ISSUES ON ZAMBIA’S ICT SECTOR

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FOREWORD

We are pleased to share with you volume I of the “Issues on Zambia’s ICT Sector” publication. This is the first in a series of publications that the Zambia Information and Communications Technology Authority intends to support over the next few years. The compendium is a collection of research work undertaken by various researchers in Zambia relating to various issues regarding the ICT sector. The Authority is grateful to all the researchers that submitted their papers for consideration during the 2018 call for papers. We are also grateful to the editorial team that reviewed all the papers that were submitted for consideration.

The compendium has been developed to assist the government, regulators and academic institutions with empirical work and evidence relating to the country’s ICT sector. The views expressed in this publication are those of the authors and do not necessarily represent those of the Zambia Information and Communications Technology Authority.

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Director General
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ABSTRACT

The need to incorporate ICT in agriculture is gaining popularity in order to meet the consumer demands of agricultural produce. For developing countries, e-agriculture has potential for many applications that improve quality and productivity in the agricultural sector. The youthful generation in developing countries is more receptive to adapting to ICT and its application areas and can be more receptive to the application of e-agriculture. This potential is mainly driven by increased access to mobile communication and government policies that promote e-governance. However, realizing the potential of e-agriculture is faced with many challenges. The majority of applications to use in e-agriculture are still only in research stages and there is no clear direction on commercializing research outputs. The research is also disjointed and not well coordinated as there are no policies that clearly state which areas to prioritize. Regulation to govern the development and management of e-agriculture applications is also nonexistent.

Keywords: e-agriculture, commercialization, sensors, cloud computing, security, regulation.

1.1 INTRODUCTION

According to Food and Agricultural Organization (FAO), over 60% of Africa's population is below 25 [1]. The majority of these youths are unemployed. The rate at which the population is growing is lower than the rate at which jobs are being created. The agriculture sector has great potential to create employment in sub-Saharan Africa and provide livelihood for most of the unemployed youths. The demand for agricultural produce is ever increasing with the rise in population. However, the number of youths that are engaged in agricultural activities are very few. There is a general tendency by youths to shun away from agriculture. Researchers believe that incorporating technology in agriculture can encourage the youth to participate in order for them to earn a living [2]. Countries such as Kenya have witnessed a growing number of youths participating in agricultural activities as a result of the introduction of Information and Communication Technology (ICT) [2]. In Zambia, the Second National Agricultural Development Policy (SNAP) vision is aimed at promoting food and nutrition security, increase employment opportunities and income [3]. The policy goes on further to make special mention of implementing agricultural based technologies for the youth and the women as they are considered to be the a special category that require to be encouraged to participate in agriculture.

E-agriculture utilizes and communications Technology (ICT) and Internet to deliver enhanced agricultural services and information provision [4]. E-agriculture involves designing and implementing innovative ICT applications that support different areas of agriculture. The application areas include control, monitoring, prediction and logistics. E-agriculture offers a new dimension to the way agriculture is manage. This paper brings out the challenges, opportunities and open issues that are hindering that path to unprecedented growth of e-agriculture in the developing countries especially in Zambia among the youth.

1.2 PROBLEM STATEMENT

E-agriculture is a new term that has been introduced in agriculture. It set to improve some of the inefficiencies that exist in agriculture. Zambia’s National information and Communication Technology Policy that was implemented in 2006 lists agriculture as one of the areas where ICT should be applied in order to bring about social economic development. The policy sets ICT to play a major role in making agriculture competitive by supporting activities related to planning, implementation, monitoring and delivery of information [5]. The strategies that were set out in the policy included creating an integrated agricultural information system, implementing weather and meteorology early warning systems and developing a database applications and other systems that promote the sustainable utilization of agricultural resources.
Despite the policy being in place, many of the strategies that were outlined have not yet been implemented. Apart from the lack of implementation of these strategies, other issues have also emerged. The issues include youth and women being viewed as the ones to drive the future of agricultural [3]. This study seeks to answer the following questions in relation to the youth.

a) What opportunities can e-agriculture bring to developing countries?

b) What are the challenges of implementing e-agriculture in developing countries? and,

c) What open issues affect e-agriculture in developing countries?

In order to answer the questions a systematic review of existing literature was conducted for developing countries. Since the focus was on Zambia the majority of the literature focuses on the Zambian context. The period selected for review is between 2006 and 2018. The period was chosen because 2006 marks the beginning of the Zambia's National Information and Communication Technology Policy that included integration of ICT in agriculture.

1.3 E-AGRICULTURE APPLICATIONS

1.3.1 Other Countries

a) Nano Ganeshi India

Nano Ganesh has been implemented in India since 2014 and has more than twenty thousand small scale farmers [6]. The Nano Ganesh unit has an actuator attached to the irrigation pump for switching the pump on and off using GSM commands. The unit has a water sensor which enables farmers to check for water availability near the pump and the unit also enables farmers to check for availability electricity at the pump. This system allows farmers to control the irrigation pump from anywhere as long as they are connected to the GSM network.

b) Kilimo Salama: Kenya and Rwanda

Kenya and Rwanda use a system called Kilimo Salama (Safe Farming) weather index insurance programme that has been in existence since 2009 for 64,000 smallholder farmers [7]. The programme offers lower insurance premium to smallholder farmers. The programme utilizes solar powered weather stations that collect weather data every 15 minutes and uploads the information for storage and analysis later. The stored measurements are compared to historical data in order to calculate the insurance pay out at the end of a growing season. The system uses low cost SMS for marketing and dissemination of information as a result of partnership between Kilimo Salama and Safaricom. The partnership does not only end on providing low-cost SMS services but extends to the way pay outs are handled. M-PESA a mobile best financial service is used to make the pay outs.

c) Wireless Sensor Networks: Kenya and Indonesia

In Kenya and Indonesia Wireless Sensor Networks that use solar power are installed in some tea plantations [8]. The Wireless Sensor Networks moisture, pH, carbon, nitrogen, calcium, potassium and magnesium levels in the tea plantations soil. The measures are taken every 15 seconds and sent wirelessly. The aim of this system is to improve the quality of tea.

d) Croplift: Uganda

Croplift is another service that is being piloted in Uganda [9]. The system is designed to authenticate agriculture inputs using scratch labels and SMS system. The system provides farmers with an opportunity to verify that the inputs they are purchasing are genuine. The SMS system connects to the Ministry of Agriculture to verify whether the scratch label entered belongs to a genuine product. The system has been implemented by the minister of Agriculture in Uganda to eliminate the problem of counterfeit products in farming inputs. The implementation of e-agriculture in other developing countries shows that ICT can indeed bring benefits to the agricultural sector.

1.3.2 Application Development to E-agriculture in Zambia

A prototype to reduce theft such as fertilizer under Farmer Input Support Programme (FISP) in Zambia has been proposed and tested [10]. The system uses barcodes placed on bags containing the input to identify each bag and record the data in a database in the cloud. Regular updates are made to the database to reflect the changes in inventory levels when input moves from one storage location to another. The input inventory management system arises out of the need to reduce theft of inputs which stands at 56% in warehouses.

A grain inventory management system for the Food Reserve Agency in Zambia using RFID and Cloud storage services was proposed [11]. The proposed system requires placing RFID tags in each bag brought to the storage warehouse. RFID readers positioned on doors of warehouses take note of bags entering and leaving the warehouse. The use of RFID readers is expected to monitor accurately the movement of bags in...
and out of the warehouse. The data read by the RFID reader is supposed to be stored in the Cloud and the system can replace the existing paper-based system. The benefits of the system is that it can minimize the theft of grain in warehouses after the harvest period.

Another system that has been proposed extends on the work of [11] to include the aspect of tracking grain that is in transit [12]. The proposed system uses GPS technology to track the vehicles that carry grain from one storage warehouse to another. The aim of the system is to improve on the security of the grain by monitoring that the grain that lives the warehouse is the same grain that arrives at the destination warehouse. Furthermore, it tracks that the vehicles carrying the grain using designated routes.

Another system proposed is based on using Android and wireless sensor networks to monitor environmental conditions in storage warehouses for the Food Reserve Agency Zambia [13]. The environmental conditions that are monitored include temperature, humidity, water and motion. Temperature and humidity important to maintain and prevent spoilage of produce kept in warehouses. The parameters are continuously monitored to ensure they are within the set limits. Flooding in warehouses can also cause spoilage of food and the system monitors that using the water level sensor. Finally, the issue of theft cannot be overlooked and the system uses motion detection to detect the presence of intruders within the warehouse.

A model based on Zigbee, GSM, cloud and mobile application has been proposed to monitor temperature, humidity and presence of intruders in a poultry house [14]. The proposed model uses open source boards, zigbee protocol, and GSM shield to collect data from the poetry house and send it to a web application in the Cloud. Extreme values of temperature and humidity related to the farmer using SMS and through the web application. Farmers are notified of the presence of intruders in the poultry house using a phone call and SMS received via GSM network. The system is expected to provide early warning to farmers for extreme environmental conditions and presence of intruders in the Poultry house.

1.4. CHALLENGES OF E-AGRICULTURE APPLICATIONS IN DEVELOPING COUNTRIES

A. Commercialisation of Research Outputs
Zambia’s National Information and Communication Technology Policy of 2006 requires Higher Education institutions to be leaders in research and publish results of their experiments [5]. Furthermore, the policy requires Higher education Institutions to be leaders in testing new ICT technologies and make recommendations to the government, private sector and society. A number of publications have been made by Higher Education institutions in different research areas including e-agriculture. However, many of these research publications have only resulted in academic promotion and giving qualifications to students [15]. There is no deliberate policy or an existing framework that can be used to commercialize the output of the research. Having guidance on how to commercialize research outputs can go a long way in solving problems in society that are location specific. It is also possible to start business ventures from research outputs especially among the youth. The lack of commercialization affects different subject areas not just e-agriculture applications.

B. Lack of well Coordinated Research Platform
Looking at the number of ICT applications that are being developed in the agriculture sector. There seems to be no proper guide as to what research direction the country is supposed to take. The application are usually developed on an ad hoc basis without reference to a guide that is supposed to govern the research direction of applications to be developed. The current research applications in e-agriculture seem to focus on responding to ad-hoc problems that arise within agriculture. Existing policies only direct research institutions to be leaders but, do not provide a guidance on how to coordinate research among different higher learning institutions [5] [3]. A good number of youths pass through these research institutions where are they can acquire knowledge to be innovators and implementers of e-agriculture.

C. Challenges in Accessing Information
The move towards implementing and offering government services using ICT is a welcome one. In terms of e-agriculture, the emphasis on providing local content cannot be overlooked. The content provided to the farmers is required sometimes to be translated in local languages to improve understanding by the farmers [9]. Offering information to farmers using ICT has not been an easy task to achieve. Some of the reference materials that farmers need are still written in a language that the farmers cannot understand. Furthermore, there are challenges in terms of providing information to farmers in a timely manner. An example that can be given is that of the ministry of Fisheries and livestock. The ministry was set up in 2015 after
the Ministry of Agriculture was split but at the time of writing the ministry does not have a website. This in itself brings a challenge to farmers that want to access up-to-date information from the ministry on their own without the need to travel to an agriculture office.

D. Financial Constraints

E-agriculture requires some form of investment. The Investment may be required to purchase equipment and maintain it. However, many developing countries do not provide financial products that can be used by both innovators and implementers to invest in agriculture technology [1]. The lack of financial products designed specifically for investing in agriculture slow down the implementation of ideas and the subsequent use of innovation that come from such ideas. The existing financial products are more general and usually require collateral when borrowing. This tends to discourage the youth from utilising such products because they may not meet the requirements expected.

E. Fragmented ICT Infrastructure, Poor Services

The existing ICT infrastructure in Zambia is highly fragmented [17]. Some of the infrastructure is owned by the private sector while others are owned by government agencies. The fragmentation makes it difficult to develop a holistic approach that can be applied in e-agriculture. In addition, the services provided in the telecommunication sector are poor. A case in point is where Zambia Information and Communications Technology Authority (ZICTA) the regulator in Zambia fined three service providers namely Airtel, MTN and Zamtel for poor quality services in 2018 [18]. The fines where for poor services related to SMS, Call setup and HTTP access. Most of the equipment that is required to improve the ICT infrastructure is usually imported from outside the Country. This in itself is a challenge to the innovators as they have to import nearly all the gadgets that are required for them to develop their applications. Even basic devices such as sensors and microcontrollers are never sold in retail electronic shops in the country.

F. Lack of Skilled ICT Personnel

The National Information and Communication Technology Policy also puts an emphasis on the training of manpower in public and private sector in ICT [5]. There is a general shortage of ICT skills in both public and private sector [17]. This makes it difficult to implement some of the strategies that are required to achieve integration of ICT in agriculture. Great strides have been made been trying to train personnel with the introduction of different ICT programmes at public universities and colleges. Other private institutions have also been established to train the required human resource. Despite these efforts there is still a shortage of ICT skills.

1.5 OPPORTUNITIES OF E-AGRICULTURE

A. Increased Network Coverage

The coverage area for mobiles cellular networks is high at 92% in Zambia and 64% of households having access to a mobile phone [22] [23]. Such high coverage and increased subscription provide opportunities for implementing local e-agriculture applications. In other countries, SMS applications prove to be prominent in agriculture and can easily be accessed on almost any mobile device. SMS does not require internet connectivity in order for it to work hence making it popular even in rural communities. SMS applications in other developing countries are successful at providing marketing information, weather forecast, ordering of inputs, banking services to small scale farmers.

The second national agriculture policy has placed an emphasis at promoting SMS based extension services [3]. This provides opportunities for innovative solutions that can be used to provide extension services using SMS. In addition, SMS could prove useful at providing information from early warning systems to farmers. It has been demonstrated in some of the research applications that SMS can also be used to provide real time information to the farmer regarding the status of their livestock [14].

Running voice based messaging systems alongside SMS could help to bridge the barrier that is there for farmers that cannot read. Voice based applications can be provided in local languages making the information dissemination easy to understand. Having applications that are innovative in such areas can promote e-agriculture among the small scale farmers. The small scale farmers can also include the youth who are much more conversant with the use of mobile phone technology. Accessing such information services will just seem as normal as using traditional text messaging that the youths are already used to.

B. High Demand of Agricultural Produce

The rate at which the population is growing is high and the demand for agricultural produce also increases proportionally [1]. There is great potential in providing and selling agricultural produce to the ever growing population. There is a need to find ways of improving agriculture production and quality of
produce that is delivered to the market. Other areas that may require improvement include logistics for managing the distribution of both agricultural produce as well as agricultural inputs. This provides opportunities for the youth to come up with innovative solutions that can improve the quality of produce or increase the production capacity. Experiments have already started in this area that can monitor the environment to ensure the parameters required in agriculture are within the set limits to achieve high production. Other systems under experimentation are aimed at providing security of goods that are in transit. This is just a start of many applications that target meeting demands of consumers.

C. SMART Zambia Master Plan
The move towards providing e-governance systems has resulted in the smart Zambia master plan. The first phase of this plan was to establish a data center that could be used by government as well as the private sector to provide storage and other Cloud services [19]. The second phase is to provide optic fiber connectivity across the country. Other developments related to infrastructure included installation of cell Towers. This development of infrastructure provides opportunities of implementing e-agriculture since the platforms for storage and now available. Unique applications can be developed in e-agriculture that utilize the processing capability of the data center and high data rates offered by optic fiber [17].

D. Productive Capabilities and DecisionMaking
Applications that collect information have the ability to transform the way decisions are made. Information can be collected about weather conditions, diseases, pests, market performance and other useful information in agriculture. The datacenter could prove to be useful tool for analyzing data required for decision-making. Incorporating SQL databases and data mining can help make predictions about the future such as weather forecast in relation to climate change [20]. The wider network coverage can be used to disseminate such information to farmers using various ICT platforms. With the right training the youth can be encouraged to utilise such information and make informed decisions concerning their agricultural businesses. systems that have predictive capability can also be useful by policy makers in guiding long term decision-making concerning the agriculture sector.

E. Lower Coast of Production
Incorporating ICT in agriculture has the potential to lower the cost of production. For example the use of early warning systems about weather conditions or pests can help farmers in the reducing the impact of such problems. The cost of technology such as sensors has reduced and therefore cheaper solutions that require use of sensors can be implemented. It is possible for small scale farmers to have access to affordable ICT technology to support their agricultural activities. In turn, the information such systems provide to the farmer enables them to minimize losses that can result if such systems were not in place.

F. Social Media Platforms
In most developing countries many youths are on social media platforms and own smartphones. Social media can be a good platform to disseminate agriculture information to youths that are engaged in farming. Countries such as Kenya utilise social media to share information such as marketing and farming trends [2]. There are some groups on social media such as Facebook in Zambia where young farmers actually market their products. The ministry of Agriculture and Cooperatives in Zambia has a presence on Facebook to disseminate information to farmers that have access to such platforms. Social media has great potential to improve communication and a young farmer’s community. Social Media platform cannot only be restricted to text information but, can include videos to provide training. With the coming of networks that support 3G and 4G technology, social media can go a long way in providing training information to farmers.

G. Weather Based Insurance
The second national agriculture policy has made special mention of implementing weather based insurance schemes for small scale for the farmers. This idea has worked in Kenya and Uganda under the project called Kilimo Salama [7] [3]. This provides an opportunity for insurance companies, mobile service providers and innovators of ICT technology for agriculture to come up with such products to meet the demands of farmers. Lessons can be learnt from other countries that have implemented and succeeded. This opportunity is for both the young innovators, farmers and farmers in rural communities.

1.6 OPEN ISSUES

A. Ownership of Collected Data
The ownership of data that can be collected from the farming community is not clearly defined. Should
this data be owned by private sector or should ownership be in the hands the public sector. For example, personal information of farmers can be obtained in order to know where they are located, what type of farming they are engaged in and other details. The next question to ask is who owns this data that has been collected and for what purpose is it going to be used for. These are issues that need to be outlined in some form of policy to guarantee that individual's privacy is protected as well as the information about the farming activities is also protected.

B. Regulation in E-Agriculture
There are no specific policies that regulate e-agriculture applications within Zambia. As much as more investment may be sought to invest in the agriculture sector, it is important to put in place a regulatory framework that governs our players in the sector as opposed to conduct the operations. The existing framework is general and not specific to the agriculture sector which makes it difficult to deal with issues that may arise in terms of managing the digital content that can be generated [17].

C. Security of Data
In the 7th National Development Plan and the Second National Agriculture policy, the government of Zambia has planned that technological advancements in agriculture should be led by the private sector [3] [17]. But there are still questions that need to be answered such as, how is security of any electronic data generated going to be guaranteed? The setting up of the data center is a good move in terms of providing storage facilities to both public and private sector. However, it is a well-known fact that security in the Cloud is still an issue that has not been resolved [21] For example, if applications are developed that require to control actuators within the farming set up the chances of that system being controlled by unknown people are always there. Due to lack of concrete security measures implemented in cloud storage facilities the issue of widespread use of such technology in managing critical applications in agriculture will still remain to be a challenge.

1.7 CONCLUSION

The majority of the farmers in Zambia are in the small scale category. The focus of the second national agriculture policy is to encourage women and youths to participate in agriculture by promoting agriculture technology. Introducing e-agriculture practices has the potential to encourage more youths to participate in agriculture and reduce levels of unemployment. Opportunities in innovation can range from SMS applications, mobile payment systems, social medium information sharing.
REFERENCES


ABSTRACT

This article reports a study undertaken in October 2017 to investigate Cybercrime in Zambia at Kwame Nkrumah and Mulungushi Universities, respectively. The main objective of the study was to investigate how to mitigate Cybercrime in the said Universities. In terms of the methodology, the study consisted of Interviews and questionnaires targeting 100 respondents, 50 from each University. Relevant pieces of information were sought directly from key users of Information Communication Technologies at the universities, who in this case were 30 students and 20 members of staff from each institution. How to mitigate cybercrime in Zambia was confirmed by this study, where findings revealed that there was cybercrime in almost all departments at the universities. Common forms of cybercrime which were utilized to cause damage in various ways were also identified. The study established that the most common form of Cybercrime was spam and hacking someone else's account, where information was obtained from another person's account without their consent. The study also established that there are challenges of fighting Cybercrime which are mainly: Reliance on ICT's- Findings indicated that many everyday communications depend on ICT’s and Internet-based services, including VoIP calls or email communications. Number of users is also another challenge of fighting cybercrime, findings revealed that as the number of people connected to the internet increases, the number of targets and offenders' increases and it is difficult to estimate how many people use the internet for illegal activities.

In order to mitigate cybercrime, some of the following preventive steps need to be taken: maintaining good system hygiene, inculcating safe browsing habits, avoid leaving Digital Footprints, securing windows system with an updated operating system and installed software, and install good internet security software to protect the computer. Use of Enhanced Mitigation Experience Toolkit on Windows is a great way to protect one's system against attacks.

Generally, the study established that ICT’s played a significant role in mitigating Cybercrime and also that there are ways of mitigating cybercrime which significantly help to protect the system against attacks, despite the challenges experienced in trying to mitigate Cybercrime.

Keywords: Cybercrime, Internet, Computer, Mitigate, Software, ICT’s.

2.1 INTRODUCTION

Kwame Nkrumah University (KNU) was opened in 1967, first as a Teachers Training College. In 1971, it was renamed Nkrumah Teachers’ College in honour of the first president of Ghana, Dr. Kwame Nkrumah and later renamed Nkrumah College of Education. It was later turned into a Degree awarding institution in 2009 and renamed as Kwame Nkrumah University (KNU). Through its highly qualified, competent and dedicated staff, KNU has contributed significantly to the development of the country and the sub-region. Out of 8,450 teachers churned out by the institution between 1967 and 2004, many have risen to managerial positions not only in education but also in business and politics in various countries of the sub-saharan. This article, therefore, investigates Cybercrime in Zambia at selected universities which includes Kwame Nkrumah University; the study was carried out in October, 2017.

According to National Crime Prevention Council (2011), Cybercrime is a crime committed or facilitated via internet. It is any criminal activity involving computers and networks which can range from fraud to unsolicited emails. Cybercrime poses a lot of threat in today’s world. Cybercrime has been increasing in complexity and financial costs since organizations started to utilise computers in the course of doing business. As technology increases, criminals have realised that this is the cost effective method of doing business. According to Gercke(2012), the influence of
ICTs on society goes far beyond establishing basic information infrastructure. The availability of ICTs is a foundation for development in the creation, availability and use of network-based services. E-mails have displaced traditional letters; online web representation is nowadays more important for businesses than printed publicity materials; and Internet-based communication and phone services are growing faster than landline communications. The availability of ICTs and new network-based services offer a number of advantages for society in general, especially for developing countries. Common Cybercrime trends include:

- Malicious software-includes; viruses, worms, trojan horse and backdoor.
- Web Hacking- This activity is conducted to embarrass an organisation and show that it has weak security.
- Unauthorized alteration of systems.
- Website Defacement.

2.2 LITERATURE REVIEW

A survey done by Yedaly and Wright (2016) outlines some of the malicious cyber activities in Africa, these include: Malware, C & C Servers, Bots, Phishing Hosts, Spam and Attacks.

What constitutes a Cyber-attack? Information management which is socially or politically motivated carried out through the internet. Attacks are generally targeting the general public, national or corporate organizations and are spread through malicious programs (viruses), unauthorized web access, fake websites thereby causing far-reaching damage. The attacks can be classified either as;

a) DoS (Denial of Service attack which is an attack meant to disrupt services or;

b) DDoS (Distributed Denial of Services attack which is carried out from a distributed environment.

a) Challenges of Fighting Cybercrime

One of the challenges of fighting cybercrime is Reliance on Information Communication Technologies (ICT’s); according to Gercke (2012), literature reveals that, many everyday communications depend on ICT’s and Internet-based services, including VoIP calls or email communications. ICT’s are now responsible for the control and management functions in buildings, cars and aviation services. Furthermore, literature done by Gercke (2012) indicates that, the dependence of society on ICTs is not limited to the western countries. Developing countries also face challenges in preventing attacks against their infrastructure and users. The development of cheaper infrastructure technologies such as WiMAX has enabled developing countries to offer Internet services to more people. Developing countries can avoid the mistakes of some western countries, which have concentrated mainly on maximizing accessibility, without investing significantly in protection. US experts have explained that successful attacks against the official website of governmental organizations in Estonia could only take place due to inadequate protection measures.

Another challenge of fighting cybercrime is Number of users; as the number of people connected to the internet increases, the number of targets and offenders increases and it is difficult to estimate how many people use the internet for illegal activities. Literature done by Gercke (2012) indicates that, it is difficult to estimate how many people use the Internet for illegal activities. Even if only 0.1 per cent of users committed crimes, the total number of offenders would be more than one million. Although Internet usage rates are lower in developing countries, promoting cybersecurity is not easier, as offenders can commit offences from around the world. The increasing number of Internet users causes difficulties for the law-enforcement agencies because it is relatively difficult to automate investigation processes.

b) How to Mitigate Cybercrime

According to Gercke (2012), deterring cybercrime is an integral component of a national cybersecurity and critical information infrastructure protection strategy. In particular, this includes the adoption of appropriate legislation against the misuse of ICTs for criminal or other purposes and activities intended to affect the integrity of national critical infrastructures. Another way to curb these Cybercrimes is to focus on offering practical hands on training in the following areas:

- Hacking
- Computer Forensics
- Intrusion Detection
- ReverseEngineering and malware analysis
- Mobile Security

Cybersecurity plays an important role in the on-going development of information technology as well as Internet services. Cybercrime legislation is an integral part of a cyber-security strategy. Making the Internet safer (and protecting Internet users) has become integral to the development of new services as well as governmental policy.
Cybersecurity strategies – for example, the development of technical protection systems or the education of users to prevent them from becoming victims of cybercrime – can help to reduce the risk of cybercrime. An anti-cybercrime strategy should be an integral element of a cyber- security strategy (Gercke, 2012).

Literature done by (Mwale, 2013) indicates that, following the sudden rise in Cybercrime in Zambia, The Zambia Information and Communication Technology Authority (ZICTA) plans to develop cyber security policies aimed at fighting the scourge. The Zambian police has revealed that over USD4 million has so far been stolen from the country’s commercial banks through Cybercrime. The police are collaborating with ZICTA to investigate theft which police said was committed by foreign cyber criminals with assistance of Zambians, who they have trained. Furthermore, the Authority has started search for a cyber-expert who will be working with government security agencies in a bid to tackle Cybercrime.

Another survey done by TechTrends (2014) reveals that ZICTA and Zambia Police (ZP) have come together and launched the first Cybercrime fighting laboratory based at the police headquarters in Lusaka. Later in the year 2014, ZICTA in partnership with International Telecommunications Union (ITU) the first training workshop called Cyber Drill in Africa was conducted between the 29th and 1st of October for Computer Incidence Response Teams (CIRTs) professionals on the continent.

Further literature suggest that, cybercrime can be mitigated by taking some of the following preventive steps: Inculcating safe browsing habits, maintain good system hygiene, avoid leaving Digital Footprints, securing windows system with a fully updated operating system and installed software, and ensure that a good Internet security software is installed to protect the computer. Using the Enhanced Mitigation Experience Toolkit on Windows is a great way to protect your system against attacks.

2.3 OBJECTIVES OF THE STUDY

a) To indentify common Cybercrime trends.

b) Mention some of the challenges faced when fighting Cybercrime.

c) How to mitigate Cybercrime.

2.4 METHODOLOGY

In terms of the methodology, the study consisted of Interviews and questionnaires. Relevant pieces of information were sought directly from key users of Information Communication Technologies at selected universities, who in this case were students and members of staff. The data was collected by using in-depth interviews and questionnaires from a sample of 100 informants comprising 60 students and 40 members of staff drawn from various departments at Kwame Nkrumah University and Mulungushi University. The participants were selected randomly and purposively.

Both qualitative and quantitative methods were applied. Qualitative method was used to collect information pertaining to opinions and views of the respondents and quantitative method was used to collect statistical data. Purposive sampling was applied on certain ‘key’ informants because of the predetermined nature of information that was required, for instance the Heads of Departments, Librarians and Computer Laboratory operators. Relevant secondary pieces of information were also solicited from documentary sources to supplement the primary data.

2.5 FINDINGS/DISCUSSIONS

This section presents the findings of the research conducted in October, 2017 on how to mitigate Cybercrime at Kwame Nkrumah University (KNU) and Mulungushi University (MU). Out of one hundred respondents who were interviewed and given questionnaires, the majority 60 were students at KNU and MU while the remaining 40 were employees at the two institution. All respondents that were interviewed at least confirmed that they were aware of different types of cybercrimes committed at the two learning institutions. The students seemed to have integrated ICT’s in a widest range of areas; such as in communication, knowledge production, research, entertainment, conveying of data from one place to another, gossip on various social media platforms, et cetera.

A close study, both through interviews and questionnaires of respondents at KNU and MU further revealed ways through which Cybercrime could be mitigated at the two learning institutions. ICT’s were seen to have enhanced the flow of information through internal communication networks that linked various departments, sections and individuals within the institution, as well as external networks that linked the institution, it’s employees and students to the outside world.
The table below summarises findings on the common Cybercrimes at KNU and MU. Out of the 100 total respondents, 60 were students while 40 were lecturers. The most common form of cybercrime students were aware of was swindling of money by internet users, findings reveal that 32 out of 100 respondents representing 32% were aware of swindling of money by internet users with fake accounts as a common cybercrime, while 18 (18%) of lecturers also indicated that swindling was a common cybercrime.

Findings further showed that 10 students (10%) were aware that phonography was another form of cybercrime while 6 students out of 100 respondents representing a percentage of 06% were aware of hacking through access to classified information as well as transmission of viruses and plagiarism as other common forms of cybercrime. Findings also revealed that 9 (9%) lecturers were aware of hacking through access to classified information as a common form of cybercrime, another 7 (7%) indicated transmission of viruses was another common cybercrime and only 6 (6%) being aware that plagiarism was a common form of cybercrime.

Table 1: Common Cybercrime at KwameNkrumah University and Mulungushi University

<table>
<thead>
<tr>
<th>Category</th>
<th>Variables:</th>
<th>Frequency</th>
<th>Percent (%)</th>
<th>Cumulative Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>a) Swindling of money</td>
<td>32</td>
<td>32</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>b) Hacking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Access to classified information</td>
<td>06</td>
<td>06</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Transmission of viruses</td>
<td>06</td>
<td>06</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d) Pornography</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e) Plagiarism</td>
<td>06</td>
<td>06</td>
<td></td>
</tr>
<tr>
<td>Lecturers</td>
<td>a) Swindling of money</td>
<td>18</td>
<td>18</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>b) Hacking</td>
<td>00</td>
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<td></td>
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<tr>
<td></td>
<td>-Access to classified information</td>
<td>09</td>
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<td></td>
<td>-Transmission of viruses</td>
<td>07</td>
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<td>d) Pornography</td>
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<td></td>
<td>e) Plagiarism</td>
<td>06</td>
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</tr>
</tbody>
</table>
The study also established that there are challenges of fighting Cybercrime which are mainly: Reliance on ICT's. Findings indicated that many everyday communications depend on ICT's and Internet-based services, including VoIP calls or email communications. Number of users is also another challenge of fighting cybercrime; findings revealed that as the number of people connected to the internet increases, the number of targets and offenders' increases and it is difficult to estimate how many people use the internet for illegal activities.

In order to mitigate cybercrime, some of the following preventive steps needed to be taken: maintaining good system hygiene, inculcating safe browsing habits, avoid leaving Digital Footprints, securing windows system with an updated operating system and installed software, and install good internet security software to protect the computer. Use of Enhanced Mitigation Experience Toolkit on Windows is a great way to protect your system against attacks.

2.6 CONCLUSION

In this article, an investigation on how to mitigate Cybercrime in Zambia at selected universities which includes Kwame Nkrumah and Mulungushi Universities was done. It had been noted that Information is needed for various purposes and serves as an invaluable commodity or product, just like it is an important aspect of decision making in all levels of management in institutions such as Kwame Nkrumah and Mulungushi Universities. This article has, therefore, highlighted various ways through which Cybercrime can be mitigated and also the crucial role ICT's have played at the institutions in mitigating Cybercrime.

How to mitigate cybercrime in Zambia was confirmed by this study, where findings revealed that the respondents in almost all departments at the universities were aware of common forms of cybercrime. Furthermore, common forms of cybercrime which were utilized to cause damage in various ways were also identified.

Not only that; It was also noted in this article, the increasingly important role of ICT’s in facilitating the introduction of new products and services, aimed at improving operational processes, and in guiding managerial decision making. Challenges faced in mitigating Cybercrime at the two institutions were also assessed, and the effects that arise as a result of this were determined. Generally, the study established that ICT's played a significant role in mitigating Cybercrime and also that there are ways of mitigating cybercrime which significantly help to protect the system against attacks, despite the challenges experienced in trying to mitigate Cybercrime.

2.7 RECOMMENDATION

- Kwame Nkrumah should put in place an Information Communication Technology (ICT) policy so as to be able to address cybercrime effectively.
- Furthermore, the two universities should prepare for cyber threats which involve implementation of a variety of prevention, protection and mitigation strategies by students and staff.
- Create access control lists and firewalls
- Monitor networks closely.

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ABSTRACT

Digital Financial Services have largely been attributed as the engine for growth in broadening the scope and depth of money services to customers, particularly the unbanked and poorer communities. Among the most popular of the bouquet of services is mobile money transactions that have seen a significant uplift and penetration, particularly in Southern Africa. A corollary development of this boom has been convergence between mobile technology and banking, with both sectors leveraging off each other. Additionally, the value chain has seen growth intermediaries poised to mitigate any gaps in making the final mile to the client, such as agents and aggregators. This article highlights the status of the banking and mobile money sectors, their individual contributions in real and gross terms, and the journey that legislation has taken in order to keep up with technological developments. The article recommends increased cross regulator collaboration to reduce regulatory arbitrage, mitigate perceived deprecations of digital financial service providers and foster efficiencies. The article encourages regulation that is fit for purpose, promotion of a right balance between prudential oversight of risk, capital and governance of industry players, and the implementation of a regulatory light architecture that also ameliorates systemic risk.

Keywords: Digital Financial Services, Banking, Regulation, Interoperability

3.1 INTRODUCTION

Zambia has experienced a period of strong economic growth from 2005-2013 averaging a peak of 6.4% annual growth in 2013 but bottoming out at 2.9% in 2015. The 2018 performance has been forecast at 5.0% with improving macroeconomic environment and rising commodity prices. In line with the desire to enhance job creation and industrialise its policies, the country has fronted a consistent message of encouraging private investment in all its major growth sectors.

Digital financial services have become an important driver of financial inclusion where banks traditionally did not have reach, bolstered by the distribution of technology created by the rapid growth of mobile networks and subscriptions.

Zambian banks in particular are well capitalised at about 13% of assets and profitable, with appreciable Return on Equity ranging upto 35%. As regards non-performing loans, these have levelled off to below 8% on average and the banks’ balance sheets are relatively underexposed to loans.

Notwithstanding the impressive growth of digital financial services, many countries have not yet adopted mobile money as rural areas remain largely underserved. Additionally, most of the mobile money services are utilised for basic payment and transfer services.

In order to bridge the technological and regulatory gap, several strides have been made across a spectrum of regulators to provide for some framework for the fast-paced growth in this sector, and to ensure financial inclusion is counterbalanced against an effective risk governance architecture and oversight over potential and actual anti-competitive practices.

3.2 NOTABLE NUANCES OF THE AFRICAN BANKING SECTOR

We now turn focus towards five unique features that permeate banking on the continent.

3.2.1 Financial Depth

A common indicator of financial depth is the quantum
of domestic credit to the private sector as a percentage of deposit taking financial activities in championing growth through private sector investments. Statistics reflect that the estimated financial depth per region was 21% for East Africa, 20% percent for West Africa and 31% for Southern Africa without South Africa. With South Africa, Southern Africa ranks the highest at 43%.

A key driver of financial depth has been the innovation of mobile technology to drive ‘branchless banking’, particularly in East Africa. The concept of mobile banking that requires less Know Your Client procedures and which attracts cheaper transactional costs have sustained the capture of more rural savings within the financial systems. In Kenya, compounding factors for the uptake of mobile banking technology have included the early movement into the sector prior to onerous regulation, use of local agents and simplification of on boarding procedures. A limiting factor to deepening savings in Africa generally is the mismatch in maturity between assets and liabilities, that is, predominantly shorter term deposits that are lent out at longer maturity tenors. This mismatch is a fertile source for systemic risk within the banking sector, which has a potential of causing liquidity challenges. Some scholars have suggested that this mismatch is a further reflection of the financing behaviours of an emerging continent as a whole, with greater demand for short term financing.

Interestingly though, Africa's banks, though less efficient, are more profitable and also operate in less competitive environments. Net interest margins (NIM) in 2011 were estimated at 5.9 percent compared to a lower NIM of 4.7 % outside Africa. Similarly the Return on Assets (ROA) stood at 2.1 % on average as opposed to 1.5 % outside Africa.

3.2.2 Access
Access to financial services has improved in recent years. Account penetration in Sub Saharan African (SSA) countries has seen an increase of almost 20 % between 2011 and 2014, buoyed by ongoing financial innovation and penetration of mobile phones has contributed to the fast rise of mobile banking in SSA, providing an opportunity to reach consumers in remote areas where efficient transport infrastructure is lacking. Zambia has itself witnessed growing partnerships between commercial banks and mobile service providers so as to enhance financial inclusion, which is currently estimated at 59%.

The impact of technology in bringing banking services to the under and unserved sectors is now recognised even in statute. Zambia has recently passed an ambitious new Banking and Financial Services Act.27 Section 12 (1) of the BFSA now provides in part that: “A banking licence may, subject to the conditions of the licence, authorise a bank to engage in the following activities in addition to banking business 28:

... (c) provide money transfer or transmission services from a customer’s account;
...
(j) provide branchless banking services.”

The above provision is but one example of the formal recognition of the impact of disruptive industry within the banking sector.

3.2.3 Adequacy and Quality of Capital
An assessment of the financial soundness in the SSA is said to have improved over the years, notwithstanding some persistent weaknesses remain primarily in asset quality and provisioning. The incidence of systemic banking crises has declined with only one major crisis recorded in the past decade, while most countries have implemented an 8% minimum risk-weighted capital adequacy ratio (CAR), and actual ratios in most countries have exceeded the minimum.

SSA regulators have attempted to place regulatory and prudential requirements to maintain a sound banking system as a reaction to the impact of systemic risk that has caused previous credit crunch around the world. The Central Bank in Zambia has reflected the Basel III approach of counter cyclical capital buffer in its BFSA. Section 54 of the BFSA introduces the power of the BFSA to request a bank or financial institution to maintain a counter cyclical buffer in their risk weighted assets and forms of common equity capital tier one. This is subject to an assessment as to the purpose of the capital released by the bank or financial institution, that is, whether its use is to help absorb losses in a bank or financial institution that pose a risk to financial stability.

Section 2 of the BFSA defines counter cyclical capital buffer as the: “amount of capital prescribed by the Bank to be maintained by banks and financial institutions where there is excessive buildup of credit that is likely to lead to a system wide risk;”
The BFSA introductions are on the back of increased capital requirements for banks and financial institutions within Zambia for foreign owned banks and local banks by the Central Bank.

3.2.4 Fragile Currency
Dollarization has been a constant threat towards maintaining the integrity of countries in African nations. In SSA between 2001 and 2012, of the most highly dollarized countries in the region Tanzania and Mozambique managed to reduce their dollarization levels to below 30%, while Sierra Leone increased to beyond 30% while Zimbabwe became fully dollarized.

Some economists reported that the Zambian kwacha had been overvalued since 2000 as it became the world’s third worst performing currency in 2015 when it plummeted by 41% points against the US dollar, consequently downgrading the country from B1 to B2 by international credit rating firm Moody’s. The Kwacha however had begun showing some bullish performance since an upturn of copper prices beginning of 2016, becoming one of the world’s best performing currencies.

The official currency of Zambia is Kwacha. Section 29 of the Bank of Zambia Act provides that:

“The units of currency of the Republic is the Kwacha (abbreviated as K). The denominations of money in the currency of the Republic are the Kwacha and the ngwee (abbreviated as N or as n). One ngwee is the one-hundredth part of the kwacha.”

Implementation of maintaining the Kwacha as legal tender has posed some challenges in light of the country being a large net importer of goods and services. Attempts at recent regulatory intervention by the Central Bank have resulted in a degree of policy uncertainty. For instance, statutory instrument number 33 of 2012 that was aimed at restricting the use of foreign currency for specific transactions was fraught with challenges leading to its revocation in 2014.

The Central Bank also proceeded to rebase the currency through the Redenomination of Currency Act Number 8 of 2012 by removing 3 zeroes. It was felt that this move would facilitate easier business transactions, create greater confidence in the currency, reduce the cost often incurred when customizing standard packages that were purchased by entities, create efficient payments systems, and re-introduce a culture of using coins which were viewed as being more durable.

3.2.5 Some Key Terms
The term ‘Mobile financial services’ has been used to describe a wide range of potential services that can be provided over a mobile network. This includes mobile money services, banking-type services, insurance and other services. At the heart of the term mobile financial services is the term ‘mobile money’ which is a form of electronic money issued on receipt of funds, redeemable for cash, and which enables the user to carry out financial transactions over a mobile phone.

As regards ‘e-banking’, the term implies the provision of banking products and services through electronic delivery channels. Electronic banking has been around in the form of automatic teller machines (ATM’s) and telephonic transactions, and in more recent times has been transformed by a new delivery channel being the internet. The internet has offered faster access, more convenience and availability irrespective of the customer’s location.

‘Internet banking’ will often refer to the use of the Internet to deliver banking activities such as funds transfer, paying bills, viewing current and savings account balance, paying mortgages and purchasing financial instruments and certificates of deposits. Synonymous terms include ‘online banking,’ ‘e-payment’ and ‘e-banking’.

Notably the Banking and Financial Services Act does not expressly list digital financial services under the definition of financial service. Notwithstanding, the Bank of Zambia in realising this gap has rolled out directives to specifically deal with electronic money or ‘E-money’. E-money is defined in the National Payment Systems Directives on Electronic Money Issuance, 2018 (“E-directives”) as:

“…an electronic store of monetary value as represented by a claim on its issuer, that is,

a) Issued on receipt of funds in an amount no lesser in value than the value of the e-money issued
b) Stored on an electronic device
c) Acceptable as a means of payment by persons other than the issuer; and
d) Redeemable upon demand for cash denominated in Zambian Kwacha”
Another key term is interoperability (account-to-account), that is, the ability to transfer funds from one account to another. On a broader scale, it is understood to mean the ability of a system, product or service to work with other systems, products or services without special effort on the part of the customer.

3.2.6 Mobile Money Penetration
It is estimated that between 2011 and 2014, 700 million adults worldwide became account holders while the number of mobile money accounts reached 411 million globally in 2015. Mobile money is estimated to be available now in 93 countries. The largest number of mobile money transactions are person-to-person transfers and airtime top-ups, but only 3.6% of the value of all transactions was airtime top-ups.

Some studies have posited that mobile money has been most successful in replacing cash transactions for domestic remittances, particularly remittances to rural family relations. Mobile money remittances have since surpassed cash in Kenya, Tanzania, and Central America. As a sector, the Information and Communication sector in Zambia contributed approximately US$493 million in sales turnover in 2016, a mile ahead of the insurance and other financial services sector which contributed US$70.9 million. It is also reported that both the Information and Communication sectors and the deposit taking corporations form part of the sectors with a net outflow of US$200.9 million.

It is interesting to note that sub-Saharan Africa has led the way in driving mobile money services and mobile digital financial inclusion as a whole. Financial inclusion has seen a particular positive impact on access to financial services for disadvantaged income, gender and rural segments of the population. As far back as 2004, South Africa launched mobile money services being followed by Kenya in 2007 and Uganda in 2009.

According to the Foreign Private and Investor Perceptions Survey 2017, Information and Communication sectors in Zambia contributed approximately US$493 million in sales turnover in 2016. It is also reported that both the Information and Communication sectors and the deposit taking corporations form part of the sectors with a net outflow of US$200.9 million.

3.2.7 The Role of Industry Players
Mobile Network Operators (MNOs) have had a significant role to play in the growth of digital financial services as they leverage their scalability in infrastructure, agent networks, client base and overall business value chain. MNO's have thus thrived in both 'open' and 'grey' regulatory environments in driving the growth of mobile money transfer and payment services. It is estimated that that more than half of the MNOs in SSA had launched a mobile money service by the end of 2014.

Other players are Banks and non-Banking Institutions which offer a range of services ranging from account, transfer, and payment services.

Along this value chain are agents; the direct human interface of mobile money with the customer, and agent networks are understood to be the backbone of the service for cash-in and cash-out transactions, as well as often assisting with transfers and payments. Statistics have predicted that agents are responsible for more than 90% of cash-in and cash-out transactions, competing with bank branches and ATMs' for cash-in, cash-out and other transactions. An additional advantage is that the agency model is capital light in comparison to a full-fledged traditional banking model.

3.2.8 Mobile and Banking Services: A Convergence of Technology
The ethos of the convergence of mobile and banking services has been to leverage the aspects of space and tenor offered by either technologies. Thus, geographical footprint can be achieved through mobile money services and interest income through on lending to customers from deposits. It is now possible to transfer funds from traditional bank accounts to unbanked persons having 'e-wallets' and to make such payments through mobile money agents outside the branch network architecture.

A corollary development of mobile technology in the traditional banking industry is 'branchless banking'. The Banking law in Zambia has now clearly included aspects of branchless banking which it defines as the provision of banking services or financial services without relying on physical branches.

Zambia Information and Communications Technology Authority (ZICTA) recently reviewed its licensing regime to recognise the increase in technology convergence. The ZICTA Licensing Guidelines recognise the need to regulate the provision of electronic communication services and products and monitor the performance of the sector. The licensing regime generalises between network and service licences,
and individual and class licenses. Market segmentation has been categorised into four geographical segments from international to district segments.

In some jurisdictions, a Mobile Network Operator (MNO) entering the mobile banking service industry requires a banking licence and is subject to banking regulation, including reserve requirements and other regulations. This would be extended to deposits from each mobile bank user required to be held in discrete accounts without the possibility of pooling with other deposits. A noted example is Bharti Airtel in India.

Other MNO’s have chosen a more mid-point strategy by either outright purchase of an existing Bank or partnering with an existing Bank to provide savings and loans through its existing mobile money service platform. Common cited examples of the latter model include M-Pawa (Vodacom and Commercial Bank of Africa in Tanzania) and M-Pesa (Safaricom and Kenya Commercial Bank in Kenya). These models inevitably drive up bank accounts’ uptake as traditionally, there is a higher penetration of mobile subscribers than bank accounts in these regions.

In the converse model where Banks, Banks would ordinarily get Central Bank approval to provide an additional payment platform as part of their financial services offering. This would include getting a [Mobile] Virtual Network Operators’ license from the telecoms regulators.

3.2.9 Interoperability

Interoperability is the ‘holy grail’ of digital financial services. Players along the value chain typically allow interoperability between and across accounts of an individual, and between accounts of different individuals. A more common feature now is the inclusion between bank accounts and e-wallet accounts, signifying the interplay between banks and mobile money markets.

A glaring hurdle that requires attention is the lack of synergy between transactions across different mobile wallets on separate mobile networks. As such, a user is often locked in mobile money services provided on a particular mobile network provider, a restriction at times referred to as ‘on-net transfers’. The need for an open and accessible interoperable architecture in mobile money payments cannot be overemphasized. In order to grow digital financial services, particularly in disadvantaged groups as earlier highlighted where mobile penetration is higher than traditional bank-

3.2.10 Some Prudential and Regulatory Considerations

One school of thought is that different financial services involve various levels of risk and therefore require different types of regulation. As such, where there is a diversity of services and lower risk financial products, it is not recommended to have high handed regulatory requirements that may be a hinderance to development of digital financial services. At the barest minimum, three elementary protections from a prudential stand point are ability to convert cash to electronic money, storage of money, and transfer and payment services capabilities.

Another school of thought is that Banks should be exposed to higher levels of prudential regulation. As such there is need for prudential regulation around sufficiency of capital, reserves, governance and disclosures.

The E-directives have made a clear distinction in requirements between Banks and non-banking institutions in the form of authorisation versus designation respectively. Commercial Banks only require authorisation to issue e-money by submitting prerequisite documentation.

Non-commercial banks however require a process of designation using a 21-criteria list of requirements. The Directives are far ranging for non-commercial bank applicants; pre-launch inspections, minimum capital requirements, customer account management, outsourcing to third parties, Know Your Customer, consumer protection, and Anti Money Laundering controls among others.

It can be said with some level of certainty that the E-directives appear excessive for non-commercial bank applicants. In other countries, lighter licensing has been proposed for this class of entities such as electronic money issuer (EMI) licences.

3.2.11 Digital Financial Services and Competition Law

MNO’s play a dual role in the mobile money and telecommunications market. Depending on which arm of the business model is stronger, it is not uncommon that MNO’s can either increase wholesale demand for its telecommunication network services by using mobile money services as a loss leader, or strengthen
its mobile money service arm so much that it creates defensive anti-competitive tendencies in protecting its position.

MNO’s have been accused of certain anti-competitive behaviours, such as, market power communications channels to leverage network effects so as to prevent competitors in the mobile money market. These actions include refusing to provide Unstructured Supplementary Service Data (USSD) to competitors, offering uncommercial margins to competitors, price discrimination.

Refusal to supply is another instance in which MNO’s have been accused of anti-competitive behaviour. A case in hand is the fine of MTN by the Competition and Consumer Protection Commission for restricting access to USSD of Zoona, a major player in the mobile payments sector in Zambia.

A further cited potential anti-competitive action is discriminatory pricing, whereby, MNO’s which share revenues with financial institutions choose to provide better pricing to their network services than competitors of the other partners. A common approach is to zero-rate the pricing of services from one financial service provider without spreading the offer to other financial service providers.

3.2.12 Recommendations

A critical point of reform is not to discourage financial innovation but to focus on demanding information transparency and enhanced supervisory capabilities by regulators. Below is a list of recommendations that if implemented can ensure a sustained and secure digital financial service offering.

3.2.12.1 Regulatory Collaboration

The regulatory and legislative powers of regulators has broadly been carved into ex ante powers and ex post powers. The former relates to the role of regulators to make regulations that are forward looking while the latter deals with enforcement against violations of the law and regulations. Depending on the country, some agencies enter into memoranda of understanding to coordinate efforts while in other countries, it is a statutory requirement for agencies to collaborate. In fewer countries, separate agencies are created to ensure oversight of all agencies to ensure efficiency, reduce duplication and inter leveraging of resources and skill sets. The degree to which regulators collaborate is critical because regulatory approaches differ with each regulator. For instance, competition authorities were established more recently as compared to telecommunication authorities and bank supervisory agencies respectively. Bank regulators have longer established systems and regulations, while competition authorities may be more biased towards investigatory and information gathering; telecommunication regulators may impose much higher fines percentage wise in light of the higher financial outlay in the sector.

3.2.12.2 Agent Networks

It is recommended that the agency network roll out should continue to ensure that restrictive covenants between mobile financial services providers and agents are discouraged. Regulators should ensure that the less served areas of any geography get the benefit of digital financial services by opening commercial relationships between financial service providers and agents.

The Bank of Zambia has recognised the need to interact with agents in providing a full financial solution to the client. The Bank of Zambia Guidelines on Outsourcing expressly exclude the following activities as activities not considered as outsourcing: market information services, common network infrastructures, clearing and settlement arrangements between clearing and settlement institutions and their members and similar arrangements between members and non-members, correspondent banking services and introducer arrangements.

3.2.12.3 Account-to-Account interoperability

As highlighted earlier, greater collaboration among financial, telecommunication and competition regulators will ensure a more seamless experience for the client by encouraging mobile financial systems across different networks. Increased interaction among different bank accounts, and between e-wallet and bank accounts will be increasingly required as demand for the services increases. The focus on account-to-account interoperability is also at regional level and cross jurisdictional level. Recently, the Common Market for Eastern and Southern Africa (COMESA) urged member states to put in place digital payment platforms for Small and Medium Entrepreneurs and cross border traders.

It is gratifying that some pockets of collaboration can be seen among MNOs and representative associations. For instance, Zamtel recently announced signing a Memorandum of Understanding with the Zambia National Marketers Credit Association to create an electronic platform for collecting Base Tax from over
six million marketers and traders across the country.

3.2.12.4 Fit for Purpose Technology and Standards
It is commendable that ZICTA has installed and continues to install communication towers in chiefdoms countrywide in an effort to improve communication in rural communities. A focus for developing countries however is to adopt global technology whose requisite infrastructure, capital injection and technical expertise is adequate for their environment.

Infrastructure build by the Telecommunications Authority must tally with private sector initiatives so as to promote concepts of collocation and leveraging. Global initiatives and standards such as the Society for Worldwide Interbank Financial Telecommunications (SWIFT), E-banking, digital migration, Basel III and other protocols must be co-domesticated in bit sized pieces in order to suit the fiscal purse of the local jurisdiction.

3.2.12.5 E-banking as a National Agenda
In order to have the right ‘tone at the top’, the agenda of digital financial services has to be repeatedly drummed at the highest policy levels. Public sensitisation campaigns, national financial and telecommunication indabas and policy reform fora alike must make it a point to have the e-finance as a standing agenda item.

In addition to national sentiment, cooperating partners such as the World Bank are important in supporting the drive to digital financial inclusion. This may be through project support, research symposia, or regulatory reform support.

On a broader scale, international cooperating partners in various sectors should also ensure a unified agenda in this regard to avoid a push-pull effect on the already thin resource base of developing countries.

3.2.12.6 Strengthened Risk Governance Framework
The resilience of the digital financial landscape will depend on the risk governance frameworks adopted by the national payment systems and industry players. Key elements of a reliable system include settlement finality, high degree of security, operational reliability, efficiency and practicability, objective and publicly disclosed criteria for participation, and governance arrangements.

 Basel III recognises the need to address the systemic risk arising from the interconnectedness of banks and other financial institutions principally through its Committee on Payments and Settlement Systems (CPSS). The aim is to ensure that strong standards for financial market infrastructures, including central counterparties, are established.

The need downstream risk, which is at the core for enhanced risk governance, is that digital financial services create new opportunities for governance, operational, legal and reputational risk. As already highlighted earlier, different countries have begun passing regulation and legislation around digital financial services in order to have a sound domestic banking system, a resilient national payments platform, and an efficient consumer protection edifice that promotes trust and confidence among consumers.

3.3 CONCLUSION
It is evident that digital financial services have become a critical factor in achieving financial inclusion. The growth trajectory of the telecommunication, banking and competition sectors have seen some level of convergence in providing a unified platform. The strides undertaken so far however still leave grey areas in the regulatory architecture and requires greater off-taker relationships among regulators. Ultimately, the aim is to have the beneficiary, being the consumer, receive an efficient service at the most minimal cost, on the back of an architecture that is interoperable and has a sound risk governance framework.
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ZICTA Licensing Guidelines 2017
ABSTRACT

The advent of Digital Financial Services (DFS) has seen the introduction of electronic means of payment and savings mostly via mobile phone. With increased mobile phone access, the trend is likely to disrupt the way business is conducted and cause various regulatory considerations. This article highlights the background to the advent of DFS in Zambia; giving a historical timeline of major events in the market since the year 2002. It then provides an outlook based on recent trends before giving recommendations for regulation which includes a suggestion for a model for future regulation of Digital Financial Services and measurement of impact of that regulation on usage of Digital Financial Services. Key among the recommendations is the need for interoperability of DFS and the need for the future telecommunications regulator (ZICTA), financial regulator (BOZ) and capital market regulator (SEC) to collaborate in the regulation and development of DFS.

Keywords: Digital Financial Services, mobile money, proportionate regulation, M-Akiba, e-vouchers.

4.1. BACKGROUND AND HISTORY

The launch of the now defunct Celpay Zambia Limited in Zambia in 2002 was the dawn of an increasing trend towards use of Digital Financial Services (DFS) on Zambian soil (Seshamani and Kabala, 2016). By the end of the global financial crisis, Zambian based telecommunications giants and other start-ups had already eyed and strategized for entrance into the digital financial services space. For instance; in 2009, Zoona was founded and launched in Zambia by brothers Brett and Brad Magrath (Rooyen, 2016). This was followed by Mobile Network Operators (MNO) Airtel and MTN who launched their DFSs in 2011 and 2012 respectively (Seshamani and Kabala, 2016). By June 2017, the government owned Mobile Network Operator (Zamtel) also announced the introduction of ZAMTEL Kwacha, a mobile payment solution for ZAMTEL customers. Prior to its launch, ZAMTEL Kwacha was only being used by employees internally for disbursements. Among the banks, Zambia National Commercial Bank (ZANACO) was the first to launch a mobile banking solution through the introduction of Xapit in 2007 (Kaulu, 2016). Other banks have since followed suit. Figure 1.1 below summarises the main DFS on the Zambian market and indicates a timeline for their launch in Zambia.

Figure 1.1: Timeline for the history of DFS in Zambia

Source: Author’s construction from various sources

Many citizens in developing countries are financially excluded according to Severino (2015). The Ministry of Finance’s 2017 to 2022 financial inclusion strategy for instance states that the inclusion rate in 2015 was only 59% in Zambia with 49.9% of rural dwellers financially excluded and financial services access points were concentrated in Lusaka and Copper belt provinces. Therefore, the rise of Digital Financial Services (DFS) presents an opportunity for providing financial services to both the served and underserved. According to Skinner (2017), Africa is leapfrogging financial service provision with mobile. M-PESA service for instance is so popular in Kenya that according to Mas and Radcliffe (2011) “there are now nearly five times as many M-PESA outlets in Kenya as there are Post Bank branches, post offices, bank branches, and automated teller machines”. M-PESA is a low value electronic money storage and payment system introduced in 2007 by Safaricom (Mas and Radcliffe, 2010) initially in Kenya and has seen tremendous growth. Offering financial services in recent years but at a slower pace. An example of this trend can be seen from the
utility companies such as Lusaka Water and Sewerage Company and the Zambia Electricity Supply Corporation as well as the tax authority (Zambia Revenue Authority) who in recent years began accepting payments via mobile money accounts.

What then are Digital Financial Services? Not many scholars have attempted to define them. However, the Master Card Foundation and International Finance Corporation (2016) define Digital Financial Services (DFS) as, “The use of digital means to offer financial services [and] encompasses all mobile, card, Point Of Sale (POS) and e-commerce offerings delivered to customers via agent networks.” Asmundson (2011) explains that financial services are services provided by players such as insurance companies, banks and related parties. This definition is consistent with Zambia’s Banking and Financial Services Act’s description of financial services. It can however be expanded to include services provided by accountancy firms; most of which describe themselves as professional financial services entities. Therefore, financial services can be summarised as professional services that include any of the following or a combination of these: investment, lending and management of assets. Digital financial services ride on digital technology to provide any of the stated services.

On a global scale, GSMA (2017) reports that, two thirds of the world’s population (i.e. 4.8 billion unique subscribers) had a mobile subscription and the figure is projected to grow to 5.7 billion mobile services subscribers by 2020; almost three quarters of the world’s population. Regional penetration rates are forecast to range from 50% in Sub-Saharan Africa to 87% in Europe.

According to the UNCDF (2014), Zambia is seen as a country with high mobile money market potential, low financial inclusion levels, relatively high levels of mobile penetration and a rural and urban population distribution that is promising. A 2010 Central Statistics Office (CSO) census report showed that 60.5 percent of the then 13,092,666 Zambians are rural dwellers.

Citing a CSO and Zambia Information and Communications Technology Authority (ZICTA) ICT survey, Imanga (2015) states that “94.3 % of the rural population aged above 10 years do not have bank accounts compared to 73.7 % of individuals in urban areas without bank accounts.” All these figures suggest that there is room for increased financial inclusion using digital means. Official telecommunications records show that there were more than 13 million active mobile phone subscribers in 2017 in Zambia (ZICTA, 2018).

This in comparison to a CSO estimated population of 16,405,229 (as at 2017) means that it would be possible for more than 80% of the population of Zambia (including many rural dwellers) to access payment and banking solutions via mobile phone. In fact, a GSMA (2015) survey found that in 19 markets surveyed including Zambia, there were more mobile money accounts than bank accounts. This could be in part due to the wide penetration of mobile phone services. Over 8 million (62.55% of the population) mobile phone subscriptions were noted by March 2011 in Zambia (Dermish et al 2012: 16). Table 1.1 below shows the market penetration of mobile phone companies in Zambia as at March 2011.

Table 1.1: Market penetration of mobile phone companies

<table>
<thead>
<tr>
<th>Mobile Network Provider</th>
<th>Subscriptions</th>
<th>Penetration (%) of Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airtel</td>
<td>4,229,714</td>
<td>32.42</td>
</tr>
<tr>
<td>Zamtel</td>
<td>1,230,991</td>
<td>9.4</td>
</tr>
<tr>
<td>MTN</td>
<td>2,703,848</td>
<td>20.73</td>
</tr>
<tr>
<td>Total</td>
<td>8,164,553</td>
<td>62.55</td>
</tr>
</tbody>
</table>

Table 1.1: Market Share of mobile Phone companies

Due to this wide penetration, mobile telecommunications giants such as Airtel, MTN and Zamtel have the ability to provide financial services to more individual customers than banks can. With these services, a user can deposit and withdraw money, check balances, transfer to another person or organisation (e.g. when paying bills or sending money to a friend or family member) and buy airtime among other things. It only remains to be seen whether Airtel and MTN mobile banking services in Zambia will achieve as much sustained success as M-Pesa’s success in Kenya. This gap is one that presents opportunities for research.

The government is also playing a progressive role in the cashless society trend. For instance, in the 2015/2016 farming season, it introduced support via e-vouchers for the Farmer Input Support Programme (FISP) which was since 2002 running manually (Siame, Lichilo and Siame; 2017). With the e-voucher system, farmers were reported to have received agriculture input support via value stored electronically. They would then use this value to obtain their agriculture inputs. Musika (2015) report that the e-voucher system is designed to save resources through elimination of FISP costs such as transportation, procure
ment and other administrative costs and it could be argued that it can help detect duplicate payments and eliminate payments to ghost recipients by tracking national registration card numbers of recipients.

Another milestone event with respect to government championing the use of mobile money was in 2014 when according to Chikumbi et al (2016), the local tax collector (Zambia Revenue Authority – ZRA) began accepting mobile money payments as an option for domestic and customs tax payments. Further, government utility firms such as Zambia Electricity Supply Corporation (ZESCO) and Lusaka Water and Sewerage Company (LWASC) also now accept mobile money payments.

In addition to government efforts, new payment modes such as Zoona and Speedpay are filling the gaps that have for long been left unutilised in the Zambian mobile banking and transaction payments space. Banks know these means of alternative payment are soon filling the space of banking services. For this and similar reasons, most of the almost two dozen banks in Zambia have introduced mobile phone banking which allows clients to make transactions using mobile phones. The first of this service was in 2007 when the Zambia National Commercial Bank (ZANACO) introduced Xapit. Recently, banks such as Investrust, Barclays and Standard Chartered have introduced card-less services which allow users to use ATMs to make payments to others including third parties. An empirical study by Kaulu (2016) revealed that Xapit customers felt that the service was generally effective to them with a number of respondents of the view that FNB’s e-wallet was the next best alternative to Xapit.

On the international scale, DFS are changing the way various countries in Africa and globally do business. The most popular mobile money financial service in the world is the earlier alluded to M-PESA of Kenya (Jack, Suri and Townsend, 2010). Apart from the M-pesa trend, the central bank of Kenya (CBK) in conjunction with various stakeholders introduced M-akiba in June 2017. According to The Economist (2017) Akiba is a Swahili word which means saving. M-akiba is a service providing a way of selling government securities (bonds) via mobile phone so that individual mobile phone holders can trade in small units of government securities from the comfort of their homes using their mobile money accounts. This should make monetary policy more effective as even the unbanked may now have access to government debt instruments. Citing a study published by global mobile operators lobby, Oketch (2013) states that “Mobile phone money services have become the preferred avenue of savings around sub-Saharan Africa” as various individuals use mobile network accounts for their individual and group savings.

4.2. DIGITAL FINANCIAL SERVICES (DFS) MARKET OUTLOOK

As seen from earlier cited studies, Digital Financial Services (DFS) are increasingly becoming a part of the way business is done in Zambia and worldwide. However, there are many opportunities for development in Zambia because some DFS have not yet been introduced in the Zambian DFS market place. This section will look at some of the DFS that have been introduced in other countries but are not yet introduced in Zambia, give a brief outlook of who is likely to introduce them and who the key stakeholders will be.

The first notable DFS which is in operation in other countries but not in Zambia is M-Akiba. This is a government bond issued by the government of Kenya with an aim of raising funds in a financially inclusive manner. The bond leverages on mobile phone penetration to enable many users register; trade and settle their bond dues via mobile platforms. The system uses the Safaricom and Airtel Kenya networks and targeted to raise 5 billion shillings by June 2017. Within the first 15 minutes of its launch, M-Akiba raised 847,000 Kenyan Shillings thereby bringing a notion that it is likely to improve on the bad savings culture that most Kenyans are perceived to have (Murithi, 2010). According to Osano and Cook (2017), the launch of M-Akiba involved the collaboration of various public and private stakeholders including; the Central Bank of Kenya (issuing the bond with the national treasury), Capital Markets Authority (CMA) – providing regulatory oversight, Central Depository and Settlement Corporation (CDS) – managing the bond register and coupon payments under delegation from the central bank, Safaricom and Airtel Money - providing the mobile money accounts as a trading platform, Nairobi Stock Exchange providing a helpline and trading platform and many more stakeholders.

In the USA, the Securities and Exchange Commission allowed the use of block chain technology in the issue of shares. Further, Alexandre (2018) asserts that the SEC in that country requires crypto currency trading platforms to be registered with the commission.
This too might be interpreted as approval by the SEC of crypto currencies – as long as trading platforms for these are registered. The definition of block chain is something Leon et al (2017) elaborate in detail. However, a summary definition by Condos (2016) is that “block chain is an electronic ledger (register) of digital records, events, or transactions that are represented in condensed form known as a hash (digital security feature), authenticated, and maintained through a “distributed” or “shared” network of participants using a group consensus protocol (multiple users).”

Bringing these developments home, no notable exchanges established in Zambia are predominantly using the block chain technology yet. The situation is unlikely to change unless new products using the underlying technology show up in the Zambian market. It would however be important for regulators to keep an eye on what is happening in countries where the said technology has been approved so that the country is ready to manage the consequences of this technology when stakeholders decide to introduce it.

Another notable area where DFS are disrupting the way business is done are crowdfunding platforms. This is where individuals or entities can request and receive funding online directly from each other using a digital platform. This cuts transaction costs and provides easy access to funds. Aggarwal (2017) asserts that Chinese authorities have come up with a host of P2P related regulations due to numerous high profile corporate failures in a market that has seen unprecedented growth. The Chinese market is not the only one seeing growth in crowdfunding. Figure 1.2 below summarises global crowdfunding transaction value predictions by Statistica (2018).

The total value for 2018 is estimated to be around US$9,370 m. Scholars argue that Person to Person (P2P) lending platforms have been the main contributor to this growth. These are usually online portals where borrowers of funds input their details and request for funds while lenders also log on and provide funds to borrowers they wish to fund. Crowdfunding can be used to ask for donations, provide debt and provide equity funding usually with a return for the latter two. Zambians have in recent years tried to set up P2P lending platforms but have not managed to launch on a large scale largely due to failure to completely comply with regulatory requirements. A successful launch and operation of a crowdfunding platform in Zambia will to a large extent depend on compliance with regulatory requirements and provision of a single regulatory framework for crowdfunding with emphasis on P2P systems. This is something that requires increased private and public sector collaboration.

The last but most notable DFS are mobile banking systems. These have reached an advanced stage on mobile network operators’ platforms. Although banks might not currently be intensively using mobile banking as an opportunity to offer a branchless bank, MTN mobile money, Airtel money and ZAMTEL Kwacha could become the next means of payment and saving for the future. Zambians could use these to pay for goods and services, pay utility bills and even pay taxes. So far, the Zambia Revenue Authority, ZESCO and Lusaka Water and Sewerage Company are all accepting mobile money payments as alluded to earlier in this article. Interoperability of mobile money systems however needs to be advocated for in order for more users to get on board. With the issue of circular 6 of 2016 by Bank of Zambia (revising item value limits on cheques downwards), more people and even companies will need to use electronic systems rather than cash – presenting more opportunity for scaling up usage of DFS.

4.3. REGULATION

The advent of digital financial services has been the financial sector’s big game changer. It has not only broadened access for ordinary day to day consumers but has also lowered the barriers of entry into the sector (Pollari, 2016). However, implementation of innovation without supervision is a powerful recipe for disaster (Soo, 2017). A regulatory framework for DFS is important because it would help create stability for various stakeholders in the market and build confi-
Regulation has to however be created in such a way that implementation would result in benefit to the consumers (get more people on board and protect them from financial risk) and enhance continuity of business to the service providers. Overregulation might stifle innovation (Cardone, 2017) while under-regulation could lead to unsafe and often times inefficient digital financial services (Soo, 2017). A balance has to be made so that optimality is achieved. Constant engagement between innovators and regulators can help regulators understand the products and help speed up regulatory approvals. The regulator can also help promote approved services in order for consumers to know which services are safe and which ones are not. For these reasons, proportional regulation is recommended for the Zambian market. Proportional regulation is one where the regulator considers the appetite for the product by consumers and service providers and the provision of safe products rather than just concentrating on the latter.

On the international scale, DFS are changing the way various countries in Africa and globally do business. The most popular mobile money financial service in the world is the earlier alluded to M-PESA of Kenya (Jack, Suri and Townsend, 2010). Apart from the M-pesa trend, the central bank of Kenya (CBK) in conjunction with various stakeholders introduced M-akiba in June 2017. According to The Economist (2017) Akiba is a Swahili word which means saving. M-akiba is a service providing a way of selling government securities (bonds) via mobile phone so that individual mobile phone holders can trade in small units of government securities from the comfort of their homes using their mobile money accounts.

This should make monetary policy more effective as even the unbanked may now have access to government proportional regulation would also further consider the principle of proportionality which implies that small and non-complex institutions can comply with [guidelines] by implementing less complex, but still appropriate… policies, while large and complex institutions have to implement more sophisticated policies (Schenkel, 2017).

Figure 1.3 on page 33 provides a conceptual framework for a study on the impact of proportional regulation on digital financial services.
Figure 1.3: Kaulu’s model for regulation and measurement of impact of Digital Financial Services (DFS)

Source: Author’s construction based on Technology Acceptance Model and Social Impact Assessment Model
4.4. CROSS BOARDER REGULATORY CONSIDERATION

An inherent feature of Digital Financial Services is provision of access to users over a wide geographic area. This leads to consideration of cross boarder regulations and with the advent of Digital Financial Services, Zambia may need to consider these sooner than later. This requires consideration of many questions. For instance, if a company offers services in Zambia but part of its management team is outside the country, who should be held accountable for a wrong decision made by a foreign based manager/employee who is not a Zambian permanent resident? Thus, conduct risk (risk associated with how a company interacts with its customers) needs to be considered in cross boarder regulation. If a foreign based customer did a fraudulent transaction on a local system, how should the regulator go on getting recourse for the party suffering damages? Thus conduct risk needs to be considered from this perspective as well. One way in which it could be managed by regulators is enshrining a senior management regime in regulations that maps responsibility for risk to senior roles within the organisations so that certain senior roles take responsibility for their decisions regardless of the country they are seated in. Further, it could be compulsory that although the firm has operations in other countries, certain key decisions must be clearly mapped to local personnel even if those decisions are undertaken in other countries – this would entail proving that the local person will sign off on all key decisions relating to their role. That way, whether the firm conducts business in a local office or not, a local person would be held responsible for decisions made by the firm. The regulator may then need to approve who seats in those roles so as to ensure they are capable of performing their job objectively and professionally. Arising from all this is the need for interoperability or corporation among regulators - local and foreign. Local regulators that may need to cooperate in readiness for increased activity are BoZ, SEC and ZICTA. This could be done through Memorandum of Understanding (MOU).

4.5. RECOMMENDATIONS

The overwhelming demand for digital financial services implies that regulators need to be more robust in the way they conduct their business in order to cope. At the local scene, clients may want to transfer money across platform (e.g. from airtel to MTN to ZAMTEL). To achieve this, the systems need to be able to interconnect. This state is normally called interoperability. Regulators (ZICTA, SEC and BoZ) and mobile network operators (MTN, Airtel and Zamtel) need to begin working on a concept for the development of a system that has increased interoperability. This could then be extended to interoperability with bank accounts. That way, more people would find making electronic payments easy. Case studies of countries that have done this such as Tanzania would be helpful in this regard. As the regulator strives to push for interoperability, it would be essential to ensure that charges are kept in check as these would act as a barrier to this goal and financial inclusion.

The international nature of access and impact of digital financial services on society also means that many of the digital financial services regulators may need to open arms and prepare to collaborate with other local and international regulators. If Zambia is to introduce a mobile phone traded bond like Kenya, the central bank (BoZ), telecommunications regulator (ZICTA) and securities regulator (SEC) need to collaborate. Further, as telecommunications companies decide to interoperate with their sister companies abroad and offer financial services (e.g. money transfers) via cross border transactions, there would need to collaborate with international regulators. The regulators could therefore reach out now rather than later so that laws and agreements are put in place now rather than later under pressure.

It was highlighted in the article that M-Akiba was brought about through collaboration of various stakeholders (both public and private) including regulators. The proactive involvement of the regulators (Capital and money market regulators) could have contributed to the success of M-Akiba’s launch. The success of a similar product in Zambia would therefore also require the involvement of the Bank of Zambia (BOZ), Securities and Exchange Commission (SEC), the Zambia Information and Communications Technology Authority (ZICTA) and mobile network operators (MTN, Airtel, ZAMTEL and Vodafone). The introduction of a mobile phone traded government bond in Zambia would be essential for monetary and fiscal policy management as Zambia approaches 2022 and 2024; the respective due dates for the repayment of the principal on the $750 million and $1 billion Eurobonds.

The launch of such a product before the year 2022 could also alleviate government of pressures of raising funds through external borrowings as it would
instead mop idle funds held by citizens in commercial banks. Despite the benefits, no stakeholder has made notable efforts towards the introduction such as product in Zambia yet.
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ABSTRACT

This paper aims to understand E-governance in the Public Sector-Electronic Governance and Administration is meant to provide the basic understanding, principles, domains and where it can be applied in public administration and related programs in developing countries. In this paper, you will find out what you need to know about the aims and objectives of the E-governance, uses, domains and benefits accrued by its usage.

5.1. INTRODUCTION

Technological advances have changed the way people go about their daily activities and how they are governed in different societies around the world. Whether one is checking their e-mails or texting or sending messages with other phones, mobile communication is growing, and the potential ability to navigate the World Wide Web is improving dramatically. We use the internet to shop on-line, do banking transactions, book for our flight tickets and make payments on-line, check the weather, do research on any subject and connect with other people. You may wonder what this has to do with public administration. As Internet usage grows, and the use of technology in general grows, so too does the use of technology and Internet by governments and public sector to provide services to their citizens. E-governance is the general term used to describe the government’s use of technology in performing its multiple responsibilities (Holzer and Schwester, 2011). This paper is meant to develop reader's knowledge and understanding on how government services are performed through the modern technology.

Although much of the governance in Zambia is done through the traditional ways, the government through smart Zambia has shown its intentions to move to these more efficiency and effective platforms for its government. The Smart Zambia agenda is part of the 7NDP stipulated by the government through the ministry of finance. Some of areas that have already benefit include e-voucher for supplying agricultural inputs, E-taxes by Zambia Revenue Authority, E-Napsa and E-health among others.

5.2. OBJECTIVE OF THE PAPER

The paper aims to achieve the following learning outcomes:

- Examine the term e-governance;
- Discuss the principles of e-governance and its objectives;
- Examine and discuss types of service delivery in e-governance
- Discuss the major administrative and democratic improvements of e-governance
- The application of e-governance in delivery of public and community services

5.3. WHAT IS E-GOVERNANCE?

E-Governance has become an accepted methodology involving the use of Information Technology in improving transparency, providing information speedily to all citizens, improving administration efficiency, improving public services such as transportation, power, health, water, security and municipal services.

Governance has always been dependent upon technology, in the broadest sense of knowledge, skills, techniques and epistemological strategies, as well as devices, hardware, software and power circuits. As the reach for governance spread into new areas of the globe as well as new aspects of hitherto personal relationships, it has come to rely upon more complex assemblages of technically stored and dis
semanted knowledge (Coleman, 2008).

E-governance is the public sector use of information and communication technologies (ICTs) with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective. E-governance involves new styles of leadership, new ways of debating and deciding policy and investment, new ways of accessing education, new ways of listening to citizens and new ways of organizing and delivering information and services. E-governance is generally considered as a wider concept than e-government, since it can bring about a change in the way citizens relate to governments and to each other. E-governance can bring forth new concepts of citizenship, both in terms of citizen needs and responsibilities. Its objective is to engage, enable and empower the citizen (UNESCO)(www.unesco.org).

E-governance entails the digitized coding, processing, storage and distribution of data relating to three key aspects of governing societies: the representation and regulation of social actors; the delivery of public services; and the generation and circulation of official information (Coleman, 2008).

E-governance is more than just a government website on the Internet. The strategic objective of e-governance is to support and simplify governance for all parties; government, citizens and businesses. The use of ICTs can connect all three parties and support processes and activities. In other words, in e-governance electronic means support and stimulate good governance.

In Zambia, The concept of E-governance has been adopted by the government although at a slower pace compared to most sub-Saharan African countries. For example, the government has introduced the e-voucher in the agricultural sector to serve the over one million smallholder farmers with inputs and agricultural equipment in order to improve food security and agricultural productivity.

According to the 7NDP digital communications are now a crucial component of everyday life. Technologies such as mobile phones and broadband have revolutionized the way Zambians work, socialize and enjoy their leisure time. Improvements in connectivity means that Zambia is rapidly embracing a vibrant digital economy.

The Government has recognized the need to prioritize ICT development. There is evidence that acceleration of ICT broadband penetration, adoption and effective use bring clear social and economic benefits. In particular, it is estimated that increases of 10 percent in broadband penetration on average, have associated increases of 3.19 percent in GDP, 2.61 percent in productivity and a net generation of more than 67,000 jobs.

Zambia is centrally located and surrounded by eight neighboring countries with high potential and opportunity to be the ICT hub in the region. However, the country faces several challenges, such as limited broadband infrastructure, under-utilisation of ICT in industries and business, an underdeveloped ICT industry and innovations and lack of skills among public officials, policy makers, entrepreneurs and citizens to support socio-economic development and regional competitiveness. Furthermore, information systems and e-services have not been put into wide uses in the core business of industries and key sectors. Therefore, there is need to develop broadband infrastructure and services. To address these challenges the Smart Zambia Master Plan has been developed, whose vision is “a prosperous and globally competitive knowledge-based developed country by 2063”, to facilitate efficiency in the economy through the strategic application of ICT for job creation, value addition and global competitiveness. The following are the project objectives:

a) To contribute to the sector’s development by introducing an efficient and advanced telecommunication network as a driving force to further promote the nation’s economic and social development;

b) To support achievement of a variety of government goals, such as better delivery of services to the public and citizens, through better access to information and more efficient government administration;

c) To establish a high capacity fixed and wireless broadband infrastructure for government, business, citizens and ICT regional hub services;

d) To reduce the cost of communication services in Zambia; and

e) To develop education and human capital.

Through the Smart Zambia Master Plan, the Government will achieve the harmonized construction of national ICT infrastructure. It is, therefore, the Government’s intention to integrate construction of all ICT infrastructure under the Smart Zambia Master Plan in a phased approach, to enable the country achieve its objectives in the ICT sector. It is proposed that the Smart Zambia Phase II Project be financed through a
concessional loan at an estimated cost of US$ 369 million to cover the National Optic Fibre Backbone, Metropolitan Area Network, Access Network (fibre and fixed wireless), Government Campus Network, Virtual Landing Stations, Regional Data Centre and a One-stop Government Service Centre.

It clear from the above government vision that the e-governance concept is on the growth path in Zambia as a mode of governance in order to provide quick, efficient and effective public services such as health, education, security, manage taxes, among others.

5.4. PRINCIPLES OF E-GOVERNANCE

According to Quadri Maryam O, Martha Oruku and Okeke C.I (2014), the principles of e-governance are to:

- Build services with citizen choices in mind;
- Increase government accessibility;
- Foster social inclusion;
- Disseminate information in a responsible fashion; and,
- Use taxpayers resources effectively and efficiently.

Cited in the paper on e-governance and public sector by Holzer and Schwester published in 2011 (Holzer and Schwester, 2011).

Let us consider some of the objectives of e-governance. According to Ojo cited in Maduabum (2008: 670), objective of e-governance include the following:

- To ensure transparency in the workings of government;
- To ensure greater efficiency, objectivity, accountability and speed in providing services and information to the public;
- To provide qualitative and cost-effective services;
- To provide a single window for all government services;
- To evolve responsive administration;
- To provide a friendly, speedier and efficient interface; and,
- To eliminate the middlemen

The last objective is very interesting as far as the Zambian case of Farmer input support program through the introduction of e-voucher is concerned. The ministry of Agriculture and Cooperatives, Honourable Michael Katambo MP, recently announced in parliament that the government has been able to save over ZMW 4 billion through the introduction of the e-voucher to provide agricultural inputs to over 800 000 smallholder farmers throughout Zambia. These savings came about because of elimination of the middlemen in the supply chain of inputs.

The next question in the e-governance model of governance is obviously how it is administered. According to Quadri Maryam o. et al. (2014) the major administrative and democratic improvements offered by e-governance are as follows:

- Cheaper and more effective management and processing of information;
- A freer flow of information between departments, agencies and layers within government;
- More professional administrators, supported by standardized, electronically-embedded decision-making systems;
- The routine provision of services according to impersonal rules, as opposed to clientelist arrangements;
- Transparency, particularly in relation to the procurement of government services;
- Opportunities to work in partnership with the private sector in modernizing governmental processes;
- A freer flow of information between government and citizens;
- The strengthening of intermediary democratic institutions, such as parliaments, local government, civil-society organisations (CSOs) and independent media;
- Opportunities for citizens to participate more directly in policy development;
- Opportunities to combine traditional and modern methods of accountability;

5.5. TYPE OF SERVICES OFFERED IN E-GOVERNANCE

The quest to improve service delivery through the use of ICTs in governments typically focuses on four main dimensions. These are:

G2C (Government-to-Citizens): This focuses primarily on developing user-friendly one-stop centers of service for easy access to high quality government services and information. G2B (Government-to-Business): This aims to facilitate and enhance the capability of business transactions between the government and the private sector by improving communications and connectivity between the two parties. For example the patriotic government has
embarked on a number of projects in the construction of roads, airports, health centres throughout all the ten provinces of Zambia. These activities requires the government of the republic of Zambia through Road Development Agency to deal with a lot of business enterprises participating in the construction of these infrastructure and G2B is the best form of platform to improving communication.

G2G (Government-to-Government): This is an inter-governmental effort that aims to improve communication and effectiveness of services between central, provincial, district and local governments in the running of day-to-day administration. It generally aimed at improving the efficiency and effectiveness of overall government operations. Again the patriotic government is forming new districts with the aim of distributing development programs in rural areas. This is a good platform to carry out the activities of services delivery and communications.

Intra-government: This aims to leverage ICT to reduce costs and improve the quality of administration and management within government organization (Islam and Ahmed, 2007).

5.6. DOMAINS OF E-GOVERNANCE

According to Quadri Maryam o. et al. (2014) there are three main domains of e-governance:
- E-administration: improving government processes.
- E-services: connecting individual citizens with their government.
- E-society: building interactions with and within civil society.

Let us look at these three domains in a brief detail.

5.6.1. E-Administration

The main purpose of e-administration is to improve the internal working of the public sector by cutting process costs, managing process performance, creating strategic connections within government bodies, and creating empowerment. Shortening the lead time for passport application from two weeks to one day is an example of e-administration. The current situation at passport office were you would find citizens queuing for passport application is case in point where this domain can be used effectively. The person living in rural district has to travel distances to the provincial office in order to get a passport making the whole exercise costly.

5.6.2. E-Services

Initiative focus mainly on improving the relationship between the government and its citizens by increasing the information flow between them – which notably, involves two-way communication – and improving the service levels of government towards its citizens. Public service institutes offering citizens the opportunity to apply example of e-services.

5.6.3. E-Society

Initiatives for business licenses through a government websites is one extend e-service domain by focusing on institutional stakeholders, such as private sector service providers, other public agencies, and not-for-profit and community organizations. E-society focuses on building long lasting partnerships and social/economical communities: for example through the creation of a business community portal.

The three domains of e-governance are seldom separate in their implementations; rather, they involve overlapping activities as part of the same initiative (Arjan de Jager, 2008).

E-governance as we observe from our discussion may enhance access to government by citizens. It may increase access by those who work within government and those who work with government. It facilitates good governance for all stakeholders.

5.7. APPLICATION OF E-GOVERNANCE

In this section, the author seeks to highlight the areas of application of e-governance concepts.
E-governance as we observe from our discussion may enhance access to government by citizens. It may increase access by those who work within government and those who work with government. It facilitates good governance for all stakeholders.

According to Ojo (2016) cited in Maduabum (2008:670) the application of e-governance include:

- E-government
- ICT
- E-democracy
- E-participation

Let us briefly look into each of these areas of application of e-governance.

Intra-government: This aims to leverage ICT to reduce costs and improve the quality of administration and management within government organization (Islam and Ahmed, 2007).

5.8. E-GOVERNMENT

In the above section, we learnt a lot about e-governance. In this section we are focusing on the term ‘e-government ’ confusion still reigns concerning the difference between the two terms ‘e- governance’ and ‘e-government’. E-governance denotes a “wider concept that defines and assesses the impacts technologies are having on the practice and administration of governments and the relationships between public servants and the wider society, such as dealings with the elected bodies or outside groups such as not for profits organizations, NGOs or private sector corporate entities” and e-government as “a narrower discipline dealing with the development of online services to the citizen, more the e of any particular government service – such as e-tax, , e-education , e-learning, e-auction, e-transportation, e-security, or e-health Sheridan and Riley (2012) cited in Palvia and Sharma (2007). This section, therefore will enhance readers’ knowledge on the concept of ‘e-government’. This concept is more of the application of e-governance in the public sector.

5.9. WHAT REALLY IS E-GOVERNMENT

There are many definitions of E-government. Let us consider some of these definitions. E-government is the use of information technology to free movement of information to overcome the physical bounds of traditional paper and physical based systems. It is the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees.

The aim of e-government therefore is to provide efficient government management of information to the citizen; better service delivery to citizens; and empowerment of the people through access to information and participation in public policy decision-making (Basu 2004).

E-government is the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends:

- Better delivery of government services to citizens,
- Improved interactions with business and industry,
- Citizen empowerment through access to information, or more efficient government management.

The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions (World Bank, 2011) (www.worldbank.org).

For example, at Road safety agency (RTSA) selected services by the agency such as Renewal of driving licenses, road taxes, change of ownership, and many other services that do not need physical inspection can be done through e-government and this can results in better delivery of services to citizens, improved interactions with the people, businesses, industry and getting feedback for continuous improvement.

E-government is the use of new information and communication technologies (ICTs) by governments as applied to the full range of government functions. In particular, the networking potential offered by the Internet and related technologies has the potential to transform the structures and operation of government (OECD, 2009).

E-government involves using information technology, and especially the Internet, to improve the delivery of government services to citizens, businesses, and other government agencies. The common theme behind these definitions is that e-government involves the automation or computerization of
existing paper-based procedures that will prompt new styles of leadership, new ways of debating and deciding strategies, new ways of transacting business, new ways of listening to citizens and communities, and new ways of organizing and delivering information. Ultimately, e-government aims to enhance access to and delivery of government services to benefit citizens. More important, it aims to help strengthen government's drive toward effective governance and increased transparency to better manage a country's social and economic resources for development (Basu, 2004).

5.10. OBJECTIVES OF E-GOVERNANCE

Objectives of e-governance as provided by Ajayi in Maduabum (2008:670) are:
- To replace traditional governance with electronic governance;
- To create knowledge-based governance;
- To enhance Simple Moral Accountable Responsive and Transparent (SMART) governance;
- To reduce bureaucracy;
- To maximize productivity and quality;
- To eliminate waste;
- To increase efficiency;
- To create an easy and free access to government information; and
- To reduce the cost of service delivery.

Beyond these general objectives, we can also consider two distinct objectives of e-government. As regards the objectives of e-government a distinction should be made between the objectives for internally focused processes (operations) and objectives for externally focused services for external strategic objectives.

5.10.1. External Strategic Objectives

The external objective of e-government is to satisfactorily fulfill the public's needs and expectations on the front-office side, by simplifying their interaction with various online services. The use of ICTs in government operations facilitates speedy, transparent, accountable, efficient and effective interaction with the public, citizens, business and other agencies.

Internal strategic objectives. In the back-office, the objective of e-government in government operations is to facilitate a speedy, transparent, accountable, efficient and effective process for performing government administration activities.

Significant cost savings (per transaction) in government operations can be the result.

In summary, E-government is contributing to making public administration more efficient and effective. By enabling access to government services, e-government has the potential of enhancing social and economic development of any country. When citizens have better access to information on available services, making payments online, doing e-transfer etc all these can enhance productivity at both the private and public levels. Effective use of e-government can also improve the efficiency and effectiveness of the public sector and linkages between government agencies.

5.11. INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

We mentioned in the last section that the use of ICT in government operations facilitates speedy, transparent accountable, efficient and effective interaction with the public, citizens, business and other agencies. There is a growing recognition worldwide that effective public sector governance requires the use of ICT to achieve more efficiency in the functioning of government and to improve the delivery of government services for organizations and individuals. Our focus in this section is on the application of ICT by the government to provide services.

Most of the developing countries understand the enormous potential of ICT, not only as a tool for improving governance and creating more jobs, but also more significantly as a means to enhance the standard of living of the people. The ICT policy aims at increased application of IT in all occupations, enhancing the IT industry base, creating a robust state information infrastructure and creating human resources for IT (Basu, 2004). Although the policy statements differ from country to country however there are some fundamental similarities in the objectives, which can be summarized as following:

5.12. OBJECTIVES OF THE ICT POLICY

- Upgrading of the standard of living of the people of the state through use of IT in all sectors as a tool to enhance productivity, efficiency and optimize utilization of resources, and through full exploitation of the employment potential of the IT sector.
• Establishment of an information infrastructure comprising a high speed broadband communication backbone, nodes, access network, distributed data warehouses and service locations to cater for the needs of trade, commerce, industry and tourism and also to enhance the delivery of government services to the people.
• Facilitating the flow of direct investments.
• Development of human resources for ICT through increased use of ICT in educational institutions and through academic and training program that improve the employability of educated youths in the ICT sector.
• Facilitation of decentralized administration and empowerment of people through the application of ICT (Basu, 2004:118). E-governance which we discussed in the first unit is said to have its firm root in the power of ICTs which provide three basic change potentials for good governance and development. These change potentials can, in turn bring five main benefits to a developing economy.

5.12.1. Benefits
• Government that is cheaper
• Producing the same outputs at lower cost.
• Government that does more
• Producing more outputs at the same total cost.
• Government that is quicker
• Producing the same outputs at the same total cost in less time.
• Government that works better
• Producing more outputs at lower total cost in less time and to a higher quality standard
• Government that is innovative
• Producing new outputs

The first three groups of benefit are classified as the efficiency gains while the last two could be regarded as the effectiveness gains (Maduabum, 2008).

5.13. ROLES OF ICTs IN E-GOVERNMENT

Supporting Economy of Implementation – ICTs increases the efficiency of government administration (this is a direct result of the replacement of street level bureaucrats’ by electronic information devices). Management is further enabled to more strictly control administrative activities of the workforce through the use of ICT application (Snellen, 2005). Supporting Public Service Provision – both private and public sectors now apply ICT to integrate and improve their service delivery.

Through e-Business, the expectations of people with respect to the service level of public administration are rising.

Supporting Democracy – representative democracy relies on the belief that best way to make a decision is wider participation for all citizens having access to relevant information. ICT promises direct democracy in the form of continuous opinion polling, instant referenda, tele-conferencing, digital cities, e-voting, e-electorate and discussion groups. ICT can enhance interactive policy-making for effective democratic governance. The Internet-related ICT facilities which are used in this respect are e-mail, UseNet and newsgroups, Internet relay chat, and the World Wide Web (Snellen, 2005).

Furthermore, in developing countries like Zambia there are issues, challenges and opportunities that can be identified in the use of ICT and its application in the E-governance. Some of the issues, challenges and opportunities are discussed in the table below:
Table 3.1 Issues, Challenges and Opportunities for use of ICT in E-government

<table>
<thead>
<tr>
<th>Issues</th>
<th>Challenges and opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision and policy making initiated by governement</td>
<td>ICT can exploit the vast reserves of data the public sector has available to develop, model, visualize and simulate decisions and policies. Also by involving constituencies through political representatives or directly through processes of information, consultation, active participation and elections.</td>
</tr>
<tr>
<td>Empowerment from the bottom</td>
<td>ICT can help to leverage the voices and expertise of huge numbers of individuals and groups, setting their own agendas and developing their own policies in new forms of crowdsourcing, mass collaboration and mass creativity. This can also result in short term single issue politics, and sometimes in instant street politics and forms of mob-rule, but can potentially also build to more permanent countervailing power bases possibly at odds with governments.</td>
</tr>
<tr>
<td>Empowering communities and localities</td>
<td>ICT can support the extension of participation beyond formal politics and the ballot box, by promoting subsidiarity at local and neighborhood level. This leverages local resources, know-how and skills for developing new forms of advocacy, support and social capital, which can both strengthen diverse cultures and interests as well as bridge between them.</td>
</tr>
<tr>
<td>Transparency and openness</td>
<td>Can be supported by ICT through freedom of information and consultation, to reveal the purposes, processes and outcomes of government, also through real-time tracking and tracing. This will help place responsibility, reduce corruption and make decisions more responsive, although legitimate privacy and the space for risk taking should be safeguarded</td>
</tr>
<tr>
<td>Accountability, rights and responsibilities</td>
<td>ICT contributes to these becoming blurred as decision and policy-making are opened up and government shares the stage with other actors. Important questions are raised about whose voices are heard and who do they represent, with the ever present danger of trivialization and short-termism unless the right to participate in policy making is balanced with some responsibility for policy impacts.</td>
</tr>
</tbody>
</table>

Source: developed by the author
5.14. REASONS WHY GOVERNMENT USES ICTs IN ITS OPERATIONS

i. Priority development needs that require government involvement. E-government applications are best embedded in areas that are perceived as closely related to the priority development needs of the society. This approach creates broad supports, making it easier to overcome inherent difficulties and to sustain attention, commitment and funding.

ii. Efficiency and effectiveness as key success criteria of government involvement. It is best if the role that government plays in such area is judged partly or predominantly by factors that ICT can bring.

iii. However, whether government will make use of ICT in its operation, and the ability of government to do so will depend on the following factors provided by Arjan de Jager (2008):

• Availability of (initial) funding. The initial pilot e-government operation should start with a good understanding of the cost involved and with assured funding that follows careful analysis of opportunity costs.

• Skills and culture of the civil service. Civil servants must be able (through ICT, change and program management and partnership building skills) and willing to support e-government, or at a minimum must be eager to learn and change.

• Co-ordination. This involves the necessary ‘back-room’ co-ordination and effort – within and between government agencies, and this must take place before any e-government application goes on-line in order to avoid duplication, assure interoperability and meet the expectations of users.

• The education and literacy levels of the target audience.

iv. Legal Framework. Legal requirements should be dealt with at the initial stage of the ICT policy and operation by the government.

v. ICT Infrastructure. Supporting infrastructure needs should be assessed against the background of requirements and desired results of e-government development plans.

vi. Political leadership and long-term political commitment. The chief executive officer of the public sector must be committed to e-government; he must lead and build broad support for it, and must be eager to learn.

vii. Public engagement. The public should have a personal stake in e-government development. Their engagement should be reinforced by actively, genuinely and continuously soliciting people to participate in the development of e-government applications so that there are custom-crafted to the way people live and work.

viii. Plans for development of human capital and technical infrastructure. There should be a vision and plans for closing the existing gaps in ICT skills and access, otherwise, neither the public administration nor the citizenry can hope to become ICT literate and capable, which are important ingredients for e-government success.

ix. Partnership. The government should involve business firms and civil society organization (CSOs) as its partners in securing access and adequate capacity to service the ICT network.

x. Monitoring and evaluation. Setting clear responsibilities and realistic benchmarks for e-government, as well as for its transparent monitoring, is an important ingredient for eventual transparency and accountability framework in the public sector (Arjan de Jager, 2008).

In our discussion above, we can deduce that ICTs are very much likely to lead to more efficient service delivery. ICTs are at the core of modern transformations of public administration. ICTs applications can play a role in the enhancement of the internal effectiveness and efficiency of the executive functions and by so doing bring a great deal of improvement on government services.

5.15. E-DEMOCRACY

In this section of the paper, readers will be introduced to the concept of ‘e-democracy’. There is increasing recognition of the need to consider the innovative application of ICTs for participation that enables a wider audience to contribute to democratic debate. This section will discuss this issue in detail.

5.15.1. E-democracy – What does it mean?
E-democracy is concerned with the use of information and communication technologies to engage citizens, support the democratic decision making processes and strengthen representative democracy (Macintosh, 2004). The concept of E-democracy refers to the use of information and communication technology (ICT) in political debates and decision-making processes, complementing or contrasting traditional means of communication, such as face-to-face interaction or one-way mass media. (Paivarinta and Saebo, 2006). E-democracy is the use of information and communication technologies and
strategies by “democratic sectors” within the political processes of local communities, states/regions, nations and on the global stage.

The “democratic sectors” include the following democratic actors:
- Government
- Elected officials
- Non-Governmental Organizations (NGOs)
- Media (and major online Portals)
- Political parties and interest groups
- Civil society organizations (CSOs)
- International governmental organizations
- Citizens/voters

E-democracy Conceptual mode

![E-democracy Conceptual mode](image)


This model illustrates e-democracy activities as a whole. Governments provide extensive access to information and interact electronically with citizens, political groups run online advocacy campaigns and political parties’ campaign online, and the media and portal/search sites play a crucial role in providing news and online navigation. In this model, the ‘Private Sector’ represents commercially driven connectivity, software and technology. For example, the recently held mayoral elections in Lusaka, a number of political parties used online media to reach their target voters. This a typical example of e-democracy system.

5.15.2. Models of E-democracy

<table>
<thead>
<tr>
<th>Citizens set the agenda</th>
<th>Partisan democracy</th>
<th>Direct democracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government (politicians and officers) set the agenda</td>
<td>Liberal democracy</td>
<td>Deliberate democracy</td>
</tr>
</tbody>
</table>

Citizens mainly implicitly included in decision making processes
Citizens have an explicitly defined role in decision making processes

Let us consider some of the characteristics of these models of e-democracy as analyzed by Paivarinta and Saebo (2006):

5.15.3. Partisan Democracy

Partisan democracy initiatives are characterized by citizen-initiated participation and implicit citizen intervention in the decision-making process.

Active citizens participate in the political debate, but not through traditional channels or solely through representatives. Information technology seeks to obtain visibility for alternative political expressions and criticism without interruptions from the political elite. Unrestricted discussions set the agenda. Examples include use of independent online communities discussing politics, chat room discussions, Usenet discussions, and blogging (2006).

5.15.4. Liberal Democracy

Liberal democracy in general is characterized by a representative government, where citizens form the electorate, giving mandates to representatives at the local level but also participating in the public debate. Online communication becomes part of the issues here as citizens may be asked to submit suggestions to the public authorities, citizens can be given opportunities to communicate with representatives and government officials.

5.15.5. Deliberative Democracy

The ideal of Deliberative Democracy connects citizens more explicitly and directly to decision making processes and emphasizes the role of open discussions in a well-functioning public sphere.
Politicians and citizens share an interest in dialogue and discourse leading to the formation of political opinion. Deliberative E-Democracy implementations, with explicitly defined relationships to the actual decision-making processes, may increase the level of citizen participation, if compared to traditional means of political discussion between citizens and decision-makers.

The use of the framework to analyze particular implementations can reveal the democratic ideas beneath the surface, and address particular ways to use a technology according to the pursued democracy model (Paivarinta and Saebo, 2006).

Engaging your “own” citizens or constituents through digital media includes enhancing active participation in law-making, policy-making, and legislative process, all of which are influenced by a variety of forces—public opinion, debate, lobbyists, special interest groups, consultation with constituents, committee hearings, and expert testimony (Caldow, 2004). This perception actually concludes our discussion on E-democracy in this paper and next looks at E-participation.

5.15.5. Direct Democracy
Direct Democracy focuses on how traditional institutions lose power in favour of network-based groups or individuals. In Direct Democracy, network-based groups and individuals take over the role of traditional institutions. A direct E-Democracy initiative requires communication technology to support coordination among a great number of decision-makers, i.e. citizens, possibly geographically scattered, with diverse interests and backgrounds (Paivarinta and Saebo, 2006: 823–827).

By looking at the main purposes of discussion forums for different democracy models Paivarinta and Saebo illustrate how the framework can be used to identify differences in how a particular technology may work under different conditions (democracy models). This is presented in table 3.3.

5.16. E-PARTICIPATION

5.16.1. Introduction
In the last section of this paper we discussed the term ‘e-democracy’ in brief detail. In this section we are still discussing an issue that is related to democracy. Democracy is about popular participation – getting people to be involved in the process of decision-making. Democratic political participation must involve the means to be informed, the mechanisms to take part in the decision-making and the ability to contribute and influence the policy agenda. Using ICT in the course of democratic participation is particularly attractive to a number of target users, including citizens living abroad, younger generations (Generation X), and companies and organizations which would otherwise not be able to participate.

5.16.2. The objectives
At the end of this section, you should be able to:

a) Discuss the term “e-participation; 
b) Examine the various forms which e-participation can take; 
c) Discuss the outcomes of e-participation

5.16.3. E-Participation – What does it mean?
E-participation involves the extension and transformation of participation in societal democratic (ICT), primarily the Internet and its associated technologies. It aims to support active citizenship with the latest technology developments, increasing access to and availability of participation in order to promote fair and efficient society and government and consultative processes mediated by information and communication technologies (Saebø, Rose and Flak, 2008). E-participation is a relationship based on partnership with government in which citizens actively engage in defining the process and content of policy-making. It acknowledges equal standing for citizens in setting the agenda, proposing policy options and shaping the policy dialogue – although the responsibility for the final decision or policy formulation rests with government (OECD, 2001).

Many forms of ICT with the potential to support participation include chat technologies, discussion forums, electronic voting systems, group decision support systems, and Web logs (blogs).

5.16.4. E-Participation Objectives
Let us consider some of the objectives of e-participation.

• Reach a wider audience to enable broader participation.
• Support participation through a range of technologies to cater for the diverse technical and communicative skills of citizens.
• Provide relevant information in a format that is both more accessible and more understandable to the target audience to enable more informed contributions.
### Table 3.3: Example of Models of E-Democracy

<table>
<thead>
<tr>
<th></th>
<th>Partisan Democracy</th>
<th>Direct Democracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizens set the agenda</td>
<td>Discussion forums are channels for expressing opinions by citizen groups often criticizing existing power structures.</td>
<td>Discussion forums represent a direct channel to raise issues and affect decisions.</td>
</tr>
<tr>
<td></td>
<td>No explicit connection to existing governmental or political decision-making processes is defined beforehand. Citizens set the agenda for public discussion but not for decision-making.</td>
<td>The citizens are online affecting the decisions to be made (mostly at the local level). Citizens set the agenda both for public discussion and decision-making.</td>
</tr>
<tr>
<td></td>
<td>ICT seeks to obtain visibility for alternative political expressions uninterrupted by political elite.</td>
<td>ICT is a crucial pre-condition for democracy to support coordination among decision makers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Liberal Democracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government (politicians and officers) set the agenda</td>
<td>The candidates inform citizens about their arguments whereas the citizens try to lobby the candidates. The purposes of communication are defined beforehand by the authorities,</td>
</tr>
<tr>
<td></td>
<td>The democracy is regarded as occurring after the citizens have been informed about the candidate viewpoints, and vice versa, before the elections, and about the decisions made in between.</td>
</tr>
<tr>
<td></td>
<td>ICT seeks to improve the amount and quality of information exchange between government and citizens.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Deliberative Democracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizens mainly implicitly included in decision making processes</td>
<td>Discussion forums are used for targeted for purposes actually involving citizens in public decision-making processes. The politicians and officials are continually sensitive to the opinions from the field.</td>
</tr>
<tr>
<td></td>
<td>The citizens have a good reason to expect that their voices are heard concerning a particular matter initiated by the government.</td>
</tr>
<tr>
<td></td>
<td>ICT is developed for increased citizen participation and involvement in decision making processes.</td>
</tr>
<tr>
<td>Citizens have an explicitly defined role in decision making processes</td>
<td></td>
</tr>
</tbody>
</table>
5.16.5. Six forms of Participation Offerings are Identified Below

i. Information: Offers which are related to the provision of, access to and development of information of public agencies and which are conditions for the success of other forms of participation.

ii. Transparency through third parties: Informal offers with reports concerning measures taken by the legislator or by the executive, thereby enabling public control.

iii. Consultation: Forms of participation by which expertise as well as votes from citizens, interest groups and stakeholders from the business community and civil society are sought for on various topics.

iv. Applications / complaints / petitions: Offers which enable the submission of proposals or criticism to agencies and public authorities with decision-making powers, usually via intermediary institutions created specifically for this purpose.

v. Cooperation: Offers which are designed to enable consensus-based cooperation between administration agencies, policymakers, citizens as well as stakeholders from the business community and civil society and which lead to collective preferences and hence (also) to results which diverge from initial positions.

vi. Activism / campaigns / lobbying: Forms of participation where individuals or organized groups take measures which are designed to generate attention and support for topics and positions as well as particular interests and which hence contribute towards the formation of political opinion and will (Albrecht et al., 2008).

5.16.6. Levels of Participation that can be used to Characterize E-Democracy Initiatives

According to Paivarinta and Saebo (2006) there three levels of participation that can be used to promote democracy in society:

The first level is the use of technology to enable participation:

E-enabling is about supporting those who would not typically access the internet and take advantage of the large amount of information available. The objectives include how technology can be used to reach the wider audience by providing a range of technologies to cater for the diverse technical and communicative skills of citizens. The technology also needs to provide relevant information in a format that is both more accessible and more understandable. These two aspects of accessibility and understandability of information are addressed by e-enabling.

The second level is the use of technology to engage with citizens

E-engaging with citizens is concerned with consulting a wider audience to enable deeper contributions and support deliberative debate on policy issues. The use of the term 'to engage' in this context refers to the top-down consultation of citizens by government or parliament.

The third level is the use of technology to empower citizens:

E-empowering citizen is concerned with supporting active participation and facilitating bottom-up ideas to influence the political agenda. The previous top-perspectives of democracy are characterized in terms of user access to information and reaction to government-led initiatives. From the bottom-up perspective, citizens are emerging as producers rather than just consumers of policy. Here there is recognition that there is a need to allow citizens to influence and participate in policy formulation (Macintosh, 2004).

5.16.7. E-Participation Benefits

For project owners:

- Cost Reduction
- Resource rationalisation
- Greater productivity and efficiency
- Staff who are more competent and skilled in their jobs and thus achieve greater output, etc

For intended users:

- Successful access to and use of e-Participation tools and services by intended users
- Changed e-Participation use patterns, e.g. more and better use.
- Increased user satisfaction
- Greater empowerment of citizens, businesses, communicaites

For all stakeholders:

- Time saving and more convenience
- Simplified procedures
- Increased security

• Engage with a wider audience to enable deeper contributions and support deliberative debate (Macintosh, 2004)
• Less bureaucracy and administration
• More transparency, accountability, etc.
• Better policy development
• Better policy-making
• Better decision-making
• Improved legislation

5.16.8. Conclusion
E-participation aims to support active citizenship with the latest technology developments, increasing access to and availability of participation in order to promote fair and efficient society and government. Democratic political participation must involve the means to be informed, the mechanisms to take part in the decision-making and the ability to contribute and influence the policy agenda. With greater opportunity being made available to citizens to participate in decision-making through the use of internet for example, it is assumed that citizens will be able to influence governmental decision.

5.16.9. Methodology
The methodology that was adopted for the paper was mainly literature review and document analysis (content analysis) through reviewing of existing sources both online and offline sources. The sources included scholarly work, government documents such as seventh National development plan, Central statistics office, and journals.

5.17. CONCLUSION
Governance has always been dependent upon technology, in the broadest sense of knowledge, skills, techniques and epistemological strategies, as well as devices, hardware, software and power circuits. As the reach of governance has spread into new areas of the globe as well as new aspects of hitherto personal relationships, it has come to rely upon more complex assemblages of technically stored and disseminated knowledge (Coleman, 2008).

E-governance is the public sector’s use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective. E-governance involves new styles of leadership, new ways of debating and deciding policy and investment, new ways of accessing education, new ways of listening to citizens and new ways of organizing and delivering information and services. E-governance is generally considered as a wider concept than e-government, since it can bring about a change in the way citizens relate to governments and to each other. E-governance can bring forth new concepts of citizenship, both in terms of citizen needs and responsibilities. Its objective is to engage, enable and empower the citizen (UNESCO).

E-governance entails the digitized coding, processing, storage and distribution of data relating to three key aspects of governing societies: the representation and regulation of social actors; the delivery of public services; and the generation and circulation of official information. E-governance is more than just a government website on the Internet. The strategic objective of e-governance is to support and simplify governance for all parties; government, citizens and businesses. The use of ICTs can connect all three parties and support processes and activities. In other words, in e-governance electronic means support and stimulate good governance.

In this paper the concept of E-governance has been discussed, its principles and application including the domains used in its administration.
REFERENCES


ABSTRACT

Assessment and feedback are critical in the learning experience of any student, especially in cases where continuous assessment (CA) accounts for a substantial portion towards final examination marks. The purpose of this paper is to evaluate the impact that ICTs have had in education assessment and feedback. The study revealed that the use of ICTs in education can enhance efficiency and effectiveness in assessments and feedback. The study synopsises the relevant research on the use of information and communication technology (ICTs) in education assessment and feedback. Specifically, it reviews studies that have touched upon the merits of ICT integration in education assessment and feedback in tertiary institutions, critically looking at barriers or challenges encountered in the use of ICTs and factors influencing successful ICTs implementation in education assessment and feedback. The study recommends up-scaling of the use of ICTs as a panacea in delivering of quality education to learners.

Keywords: turnitin, reusable comment, continuous assessment, e-platforms, similarity index.

6.1. INTRODUCTION

Education assessment and feedback in institutions of higher learning can be perceived as any information communicated to the learner as a result of learning-oriented actions. None the less, formal feedback is provided in response to students' work on formative assessment such as assignments, essays or research projects/dissertations. In order to be effective, feedback on assessments needs to be accurate, timely, constructive, and personal without being generalised. The objective of the review is to evaluate the impact that ICTs and education assessments and feedback have on the learners in tertiary institutions.

6.2. LITERATURE REVIEW

Hyland (2000) posited that feedback is an essential component in all learning contexts and serves a variety of purposes including evaluation of student achievements, development of students' competencies, understanding and evaluation of students' motivation and confidence. However, within teaching and learning in a higher education setting, assessment and feedback can be perceived as any information communicated to the learner as a result of any learning oriented action.

6.3. ASSESSMENT FEEDBACK AND QUALITY

Feedback given as part of formative assessment enables learners to consolidate their strengths, identify their weaknesses and guide them about the necessary actions required of them at every stage of their learning trajectory. However, in order to promote learning that leads to higher levels of achievement in cognitive and skills outcome, formative feedback should have a range of qualities. Race (2006); Irons (2008); Juwah et al, (2004); and Shute (2008) discuss and review these key quality attributes and explain that feedback needs to be:

Timely: feedback is more effective if it is provided timely since students can still recall how they addressed each assessed task, Race (2006). Timely feedback is also important because it allows students to apply it to future learning and assessments. It is also important that the feedback timeframe is clearly communicated to the students.

Motivational: feedback may have positive or negative effect on student motivation and self-esteem. It affects students' personal feelings which, in turn, affect their engagement in the learning process, Juwah et al, (2004). As a result, formative feedback should be empowering and constructive in order to aid student motivation and encouragement.

Individual/personal: each student has unique strengths and weaknesses. As a result, in order to be effective and enable students to improve their competences, formative feedback must fit each student's achievements. It needs to be personalised and tailored to individual students' strengths and weaknesses.

Manageable: feedback should certainly be detailed enough to ensure that students understand their
strengths and weaknesses. Nevertheless, over-detailed feedback forms and too many comments can result in confusing students and making it hard for them to separate the important feedback. Consequently, feedback should be manageable and allow students to easily interpret and benefit from the feedback they need the most Race (2006).

Directly related to assessment criteria/learning outcomes: assessment criteria establish clear and unambiguous standards of achievement and must be related to the learning outcomes of a course. Since assessment criteria constitute what students had to achieve, formative feedback should explain the extent to which a student achieves each separate assessment criterion, identify knowledge gaps and address specific errors and preconceptions. Students’ reception of feedback is very important Yorke (2003). Students with positive mindset can perceive feedback as opportunity for further development while students with a negative attitude may be discouraged. As a result, quality formative feedback should also be effectively communicated to students in order to aid motivation and ensure that students engage with the content of the feedback.

6.4. METHODOLOGY

Methodology and research design direct the researcher in planning and implementing the study in a way that is most likely to achieve the intended goal. It is a blueprint for conducting the study Burns & Grove (1998). This chapter therefore describes the research design and methodology that was used, including sampling and data collection and analysis.

6.4.1. Population Description and Justification

The sample for the study involved seven (7) subject lecturers at ZCAS, (3) lecturers from University of Zambia (UNZA) and (4) lecturers from University of Lusaka (UNILUS) while thirty (30) students were picked from different programs: ten (10) from University of Zambia (UNZA) programs, ten (10) from University of Greenwich programs and (10) from UNILUS.

Of the 30 students, (15) were females and (15) were males. Of the ten (10) lecturing staff, (6) were males and four (4) were females. This composition was deemed to be representative enough on which results obtained would be extrapolated and represent the general picture.

6.4.2. Sample Size and Sampling Method

This study was a survey. It assessed the educational assessment using ICTs of candidates from ZCAS, UNZA as well as University of Greenwich. Two questionnaires were designed, one for the lecturers and teacher trainers and the other one for the students. The respondents were required to answer questionnaires that elicited information on their demographic details, examinations question paper development and marking procedure. This ensured that all relevant information for the study was collected, and would be useful to other researchers who may want to undertake research of a similar nature. This study used both quantitative and qualitative methods of data collection. Questions were posed through the questionnaires and responses based on a likert scale with categories of response coded numerically, in which case the numerical values were defined for this study where 1 = strongly agree, 2 = agree, 3 = disagree and 4= strongly disagree.

6.4.3. Data Collection and Analysis

Data was analyzed quantitatively and qualitatively. Qualitative data was analyzed by the creation of themes after the responses were coded. Quantitative data was analyzed using MS Excel.

6.4.4. Presentation and Analysis of Data

According to De Vos (1998), data analysis in qualitative research is a challenging and highly creative process. This chapter focuses on the presentation and analysis of data obtained from research questionnaires. The findings relate to the research questions that guided the study. Data was analyzed to identify, describe and explore the relationship between quality assessment using ICTs and the manual brick and mortar marking as well as the general assessments with the E-Platforms.
6.5. RESULTS

6.5.1. Suitability of ICTs in student assessments by Lecturers

Out of the 10 lecturers interviewed, (7) indicated that the use of ICTs have reduced their work load and has improved the quality of assessments in the that there is now consistency and objectivity in assessing large numbers of students while (2) wanted to maintain the traditional way of marking with red ink and putting asterisks with their personalized comments, while (1) lecturer was not sure at all.

Suitability of ICTs in student assessments by Students.

6.5.2. Convenience of E-Platforms in education assessments

Out of the 30 students interviewed, seventeen (17) indicated that the ICTs were a good and faster means of learning and getting feedback. They mentioned softwares such as Turnitin and Rubric as among the foremost innovations in ICT that has revolutionised the way the assessments are conducted especially when the numbers involved are big. Only Two (2) were not in support of the ICTs claiming they were prone to human error and preferred the old way of assessing the learners while one was not sure.

6.5.3. Electronic Assessment and Feedback Methods

There exist a number of ICT tools that can be used in the provision of formative assessment and feedback. Depending on particular contexts (traditional classroom teaching, blended learning, distance learning) and the type of the formative assessment, lecturers can employ one or more combinations of traditional and electronic feedback methods.

Type written comments, feedback forms and annotated student work are in this case more common electronic techniques for producing feedback.

The extent to which these feedback techniques and communication methods facilitate the provision of quality feedback is applauded since they integrate differently the timeliness, motivation, personalization, manageability and relation to assessment criteria quality attributes of feedback.

6.5.4. Modular Object-oriented Dynamic Learning Environment (Moodle)

Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create a personalized experience environment. Moodle is used for blended learning, distance education, flipped classroom and other e-learning projects in schools, colleges and universities as well as work places in other sectors. With customized management features, it is used to create private websites with online courses for educators and trainers to achieve learning goals. Moodle allows for extending and tailoring environments using community source plugins. Lecturers support for the composition of formative feedback enables the setup of a feedback form template through a user-friendly interface in which the tutor selects and specifies a number of mandatory and optional elements. As seen in figure 1 below, the interface for setting up a feedback form is divided into four parts:

The first part includes basic information about the tutor (name, telephone number and email). The second part requires details about the formative assignment. These details include an assignment title and number, as well as, details about the academic session in which the assignment was given. The third part allows the lecturer to write the assessment criteria.
Students’ work will be evaluated against these specific criteria which should be clearly communicated to students in the assignment handout. This part of the feedback form’s setup is dynamic since a lecturer can dynamically add criteria by clicking the “Add Another Criterion” button. Furthermore, a tutor may choose to provide an individual mark for each assessment criterion.

Enabling this option activates textboxes in which the tutor can type the percentage of the contribution of each of the assessment criteria towards the total final mark. The fourth and final part of the feedback form setup allows the tutor to specify four extra parameters. The parameter “Enable automatic late submission penalties”, if checked, triggers a build-in algorithm that enforces the late submission penalty policy followed at the author’s institution.

More specifically, there is a 5% reduction in the mark that would have been awarded for each day that has passed between the original submission date and when the work is handed in, for a maximum of 7 days. The second parameter relates to plagiarism. Here the software checks the similarity index (SI), how much work is copied from other authorities without acknowledging them. If checked, the tutor will have to provide for each student, information from an external plagiarism detection system, such as percentage of matching content, which may result in the reduction of a student’s mark. Student names and identification numbers are already inserted in the system in a manner similar used in most learning management systems. Moodle can display an alphabetical list of registered students through which a tutor can easily invoke a specific student’s feedback form by clicking a corresponding “Edit” link. The specific list also informs the tutor about the assessment status (completed or pending) for each student. Once the assessment process has been completed for all students, a tutor can allow students to see their feedback and performance by clicking the “Enable Feedback to Students” button.

### Assessment status

#### 6.5.5. Learning Management System

Learning Management System (LMS) is software that assists companies with managing, delivering, and evaluating their corporate e-Learning program. Just like Moodle software facilitates handling student assessment and evaluation and assists with handling financials. An LMS lets one design, develop, and provide e-Learning courses to the learners and lecturers at large. According to Hetiseich (2015), LMS is the next big thing when it comes to online learning. He asserts the following:

- The majority of LMS users use cloud-based systems, coming in at 87%.
- Customers primarily choose LMS software based on functionality (53%), price (32%), support (5%), corporate status (3%), and software reputation (3%).
- The LMS market is expected to grow from $5.22 billion to $15.72 billion by 2021.
- By 2020, nearly 25% of students will be online-only.
- Around 30% of LMS purchasers are large companies that particularly benefit from giving their workers an easily available, standardized learning environment.

An LMS can be an effective platform for instructional offerings. Whether it is an academic institute offering online classes, a college enhancing its class-based courses through e-Learning, a company instructing its customers, or a government organization trying to educate the public, an LMS is the future of learning. This software has features that aid easy assessment of educational assignments such as:

a) **Course and Content Management:** The primary purpose of an LMS is to effectively create and manage e-Learning courses and learning material. Therefore, choose an LMS that allows administrators to effortlessly construct and manage courses and content.

b) **User Management:** An LMS is able to facilitate effective user management, including the automation of periodic and tiresome tasks, such as forming groups of learners, managing group registration, deactivation of learner accounts, and accommodation of new users.

c) **Reporting Analytics:** A LMS possesses the ability to track and assess the impact that the learning sessions have on learners. It allows lecturers to develop actionable insights into their learning through customizable reports and control panels that present user progress via different metrics.
6.6. DISCUSSION

Students and lecturers viewed ICTs and education assessment and feedback as a leap forward in the right direction. To the lecturer, ICTs such as the expounded module platform serves many purposes. Among them are that the lecturer is spared of the job of carrying loads and loads of assessment scripts from the office to possibly home to mark and give feedback as the feedback generated from module is instant. Lecturers can also use the reusable comments that pop up on the menu so that the lecturer can recycle the same comment if the error by the students is of a similar nature. However, this type of technology has limitations especially in Africa where internet connectivity is erratic and one needs to move with connection gadgets which in most cases are well above what many can afford. Compounded to this is the fact that the detailed feedback and personalised comments require considerable manual labour. Reducing instructor workload is very important and we are exploring a number of techniques that will be incorporated in the new version of the system. The lecturer can also generate statistics and present them in any required format such as bar charts of other forms. To the student, such ICTs serve students a lot of time as they can now access feedback in real time from their gadgets such as ipads, mobile phones and hence do not necessarily need to be in class to access feedback from their lecturers.

7. CONCLUSION

Providing high quality formative feedback and assuring that students engage with it facilitates and promotes learning. Quality formative feedback needs to be timely, motivating, personalised, manageable and in direct relation to assessment criteria.

In addition, in order to ensure that students engage with the feedback contents an effective communication method is required. The effectiveness of the communication method can also be appraised against the quality characteristics of feedback. This paper presents Moodle, a web-based tool for the provision of formative feedback. Moodle attempts to be effective in motivating students to engage in the feedback process. In order to achieve this goals a number of techniques were explored in order to create a personalised and motivational online environment that timely communicates feedback in a manner that is manageable and in direct relation with the assessment criteria.
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