been found to be lagging behind regarding paperless passport application and production procedures. Generally speaking, both countries have similar problems although to different magnitudes. A combination of manual and technological procedures is indicative of the fact that existing systems are not consistently functional. It was found that the number one cause of delay in passport applications' processing, production and issuing procedures is that of redundant or fraudulent applications. The study also brings to the fore the unique context of Lesotho which, when considered closely, suggests that the problems of passport processing in Lesotho relate also to other external factors that cannot be blamed on the passport officials and/or Home Affairs Department. Under such assessment, the SA passport processing is rendered not to be entirely effective. In comparison to Lesotho, this issuing of passports does not serve such a high demand and yet it still suffers from issues of redundancy in passport applications and a mixture of technological and manual processes in the processing, production and issuing of passports.

To respond to the problems identified in both countries, this study considers that there is no single system that can independently solve the existing problems. Careful consideration of environmental factors will prompt for the adoption of a system that is customised to suit one country's unique needs. Among the systems that have been discussed through the literature review, Indonesia's system and strategies have shortened the turnaround time of passport issuing to a minimum of three days. While taking cognizance of the issue of costs, it would be advisable for SA and Lesotho to incorporate most of the features of the MISs used in the Indonesia and described in the literature review above, many of which may be activated or suspended at any time at the discretion of the country's passport-office in accordance with the demand for passports. The following merits have let to the recommendation of this system:

- The total costs of ownership of this system are said to be low;
- The system has high degree of accuracy and speed – because it is paperless;
- Security features include the ability to capture 10 figure prints;
- Modern passport-management systems are web based and, thus, allow internet applications and online tracking of passport status;
- The Mega Matcher system is able to accurately identify duplicate face and fingerprint records in Indonesia's large database. It is automatic, robust and fault tolerant software, that efficiently manages a large workload;
- It can function with interoperability and flexibility, so that it can easily work with other software and hardware programs; and
- The Mega Matcher is a cost-effective solution, because it operates at a low cost per unit, and has minimum hardware system requirements. It also helps monitor and reconcile related revenue (Neurotechnology, 2009).

The Indonesian passport issuing system has fast, distributed, accurate and reliable verification technology. The apparent reason that Indonesia adopted it is that the country has a distributed geography, with over 100 passport offices across the country. Although Lesotho and SA do not comprise many islands as is the case with Indonesia, there are a number of characteristics that bear some resemblance to which the costs of distributing passports and securing them can be significantly reduced by the decentralisation of the issuing system, and the centralisation of identity checks and authorisations. Lesotho has 10 districts with mostly one passport office in each. Within the mountainous kingdom of Lesotho it is not always easy and secure to transport hard copy versions of passports regularly from a central production unit to the application offices. SA has 9 provinces with many passport offices in each. The level of crime and the large geographic area make it costly and risky to physically distribute passports daily. The following strategies are, therefore, recommended:

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- In common with Korea, the system should be customized with components that display different demand seasons for passports (Hidglobal.com, 2010). MISs for passport processing should be able to generate information for management regularly – so that they are well informed about the performance of the office at any given point in time (Nayak & Sharma, 2011).
- The passport offices of Lesotho and SA should incorporate and coordinate to some extent, the services of the IT service provider under the same roof – to allow speedy and readily available technical support, while also allowing for the transfer of skills to local IT personnel and the other staff members.

IMPLICATIONS FOR FUTURE RESEARCH

Although this paper suggests that MISs might remedy the problems of delay in the processing, production and issuing of passports in Lesotho and SA, it is not aimed at designing these systems. Furthermore, at the time of this study, the Lesotho's Home Affairs' passport department was in the process of piloting new systems of passport processing, while SA was introducing 'smart cards' for Identity cards, as well as exploring other technology for processing, producing and issuing passports. Further research which investigates the effects of these developments of the existing problems, therefore, will be necessary in the future. The study may also be extended to other Home Affairs' services, such as identity documents, birth certificates and permits of different kinds in the public sector at large.

REFERENCES

Ajzen, I. (1991). *The Theory of Planned Behavior. Organization Behavior and Human Decision Processes*, New York: Academic Press, Inc. 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice-Hall.

Basco, M. (2011). *Management Information Systems*. Online http://www.bestmanagement papers.com. [Accessed: 25 November 2015].

Blanche, M., Durheim, K., & Painter, D. (2006). *Research in practice*. *Applied methods for the social sciences.* 2nd ed. Cape Town: University of Cape Town Press.

Bidgoli, G. (2018). *Management Information Systems.*(*8th Edition*). USA: Cengage Learning.

Bollard, A., Kaniyar, S., Larrea, E., Singla, A., & Sood, R. (2017). The next-generation operating model for the digital world. In McKinsey on Digital Services. Introducing the next-generation operating model. Transforming operations management for a digital world. McKinsey & Company. https://www.mckinsey.com/~/media/McKinsey/ Business%20Functions/McKinsey%20Digital/Our%20Insights/Introducing%20the%20next-generation%20operating%20model/Introducing-the-next-gen-operating-model.ashx.

Brynjolfsson, E. (1993). The productivity paradox of information technology. *Communications of the ACM*, *36*(12), 66-77.

Chin, Y.S., Ganesan, Y., Pitchay, A.A., Haron, H., & Hendayani, R. (2019). Corporate governance and firm value: The moderating effect of board gender diversity. *Journal of Entrepreneurship, Business and Economics*, 7(2): 43–77.

Creswell, J.W. (2014). *Research design*. 4 ed. California: SAGE.

David, M. 2004. Biometrics on passports: Best bet for tight security. *Career and Technical Education, 54*(18), 15.

Davis, F.D. (1986). A technology acceptance model for empirically testing new end-user information systems: Theory and results. Massachusetts, United States: Sloan School of Management, Massachusetts Institute of Technology.

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319-340.

Davis, F.D., Bogozzi, R.P., & Warshaw, P.R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35, 982-1003.

De Vos, C.B., Strydom, H., Delport, C.S.L., & Fouche, C.B. (2002). *Research at grassroots. For the social sciences and human services professionals.* (*2nd Edition*). Pretoria: Van Schaik.

Fillion, G., Koffi, V., & Ekionea, J.P.B. (2015). Peter Senge's learning organization: A critical view and the addition of some new concepts to actualize theory and practice. *Journal of Organizational Culture, Communications and Conflict*, *19*(3), 73-102.

Gigaba, M. (2016). Setback for SA special permits. *Lesotho Times*. 10 February:6.

Haque, A. (2011). Evaluation of selected governance reform projects: one stop service centre for urgent endorsement of passports in the regional passport office. *Dhaka*, *6*(4),16-29.

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Hidglobal.com. (2010). *E-passport Management System.* Online http://www.hidglobal.com/sites/hidglobal.com/files/resource_files/egov_solutions_broch_en.pdf. [Accessed: 20 January 2015].

Hoffer, C.W., & Schendel, D. (1978). *Strategy formulation: analytical concepts*. Saint Paul (Conn.): West Publishing Co.

Isaac, K. (2006). *The role of the academic heads of departments in the strategic planning in the Eastern Cape Technikon*. School of Teacher Education. Central University of Technology. Bloemfontein.

Kumar, C. (2007). *Towards information technology cost index at Public Community College.* Unpublished Doctoral dissertation. Arizona State University.

Lai, P.C. (2017). The literature review of technology adoption models and theories for the novelty technology. *Journal of Information Systems and Technology Management*, *14*(1), 21-38.

Laudon, K., & Laudon, J.P. (2006). *Management Information Systems*: *Managing the digital firm.* Upper Saddle River: Pearson Prentice Hall.

Leedy, P.D., & Ormond, J.E., (2010). *Practical research: planning and design*. (*9th Edition*). New Jersey: Pearson Education.

Lekkas, D., & Gritzalis, D. (2010). E-passports as a means towards a globally interoperable public key infrastructure. *Journal of Computer Security*, 18, 379-396.

Management Association, I. (2020). Information Diffusion Management and Knowledge Sharing: *Breakthroughs in Research and Practice*, 2. IGI Global.

Mihai, G. (2014). *Some aspects of using web 2.0/enterprise 2.0 technologies in accounting.* Online, http//www.ann.ugal.ro/eco/. [Accessed: 14 August 2015].

Mohamet, A.B., Hamid, A.A., & Mohamet, K.Y. (2009). Implementation of an improved secure detection for e-passport by using EPC RFID tags. *World Academy of Science, Engineering and Technology*, 60,114-118.

Nayak, A.M., & Sharma, A. (2011). *Management Information System*. Online: http://www.scribd.com/doc/79542329/Management-Information-Systems. [Accessed: 27 January 2015].

Neurotechnology. O. (2009). *Republic of Indonesia Biometric Passport System.* Online: http://www.neurotechnology.com. [Accessed: 20 September 2014].

Ruipeng Wu, G.C., & Guo, X. (2007). Key issues in information systems management in China. *Journal of Enterprise Information Management.* 20(2):198-208.

SADC protocols. (n.d). Available at: http://www.sadc.int/about-sadc/overview/sa-protocols/. [Accessed: 26 September 2016].

Sheppard, B.H., Hartwick, J., & Warshaw. P.R. (1998). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *The Journal of Consumer Research*, *15*(3) 325-343

Shniekat, N., Jawabreh, O., & Saleh, M.M.A. (2021). Efficiency and effect on the competitive advantage of management information systems (MIS) in classified hotels in the city of Petra; Type of management as moderator. *Academy of Strategic Management Journal*, 20, 1-18.

Sinah, A. (2011). A survey of system security in contactless electronic passports. *Journal of Computer Security*. 19:203-226.

Smith, E. (2011). *Terrorists drawn to South African passports.* Online: http://security.blogs.cnn.com/2011/06/15/terrorists-drawn-to-south-african-passports. [Accessed: 15 June 2015].

Taylor, S., & Todd, P.A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6, 144-176

Traveller24. (2017). How to apply for your South African Passport. Online https://www.traveller24.com/TravelPlanning/how-to-apply-for-your-south-african-passport-20170602 [Accessed: 13 June 2019].

United States of America. (2010). GAO. *Border security*. Washington DC: Government Printing Office.

Wang, Y.H., & Kuo, T.H. (2010). A financial and liabilities management support system. *Contemporary Management Research*, *6*(4), 315-340.

Want, R. 2005. *An introduction to RFID Technology.* Online: www.computer.org/security. [Accessed: 28 November 2015].

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, 171-180.

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