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Cloud Computing: An Emerging Trend for Small and Medium Enterprises

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Abstract: The impact of Information and Communication Technology, particularly the Internet, has transformed small and large organizations. Cloud Computing is emerging as one of the major IT trends of the 21st Century offering utility oriented services to organizations. This study was conducted to investigate how Small and Medium Enterprises in ECBD can utilize Cloud Computing as a business management tool to enhance networking, productivity and efficiency. The study uses qualitative approach for data collection and analysis. The findings are expected to help SMEs understand how Cloud Computing can overcome constraints, such as lack of access, use and sharing of reliable and comprehensive information amongst other social barriers. Amidst the hype surrounding this modern trend, the study reveals various challenges that hinder the utilization of Cloud Computing such as ignorance, limited infrastructure and security concerns. The study provides recommendations for SMEs to remain focused and relevant in the modern business world.

Keywords: Business Information, Cloud Computing, Eldoret Central Business District (ECBD), Information and Communications Technology (ICT), Small and Medium Enterprises (SMEs).

1. Introduction

The impact of information and communication technology, and particularly the Internet, has created great changes in small and large organizations that are now reshaping the way they manage and organize business operations. Consequently, organizations are in the process of re-organizing their operations to benefit from new technologies and to remain competitive. Worldwide today, broad access to personal computers in particular, in business, government and households has led to rapid expansion of Internet use, changing the way in which organizations access, share and manage business information [8]. Generally, the trend of ICT-enabled service delivery worldwide has been towards the deployment of services over the web thus transforming traditional economies into information and knowledge-based economies [15]. Within this context, many studies and initiatives are concerned with ensuring that SMEs are prepared to meet the challenges of the information age, and their main thrust seems to revolve around access and use of various ICTs in conducting their business. As a result of this, SMEs perceive ICTs as the engine for promoting development and growth, and also gaining global competitive advantage.

Cloud Computing is one of the major Information Technology (IT) trends of the 21st Century that is offering utility oriented services in the business sector [3]. Cloud computing is a mechanism that enables management of computing and IT infrastructure to be consolidated in one or more data center to reduce the overall cost of operating computing facilities [3]. This computing technology provides organizational abilities to access software, hardware and other infrastructural resources from a virtual space through the Internet which is the key communication channel [4]. This study therefore, is expected to

help SMEs overcome constraints, such as lack of access, use and sharing of reliable and comprehensive information and other ICT resources to solve business solutions.

1.1 Background of the Study

The study was conducted in Eldoret Central Business District (ECBD) within Eldoret Town, the administrative centre of Uasin Gishu County of the Rift Valley Province [20]. The town hosts a population of over 200,000 and serves as a commercial and industrial hub for the agriculturally rich North Rift Region covering over 10 administrative districts [17]. The ECBD was purposely selected for this study based on the number of multiple small business enterprises established in this town.

2. Aim and Objectives

The purpose of the study is to investigate how SMEs in ECBD can utilize Cloud Computing technology to manage business information and operations. The specific objectives of the study are to:

1. Find out the different ICTs utilized by SMEs;
2. Establish whether SMEs managers possess the required ICT skills;
3. Identify the economic leverage of Cloud Computing technology;
4. Assess the Strengths, Weaknesses, Opportunities and Threats of SMEs in relation to Cloud Computing; and
5. Recommend various strategies to SMEs for embracing cloud computing.

2.1 Research Questions

The study sought to provide answers to the following questions:

- What types of ICTs are needed and accessible by SMEs?
- Do managers of these SMEs possess the necessary ICT skills to utilize them?
- How do SMEs managers create, share, collaborate and publish business information?
- What are the opportunities and challenges that can be experienced in solving business solutions through cloud computing?
- What strategies are then proposed to SMEs for embracing Cloud Computing as a business management tool?

3. Research Approach and Methodology

This study targeted business managers in SMEs and focuses specifically on trade and service activities. The qualitative approach, in particular, the case study method was used to solicit the views of a total sample size of 20 SMEs managers within the ECBD. The principles of case study methodology allowed for analysis of the study findings obtained through two methods namely; primary and secondary sources. Firstly, primary data was obtained through interview schedules directed at SMEs managers. The aim of the interview schedule was to gather contextual information regarding the management of business operations and confirmed the need to adopt ICTs in particular, the cloud computing model. Secondly, the literature review revealed that cloud computing is the current trend for accessing, publishing, sharing and storing reliable, comprehensive and up-to-date information to conduct business operations. The secondary sources included journal articles, books, publications by corporate bodies and government departments and electronic sources. Of the targeted sample of 20 SMEs, all participated, giving a response rate of 100%.

4. Cloud Computing

The advent of the Internet has changed the business scenario, in particular, SMEs are now directly accessible and have implemented their Internet strategy [8]. The Internet is one of the most prominent technologies for business managers and provides all players with a means of reaching end users and being reached by them through simple, open source Internet-based applications and services designed to enhance creation, sharing, storing and publishing of information on-line [2].

Cloud computing is a mechanism that enables management of computing and IT infrastructure to be consolidated in one or more data centers to reduce the overall cost of operating computing facilities [4]. As a form of outsourcing of IT components that comes in many forms, from the use of third-party resources to store data to delivery of IT services within an enterprise, cloud computing is based on virtualized infrastructure, self configuration, and automated provisioning [4]. The concept incorporates infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS) as well as Web 2.0 and other recent technology trends that have the common theme of reliance on the Internet for satisfying the computing needs of the users [5]. The major advantage of this model is that it provides users the building blocks to develop both personally and professionally since users need not have knowledge of, expertise in, or control over the infrastructure that supports them using this technology [5].

4.1 *Role of SMEs in Social and Economic Development*

The importance of SMEs in contributing to job creation and output growth is widely accepted in developing countries [22]. Various reports indicate that SMEs constitute almost 95% of enterprises in the developing world and serve as both the backbone and driver of national economies [10]. Their contribution to overall economic and social development in developing countries is wide-ranging. Arguably, their most important contribution is income generation through employment creation for the disadvantaged populations. SMEs contribute in social and economic development, through self-improvement, enabling individuals to gain experience and confidence to enhance various skills [7].

4.2 *Role of ICTs in SMEs*

Globalization and new services enabled by ICT are reinforcing the linkages between the developed, developing and transition world. [15]. The use of ICTs in service delivery makes it possible to penetrate and extend such services to areas where service delivery was non-existent [1]. ICTs are therefore, changing the way business is done. SMEs make use of ICTs to manage business processes and information, however, they are characterized by limited awareness of markets, technology, policy, regulations and finance. Having an on-line presence creates an important new marketing channel for the SMEs by locating suppliers, identifying markets, obtain industry knowledge, as a distribution channel, secure financing, gathering, disseminating and sharing information [12].

In developing economies, there are many challenges regarding ICT infrastructure and in particular, the cost of hardware and software [11]. This in itself has created many problems in the area of business information services for the SMEs sector. Studies show that a significant percentage of SMEs are ignorant about ICTs and their importance for conducting business in this era of globalization [6]. Evidence from various studies however, reveal that ICT is capable of providing business solutions to some of the business processes and service delivery problems faced by SMEs [16]. As a result of the foregoing, SMEs are not able to cope with new challenges in the business world such as rapid information and information processing technologies which can be contained by utilizing ICTs. It is the

view of the researchers that in order to achieve good business relations and bridge the digital divide amongst SMEs, efficient application of cloud computing is necessary to achieve good business relations.

5. Major Results of the Study

The study yielded a 100% response rate and the results of the study could be used to make generalizations about how SMEs in ECBD can utilize cloud computing technology. The findings are presented hereunder:

5.1 Applications of ICTs

The findings revealed that commonly used ICTs by managers of SMEs range from software, hardware and networks and include: telephones, personal computers, broadcasting technologies, information systems and web technologies and applications, which are considered to contribute significantly to their market expansion. However, there is a very low take up of allied adoption of the Internet, particularly, in sharing, publishing and collaborating through cloud computing technology. Most respondents indicated that they were not aware about this IT trend. The study revealed that this was due to ignorance and lack of awareness since some of them were already utilizing web 2.0 technologies and social media. It is therefore, evident that SMEs managers need to be empowered to become more than receivers of information and services via cloud computing. They should also become producers of new knowledge and information to conduct business on-line.

5.2 Views on the ICT literacy and skills necessary for SMEs managers

Most of the respondents indicated that their level of ICT literacy was below average, although 60% SMEs managers possess certification in various computer applications such as word processing, spreadsheets and presentation. However, they only utilize these skills for preparing documents and managing their financial records. The study further revealed that cloud computing is a mix of many methodologies and users require proficiency in ranging from software porting and application to Internet skills and hardware skills.

5.3 Respondents' perceptions of the benefits of ICTs

The respondents' benefits derived from using ICT included: communication, increased operational efficiency, telecommuting, responsiveness, competitive advantage, strengthening business relationships through networking, expansion of market and satisfaction, cost reduction and promoting accountability. However, respondents did not indicate storage, publishing and collaboration and savings on hardware, software and other infrastructural resources as a major benefit of utilizing ICTs.

5.4 Benefits associated with Cloud Computing

The study revealed various benefits associated with utilizing Cloud Computing. Firstly, it facilitates delivery of IT services, including applications and web. Secondly, this virtualized technology allows servers and storage devices to be shared and utilization of hardware be increased. This results to common storage data systems which allow sharing of data and facilitates access of data and documents, including confidential information, from any computer at any site in the world [5]. Thirdly, cloud computing facilitates collaboration through various applications that can be easily migrated from one physical server to another. In addition, the economic leverage of cloud computing is manifested through a pay-as-you-go model which includes saving on hardware, software and infrastructure [4].

With increased demand being witnessed locally with key sectors driving uptake consisting of business process outsourcing, firms are seeking a computing platform for their services without necessarily buying the hardware and software [3]. Finally, the utilization of this model results to reduced costs in acquisition, maintenance and IT support services [5].

5.5 Major challenges associated with utilizing Cloud Computing

The study revealed that as much as cloud computing has its advantages, it also has its challenges. The main constraints experienced by SMEs include: lower levels of ICT literacy and education, including training in languages which are predominantly used in ICT platforms and the Internet, complex ICT operations and lack of technical know-how and skills to use the technologies, poor infrastructure, resistance to change and willingness to adapt to changing ICT related business technologies [23]. However, the major risk attributed with cloud computing is data security, trust and privacy issues [11].

6. Strengths, Weaknesses, Opportunities and Threats for SMEs in Relation to Cloud Computing

Vision 2030 provides great opportunities for the SMEs sector, among them, the setting up of a pilot High-Tech agro-processing park in Eldoret due to its location to high-potential agricultural area and access to airport and the fibre optic cable already laid in the ECBD [18]. The various SWOTs are summarized in the following table:

Table 1: Summary of SWOTs

<p>6.1 Strengths</p> <ul style="list-style-type: none"> • Formation of strategic alliances to enhance business opportunities eg. Business Process Outsourcing, Business Incubators, etc. • Conducting business operations irrespective of time and geographical location. • Reducing the risk of wasting resources. • Access and management of information from any computer irrespective of geographical location. 	<p>6.2 Weaknesses</p> <ul style="list-style-type: none"> • Low awareness, ignorance and resistance to changing to cloud computing; • Lack of relevant content, markets and information on markets for products and services; • Limited ICT skills and entrepreneurial linkages; • Inadequate Internet connectivity [9].
<p>6.3 Opportunities</p> <ul style="list-style-type: none"> • Focus on niche markets, growing market and demand eg. with the use of Fibre Optic Cables and WiFi. • Vision 2030 SMEs Investment Opportunities eg Business Process Outsourcing (BPO). • Enhance service provisioning and development and increased revenue [13]. 	<p>6.4 Threats</p> <ul style="list-style-type: none"> • Competition • Global crises • Technological challenges • Managing business information by third party • Lack of Trust to third party • Security and Privacy issues

7. Conclusions

7.1 Summary

Although the use of ICT for improving business services is well-established world-wide, the creation of an environment for ICT access and use by SMEs in developing countries is difficult [1]. It is not only sufficient that managers of SMEs in ECBD have access to ICT for bridging the digital divide, it is equally important that these managers are also literate and are enlightened in the new technologies such as cloud computing. Cloud computing makes it conveniently easier to innovate and increase revenues as it promises increased benefits, less recurrent costs and minimal initial capital outlay. Managers of SMEs need to be empowered to become more than receivers of information and services. By utilizing

cloud computing, they will become producers of new knowledge and information to conduct business on-line. The authors believe that when this level is reached, cloud computing will be adopted as a business management tool. Ultimately, this will empower SMEs, giving them a voice of their own within the competing discourses.

7.2 Recommendations

With the rapid expansion of ICT and an increased use of the Internet to carry out business transactions, SMEs should no longer be disadvantaged in the knowledge economy as they should be able to access, store and share wide variety of business information. This study provides the following recommendations that will guide SMEs in embracing cloud computing as a business management tool.

- *Embrace the Digital World:* SMEs should realize that the economy and business are shifting towards a new world configuration of digital information and knowledge-based work and therefore, they should see the adoption of ICTs, in particular cloud computing as inevitable. The investment will not be small, but the long-term benefits are huge.
- *Adopt cost-effective Cloud Computing technologies:* SME's need to penetrate non-traditional markets and remain competitive in the face of increasing challenges posed by globalization, liberalization and cost-effective by using various ways [19]. For example, SMEs should utilize various Internet platforms such as; Google Cloud, a free usage tier that can be used for anything to run in the cloud. Google Cloud will allow users to get started in the cloud by gaining hands-on experience, launching new applications and test existing applications in the cloud. In addition, Safaricom has unveiled various products and services ranging from e-business to e-banking (M-Pesa, M-Shwari, SafariCloud) that have revolutionized the banking and business services. Other examples include Google Drive, Google+, Google Blogger, YouTube, among others.
- *Content Development:* there is need for all stakeholders to embark on initiatives aimed at leveraging on digital content to unlock new opportunities by SMEs to conduct business on-line [21]. For example, SMEs can collaborate in developing content for specific products and services targeted for specific or general markets.
- *Improve Infrastructure:* The public and private sectors should ensure adequate and sustainable ICT infrastructure; provide stable Internet connectivity [9] in addition to formulating and implementing industry ICT policies and regulations [21]. Contributing to a conducive ICT Sector e.g. laying down of the fibre-optic cable and rural electrification in readiness to achieve the Millennium Development Goals (MDGs) in 2015 as well as achieve the Vision 2030 should be fast-tracked [12].
- *Regulatory framework to facilitate Cloud Computing:* The government of Kenya including other stakeholders like the Ministry of Information and Communication, legal researchers and business consultants should set up the right regulatory framework to facilitate uptake of cloud computing by SMEs. Research efforts need to be vested not only into technological aspects of realizing cloud systems, but also into aspects related to commercial, business and legal concerns for cloud provisioning to embrace Green IT.
- *Secure Cloud Systems:* Cloud providers such as Google, IBM, Yahoo, Amazon and Microsoft should strive to build secure cloud systems targeted for SMEs [11].
- *Change Management:* The best possible way to reorganize a business change is to emphasize change and promote ICT literacy and enlightenment through capacity building [23]. Cloud computing is a mix of many methodologies and users require proficiency in software application development and porting to understand it, hence there is adequate need for short and refresher courses targeted for SMEs to attain the necessary skills. [5].

It is the view of the researchers that in order for SMEs to meet the Millennium Development Goals (MDGs) and achieve good business relations by 2015, efficient application of ICTs, especially cloud computing, will allow SMEs automate business processes without large upfront investments in infrastructure, hardware and software thus, help them in realizing the Vision 2030 [14].

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