Factors Influencing the Adoption of Cloud Computing by Small and Medium Enterprises in Developing Economies

Ezer Osei Yeboah-Boateng, Kofi Asare Essandoh

Abstract - The key motivation of this paper is to assess the factors which influence small and medium enterprises (SMEs) in a developing economy to adopt cloud computing. Recently, service providers offering a wide range of cloud-based ICT solutions to businesses have emerged into prominence. However, the acceptance and interest in these services amongst SMEs are slow and discouraging. As such, there is the urgent need to identify the enabling and constraining forces and other key influential factors necessitating this problem. The study highlights cost reduction on IT infrastructure and maintenance, improved communication, scalability and business continuity as the main drivers of cloud adoption, whereas lack of knowledge, poor internet connectivity, security of cloud services, lack of trust and interoperability with existing systems were identified as barriers to adoption. Top management support, trialability, competence of cloud vendors, resistance to new technology, compatibility and existence of IT infrastructure are realized as key factors influencing cloud computing adoption. These findings will go a long way in helping service providers and technology policymakers to develop solutions and strategies that specifically meet the needs of SMEs and other clients in order to encourage and speed up the rate of adoption.

Index Terms— Cloud Computing, Developing Economies, SMEs, Technology Adoption, TOE framework.

I. INTRODUCTION

Universally, small and medium enterprises (SMEs) are perceived as the engine of growth and crucial enablers in socio-economic development. SMEs influence positively on earnings, job opportunities generation, poverty reduction, entrepreneurship, rural development and exports of a nation. The global leaders like the US and Japan have set up bureaus and established policies to guarantee that the SMEs sector thrives successfully. Furthermore, OECD [1] states that SMEs constitute the most significant percentage of the private sector worldwide. In fact, technological innovation can act as the driver or accelerator towards SMEs enhancing the global economy. Technology has significantly impacted various facets of life and changed the business environment. Nevertheless, SMEs are noted to experience a gradual reception towards the adoption of ICT [2]. Cloud computing, a new technological paradigm, is therefore regarded as a panacea to assuaging this challenge [3]. It provides simple, scalable as well as readily available technological solutions and grants SMEs access to similar technologies utilized by large businesses devoid of high costs and risks.

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Ezer Osei Yeboah-Boateng, PhD, Center for Communications, Media & Information technologies (CMI), Department of Electronic Systems, Aalborg University, Copenhagen, Denmark.

Kofi Asare Essandoh, Coventry University, Accra Campus.

Cloud computing is an affordable option which creates efficiency and effectiveness, reduces costs involving electricity, bandwidth, operations and hardware and does not require functional staff, in-house expertise, space, power and infrastructure [4]. Furthermore, customers just use and are charged for computing resources they need since services are delivered on-demand similar to utility providers [5].

Due to its many benefits, some of which have been outlined, cloud services are increasingly being embraced by and/or recommended especially for small businesses [6].This has led to a rapid growth of the cloud paradigm. International Data Corporation (IDC) highlights the market for cloud computing services accounted for $16 billion in 2008 and was projected to further rise to $42 billion in 2012 [7]. At this height, Application Service Providers (ASPs) have emerged offering a wide range of cloud-based ICT solutions to businesses and organizations [8]. They seek to entice SMEs to outsource their business processes such as applications, email and collaboration, security, storage and servers to them. Nonetheless, the uptake of cloud services amongst SMEs is slow and discouraging. GoGrid [9] confirms that the adoption rate of cloud computing services is slower than anticipated. This can only be attributable to the factors SMEs consider before making an adoption decision. Hence, there is the need to identify the influential factors necessitating this problem amongst SMEs in the developing world.

A review of cloud computing adoption studies shows that a large portion of the published research was conducted in developed and industrialized countries [10] [11] [12]. In contrast, little have been written in developing countries particularly when its many benefits have been trumpeted continuously. This gap is particularly apparent in the sub-Saharan Africa and most third world countries. This is largely attributable to cloud computing being in its early stages. On another hand, most existing studies have only focused on just the diffusion or acceptance, services and deployment models of cloud computing and issues of benefits and concerns and on factors that drive or inhibit its adoption. However, this study aside recognizing the driving and constraining forces necessitating adoption, it also employs a technology adoption model as used by Tan and Lin [13] in a study in Singapore to identify other organization-specific factors. Finally, this study expects to make a significance contribution to both literature and practice by adding new knowledge to cloud adoption and informing the SME industry and policy makers in technology.

II. CLOUD COMPUTING

Cloud computing is now one of the emerging trends in technology and business. Cloud computing is ubiquitous, thus offering an opportunity for everyone, everywhere. The popularity of this term coupled with its prospects has generated discussions and literature worldwide. Key topics under cloud computing have been studied and researched by different writers and authors (see [14] [5] [15] [16] [17] [18] [19] [20]), but little literature is attributed to the developing economies. Different working definitions of cloud computing have been proposed by individuals and organizations. The National Institute of Standards and Technology (NIST) [16] however provides key characteristics of cloud computing that differentiates it from other similar technologies and further offers three main service models and four deployment models.

A. Drivers and Barriers of Cloud Computing

Information technology is becoming a utility like electricity and water. It is no longer seen as a luxury but a necessity. As such, considerations must be made before any decision is made regarding implementation. Zhang et al. [17] justify that although the cloud computing offers attractive and compelling features, it has unique challenges which also discourages adoption. This makes it imperative to appreciate and comprehend the adoption drivers and barriers.

B. Drivers of Cloud Computing

Information technology is often utilized efficiently as a strategic tool for gaining competitive advantage. Rio-Belver et al. [3] and Zhang et al. [17] outline strategic, technical and economic benefits of cloud computing that drive its adoption, some of which are discussed. Since funding and cost control is the biggest challenge to SMEs, the clear benefit of cost in terms of capital expenditure (CAPEX) and operational expenditure (OPEX) is one important reason for cloud computing adoption [15]. Cloud computing reduces upfront expenses of computing since services are available on-demand on a pay-per-use pricing model [15]. Furthermore, costs involving hardware purchases, maintenance, software, system upgrades, data storage and licensing are likewise eliminated. Consequently, resources and capital can be channeled into innovation towards the core business, rather than seldom used systems. Cloud services allows for the modification of IT services to changing business and client needs. Resources and capacity allocated are driven by demand as and when necessary. Cloud computing also allows for faster and quicker deployment of IT services, some of which can be provisioned within hours and makes it easier for enterprises to scale their services rapidly and automatically to varying peaks with minimal service provider intervention. Scalability also leads to cost savings which can be used in acquiring end-user systems and training.

Zabalza et al. [21] suggest the architecture of cloud systems are designed and equipped to handle hardware failures and disaster recovery. Providers of cloud services rely on highly distributed, robust and scalable infrastructure that can store data redundantly in multiple physical locations. Cloud services are available and accessible from at any Internet-based device anywhere [22]. This encourages close collaboration and data sharing amongst employees and interaction with customers and suppliers [23]. Cloud computing is now regarded as a green initiative which most businesses are encouraged to adopt and use ecological friendly and environmentally compliant systems [15]. Cloud computing brings about reduced utility cost savings as well as low carbon emissions [18]. The operation of large scale computer datacentres allows for a decrease in electricity and hardware costs [14]. This is made possible by economies of scale, efficient assets management, less energy usage and server utilisation and optimization. Lastly, SMEs in developing economies often lack the required human expertise in technology. The choice of adopting cloud services gives SMEs access to experts from the provider.

C. Barriers of Cloud Computing

In spite of many benefits, cloud computing has also faced "outright rejection" too [18]. Key technology figures such as Larry Ellison, Andy Isherwood and Richard Stallman, have openly and vehemently criticized and raised concerns against cloud computing [14]. Armbrust et al. [14] and Catteddu and Hogben [24] point out technical, policy and organizational obstacles that may prevent companies from adopting cloud computing services, some of which are considered. Security is the principal obstacle militating against the effective deployment and provision of cloud computing services for individuals and organizations. An IDC study reported 75% of respondents agreed security is their main concern [18]. Users of cloud services do not fully control the infrastructure provided which may raise some concerns, such as security breaches and violations or attacks from hackers. Trust between a consumer and provider is also very important in cloud deployments. Sensitive information and data stored in the clouds can be subject to misuse, theft or illegal uses since the provider assumes full responsibility. These problems can be lessened during the drafting of Service Level Agreements (SLAs) to assuage confusion and ensure that the right Quality of Service (QoS) is delivered [22].

The cloud market has little standards and compliance requirements globally, since the paradigm is still emerging. The regulatory regimes for cloud computing are uncertain as well as the enforcement in many developing economies. The lack of standards makes it difficult to integrate with other applications or switch between vendors leading to vendor lock-in [19].Vendor lock-in renders a client dependent on a particular vendor for products and service in view of the high switching costs and lack of interoperability. Another concern is the issue of migrating data when a decision is reached to switch to a new cloud provider. To this end, Armbrust et al. [14] advocate for homogeneity in addressing the challenge of changeover from one provider to another effectively. Cloud computing is dependent on constant electricity and a running network or reliable Internet connection. Unfortunately, this is not characteristic of most developing countries which have unstable and slow network bandwidths and frequent power outages. Poor broadband connectivity is the main nuisance to businesses in accessing remote applications in the developing economies [11] which leads to immediate interruption of cloud services. Businesses are impacted economically during long downtimes leading to customer dissatisfaction [18].

D. Technology Adoption

One of the major challenges affecting organizations is technology adoption. As such, Marston et al. [15] propose extensive research and particular attention to technology adoption and implementation. Cloud computing is still in its early stages of diffusion. Businesses are therefore still grappling with the optimal

factors to consider when making cloud computing adoption decision owing to its short existence [25]. According to Oliveira and Martins [26], there exist many technology adoption models which include Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), the Unified Theory of Acceptance and Use of Technology (UTAUT), Diffusion on Innovation (DOI) and Technology-Organization-Environment (TOE) framework. The most commonly used model in technology innovation has been the TAM, even though most researchers [27] have often combined two or more models in their studies.

E. Technology-Organization-Environment (TOE) Framework

The TOE framework was developed for the adoption of technology by Tornatzky and Fleischer [28]. The TOE framework identified three important and inter-related aspects – technological, organizational and environmental – of an organization that influence adoption. Different empirical studies [29] [30] [31] [32] [33] have also used the TOE framework as a basis for examining acceptance of technologies and understanding the factors that influence the adoption process. A review of the literature indicates that the TOE framework provides a suitable beginning to investigate the adoption of technological innovations [26], which is organizational-led instead of individual based. It uses both technological and non-technological aspects. As such, the TOE framework is seen as ideal for predicting and explaining the adoption of technology as it is often strategic and affects the entire organization. Furthermore, the TOE model has proven to be proficient in identifying facilitators and inhibitors of e-business adoption. The TOE framework is therefore employed for this study since it considers the (1) characteristics of cloud computing (technology context), (2) organizational capabilities of an SME (organization context) and (3) external environment (environment context) in which SMEs operate.

The technological context describes both internal technologies and available technologies existing in the organization. The features of existing resources are essential to adopting cloud services [34]. It also focuses on the characteristics of technologies and infrastructure present such as the number of computers and the technology know-how of the employees [35]. Compatibility with existing systems is also a key determinant in technology innovation [27]. The success of technology adoption is influenced by the ability to transfer knowledge across the organization [31].

The organizational context outlines the various constructs of an organization include firm size; degree of centralization; managerial structure; quality of staff and the amount of slack resources available internally. The size of an organization, whether small or large, influences factors for adoption [36]. Small firms are adaptable to change compared to large firms [32] and are noted for adopting cloud services [37]. Tan [38] identifies cost, competence, employee resistance and organizational culture as key elements of an organization's technological readiness towards adoption. The organizational structure, organic or mechanistic, also plays a major role in the adoption [35].

The environmental context concerns the external factors that influence where the organization operates such as the structure of the industry, competition, government incentives and regulations and external suppliers. Adoption of innovation is higher in emerging industries compared to established or declining industries [35] since players have to innovate to stay ahead of competition. Governments also directly impact the adoption of technology in SMEs [39] through laws and policies enacted which will either drive or inhibit the adoption of new technology [29] [35].

F. Small and Medium Enterprises (SMEs)

SMEs are described differently and face the dilemma of a globally accepted uniform definition. The differences in measure and size used make it difficult to adopt a single unique definition [40]. Different definitions are used across countries, regional and economic groupings and international organizations [41] using various criteria. Though, most criteria use number of employees, turnover or assets based definitions. In order to facilitate some generalizability of findings, [42] used the number of employees for developing economies study setting and argued that the uncertainties associated with fluctuating exchange currencies make it untenable with any monetary based definitions.

Typically, SMEs have smaller staff strength and lower turnover compared to larger companies [38]. Additionally, their structure gives them the ability to easily change and exploit changing trends in their environment [43]. The main problem facing most SMEs is financing [1]. Furthermore, SMEs in developing economies are bedeviled with challenges in key strategic areas [44].

G. Use of Information Technology by SMEs in Developing Economies

Various empirical studies [39] [45] indicate SMEs are influenced by various factors when adopting a particular type of technology. ICT generates innumerable benefits to industries [46]. Technological innovation positions companies as competitiveness and offers socio-economic developments to developing countries. Yet, the level of acceptance and utilization of information technology is particularly low for SMEs in developing countries [45]. Due to financing, SMEs usually prefer low-cost technology solutions that meet their needs [36]. Overall, SMEs have failed to take advantage of ICT since they do not perceive it as innovative [38].Submit your manuscript electronically for review.

III. METHODOLOGY

A. Selection of Study Area and Sample

This study was set for typical SMEs in developing economies that are characterized by the emergence of numerous ICT opportunities and uncertain revenues [42]. The emergence of Internet solutions as such cloud computing are said to have positive impact on most developing economies [8]. Ghana, as the case nation chosen for this study has in recent times embraced ICT and associated solutions. It has a high concentration of SMEs that are spread across diverse sectors and industries [42].

The study population consists of business owners and managers, IT staff or officers and other key decision makers of ICT based SMEs in Ghana. This sample is deemed to have authority and responsibility various business decisions, such as procurement, funding of IT projects, as well as the ability to comprehend emerging ICT technologies, end-user needs assessment and functional processes. Furthermore, the sample population is also characteristic of the theoretical constructs that this study seeks to investigate, i.e. top management support, end-users

and custodians of corporate culture. Random sampling and purposive sampling were utilized in order to overcome sample selection bias.

B. Questionnaire Design

In view of the tech-savvy nature of the target samples, an online survey was employed for data collection, as in [24] and [47]. The questionnaire was structured to capture the SMEs profile, drivers and barriers of cloud computing, as well as the factors (e.g. technological, organizational and environmental) that influence the adoption of cloud computing. Before launching the online survey, it was expert reviewed and pilot tested to ensure the appropriateness of wording, format and structure. To facilitate response, two follow-up reminders were sent to respondents during the course of the survey. Participation was fully voluntary, anonymous and highly confidential and measures were introduced to ensure reliable and valid data was collected. A cookie was incorporated to prevent repeated participation.

All variables and constructs were measured using 5-point Likert-type scales with anchors '1 = extremely unimportant' to '5 = extremely important' for drivers and barriers and '1 = strongly disagree' to '5 = strongly agree' for factors. The data obtained was analyzed and presented using a simple statistical tool called the Relative Importance Index (RII). Subsequently, the indices of the variables were ranked according to their relevance. The indices ranging from 0.71 – 1.00 were classified as high, 0.41 – 0.60 as medium and greater than 0.00 – 0.40 as being low. It must be noted that only the top ranked items rated 0.71 or above, indicating a high importance, are deemed to be of importance to the study and therefore analyzed and discussed.

IV. FINDINGS AND IMPLICATIONS

A. Enablers and Inhibitors of Cloud Computing Adoption

The study found six (6) drivers and five (5) barriers enabling and inhibiting cloud computing adoption amongst SMEs in Ghana.

B. Drivers of Cloud Computing

Table 1: Drivers enabling the Adoption of Cloud Computing

Driver	Relative Importance Index	Level of Importance	Rank
Reduction in CAPEX and OPEX for IT Infrastructure	0.87	High	1st
Improved Collaboration and Interaction between Employees, Customers and Suppliers	0.84	High	2nd
Reduction in Time and Resources on IT Maintenance	0.83	High	3rd
Business Continuity, Backups and Disaster Recovery	0.81	High	4th
Access to Technical Expertise and Knowledge	0.79	High	5th
Scalability of Processing Load and Capacity	0.76	High	6th
Faster Deployment and Accelerated Time to Market	0.68	Medium	7th
Access and Connectivity to Different Devices	0.65	Medium	8th
Environmental and Ecological Friendliness	0.61	Medium	9th

From Table 1, it is realized that reduced cost is the highest driver. It also shows how SMEs appreciate the communication and interactions they share with customers since it increases customer satisfaction and better customer relationships, minimal maintenance cost and time, access to industry knowledge and experts, scalability and business continuity through data backups and disaster recovery as other key drivers of cloud computing adoption. Cost reduction as the highest ranked driver for cloud adoption amongst SMEs in developing economies is consistent with prior studies [10] [12] [24] [48]. However, the study is inconsistent with similar studies [12] [24] where scalability was considered highly. Similarly, Sahandi et al. [10] realized the use of mobile devices as a driver since it allowed SMEs to have on-demand, remote and ubiquitous access which creates competitive advantage for such organizations. These can be due to the different environments prevalent in both developed and developing countries. It is implied from the findings therefore that Cloud Service Providers (CSPs) must devise pricing strategies that make their products and services cost-effective, more competitive with minimal investment and maintenance costs than similar traditional IT alternatives. They are also are required to deploy efficient and high performance infrastructure and data centers that will adequately meet the needs of SMEs in the area of hosting, increasing loads and capacity and data storage and backups especially during system failures.

C. Barriers of Cloud Computing

In respect of barriers, the lack of internal knowledge and expertise is rated as the biggest barrier to cloud adoption for amongst SMEs in developing economies (see Table 2). The lack and inadequacy of ICT skills and knowledge is one of the major challenges affecting most SMEs [49]. Also, firms with lower ICT understanding and knowledge have little recognition for the value of ICT. Poor internet access and connectivity is the next challenge identified to cloud adoption by SMEs. As anticipated from literature, security and trust are the other two concerns that greatly affect businesses considering cloud computing. In contrast, the high level of awareness and usage of cloud services in developed countries often makes security and trust as the main barriers to cloud adoption [10] [24].

Table 2: Barriers inhibiting the Adoption of Cloud Computing

Barriers	Relative Importance Index	Level of Importance	Rank
Lack of Internal Expertise and Knowledge	0.84	High	1st
Poor Internet Access and Connectivity	0.81	High	2nd
Security of Cloud Services and Data Privacy	0.75	High	3rd
Lack of Trust	0.71	High	4th
Integration with In-house and Existing Systems	0.71	High	4th
Loss of Control	0.69	Medium	6th
Differences in International Statutory Laws and Regulations	0.66	Medium	7th
Delay in the Transfer and Migration of Data	0.63	Medium	8th
Lack of Confidence in Ability and Promise of the Cloud	0.62	Medium	9th
Lack of Standards	0.59	Medium	10th

The last concern is interoperability and compatibility with in-house system once cloud services have been adopted and implemented. In effect, there must also be heightened education on the use and benefits of adopting cloud services to increase awareness amongst SMEs. The lack of internal knowledge is a disincentive to adoption and therefore the need for continuous technology training for SMEs [50]. Efforts must also be made to address poor internet access and connectivity by upgrading Internet bandwidth and network infrastructure in order to increase faster processing times and improve performance when SMEs adopt the cloud. As Comninos [51] asserts "cloud computing requires not just high speed, but also high quality broadband connections, that are always connected". These aside, trust between providers and clients in the cloud must be tackled appropriately. There has to be a clear and functioning legal framework on privacy and data protection to increase the confidence in the various cloud vendors and providers. Trust can only be assured by negotiating SLAs and contracts that ensure business requirements are met and guarantee the security and privacy measures.

D. Factors Influencing Cloud Computing Adoption

The study discovered seven (7) organization-level factors that influence the adoption of cloud computing amongst SMEs in developing economies which were categorized under Technological (Table 3), Organizational (Table 4) and Environmental (Table 5) contexts respectively.

Table 3: Technological Factors influencing the Adoption of Cloud Computing

Technological Factor	Relative Importance Index	Level of Importance	Rank
Trialability of Cloud Services	0.81	High	1st
Existence of Required IT Infrastructure and Resources	0.73	High	2nd
Compatibility with Existing Systems	0.72	High	3rd
Strength of In-built Security Systems	0.67	Medium	4th
Learning Capability of Employees	0.66	Medium	5th
Limited Technical Knowledge about Similar Technologies	0.62	Medium	6th
Non-performance of Cloud Services to support Operations	0.53	Medium	7th

Table 4: Organizational Factors influencing the Adoption of Cloud Computing (Field Work, 2013)

Organizational Factor	Relative Importance Index	Level of Importance	Rank
Top Management Support and Involvement	0.82	High	1st
Resistance towards New Technologies	0.74	High	2nd
Conformity with Work Culture and Style	0.63	Medium	3rd
Impact of Organizational Structure and Size	0.63	Medium	3rd
First Adopters in Our Industry	0.55	Medium	5th

Respondents suggested top management as the most crucial factor towards the successful adoption of cloud computing. Borgman et al. [30] and Ifinedo [52] justify this finding in their study where the role of top management, support and involvement in the adoption and use of innovative technologies is crucial. Birchall and Giambona [53] also highlight strong managerial influence leads to efficiency in the adoption of ICT by their enterprises. Trialability is the next influential factor in cloud computing adoption in developing economies as most SMEs value the opportunity to try out and experiment cloud services on a trial basis before making final decision. Microsoft, Amazon and Google offer a trial version of their services to increase uptake. Compatibility is another important facilitator for cloud computing adoption since new solutions must work smoothly with already installed IT solutions on premise [54]. Additionally, the competence of cloud vendor, after-sales support upon adoption, presence of existing technological infrastructure and resistance to new technology by employees are other prime factors that influence the adoption of cloud computing by SMEs in developing economies. Contrarily, learning capability of employees, uncertainty and non-performance of cloud provider, existing security systems, work culture and style, organizational structure, firm size, nature of the industry and market scope were regarded as insignificant in the adoption process of the sampled SMEs.

Table 5: Environmental factors influencing the Adoption of Cloud Computing

Environmental Factor	Relative Importance Index	Level of Importance	Rank
Adequate User and Technical Support from Provider	0.79	High	1st
Choice of Skilled and Expert Cloud Vendors	0.76	High	2nd
Influence of Market Scope	0.67	Medium	3rd
The Nature of Industry	0.65	Medium	4th
Relationship with Providers, Government and Competitors	0.59	Medium	5th

Most owners and decision-makers are often against the use of technology. However, the study distinctly indicates the impact business owners and managers of SMEs have on the adoption and success of cloud computing services in their operations. Decision-makers must devise strategies to procure and deploy advanced cloud systems to ensure optimal use of IT in their organization and manage any form of resistance that can be encountered from the employee front which can lead to increased profits and competitiveness. SMEs are also not noted for implementing complex enterprise IT solutions. Nonetheless, if an organization has already adopted any traditional system, it is expedient for any new cloud-based solution to interoperate through customizations with the existing system. Similarly, cloud computing offers a utility where SMEs can change and move across providers easily which necessitates compatibility between the different cloud systems. SMEs must be given the opportunity to try and select the most suitable cloud vendor and service that matches their needs and requirements. CSPs can also introduce services by piloting it, testing innovative solutions that target those industries and provide competency and continuous support for its clients.

V. CONCLUSION & RECOMMENDATIONS

A. Recommendations

This study provides recommendations for both the clients and providers which can ultimately increase the rate of adoption amongst an essential sector in any developing economy. Cloud computing can be incorporated into a holistic national ICT policy or framework for development. It will shape the development of viable strategies by policy makers and agencies in technology that can increase the adoption and use of cloud services amongst SMEs. Efforts must also be doubled to increase broadband coverage and access to fast internet speeds at reasonable prices for small businesses. Additionally, SMEs are encouraged to invest and integrate cloud services in their business operations and activities in order to stay competitive, better customer service, ensure fast and efficient delivery and access different markets. To ensure the best quality of service, with minimal unavoidable challenges, SMEs must always negotiate for flexible and favorable terms and conditions on their SLAs with CSPs. SMEs must place emphasis on the provision of training facilities in ICT for their employees to increase knowledge. CSPs serving the market must be customer-driven in order to respond to the specific needs of SME in the current digitized and knowledge-based economy. Cloud services must be developed to integrate seamlessly with the existing IT systems prevalent in the SME industry to ensure interoperability. Providers must offer adequate training and embed free training as part of the adoption process to allow SMEs to understand and appreciate the services and applications offered. The recommendations when implemented can increase uptake tremendously and help bridge both the digital divide in Ghana, in particular and many developing economies in general, thereby increasing socio-economic development.

B. Limitations and Further Research Needs

As indicated earlier in this paper, lack of uniform definition and readily available information on SMEs in Ghana were limited and that hampers with the scope of the study. Most samples surveyed were also located in the urban cities, as expected in view of issues related to digital "location-gap" divide. Even though efforts were made to solicit lots of responses, many of the identified samples were either apathetic or gave incomplete responses. It would be interesting to carry out further studies with larger participating samples, which is likely to aid in generalization of findings. Although the study is grounded in the data collected, the results are based on the perceptions of the respondents.

This study is exploratory one to understand and gain knowledge about aspects of cloud computing adoption in developing economies. The study clearly provides possibilities for additional research. For instance, an interview-based exploratory study will produce better and in-depth understanding into the factors that influence adoption. Secondly, more enhanced statistical inferences can be made using complex techniques such as correlation matrix, multiple regressions and factor analysis to explain the association and relationships between the various variables and factors used in the study. This study also provides an avenue for future studies such as segregating respondents into adopters and non-adopters or different business areas in order to examine the different trends specific to these varying groups. Moreover, future research can consider proposing a conceptual model using a combination of two or more technology adoption models such as TOE and DOI to guide cloud computing adoption in developing economies. The study can be also be enhanced by applying the same methodology to collect and analyze empirical data from SMEs in other developing countries especially in sub-Saharan Africa, thereby increasing the availability of data for future comparisons and validation.

C. Concluding Remarks

The activities of SMEs are showing great promise in developing economies but still faced with challenges in the area of technology use. The identification of the issues associated with cloud computing adoption would help make the industry more efficient. This study investigated the key factors that predominantly influence the adoption decisions of such enterprises. It collected data from respondents in SMEs industry which was successfully analyzed to ascertain the specific factors.

The key drivers revealed reduced cost for IT purchases and maintenance, improved communication internally and externally, scalability, business continuity and access to expertise. On the other hand, the main barriers were lack of skills and knowledge, poor internet connectivity, security and data privacy, lack of trust and difficulty in integrating with in-house systems. The study also established top management support, trialability of cloud services, resistance to new technology, presence of existing infrastructure and compatibility with cloud services, competence of cloud provider and vendor support are the most influential organizational factors used by SMEs in their adoption decisions. The study offers some useful contributions to the growing body of knowledge on the factors influencing cloud adoption in SMEs globally and offers benefits to academia, technology policy makers, cloud service providers and owners, managers and IT professionals of SMEs in developing economies and elsewhere.

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