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Research Paper

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ABSTRACT

Cloud computing is a prominent trend in the field of Information Technology (IT). Existing research presents the benefits and challenges of cloud computing, however few articles take a corporate approach. Moreover, considering that cloud computing provides numerous benefits, no research has aided the understanding of the business value associated with the technology and the context within which benefits and barriers are realized. The issues in South Africa make it difficult to prove the business value of cloud computing.

The aim of this paper is to provide insight into the business value of cloud computing using qualitative evidence extracted from an exploratory study. The evaluation results are used to generate a theoretical framework. The themes concluded that cloud computing provides speed and agility as a value driver to organizations. This paper contributes to the body of knowledge by promoting an understanding of the business value of cloud computing in South Africa.

KEYWORDS

Cloud Computing, Cloud Applications, Cloud Information Systems, Business Value.

The Business Value of Cloud Computing in South Africa

INTRODUCTION

Until 1994, South Africa was under the Apartheid era, which was a system of oppression where legislated racism against the majority of the South African population existed (Worden, 2011). In 1994, Apartheid was overcome when South Africa had its first democratic election (Botha, 2002) which saw a democratically elected government create initiatives to correct imbalances (Moller, 1998). Conversely, despite efforts for improvement, poverty and inequality issues remain high and can affect the implementation of cloud computing in South Africa (Simkins, 2011).

South Africa has an excess of 2428 Information Technology (IT) companies operating across hardware, software and service markets (Jurgens and van der Westhuizen, 2011). In 2011, the IT service market accounted for 3.9 billion US dollars and was forecast to grow to 5.9 billion US dollars by 2015 (BusinessDay, 2011). In spite of the positive outlook, the South African government has been concerned that a shortage of Information Communications Technology (ICT) skills in the country will act as a restraint on the goal to achieve economic growth in the sector (Roodt and Paterson, 2008). In 2010, investments in the ICT infrastructure led to decreases in bandwidth costs by as much as 80% in some locations (Jurgens and van der Westhuizen, 2011). Decreasing bandwidth costs increase~~s~~ the cost viability of cloud computing, and also opens up the market for international cloud for computing service providers to compete in the local market (Computer Business Review, 2008).

Jurgens and van der Westhuizen (2011) mentioned that IT users in South Africa are moving away from capital expenditure models and towards operating expenditure models. This has been primarily achieved by outsourcing, which has steadily

advanced towards cloud computing. Thus increased interest in the usage of cloud computing requires an evaluation of the business value that cloud computing may provide organizations in South Africa.

Aljabre (2012) acknowledged that while cloud computing has been recognized as a means to improve business, not all businesses operate in the same environment and can be considered the same, nor can they be compared in their individual contexts. Specifically in the South African context, which is a unique environment in terms of bandwidth costs and skills shortages, it is difficult to ascertain whether cloud computing is indeed a technology worth pursuing.

The National Institute of Standards and Technology (NIST) define cloud computing as a model for enabling ubiquitous, accessible and instant network access to a shared group of customized computing services that can be managed efficiently with minor need of assistance from managers or service providers (Mell and Grance, 2011). The NIST definition of cloud computing is commonly agreed upon by various authors (Anjomshoaa and Tjoa, 2011; Chen, Paxson and Katz, 2010; Khajeh-Hosseini, Greenwood, Smith and Sommerville, 2010). Cloud computing provides facilities that are in competition with traditional on-premises computing power an alternative. Using cloud computing does not necessarily entail purchasing IT hardware, but does entail using applications over a network (Buyya et al., 2008; Marston et al. , 2010; Mell and Grance, 2011). Allowing data and applications to be available over a network or over the Internet increases availability, provided a connection is available (Conway, 2011).

Research relating to the benefits and barriers of cloud computing use is presently limited, especially in the South African context. The understanding and meaning of the business value of cloud computing by South African organizations is currently unknown. This study provides a valuable contribution towards reducing the gap in theoretical literature since it utilizes qualitative research methods and an adapted theoretical framework concerning IT business value to identify the business value of cloud computing in South Africa. The following section discusses literature related to cloud computing requirements and the benefits thereof are also discussed. This is then followed by insight into the literature surrounding the business value of cloud computing as well as theoretical frameworks that can support the business value of cloud computing. The research methodology is then discussed and is followed by an analysis of the results. The recommendations and conclusions for the study complete the paper in the last section.

CLOUD COMPUTING REQUIREMENTS

According to Arasaratnam (2011) all cloud computing models need to meet the following requirements: *elasticity, scalability, multi-tenancy, economics, abstraction and broad network access*. Elasticity refers to the ability of a cloud computing service to expand or reduce resources to the requirements of the user with limited or no interaction with the user (Arasaratnam, 2011; Armbrust et al., 2010; Leymann and Fritsch, 2009). Computing services may be provided according to the quantity required and then disposed of when no longer needed (Durkee, 2010). Scalability in cloud computing allows for the technology to perform well under different load sizes (Arasaratnam, 2011; Buyya, Ranjan and Rodrigo, 2009; Prince, 2012). Enterprises currently use cloud computing to improve the scalability of their services to better meet bursts of resource demands (Buyya et al., 2008). Scalability according to Hayes (2008) is the need to manage resources in such a way that a system continues to run as normal despite a growing number of users.

Multi-tenancy pertains to the manner in which a pool of resources is shared (Arasatnam, 2011; Dillon, Wu, and Chang, 2010). Multi-tenancy allows for easier and cheaper deployment of upgrades, due to the smaller number of instances of the application (Bezemer and Zaidman, 2010). The multi-tenancy of cloud computing is part of the reason for the economic benefits associated with the technology (Arasaratnam, 2011). Multi-tenant environments combined with the scalability of cloud computing allow an organizsation to move from capital expenditure models to operating expenditure models for computing power (Creeger, 2009). Abstraction in the context of cloud computing allows for a separation between having access to an application or platform, and actually maintaining the hardware and low-level software layers underneath it (Franklin, 2009). According to Arasaratnam (2011) this is the most significant change that cloud computing provides, allowing the operational aspect of the software to be insulated from the consumer. Broad Network Access allows cloud computing capabilities to be delivered to all standard devices over the internet (Mell and Grance, 2011).

CLOUD COMPUTING BENEFITS

A number of articles have discussed the various benefits cloud computing has to offer (Arasaratnam, 2011; Lovell, 2011; Marston et al., 2011).The most prominent benefits of cloud computing include a reduction in costs, flexibility and scalability, rapid deployment, remote access and mobility, lower barriers to innovation, efficient use of resources and green computing. Armbrust et al. (2010) argued that the development and management of large-scale data centers at low-cost locations

was the key enabler of cloud computing. Economies of scale can be achieved by combining technical and operational resources and utilizing cloud computing's ability to share computing power efficiently.

The increased flexibility and scalability of cloud computing eliminates the concerns organizations experience over marshalling resources when new IT capacity is needed (Hayes, 2008), especially when supporting spikes or organic growth in demand for computing power (Buyya et al., 2008). Klems et al. (2009) stated that enterprises experiment with cloud computing to reduce time-to-market. Bhardwaj, Leena, and Jain, (2010) state that cloud computing promotes the rapid deployment of business services, and resources to existing business that require it when needed.

Another benefit of cloud computing is remote access and increased mobility (Conway, 2011). With cloud computing, users can have access to information regardless of location (Bhardwaj et al., 2010). Individuals with innovative ideas or new services no longer require large capital to deploy their idea or incur human expense to operate it (Armbrust, et al., 2010). Cloud computing presents the benefits of virtualization (Gupta and Dejan, 2011), which allows a single computer to run multiple operating systems simultaneously (Vaughan, 2006), and therefore provides a single computer with the ability to operate as multiple computers in order to perform multiple tasks.

BUSINESS VALUE OF CLOUD COMPUTING AND THEORETICAL FRAMEWORKS

In recent years there has been an increase in the amount of research conducted in IT business value (Kohli and Grover, 2008; Devaraj and Kohli, 2003). Many articles justify their research on the basis that business has questioned the value of IT or required a justification for IT spending (Devaraj and Kohli, 2003; Kohli and Grover 2008; Schryen, 2010). It was found that while a substantial amount of research has been done in the IT valuation field, discrepancies still exist in terms of terminology, methods and findings (Kohli and Grover, 2008; Marthandan and Tang, 2012; Schryen, 2010).

Schryen (2010), Marthandan and Tang (2012) all agreed that part of the problem was that a large number of studies regarding IT business value were accompanied by a variety of methods, models and findings. In addition, studies were often performed without an underlying theoretical framework which has resulted in conflicting opinions on how best to evaluate the business value of IT (Marthandan and Tang, 2012). As a result, the research surrounding IT business value has reached a high level of complexity (Schryen, 2010).

Buyya et al. (2009) and Buyya et al. (2010) both mentioned that cloud computing allows an organization to increase focus on innovation and increase business value for their services by relinquishing concerns around setting up hardware and software infrastructure. Rimal et al. (2009) stated that the virtualization aspects of cloud computing allow the abstraction of resources from hardware, to improve agility, flexibility, costs and enhance business value.

Vendors agree (Boss et al., 2007; Hartman and Beck, 2011; Jaekel and Luhn, 2009) with findings from literature (Buyya et al. 2009; Buyya et al. 2010) that cloud computing enhances an organization's focus on innovation by reducing the concerns regarding the logistics of providing resources in order to enable innovations. Hartman and Beck (2011) proposed that cloud computing creates business value in the way that companies are able to be more responsive and it offers more convenient means of communication between companies, partners and customers. Jaekel and Luhn (2009) suggested that the business value of cloud computing entails the way in which the technology helps companies avoid large investments in licensing, benefit from cost reductions, standardize IT and speed up entry into new markets.

Melville, Kraemer and Gurbaxani (2004) synthesizsed information to develop a model of IT business value based on the resource-based view (RBV) of the firm. The RBV of a firm hypothesizes that the use of valuable and rare resources and capabilities contribute to a firm's competitive advantage (Newbert, 2008). Using this view, Melville et al. (2004) developed a model of IT business value which integrated elements of research to create a framework. The Melville et al. (2004) framework has a set of propositions summarizing knowledge accumulation with respect to the business value of IT. These propositions were based within one of either three domains (Figure 1).

The model that Melville et al. (2004) developed describe how local phenomena to specific domains shape the relationship between IT and organizational performance. The three domains are:

1. the focal firm;
2. the competitive environment, and;
3. the macro environment.

The focal firm is the firm that invests in and deploys IT resources, the competitive environment involves the industry characteristics and trading partners and the macro environment comprises of characteristics significant to IT from a macro perspective.

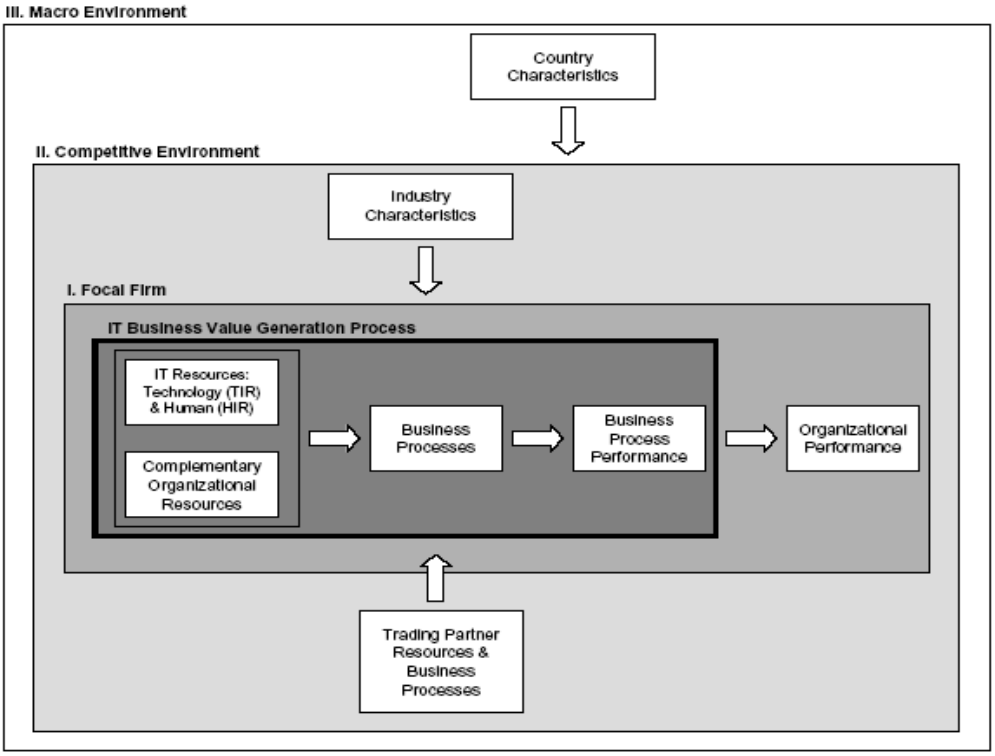

Figure 1. IT Business Value Model (Melville et al. 2004)

The framework outlined by Melville et al. (2004) provided a context of understanding with respect to what components need to be considered in the evaluation of the business value of IT in general. The Melville et al. framework was applicable to cloud computing because cloud computing is considered an IT resource as it is often referred to in literature as an IT delivery paradigm (Chieu, Kapoor, Mohindra and Shaikh, 2010), an IT deployment model (Riedl, Leimeister, Bohm, Yetton and Krcmar, 2010) and an IT infrastructure type (Borangui, Curaj and Dogar, 2010).

Research Methodology

The research sought to perform an exploratory study on the business value of cloud computing in South Africa. A qualitative approach was used with the support of semi-structured interviews to gather data. A qualitative approach was applicable as it is more subjective and inductive, in comparison with quantitative approaches

which are objective and deductive (Bryman and Bell, 2007). This method was considered the most appropriate approach considering the type of data being collected (Bavelas, 1995). The data was collected by conducting interviews with C-level executives, which are the highest-level executives in senior management, from South African firms who have investigated or implemented some form of cloud computing within their respective organisations.

The purpose of this paper is to investigate and report on the meaning of business value in the context of cloud computing in South Africa. In order to fulfill the purpose of this paper, four research questions need to be answered by the study, namely:

RQ_1: what does cloud computing mean to South African organizations?

RQ_2: what are the perceived benefits of cloud computing in South Africa?

RQ_3: what are the perceived barriers to cloud computing in South Africa?

RQ_4: what is the business value of cloud computing in South Africa?

RQ_5: what are the perceived benefits of cloud computing to South African organizations?

The qualitative strategy adopted allows for the construction of rich descriptions and explanations of phenomena and occurrences (Blanche, Durrheim and Painter, 2006) and a deeper level of understanding with regards to the preferences and decisions of the interviewees (Gordon, 2011). Since the qualitative data gathering approach is not limited to defined data sets, a creative and innovative data gathering environment is fostered without demanding constraints (Pratt, 2009).

According to Bryman and Bell (2007), deductive and inductive theories can be described as the relationship between theory and research. Deductive theory flows from general to specific allowing conclusions to follow logically from available facts and inductive theory flows from specific observations to the ability to generalize. Since the research proposes to explore the business value of cloud computing by flowing from gathered data to conclusions, an inductive approach was used as the basis for accomplishing the research. The theoretical framework developed by Melville et al. (2004) was not used to test the theory but to provide a platform to base questions on to extract data that will then be used to generate insights, therefore inductive theory.

All research was guided by an epistemology, which is an assumption about knowledge and how it can be obtained using various methods (Myers, 2009). The epistemology used in this study will be interpretivism, where knowledge is

obtained through the process of understanding the meaning behind what research subjects assign to phenomena (Bryman and Bell, 2007). This method of research was appropriate for the proposed study as it required the researcher to focus on the comprehension of the social construction of reality (Myers, 2009) in understanding the meaning people attribute to the business value of cloud computing in South Africa.

Bell and Bryman (2007) defined six steps that can be used to perform qualitative research. The steps provide a generic structure of how to perform qualitative research and allow for different methodologies, therefore an increase in flexibility.

The first step entails specifying general research questions and involves performing an analysis in order to understand the status of existing literature and current empirical research using guidelines provided by Kitchenham et al. (2007). By following these guidelines, applicable research questions could be formulated in relation to the conceptualizations of cloud computing. A framework was then sought as a foundation to the evaluation of the business value of cloud computing. No explicit framework was available to base the evaluation of business value for cloud computing on but in order to continue with further development of questions, the Melville et al. (2004) framework was used.

The second step is to select relevant sites and subjects (Bell and Bryman, 2007). Taking into account the topic, field of study and qualitative nature of the research, it was understood that C-level executives would be required to answer the questions identified. The population thus comprised of C-level executives in organizations that had investigated or implemented at least one form of cloud computing. The population was restricted to companies based in South Africa.

Guest, Bunce and Johnson (2006) suggested that six interviews may be sufficient to form meaningful themes and useful interpretations when understanding perceptions and experience in a group of homogenous individuals. Thus the research aimed to execute ten interviews and secured ten participants. Considering participants would be required from organizations which contain C-level executives that have investigated or used cloud computing, it was believed that purposive sampling would be the most appropriate in identifying participants. Purposive sampling is most effective when knowledgeable experts are required from a specific domain (Palys, 2008).

Step three involves the collection of data relevant to the context of the study. Semi-structured interviews were used as the primary research method, since this afforded the researcher the opportunity to probe responses and further thoughts in extracting

more data (Bell, 2010). Interviews were recorded, which allowed the researcher to concentrate on the interview, understand the context of answers being provided and promote a deeper level of engagement with the participant (Ritchie and Lewis, 2003). Interviews were performed face-to-face or by telephone to collect data. Face-to-face meetings were performed in Durban, Cape Town and Johannesburg.

Before starting the process of data collection, the targeted C-level executives were provided the research instrument and interview information to understand the requirements of the exercise. Participants were also informed that responses would be dealt with in a confidential manner. This encouraged participants to be more open in their discussions and allowed for more specific conversations regarding strategies, success and failures with the technology. After the interview, the researcher used the recordings and notes to transcribe the engagement into a standardized and consistent medium of text.

The fourth step entailed the interpretation of data collected in the previous step. Thematic analysis was used to perform the data analysis, which entailed identifying, analyzing and reporting on patterns, called themes, within the data (Braun and Clarke, 2006). Themes capture meaning within the data in relation to the research questions (Braun and Clarke, 2006). Themes were identified within the transcriptions created from the interviews and were labelled with codes. Codes are labels for assigning units of meaning to descriptive or inferential information captured in the study (Bell, 2010).

Step five entails considering the primary contribution of the work involved from a conceptual and theoretical perspective to revise and improve the research questions if required (Bell and Bryman, 2007). At this step, it was understood conceptually that the research report provided local interpretations of broader generalizations of research on cloud computing. Theoretically the research report would provide insight into what generalizations of cloud computing from theory are actually believed to provide business value in practice.

The sixth and final step involves writing up findings and conclusions in accordance with the themes identified.

There were ten participants that partook in the interviews of this study and have been assigned pseudonyms to maintain a level of anonymity (Table 1). The participants comprised of eight C-level executives and two heads of infrastructure, who were chosen by their CIOs on the basis that they were considered better suited for the research questions. Organizations of participants were described by size in accordance with the European Union standards for business size (Schmiemann,

2008). An organization was classified as an enterprise if employees exceeded 1000, large if employees were between 250 and 1000, medium if employees were between 50 and 250 and small if it less than 50 employees. Two of the participants were chosen to pilot test the questions in the interviews and both participants had experience in business and academia.

Name	Title	Industry	Sector	Size
Abel	Head Infrastructure Africa	Commercial Bank	Finance	Enterprise
Allan	CIO	Investment Management	Finance	Large
Chev	Head infrastructure Africa	Multinational Petrochemical	Oil and Energy	Enterprise
Eli	CEO	Telecommunications Consulting	Consulting	Small
Ivan	CEO	IT Services	IT	Small
Matt	CIO	Multinational Retailer	Retail	Enterprise
Mark	CEO	Consulting House	Consulting	Small
Neil	CEO	IT Vendor	IT	Medium
Nick	CEO	Audit Consulting	IT	Small
Una	CIO	Multinational FMCG Manufacturer	Manufacturing	Enterprise

Table 1: Participant Profiles

The interview questions were derived from the literature review conducted in this study with the aim of exploring the business of cloud computing in South Africa. Initially sixteen questions were developed based on the eleven propositions. After the validity assessments were completed, one question was removed and others reworded, which resulted in a final list of fifteen questions. Two questions were check questions to place on record what investigations or implementations were performed and to ascertain the sector the company interviewed was operating in. Three questions were introduced to solely accommodate the characteristics of cloud computing technology. Ten questions were derived from propositions developed by Melville et al. (2004).

Results

The responses of the participants were grouped into the themes that were identified in literature. References are made to the pseudonyms for participants as classified previously (Table 1).

CLOUD COMPUTING CONCEPTUALIZSATION

Participants generally conceptualized cloud computing in one of two forms.: they either classified cloud computing as Software as a Service (SaaS) implementations residing on a public cloud or as Infrastructure as a Service in a private cloud. Similarly, Grossman (2009) distinguishes two different types of clouds: "clouds that provide computing instances and clouds that provide on-demand computing capacity". No organization from the sample of participants considered cloud computing in hybrid or community models.

CLOUD COMPUTING BENEFITS

Armbrust et al. (2010) argued that even if cloud computing were more expensive, scalability and risk management in terms of over and under provisioning infrastructure would be worth the cost. The general recognition among respondents is that cloud computing is indeed more expensive and worth the investment for reasons suggested by Armbrust et al. (2010). Most participants suggested that they did not possess enough data to justify their claims, however from investigations, they found it hard to substantiate their investments from merely a cost perspective. Some of the statements from participants in support of this are:

Una: *"I do think though the cost of entry seems to be high, I do not have enough data to back that up, however in many respects as it does become quite a problem in building the business case, as it is bit of a leap in faith in many respects."*

Neil: "*not a clear cost benefit… I have never done a clean cloud analysis where it is a clear, clear … obvious cost benefit."*

It was understood that pricing was relative to the size of the organization as another participant Allan from a large investment firm made the following remark regarding the same service:

"Is it really a lot cheaper? Some of the services yes maybe, so for instance, for like I don't know 5 US dollars a year, I can get the whole Google suite of applications with email. But for something like enterprise class grade like Symantec I'm paying like ten times that, so you sort of get what you pay for."

The majority of respondents agreed that they have implemented or foresee their proposed implementations providing them with a level of speed and agility to deliver IT services quickly and flexibly, and to increase business performance. This observation agrees with Marston et al. (2011) who mentioned that cloud computing represented a union of trends one of these being business agility, where IT could be used as a competitive instrument for rapid deployment.

Allan: "*the reason we did it, the main reason why we implemented the whole virtualization so there was flexibility and we were growing very quickly. We were running out of back space servers so the lead time to deploy servers was maybe six weeks….. and I suppose with virtualization it can be done in a day, I mean you could do it in half an hour, I think the SLA[service-level agreement] we had was a day but we could do it half an hour."*

Abel: *"it will be bringing out the agility that our business requires from us going forward in the future…yes that's the biggest reason*" and "*is because of our business having to be much more agile… because of the competitive nature of our business going forward."*

Chev: **"***it's the agility management for applications…The need to add capacity that is some of the business value for cloud computing.*"

CLOUD COMPUTING BARRIERS

The literature review discussed a number of barriers to cloud computing including security (Armbrust et al., 2010) and reliability concerns (Sultan, 2010). These factors were referred by the majority of the participants and considered as part of the concerns related to the maturity of the model. Only Allan and Mark believed that cloud computing could handle any information, including financial documents in its current form. An understanding of the concerns was elicited by asking what data participants would not store on the cloud, which resulted in most participants answering everything except confidential data. Mark, in support of the security and reliability of the cloud, stated:

"I think I can quite comfortably say that the perception of security is incorrect, we are busy doing stuff with one of the financial institutions and Google has passed all their security checks and policies they actually stronger than what that particular financial institution has to offer."

The security and reliability concerns were related to trust of the technology. Some of which suggested they were representative of social issues as identified by Miller (2009), which include psychological issues with knowing data resides on a physical

computer you know the location of~~f~~, as opposed to having your information somewhere you cannot see or touch. Others were solemnly based on fact, an example being one participant's comment regarding the increase in points of failure with respect to cloud computing, which supports Chow, et al. (2009) view that cloud computing results in an increase in single points of failure.

Neil: *"if you have gone fully cloud…. There are a lot more points of break down."*

Participants acknowledged that some of these concerns stemmed from cloud computing's lack of maturity in South Africa and would eventually become a standard. A supporting statement from Mark:

"I think that it [cloud computing] is still young in South Africa, I think that the cloud computing and the true competitors will still arrive."

Nine participants saw bandwidth as a barrier to cloud computing use in South Africa. This supports literature in chapter 2 that cloud computing is influenced by bandwidth (Bayrak, Conley and Wilkie, 2011). Some statements in support of this finding include:

Neil: *"Massive, probably the biggest [problem]… so if there was [lots] of bandwidth I mean proper point 2 point connectivity……. They just turned on all the fiber and made it hit every office… the cloud will be no brainer….so it would just be... If I have got a gigabit connection to Vodacom's data center and duplicated at Teleco… and its part of the deal and the costs are affordable then it's like … who wouldn't then… that's probably the most... the biggest one…"*

Abel: *"at the moment telecommunications in SA is a bit inhibitive"*

BUSINESS VALUE OF CLOUD COMPUTING

When asked if cloud computing represented a competitive advantage, seven out of ten participants agreed that implementing cloud computing provided a competitive advantage, albeit a temporary one. The recognition that technical IT resources are not associated with sustainable advantages supports findings documented by Melville et al. (2004). It was understood that the competitive advantage would be due to the speed and agility the technology offered the organization. Further analysis revealed that the reason participants thought cloud computing provided a temporary advantage was an expectation that cloud computing would become commonplace in the near future.

Ivan: *"Eventually, cloud computing will become common place and it will drive the price down~~,~~; eventually, people will be subscribing more to services."*

"I think it could be deemed a competitive advantage in terms of how it brings about agility, but it will become common place in future."

The statements above and further comments suggest participants view cloud computing as an "evolutionary rather than a revolutionary step" (Arasaratnam, 2011). Furthermore, 50% of participants believed that there was competition in their relevant industries to implement cloud computing.

Answers varied for questions relating to that of a participant's industry and what were enablers or inhibitors to cloud computing use. Participants stated that mobility, a distributed environment, centralized IT architecture and no existing infrastructure to be enablers to the use of cloud computing. The highest responses received were for distributed computing where four participants responded in favour. With regards to inhibitors of cloud computing, participants provided big data, security, cost, bandwidth and regulatory concerns. The highest responses were three participants for security concerns.

In order to understand if similar industries would consist of the same enablers and inhibitors a comparison was made between the responses of two financial company executives, Allan and Abel. It was found that responses did not correspond to the same industry, as such enablers and inhibitors were dependent on the way the organization contextualized the barriers and benefits of cloud computing. Worthy of specific mention is participant Matt from a multinational retailer. Matt described the enabler for using cloud computing within his industry as a distributed network with a multitude of branches, however as an inhibitor he stated that bandwidth was a problem. Matt's situation is an example of the industry characteristics being dependent on the macro environment, as outlined by the Melville et al. (2004) framework.

Eight participants saw the characteristics of South Africa as influencing the amount of value that could be generated from a cloud computing implementation. Participants provided the following reasons for value generation in South Africa: infrastructure, economic development and regulatory framework. Abel and Matt indicated that they perceived the use of cloud computing as directly linked to economic development. While Abel and Chev saw regulations as an inhibitor to the prominence of cloud computing use in companies.

Conclusions and Recommendations

The problem statement outlined an aim which was to explore the business value of cloud computing in South Africa. It was identified from the literature review that there existed a void in assessing individual technology usage on organizational

performance (Devaraj and Kohli, 2003). In addition business (Trowbridge, 2011) and academic (Marston et al., 2011) resources outlined a need to explore the business value of cloud computing. Considering the unique characteristics of the South African environment, a need was established to explore the business value of cloud computing in South Africa, to provide insight to business and academics to what value may be derived from a cloud computing investment within South Africa.

After a complete review of literature, four research questions were developed. The research questions outlined the foundation from which this paper had to address them and a direction for the solution of the problem. The research design was then outlined, which provided context to the qualitative inductive approach that was used. The research design further outlined the steps taken in the design of the qualitative study in accordance with Bryman and Bell (2007), which included the selection of participants.

The data was then analyzed using thematic analysis to extrapolate the themes necessary to explore the business value of cloud computing.

The themes uncovered proposed that cloud computing implementations provide speed and agility as a value driver to an organization. This speed and agility however is achieved at a cost as perceived by participants, but may provide a temporary competitive advantage, an advantage only available if competitors have not implemented cloud computing and benefited from the speed and agility of cloud computing for themselves. Considering the expectation that the technology is a natural transition, it is assumed that any advantage gained will be short lived, however not implementing opens an opportunity for a competitor to gain this advantage.

This paper provides insight into the factors affecting business value for cloud computing in South Africa. It creates awareness for business and academics in providing future direction for research and development. The following recommendations are made based on the outcomes of this study and the broader picture:

- more academic research needs to be completed in the field of IT valuation;
- a standardised framework for individual IT technology valuations needs to be established;
- more academic research needs to be completed in the field of the cost analysis of cloud computing, and;

- research needs to be conducted to understand if cloud computing is, in fact, cheaper than traditional resources.

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