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Exploring Strategies that IT Leaders Use to Adopt Cloud Computing

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Abstract

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MBA, Walden University, 2009

BA, Stony Brook University, 2005

Doctoral Study Submitted in Partial Fulfillment

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Abstract

Information Technology (IT) leaders must leverage cloud computing to maintain competitive advantage. Evidence suggests that IT leaders who have leveraged cloud computing in small and medium sized organizations have saved an average of $1 million in IT services for their organizations. The purpose of this qualitative single case study was to explore strategies that IT leaders use to adopt cloud computing for their organizations. The target population consisted of 15 IT leaders who had experience with designing and deploying cloud computing solutions at their organization in Long Island, New York within the past 2 years. The conceptual framework of this research project was the disruptive innovation theory. Semistructured interviews were conducted and company documents were gathered. Data were inductively analyzed for emergent themes, then subjected to member checking to ensure the trustworthiness of findings. Four main themes emerged from the data: the essential elements for strategies to adopt cloud computing; most effective strategies; leadership essentials; and barriers, critical factors, and ineffective strategies affecting adoption of cloud computing. These findings may contribute to social change by providing insights to IT leaders in small and medium sized organizations to save money while gaining competitive advantage and ensure sustainable business growth that could enhance community standards of living.

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Section 1: Foundation of the Study

The IT decision-making process involves all the stakeholders of a business, including the end customers as well as the IT professionals. Cost-effectiveness of a solution affects its viability along with the technical benefits (Mazhelis & Tyrväinen, 2012). IT expenditure models of the past are now operational expense models that support and encourage delivery of IT resources as services. Growth in the computing industry complements the demand for *anything-as-a-service* (Lango, 2014). Cloud computing has meanings to different individuals; everyday consumers view cloud computing as a normal service available through an Internet-connected mobile device (Fernando, Loke, & Rahayu, 2013; Sultan, 2014). IT professionals view cloud computing as a pool of shared resources accessible through computing environments (Mazhelis & Tyrväinen, 2012).

This section covers the background of the problem, problem statement, purpose statement, nature of the study, research question, and conceptual framework of the study. This section also covers the definition of terms, declarations of the assumptions, limitations and delimitations of the research study, and the significance of the study. The review of academic and professional literature section contains extensive research and professional works on IT and a conclusion on innovation and emerging technologies such as cloud computing.

Background of the Problem

Competition is the reason for IT leaders to strategize regarding survival and faster development as compared to the others in the marketplace (Nanath & Pillai, 2013). Innovation is the key differentiating factor among fruitful and unsuccessful ventures (Mulia et al., 2013). Many IT leaders use different means of cost reduction, but technology advances aid IT leaders in reducing the effectiveness of these legacy tools (Mazhelis & Tyrväinen, 2012). The need for innovative methods of cost reduction and delivery of IT services created the innovative tools such as process automation, virtualization, and cloud computing (Chang, Walters, & Wills, 2013; Mazhelis & Tyrväinen, 2012).

Server and desktop virtualization formed the foundation for shared resources at the application and then data center or infrastructure level called *cloud computing* (Neumann, 2014). Cloud computing allows IT department managers to change their outdated perceptions of IT from just cost centers into business enablers and innovation powerhouses (Trigueros-Preciado, Pérez-González, & Solana-González, 2013). Cloud computing also enables IT leaders to defer their capital expenditure and leverage operational expenditure to support IT operations (Nanath & Pillai, 2013). There is inadequate intellectual work that precisely aligns the business necessities with the perceptions of IT leaders regarding adoption of cloud computing (Alshamaila, Papagiannidis, & Li, 2013). This inadequacy accentuated the need for this kind of qualitative single-case study.

Problem Statement

IT leaders must leverage cloud computing to maintain a competitive advantage (Arora & Nandkumar, 2012). From 2010 to 2015, IT leaders who leveraged cloud computing in small and medium sized organizations saved an average of $1 million in IT services for their organizations (Lacity & Reynolds, 2014; Sobragi, Gastaud Macada, & Oliveira, 2014; Yoo et al., 2012). Aleem and Christopher (2013) found that 93.8% of IT leaders considered IT security and 61.1% considered IT governance as the major barriers to cloud computing adoption. The general business problem that I addressed in this study was that many IT leaders do not adopt cloud computing (Trigueros-Preciado et al., 2013). The specific business problem was that IT leaders have limited knowledge of the available strategies for adopting cloud computing for their organizations.

Purpose Statement

The purpose of this qualitative single-case study was to explore the available strategies IT leaders may use for adopting cloud computing for their organizations. The target population consisted of a single organization located in Long Island, New York with IT leaders who have a working knowledge of strategies to adopt cloud computing and have successfully implemented at least one cloud computing initiative within the last 2 years. I created ABC Company as the pseudonym to discuss this single organization throughout this study. This population was appropriate for the study because IT leaders who are not leveraging cloud computing may lose an average of over $1 million per year by paying more for IT services than their counterparts who are leveraging cloud

computing (Moyano, Fernandez-Gago, & Lopez, 2013; Yoo et al., 2012). The application of the findings from this study may contribute to social change by providing insights and strategies for IT leaders in small and medium sized organizations to save money while gaining competitive advantage and ensure sustainable business growth that could potentially enhance community standards of living.

Nature of the Study

I used a qualitative method for this study. Qualitative methods enable researchers to explore participants' experiences while forming themes from the observation of data (Chikweche, 2012; Sinkovics & Alfoldi, 2012). The key focus of this study was to explore strategies from the perspective of the IT leaders; therefore, the qualitative method was suitable for this study. A quantitative method did not suit the needs of this study because the method involves the collection of numerical data (Bernard, 2013). Data required for this study came from exploring the strategies that IT leaders may use to adopt cloud computing and through the exploration of documents. The mixed method did not suit the requirements of this study because the method includes using a quantitative element to test hypotheses and a qualitative component as a basis for collection data using interviews and observations (Hayes, Bonner, & Douglas, 2013). Testing a hypothesis was not the goal of this study.

I selected the single case study as the design for this study. Single case study design suited the needs of this study because the design places more emphasis on the situation surrounding the experiences versus the actual lived experiences (Chikweche,

2012; Morse & McEvoy, 2014). The phenomenological design did not meet the needs of this study because the design permits researchers to understand the unique lived experiences of the participants (Arghode, 2012). Ethnography design did not meet the needs of this study because ethnography includes exploring the common patterns of conduct, philosophies, and language within a cultural group through observation (Schultz, 2012). The narrative design also was not appropriate for this study. Narrative design includes data collection from several sources to deliver a complete story (Franzosi, Doyle, McClelland, Putnam Rankin, & Vicari, 2013). Data needed for this study originated from interviews, exploration of documents, and participant observation.

Research Question

What are the available strategies IT leaders may use for adopting cloud computing for their organizations?

Interview Questions

I used interview questions to collect data for this study. The aim of each interview question was to acquire data leading to the answer to the research question. The exploration of participant responses led to the answer of the research question. In some cases, a probing question followed the main question to extract supplementary information from participants. Interview questions include the following:

1. What were the strategies that you used to adopt cloud computing, and why?
2. How did your cloud adoption strategies align with your business objectives?
3. What strategies did you use that were least effective in the adoption of cloud

computing, and why?

4. What strategies did you use that were most effective in the adoption of cloud computing, and why?
5. What other strategies and leadership characteristics did you use that were beneficial in the adoption of cloud computing, and why?
6. In your experience, what barriers prohibit cloud adoption strategies from being successful, and why?
7. What were your main concerns in your approach to cloud computing, and how did you address these concerns?
8. What more can you add to shed light on the strategies IT leaders use to adopt cloud computing?

Conceptual Framework

Disruptive innovation theory, as originally developed by Christensen in 1997, was the basis of this study (Christensen, 1997). According to Christensen (2011), a chain of mature technological innovation studies constitute the foundation of the disruptive innovation theory. The disruptive innovation theory is the basis for assessing the usefulness of technological innovations in the evaluation process of adoption of innovative services in an organization (Christensen, 2011; Crockett, McGee, & Payne, 2013; McMurtry, 2012). The goals of the theory are to define the marketplace, leveraged by goods and services created based on the performance profile required by consumers and delivered by the IT leaders (Dan & Chang Chieh, 2010).

Christensen (2011), a recognized expert on innovation, acknowledged that disruptive innovation characterizes an innovative model of service methodology that can augment current procedures and introduce innovative industry techniques. Evolution in IT creates disruptions in traditional business methods (Dan & Chang Chieh, 2010). IT leaders need to acclimate to the swift changes in the enterprise environment to stay competitive (Arora & Nandkumar, 2012; Dan & Chang Chieh, 2010; Russel & Millar, 2014). Disruptive innovation theory recognizes that sustaining innovations generates growth by offering a better performance in existing markets (Christensen, 2011).

The disruptive innovation theory was suitable for this study because the focus of this research was gauging opinions of IT professionals, as well as observing concerns that affect consumers' adoption and tolerance of cloud computing (Dan & Chang Chieh, 2010). IT professionals are in an extraordinary situation to counsel users on cloud computing because of their acquaintance with technical as well as business implications of cloud computing (Neumann, 2014). Traditionally, IT-supported businesses functioned as an operational unit, however now the role of IT has changed to a strategic business enabler (Neumann, 2014). However, cloud computing's adoption was slow because several IT leaders needed additional reassurances on user adoption concerns including security, performance, and interoperability (Dan & Chang Chieh, 2010). These IT leaders also needed to understand the paybacks pledged by this disruptive technological innovation to align technological innovations to company profitability (Dan & Chang Chieh, 2010).

Operational Definitions

The goals of the operational definitions are to define the terms used in this research study. Following are industry-specific terms that do not have clear descriptions for clarity regarding their potential relationship to the goals of this study:

Application-as-a-service (AaaS). Application-as-a-service cloud delivery model provides end users the capability to leverage a prebuilt application service catalog without deploying any underlying hardware and application software infrastructure (Karadsheh, 2012). An AaaS model includes prebuilt and preprovisioned storage, network, computing, operating system, and application environment to support data processing (Karadsheh, 2012).

Cloud computing. Cloud computing is a method of computing over the Internet (Andersen, Gupta, & Gupta, 2013). Cloud computing includes highly scalable information and technological competencies consumed as a service in a utility model (Andersen et al., 2013).

Cost centers. Cost centers are internal departments of an organization that do not influence profit directly but indirectly add to the cost of doing business (Mauch, Kunze, & Hillenbrand, 2012). Some examples may include marketing, IT, and research and development (Mauch et al., 2012).

Data centers. Data centers are facilities that host all the technology and infrastructure resources, including software, computing, networking, and data storage resources (Mauch et al., 2012).

Infrastructure-as-a-service (IaaS). Infrastructure-as-a-service is a cloud computing delivery model that enables the end users to leverage the core hardware components in a cloud-computing environment (Karadsheh, 2012). An IaaS model includes prebuilt and preprovisioned storage, network, and computing environment ready for the operating system, application deployment, and then data processing (Karadsheh, 2012).

Platform-as-a-service (PaaS). Platform-as-a-service is a cloud computing delivery model that enables the end users to leverage the core hardware and essential software components in a cloud-computing environment (Karadsheh, 2012). A PaaS model includes pre-built and pre-provisioned storage, network, computing, and operating system environment ready for application deployment and then data processing (Karadsheh, 2012).

Software-as-a-service (SaaS). Software-as-a-service is a cloud computing delivery model that enables end users to deploy applications and functionality through remote access to web-based services or infrastructure on the Internet (Karadsheh, 2012). End users do not purchase software to install it on their workstations because cloud computing service provider owns the software and licenses the use of the software to the end user (Karadsheh, 2012).

Virtualization. Virtualization allows for consolidation of many physical data center resources into fewer physical resources that host various virtual and logical independent entities (Bao Rong, Hsiu-Fen, & Chi-Ming, 2013).

Assumptions, Limitations, and Delimitations

I leveraged many primary and secondary data sources for this study. These resources included interviews with IT professionals and experts, corporate documentation, peer-reviewed articles, and scholarly journals. I used these data sources to make assumptions and highlight limitation as well as delimitations of this study.

Assumptions

Assumptions are the facts that the researcher assumes to be true but cannot verify (Yin, 2014). I assumed that the prospective IT professionals would respond to the interview questions in an impartial and truthful manner. Further assumptions included that the members targeted for this study would be honest and forthcoming with information on the research, development, and applications of cloud computing at their respective companies. There was an assumption of a collection of relevant data from the responses as well. Additionally, an expectation existed that the IT professionals would ask questions before use of the testimonials.

Limitations

Limitations are the inspirations that an investigator cannot control (Yin, 2014). The results of any qualitative exploration may only be effective if the participants provide credible and dependable information (Tirgari, 2012). The availability of the targeted group was a limitation since the scheduling of time for face-to-face interviews was a challenge, because of the busy work schedules of the participants. Using only IT leaders and not the entire organization limited the findings of the study. Additionally, using a

limited population size narrowed the use of the findings to only organizations in Long Island, New York.

Delimitations

Delimitations identify the bounds of a research study (Yin, 2014). The delimitations of this research study included (a) the geographic boundaries of Long Island, New York; (b) the organization selected for the single-case study; (c) the population; (d) the size of the population; and (e) the selection of participants. The participants were from different IT departments such as application development, infrastructure, networking, operations support, vendor management, and finance.

The latitude of this study also included IT infrastructures, which consisted of software, hardware, communications, and facilities needed to support IT infrastructures. The IT infrastructure leaders used unique technologies that helped improve IT efficiencies and were available in past 5-8 years. The scope of this research study excluded the staff reduction elements or any elements that may adversely affect staffing levels. I collected data by interviewing 15 IT leaders selected using a purposeful sampling method and by reviewing documents such as policies, guidelines, and technical whitepapers internally published by the organization that are related to cloud computing implementation.

Significance of the Study

This study is of value to business because an understanding of the strategies for the adoption of cloud computing to gain the operational and technical efficiencies of

innovative technologies may result in cost savings as well as acceleration of time-to-market for product and services development initiatives. Accelerated time-to-market may lead to a competitive advantage for these organizations. Cloud computing redefines the way IT leaders conduct business, opening new markets for IT leaders to conduct business (Andersen et al., 2013).

Contribution to Business Practice

The results of this study may fill gaps in the understanding and effective practice of business. Leaders of organizations who might be thinking of migrating to a cloud environment or adding other systems to the cloud may benefit from the results contained in the study. The decision to move other systems to the cloud might improve efficiencies, reduce operating costs, and increase earnings (Nanath & Pillai, 2013). IT leaders from other organizations might use the findings of this study to create other cost-saving strategies that benefit customers in local communities in the form of lower costs of products and services.

The importance of reduction of cost in IT operations encourages IT leaders worldwide to innovate, and various global IT leaders are leveraging innovative approaches to minimize overhead costs associated with IT infrastructures (Mauch et al., 2012). IT leaders believe that the IT infrastructure in a utility model reduces cost and leverages commodity support services (Choudhary & Vithayathil, 2013; Mauch et al., 2012). It is difficult for IT executives to justify investments in the new infrastructure and staffing because the indirect impact of IT offers challenges to quantifying without proper

tools and chargeback mechanisms (Mauch et al., 2012). When the IT leaders attempt to drive the cost out of their business to increase profitability, the cost centers are the first on the target list (Mauch et al., 2012). By leveraging cloud computing, IT leaders can add value to their business while leveraging the economies of scale resulting in improved business practices (Nanath & Pillai, 2013).

Implications for Social Change

This study aligned with the commitment by the Office of Research Integrity and Compliance (2014) to stimulate positive social change by cultivating human and social conditions and encouraging the development of individuals, communities, organizations, and society. The results of this study may contribute to business and social change if the IT leaders decide to move other systems to the cloud to reduce costs. Additionally, IT leaders could deliver reduced costs for products and services and attract customers they otherwise would not have because of the higher costs (Carcary, Doherty, & Conway, 2014; Song, Li, Wang, & Zhu, 2013). As IT leaders use less hardware due to cloud computing, this may reduce unrecyclable components deposited to landfills (Moyano et al., 2013; Song et al., 2013). Cloud computing adoption strategies may enable IT leaders to make operational improvements that might improve the profit margin and overall welfare of employees.

A Review of the Professional and Academic Literature

The appraisal of professional and academic literature was valuable in finding appropriate peer-reviewed articles for the study; out of 160 references used in this study,

with 140 of them (representing 87.5%) were peer-reviewed and published within 5 years of expected CAO approval (see Table 1). I identified gaps through the exploration of the literature and recently published research on similar studies. Further exploration of the literature also helped me with the identification of study themes appropriate to the research topic and question.

Table 1

Frequencies and Percentages of Peer Reviewed Articles

Description	Frequency/ Percentage
Total number of references:	160
Total number of references used that are 5 or fewer years old based upon the anticipated CAO approval date:	144
Percentage of references used that are 5 or fewer years old based upon the anticipated CAO approval date:	90%
Total number of references that are peer reviewed (verified using Ulrich):	140
Percentage of peer reviewed references:	87.5%

The peer-reviewed articles used in this study are available in the following databases: Business Source Complete, ProQuest, Walden University Library, and Google Scholars. The strategies used in locating the sources of articles for this study included documentation of the database and universal resource locator (URL) for articles used in the study and tips gathered from the research courses. Other strategies included the use of relevant articles submitted by peers during discussion forums in the Walden University seminar and research courses.

I leveraged the following approaches to identify peer-reviewed articles for this study: I searched for a doctoral study topic in the existing literature and leveraged

feedback from the doctoral study chair. The Walden University Library website was valuable for searching for a researchable topic. I used keywords (such as *innovation*, *cloud computing, virtualization,* and *competitive advantage*) to find articles, and browsed through the abstracts of searched articles to conclude their significance and effectiveness for the research study.

Other methods included a systematic appraisal of the literature to classify the purpose of the research study, research method and design, population and sample, research frameworks and models, data collection and analysis, and research results. I organized the literature review into subsections, including (a) industry examples and applications, (b) innovation, (c) competitive advantage, (d) constituting elements of cloud computing, (e) performance, (f) interoperability, (g) flexibility, and (h) data security to deliver contextual understanding of this study and for improved flow of comprehension by readers.

The result of the recommendations realized through this doctoral study may fill the gap that exists in the organizational areas where the advantages of cloud computing lack clarity (Choudhary & Vithayathil, 2013). Many IT leaders rely on in-house IT departments for progress with unique technologies that focus on constructing business methods (Nanath & Pillai, 2013; Sakhapov & Absalyamova, 2014). The goal of every organization is to become proficient and competitive by leveraging IT resources in a cost efficient way (Nanath & Pillai, 2013; Russel & Millar, 2014; Sakhapov & Absalyamova, 2014).

The purpose of this qualitative single-case study was to explore how IT leaders strategize to adopt cloud computing. Disruptive innovation theory, as originally developed by Christensen in 1997, is the basis of this study. According to Christensen (2011), a chain of mature technological innovation studies constitutes the foundation of the disruptive innovation theory. Diffusion of innovation (DOI) theory, developed by E. M. Rogers (1962), is one of the oldest social science theories. DOI strives to explain how, over time, an idea or product gains momentum and diffuses through a particular population or social system (Rogers, 1962). I did not select DOI as the theoretical framework for this study because it does not take into account an individual's means or communal provisions to embrace the new advancement or innovation (Cua, 2012; Rogers, 1962). The resource-based view (RBV) theory, formulated by Barney (1991), offers a way to explore sustained organizational competitiveness. I did not use RBV because of its negligence to the instruments by which resources add value to competitive gains (Eisenhardt & Martin, 2000) and the theory's inability to deliver an effective prescription for leaders (Priem & Swink, 2012).

The disruptive innovation theory is the foundation for assessing the usefulness of technological innovations in the evaluation process of adoption of innovative services in an organization (Christensen, 2011; McMurtry, 2012). The goals of the theory are to define the marketplace, leveraged by goods and services created based on the performance profile required by consumers and delivered by the IT leaders (Dan & Chang Chieh, 2010). This literature review contains a chain of mature technological

innovation studies and peer-reviewed resources that constitute the basis of the disruptive innovation theory (Christensen, 2011).

Industry Examples and Applications

Applications of cloud computing vary from industry to industry as well as from workload to workload (Mohlameane & Ruxwana, 2014). Priem and Swink (2012) focused on the standards, architecture, and process transparency in global supply chains by leveraging innovative technologies. Lack of standard information systems among different organizations creates inflexibility and inconsistency (Mohlameane & Ruxwana, 2014; Priem & Swink, 2012). The absence of interoperability and flexibility across IT systems challenges an organization's reliance on global supply chains as well (Priem & Swink, 2012).

Two fundamental capabilities developed over the past 5 years are that of the suppliers of AaaS and supplies of infrastructure for the applications used by businesses (Lango, 2014). The provisions among the suppliers of AaaS and suppliers of infrastructure have resulted in distinctive system undercurrents in supply chain systems. Demirkan and Dolk (2013) addressed issues of service science as an essential area of information systems research. Demirkan and Dolk also highlighted the various characteristics of manufacturers and customers of services focused technology advances, as well as value-add or solution vendor mediators, systems integrators, traditional businesses, users, and government officials as observers of technological advancements of cloud computing.

According to Kumthekar and Aserkar (2012), IT is an empowering driver for a supply chain. The accessibility of logistical administration software provides a competitive advantage to the consumers (Kumthekar & Aserkar, 2012). Logistics administration applications leverage the SaaS model for cloud-based procedures (Kumthekar & Aserkar, 2012). According to Mohlameane and Ruxwana (2014), IT is an enabler of an organization's agility. A distinctive belief is that superior IT venture empowers an organization to be additionally nimble (Mohlameane & Ruxwana, 2014). Nevertheless, traditional IT may obstruct administrative agility for IT operations (Mohlameane & Ruxwana, 2014).

Andersen et al. (2013) discussed the notion of cloud computing as an interesting topic for business decision makers. The promise of cloud computing to deliver litheness and rheostat expenditures through a flexible service model manufactured on a shared hosted platform appeals to business owners by adding agility to their IT operations (Li, Zhao, Rong, & Tang, 2013). Andersen et al. also discussed that cloud computing brings about a new business age where cost efficiency is the foremost objective. Andersen et al. deliberated upon the IT's capabilities presented via cloud computing, including: (a) benefits to organizations, (b) commercial usage, and (c) social benefits.

Uchechukwu, Li, and Shen (2012) discussed the efficiencies built into cloud computing that encourage the restructuring of experimental progress procedures, quickening timelines and cutting IT infrastructure related expenses. Preliminary applications in life sciences frequently focus on the efficient management of large

amounts of data produced by the research and development progression, where cloud computing can accelerate the analysis of trial data to attain expedited results (Uchechukwu et al., 2012). Augmenting the techniques used for gathering documents from numerous sources, shared, and moved to an archive system is a unique application of cloud computing (Uchechukwu et al., 2012). A shared IT environment includes the advantage of strict security, consolidation, automation, and monitoring of external participants (Flores, Antonsen, & Ekstedt, 2014; Hu, Deng, & Wu, 2013; Sanghyun, 2014).

Dahl (2011) argued that given the comprehensive, cross-functional, and exclusive nature of the procedure of product design, comprehension of design teams requires additional investigation by leveraging shared IT resources. Strategies to adopt cloud computing may aid future researchers in enhancing their research, which may focus on (a) internal procedures refined within the product design team, (b) macro inspirations in the product design atmosphere, and (c) the explanation of product design grouping (Dahl, 2011). Henard and McFadyen (2012) contended that, while researchers look to advance innovative technologies, IT leaders lack incentive to conclude the significance of their technologies by classifying future applications.

Henard and McFadyen (2012) emphasized a specific stage of technology development to take advantage of innovative technological advancements: the *development* or *emergence stage*. When an auspicious innovative technology development first starts in a central research laboratory, its objective and target markets

frequently appear copious but lack clarity (Henard & McFadyen, 2012). The vagueness of goals and aimed markets for products under development increase demand for innovative technologies to minimize the risk factor (Dahl, 2011; Henard & McFadyen, 2012).

Xiaolong, Mills, Znati, and Melhem (2014) proposed guidelines for energy proficient cloud computing services to promote environmental friendliness: (a) installing an appropriate non-disruptive power supply, (b) using a preemptive remote administration, and (c) employing a scalable design that acclimates to fluctuating necessities or volatile requests for resources. According to these guidelines, IT leaders must also adopt innovative technological developments and sustain consistent examination plans and valuations of the data center efficiencies to manage IT costs effectively (Li et al., 2013; Xiaolong et al., 2014). Gibson and Kasravi (2012) evaluated cloud computing to increase production for the businesses while lessening raw material and power consumption. Ye, Yang, and Aranda (2013) also observed the usage of communal and private clouds, apprehensions around the conceived threats associated with consuming cloud resources, and the remunerations of leveraging cloud computing for resource amalgamation, ecological observation, and proficiency administration.

Jing, Ali, She, and Zhong (2013) stated that virtualization delivers secure segregation of workloads traditionally delivered by dedicating physical servers to run application workloads. In addition to this secure separation proficiency, there are generous benefits to virtualization, including ease of planning, decreasing floor space

requirements in the data center, reduced laborers charge due to simplicity of management, and reduced energy usage (Jing et al., 2013; Pearce, Zeadally, & Hunt, 2013). According to Helland (2013), the function of the IT division in any organization shifts with the organization's maturity and adaptation to advancements in technology.

IT leaders have to evolve their IT departments into user-friendly and business-enabling departments to avoid executive management scrutiny (Helland, 2013; Park & Kim, 2014). The amplified attention to cloud computing, green technologies, and subcontracting are difficulties that IT departments encounter (Helland, 2013; Pearce et al., 2013). IT leaders need to evolve their methodology of IT resources, understanding the long-term business consequences that will arise if they resist this paradigm shift toward cloud computing (Helland, 2013; Pearce et al., 2013).

Innovation

Bala Subrahmanya (2013) suggested that leadership is a dominant influence affecting innovation. Numerous scholars revealed that transformational management and leadership positively affect structural innovation (Bala Subrahmanya, 2013; Henard & McFadyen, 2012). Nonetheless, there is a lack of scholars investigating the circumstantial environments of emerging innovation (Henard & McFadyen, 2012). Innovation drives the capability of an IT leader to advance innovative products or services (Hu et al., 2013; Wang & Alexander, 2013). Innovation also drives an organization's success in taking these innovative goods or services to the marketplace (Hu et al., 2013; Wang & Alexander, 2013).

Hu et al. (2013) and Helland (2013) mapped the correlation of innovation with cloud computing. According to Hu et al., the need for business agility gave birth to the innovation of cloud computing. According to "Business Models for Strategy and Innovation" (2012), commercial models and innovation management are directly related. Digital technology such as automated commerce, collaborative web applications, and cloud computing fashion a prospect for innovative business opportunities. Commercial applications of innovative technologies are also a type of innovation ("Business Models for Strategy and Innovation", 2012; Li et al., 2013).

Heng et al. (2014) examined an assortment of innovative business developments that effective business managers use to create innovative approaches to the creation of products and services. Heng et al. and Li et al. examined numerous innovations, including the enhancements of social networks to manage talent within the organization, leveraging collaboration technology, and innovations in information management. Heng et al. also supported the importance of innovation for an organization's growth by many experts, including William Dutton, of Oxford University, Rob Bernard of Microsoft, a computer software company, and Hal Varian, of the Internet firm Google. Kun, Ming, Shaojing, and Jian (2014) deliberated on the emerging technology of cloud computing in a non-technical way and observed concerns about organizational assessments and appraisals of cloud-based architectures and solutions. The use of cloud computing enhances utilization rates and decreases expenditures and overhead of cloud service suppliers (Kun et al., 2014; Park & Kim, 2014; Sanghyun, 2014).

Global IT leaders immersed in the promised value of nearly limitless computing, network, and storage resources of cloud computing leverage these resources to create value for the consumers (Cavage, 2013; Nallur & Bahsoon, 2013). The evolving nature of cloud computing encourages service based application to adapt to the emerging values and requirements of cloud computing (Cavage, 2013; Nallur & Bahsoon, 2013). Nallur and Bahsoon (2013) focused on the value of a distributed apparatus for such automatic adaptation by leveraging standardized enhancements and innovations.

Sakhuja and Shukla (2013) explored associations among diverse categories of Internet usage, IT alignment, and planned tractability. Usage of the Internet for communication with consumers relates to strategic tractability for small and mid-sized enterprises with more market orientation (Sakhuja & Shukla, 2013). The goals of the theory are to define the marketplace, leveraged by goods and services created based on the performance profile required by consumers and delivered by the IT leaders (Dan & Chang Chieh, 2010).

A theoretical exploration of the innovation and cost control spans beyond academic research (Christensen, 2011). This exploration also includes practical implications regarding the durable sustainability of all organizations (Christensen, 2011). Innovations and advancements in technology enable IT leaders to apply these improvements in the form of innovative technologies such as cloud computing (Dan & Chang Chieh, 2010). Garrison, Kim, and Wakefield (2012) deliberated upon the applications of cloud computing systems in an organization's IT infrastructure, which

may improve data storage capability while reducing IT expenses. Garrison et al. also described the categories of service models offered by cloud services providers, containing *Software-as-a-service (SaaS)*, *Platform-as-a-service (PaaS)*, and *Infrastructure-as-a-service (IaaS)*. Garrison et al. discussed many competitive rewards of economic cloud computing outlook.

Neumann (2014) deliberated upon the use of cloud computing in various operations of business organizations in the United States. Neumann identified that the innovation enables IT leaders to leverage their existing or familiar IT infrastructure and renovates technology into communal resources distributed as a service over one or more networks. Neumann also focused on the use of cloud computing that permits Internet consumers the access and use of computing resources such as IT infrastructure and other computing resources, including software applications.

Budrienė and Zalieckaitė (2012) deliberated regarding a continuously fluctuating, energetic, and various business atmospheres that drive monetary bodies, including enterprises, to respond to fluctuations in the marketplace. According to Budrienė and Zalieckaitė, the use of cloud computing also encourages these environments to pursue unique prospects and inventive resolutions permitting (a) conservation of resources, (b) development innovative merchandises and services, and (c) persistence on the international marketplace, which necessitates superior value and promptness of information. IT leaders of small and medium-sized enterprises can fashion their technology infrastructure but doing so requires substantial monetary resources (Budrienė

& Zalieckaitė, 2012). A *pay-as-you-go model* may enable IT leaders of a small or mid-sized organization to eliminate the need for upfront capital requirements, to deliver innovation by leveraging cost-effective means (Wang & Alexander, 2013).

Competitive Advantage

According to Liu, Sheng, and Marston (2015), corporate leaders distinguish themselves in their market segment by positioning IT to cultivate strong IT competencies and counterattack rivals' endeavors to emulate or advance these proficiencies. Although this strategy is the warranted approach because of vigorous IT proficiencies, there does not appear to be empirical proof proving or disproving this supposition (Liu et al., 2015). IT leaders support the nimbleness of an organization's infrastructure and appetite to innovate (Mohlameane & Ruxwana, 2014). A general proposition is that the superior investments in technology infrastructure empower a business to be flexible (Mohlameane & Ruxwana, 2014). Nevertheless, it is possible that IT leaders can also obstruct and occasionally even encumber business agility (Mohlameane & Ruxwana, 2014). Mohlameane and Ruxwana (2014) offered the proposition that organizational leaders want to grow their organizational IT proficiency and administer their IT infrastructure assets to attain nimbleness and competitive advantage.

Roberts and Grover (2012) examined how IT leaders may accelerate an organization's client dexterity and competitive commotion. Consumer demands drive the behavior of a company's leaders and encourage them to innovate in order to maintain their competitive advantage (Roberts & Grover, 2012). IT agility also performs a

significant role in the collaboration gained from the communication amongst a company's leaders' synchronization efforts and their advancement in the integrated information systems (Nanavati, Colp, Aiello, & Warfield, 2014). These integrated information systems enable IT leaders to respond to the dynamic demands of consumers to attain competitive advantage (Nanavati et al., 2014).

Haimes and Chittister (2012) deliberated on the impact of cloud computing on organizational strategy and corporate representations. Haimes and Chittister anticipated that IT leaders, who efficiently manage threats around cloud computing, created a sustainable competitive advantage. A unique advantage of cloud computing is to enable businesses to answer their consumer requests efficiently (Haimes & Chittister, 2012). Helland (2013) highlighted the infrastructure required to support cloud computing initiatives by associating with the limitations and conveniences of living in a shared housing such as apartments and condominiums. Helland also emphasized the importance of practice and presentation designs in the formation of PaaS, the progress of utility-modeled software and applications in the deployment of SaaS, and efficient applications of web-based access to shared application resources for cloud users.

Cloud computing allows IT leaders not only to alleviate threats to the highly competitive commercial atmosphere but also to advance competitive leads (Iyer & Henderson, 2012; Walterbusch, Martens, & Teuteberg, 2013). Iyer and Henderson (2012) designated numerous cloud computing advantage configurations and a few business-related tactical hazards. Vigorously handling a blend of legacy IT and cloud

solutions is an IT administration necessity as businesses participate in networks that embrace rivals, infrastructure suppliers, and software platform providers (Nanavati et al., 2014).

Ussahawanitchakit (2012) targeted the effects of information attainment regarding competitive advantage of e-Commerce industries in Thailand through technology recognition and information productivity as mediators. Information attainment is the self-governing adaptable, where technology reception and material productivity are the regulating variables, and competitive advantage is the reliant variable (Chauhan, Malhotra, Pathak, & Singh, 2012). Liu et al. (2015) searched the degree to which competitive activities of international IT leaders and local merchants of Internet merchandises and services formulate the dispersal of their corresponding merchandises or services in developing marketplaces. Liu et al. authenticated the premises with longitudinal field data from two combinations of rival Internet products in the search engine and e- markets.

Nevala, Ollila-Tåg, Pitkäkoski, Takala, and Toivola (2012) discovered how to achieve expertise in a traditional business with an innovative service. Numerous diverse materials of concern exist when introducing an innovative service to the marketplace to create competitive advantage (Huang, Wu, & Chen, 2013; Nevala et al., 2012). Nevala et al. gained this opinion from management scholars knowledgeable in the corporate lifecycle.

According to Kaur and Chana (2015), the eventual objective of cloud computing is to deliver excellent tractability where the consumer can have any source and information at any time, in any quantity, with robust safety, and custom-made service level agreements. Consumer leverages a utility model, with no upfront capital expense in a cloud computing environment (Chauhan et al., 2012; García, Espert, & García, 2014; Walterbusch et al., 2013). Timely availability of software and hardware resources is a significant factor in implementation and deployment on-demand to improve customer satisfaction and to stay competitive (Kaur & Chana, 2015).

Constituting Elements of Cloud Computing

Organization-wide adoption of cloud computing presented flexibility and enhancement over the traditional client-server model to organizations, as well as older time-sharing models of the 1970s (Caytiles & Lee, 2012). Cloud computing delivers an economic, innovative, and traditional computing platform to greater masses at scale (Caytiles & Lee, 2012). Cloud computing enables consumers to easily access, install, and acquire innovative technologies that are traditionally cumbersome to procure and consume (Sultan & van de Bunt-Kokhuis, 2012). Cloud computing's shared service models, including IaaS, SaaS, and PaaS, apply to many cloud computing models, including public, private, hybrid, and community cloud offerings (Chao, 2014; Young Bae, Junseok, & Bong Gyou, 2013).

After the success of virtualization, many IT leaders started to build their internal or private clouds by extending their virtualization capabilities to the end users via service

catalogs (Chao, 2014; Garg, Versteeg, & Buyya, 2013). These virtualization capabilities included server, network, and storage virtualization (Chao, 2014). These internal or private clouds require in-house capabilities to support all the components of the cloud (Frey, Hasselbring, & Schnoor, 2013).

By leveraging existing infrastructure components to create internal clouds benefits the IT leaders reduce their cost of entry into the private cloud model (Young Bae et al., 2013). If using existing infrastructure is not an option, IT leaders also offer commercially available private clouds to their organizational users. Internal or external services providers host and manage dedicated clouds (Frey et al., 2013). Leveraging private clouds enables IT leaders to consolidate their infrastructure assets (Lal & Bharadwaj, 2015).

Shared or public cloud computing models take advantage of combined cloud resources for more than one organization or business (Lal & Bharadwaj, 2015). Commercial cloud providers manage and host public clouds, including hyper-scalars such as Amazon, Microsoft, and Google (Lal & Bharadwaj, 2015). End users lack any control over the services and underlying infrastructure (Young Bae et al., 2013). Services offered by public cloud computing providers are *pay-as-you-go*, or subscription based. Customer-relationship-management (CRM) systems such as Salesforce.com are effective examples of how customers consume public cloud resources (Lal & Bharadwaj, 2015).

Hybrid and community clouds are an amalgamation of public and private cloud model (Chandrashekhar, Gupta, & Shivaraj, 2015; Goutas, Sutanto, & Aldarbesti, 2016).

Community clouds leverage communal resources to serve many IT leaders who form a community because of their common trepidations, duties, and purposes (Katzan, 2010). Community clouds include a combination of internally as well as externally hosted resources (Katzan, 2010). The hybrid cloud approach combines the private, community, and public cloud approaches into a single model (Katzan, 2010).

The hybrid cloud models leverage the interoperability as the minimum common factor between private, public, and community approaches (Chandrashekhar et al., 2015; Goutas et al., 2016; Katzan, 2010). Hybrid clouds require internal as well as external infrastructure investments. Hybrid clouds enable IT leaders to control their mission-critical data and applications while leveraging the scalability and flexibility of internal and external cloud computing resources (Chandrashekhar et al., 2015; Goutas et al., 2016). Cloud computing service providers offer these services in the form of bundles to attract consumer and to provide users with the flexibility of choice and economies of scale (Katzan, 2010).

Cloud services models such as a SaaS enables customers to operate their applications out of a cloud infrastructure (Lal & Bharadwaj, 2015). Consumers access the SaaS applications via a web browser over the Internet (Katzan, 2010). In a SaaS environment, the consumer does not have access to the underlying infrastructure and can only make selective modifications to the applications themselves.

Some of the SaaS offerings include CRM, virtual servers, and desktop applications, where communication methods include messaging, and numerous others

(Lal & Bharadwaj, 2015). The cloud-computing infrastructure delivers messaging, including email and instant messages because of their Internet dependency (Lal & Bharadwaj, 2015). Management of messaging consumes numerous internal technical resources; therefore, messaging is a candidate for outsourcing to the cloud (Lal & Bharadwaj, 2015). Outsourcing messaging has its caveats, including the risk of data loss and ownership issues, including sensitive information sharing among the employees over messaging (Lal & Bharadwaj, 2015).

PaaS allows consumers to customize the application, perform application development tasks, and leverage application development methodologies supported by the cloud provider (Lal & Bharadwaj, 2015). PaaS offerings include application development tools and environments, databases, and web services (Goutas et al., 2016). PaaS offerings do not allow consumers to have access or permissions to alter the fundamental cloud infrastructure that supports the PaaS offering (Chandrashekhar et al., 2015; Goutas et al., 2016). PaaS environments enable additional controls for the end user in the application environment as compared to a SaaS offering (Lal & Bharadwaj, 2015). Some of the examples of PaaS include Microsoft Azure and Google Apps (Goutas et al., 2016).

IaaS enables the usage and management of cloud computing software resources, including services such as computing and networking capabilities, virtual machines, and virtual storage pools (Rahman & Choo, 2015). The IaaS offerings usually include (a) physical domains, (b) virtualization, and (c) networking (Rahman & Choo, 2015). The

IaaS enables customers to consume virtualized computing resources in a *pay-as-you-go* or utility model (Rahman & Choo, 2015). IaaS models empower consumers to leverage IT infrastructure resources without incurring any capital expenditure (Katzan, 2010). The end user can administer and modify the software layer of the infrastructure, including data storage space, network resources, and operating environments (Chandrashekhar et al., 2015; Goutas et al., 2016). Some of the IaaS offerings include Microsoft Azure, and Amazon Elastic Compute Cloud (EC2) available to consumers (DaSilva, Trkman, Desouza, & Lindič, 2013; Goutas et al., 2016).

Organizations such as Amazon, Google, and Microsoft evolved into popular cloud services providers for organizations of all sizes and provided a utility model for consumption of their cloud resources to their consumers (Karadsheh, 2012; Thanakornworakij, Nassar, Leangsuksun, & Paun, 2013). Cloud providers such as Amazon, Google, and Microsoft leverage the economies of scale methodology and achieve higher returns on the total cost of ownership of their cloud underlying resources by increased hardware and software resource utilization by leveraging a multi-tenant resource consumption model (Karadsheh, 2012). Enterprise-grade cloud services providers typically offer both *pay-as-you-go* and leasing options to their consumers because the trend of resource consumption varies from client-to-client (Karadsheh, 2012). IaaS providers leverage the secure multi-tenancy consumption models to enhance their resources utilization (Zissis & Lekkas, 2012). IaaS providers prefer to leverage

applications, computing, network, and storage resources that allow them to leverage multi-tenancy and to be scalable (Zissis & Lekkas, 2012).

Multi-tenancy enables cloud providers to achieve economies of scale by pooling their cloud resources in a shared pool and delivering resources to the end users as a service (Zissis & Lekkas, 2012). Secure multi-tenancy comprises of secure isolation of resources at the computing layer, network layer, and storage layer (Zissis & Lekkas, 2012). Examples of best-of-breed multi-tenancy solutions include VMware's server virtualization at the computing layer, Cisco's network virtualization at the network layer, and NetApp's storage virtualization at the data storage layer.

The secure multi-tenancy model leverages load-balancing and secure isolation of workloads in the cloud infrastructure (Zissis & Lekkas, 2012). Load balancing enables users to scale-up or scale-down the usage of cloud computing resources without running into any resource contention (Zissis & Lekkas, 2012). A secure multi-tenancy feature of shared cloud resources makes these cloud resources consumable by the consumers in a secure manner (Zissis & Lekkas, 2012).

Cloud computing scalability and flexibility take advantage of the speedy network, internal local area network or external wide-area network, cheap and dense data storage and high performance virtualized computing farms running on powerful microprocessor technology (Alali & Yeh, 2012). Innovations in networking, data storage, and computing platforms facilitated the rapid growth in cloud computing advancement (Zissis & Lekkas,

2012). Virtualization enables IT leaders to use different operating systems and applications in cloud computing (Pearce et al., 2013).

Economies of scale play a vital role in IT leaders adopting virtualization to extend the utilization of their physical IT infrastructure resources (Mazhelis & Tyrväinen, 2012; Pearce et al., 2013). Virtualization of IT infrastructure resources was the catalyst for cloud computing (Pearce et al., 2013). Virtualization enables IT leaders to adopt and consume innovative technological advancements with minimal lead-time for deployment of resources (Bugnion, Devine, Rosenblum, Sugerman, & Wang, 2012). Virtualization technology vendors are aligning their hardware and software innovative developments to the developments in cloud computing to improve their operational and technical efficiencies that result in the acceleration of their business growth and competitive advantage (Alali & Yeh, 2012).

Cloud computing vendors are using virtualization to extend their physical IT resources, including high-performance computing, clustering, and load balancing to the cloud services consumers (Mauch et al., 2012). IT leaders of large organizations such as Microsoft, Exxon-Mobile, and Apple use virtualization technologies to improve efficiencies of their data centers (Young Bae et al., 2013). Some cloud computing providers use hardware focused systems while numerous others leverage network-focused methodology to the deployment of network and computing resources (Mauch et al., 2012).

The marketplace includes choices of cloud computing platforms and providers for organizations. According to Young Bae et al. (2013), numerous enterprises IT users use data storage, data management and backup, and network related services in the cloud. Cloud computing platforms integrate with the traditional application platforms (Giessmann & Stanoevska-Slabeva, 2012). Nonetheless, unavailability of integration with numerous homegrown applications concerns IT professionals and hinders the adoption of cloud computing (Lai & Yu, 2012).

Performance

The performance of resources in cloud computing environments is also a factor that IT professionals consider before deciding if a cloud platform is a good fit for a certain application or workload (Benedict, 2013). The performance encompasses the latency, availability of Input/output (I/O) operations and response time of the workload (Tan & Teh, 2013). Without scalability of performance, cloud-computing platforms cannot meet the needs of current workloads and applications (Benedict, 2013). Technical terminology in IT for performance reflects the capability of the IT leaders to fulfill a request in a timely manner or respond to a query promptly (Lin & Chang, 2013).

Performance can also relate to the satisfaction of human necessity in a prompt fashion (Mauch et al., 2012). The components of cloud computing components scale for performance and capacity (Benedict, 2013). Performance scalability enables IT leaders to extend the usability of their hardware, software, and storage components (Mohlameane & Ruxwana, 2014).

Automation helps with the scalability of performance in a virtualized or cloud environment (Benedict, 2013). Performance factors enable the elasticity in cloud computing infrastructures by delivering features and functionality to applications quickly, reducing their time-to-market (Katzan, 2010). Automatic load balancing for performance is the main attribute for federated cloud computing infrastructures (Mladenow, Kryvinska, & Strauss, 2012). One of the concerns of IT leaders is that the commoditization and utility models of cloud computing services may lead cloud services suppliers to lessen the required performance levels (Mladenow et al., 2012). Another concern is the availability and the response times that the consumer applications require for their optimal usability (Mladenow et al., 2012). The geographical diversification of cloud computing resources also impacts the response times and performance of cloud computing services (Young Bae et al., 2013).

The availability and reliability of cloud computing resources also affects the performance of a cloud-computing platform (Katzan, 2010). Availability of resources signifies the user's desired level of access to cloud computing resources and reliability deals with the accuracy of information or data requested by the end user (Mohlameane & Ruxwana, 2014). Reliability often reflects the sturdiness, elasticity, and recoverability of a cloud-computing platform (Clarke, 2012). Lack of reliability causes adverse results for the organization, such as data corruption and loss, which results in operational inefficiencies (Clarke, 2012). These operational inefficiencies result in loss of market share, as well as loss of profits for the organization (Katzan, 2010).

Interoperability

Interoperability denotes the capability of innovative technology to be reliable and compatible with existing or old technologies (Young Bae et al., 2013). IT leaders, who embrace cloud computing, face challenges, including, security, interoperability, and restrictions on the adaptation of enterprise resource (Abouelhoda, Issa, & Ghanem, 2012). The propagation of cloud computing presents issues with interoperability, transportability, and relocation of data and resources (Sultan, 2014). Interoperability is also a challenge for in-house applications, but this issue magnifies in cloud computing environments (Poulymenopoulou, Malamateniou, & Vassilacopoulos, 2012). In an in-house model, IT leaders manage their infrastructure and platforms at any time internal IT leaders can make any change or improvement (Young Bae et al., 2013). The cloud provider manages and controls the infrastructure, where consumers do not have any control over the underlying infrastructure (Young Bae et al., 2013).

Interoperability is a vital factor in the acceptance of IT innovations in corporations, but as a model, interoperability is restricted to methodological or serviceable influences (Poulymenopoulou et al., 2012). Interoperability is also important due to the correlation of the value of interoperability among the business and the embrace of IT advancements (Sultan, 2014). The reduced uncertainty of any innovative technology translates into the better adoption of that innovation by the potential consumers (Li & Li, 2013). Interoperability of a cloud computing platform influences the adoption rate of that platform as well (Li & Li, 2013). Increased interoperability and

openness of a technological novelty encourage cross-platform development (Li & Li, 2013).

Ease of use is a byproduct of cross-platform compatibility in a cloud infrastructure (Huang, Chen, Chen, Hsu, & Hsu, 2014). Lack of compatibility with other industry practices and standards creates gaps in the production readiness of a product (Huang et al., 2014). Standardization generates ease of integration, ease of management, and ease of development for the end users and improves the time-to-market for the products and services under development (Huang et al., 2014). Mission and culture of an organization play a vital role in the alignment of technology infrastructure and business objectives (Huang et al., 2014). Lack of business values and IT alignment causes failure of many IT projects (Jeon, Min, & Seo, 2014). A useful innovation encourages teamwork over isolated methodologies (Jeon et al., 2014).

In a business environment, the cloud platform's integration points with the organization's existing culture and infrastructure drive the success or failure of cloud computing initiatives (Nadjaran Toosi, Calheiros, & Buyya, 2014). IT leaders look for compatibility in a cloud platform as an important factor while evaluating those platforms (Nadjaran Toosi et al., 2014).

Flexibility

Environmental influences such as socio-economic, administrative, lawful, and technological elements influence businesses to be adaptive and flexible. IT leaders use several tools to monitor and control these environmental fluctuations (Barrett, Howley, &

Duggan, 2013). IT leaders who do not embrace change tend to lose their innovative and competitive advantages (Barrett et al., 2013). International laws influence how global IT leaders conduct their business across borders. Narayanan (2012) discovered that a rationalization exists in prevailing international law for republics' cloud computing regulations to have an extraterritorial consequence. Narayanan also revealed that collaboration produces a superior malleability for the governing body and permanency for cloud computing. Cloud computing enables flexibility and cost control for data storage, resulting in additional economic capabilities (Mazhelis & Tyrväinen, 2012; Onsongo et al., 2014).

The movement of innovative and legacy applications to a cloud-based platform necessitates adapting these legacy applications to an innovative computing standard (Andrikopoulos, Binz, Leymann, & Strauch, 2013). Andrikopoulos et al. (2013) emphasized the importance of leveraging virtualization to transfer the entire application stack to a cloud platform, allocating the essential workforce resources to work on innovation enhancement. Advancements in technology-enabled cloud services have to be adaptable and flexible for data and application migration (Andrikopoulos et al., 2013).

According to Nassim Aryani (2014), IT leaders have to emphasize their competencies in the incorporation and integration of information systems and to deliver the suitable information systems that align with organizational goals, therefore, gaining the competitive advantage in the global economy. This competitive advantage requires the adoption of dexterity in the business (Nassim Aryani, 2014). Nassim Aryani also

stated that the technological advancements forecast the adaptive proficiencies in the business.

Technological advancements enable the attainment of business objectives, elasticity, answerability, and enhancement of the excellence and productivity in an organization (Nassim Aryani, 2014). Innovative technological advancements, including cloud computing enable IT leaders to excel and achieve flexibility and accelerate adeptness. Customization and integration of cloud platforms enable IT leaders to attain a competitive advantage by being able to speed up servicing of their users and partners (Manias & Baude, 2012). Measurement of the awareness of IT leaders on malleability is an integral element in cloud adoption decision-making process (Manias & Baude, 2012).

Data Security

Data security is a vital element in cloud adoption decision-making process because of numerous security and data ownership concerns. IT leaders keep their sensitive data and intellectual property securely behind firewalls to deter hackers and unauthorized access (Flores et al., 2014; Sindhu & Mushtaque, 2014). Cloud computing includes new concerns and challenges around the protection of data and software applications, including confidentiality of personal information, as well as protection of the physical and virtual infrastructure resources (Desai, 2013; Srivastava & Kumar, 2015).

The Internet has global economic, political, and social impact, where strict regulations do not always govern the use of Internet resources (Sindhu & Mushtaque,

2014). Use of the Internet to enable cloud-computing resources to the public generates various uncertainties about the data security in cloud computing (Desai, 2013; Flores et al., 2014; Srivastava & Kumar, 2015). Juels and Oprea (2013) discovered the relationship between cloud computing and a service archetypal that emphasizes on open and shared data security architecture. Juels and Oprea noted that corporate IT leaders' sluggishness with migrating to open clouds is a result of their concerns that go past encryption of records and files in the cloud. Juels and Oprea stressed the importance of real-time checking and appraisals by neutral auditors, which can institute safekeeping perceptibility in the publically shared cloud resources to guarantee IT leaders that the cloud offering is secure.

Sunyaev and Schneider (2013) encouraged endorsement of cloud computing offerings by autonomous accreditation institutions, which may address the issue of nimble organization's disinclination to deploy this innovative technological advancement. Sunyaev and Schneider also emphasized data irregularity in cloud computing marketplace, the absence of statistical data to appraise cloud offering's superiority, data safekeeping, and vagueness around lawful amenability with transnational confidentiality rubrics. Desai (2013) stressed the importance of innovative engineering strategies and blueprints to address information safety concerns and the development of cloud computing. The legislative and regulatory initiatives by governments around the globe offer key strategies to safeguard data and private user

information in a public and private cloud, including, but not limited to, unauthorized access and use of private or personal data (Cohen, 2013; Desai, 2013; Schweitzer, 2012).

Dadameah and Costello (2011) examined the United Kingdom government's tactical and strategic progress in the information and infrastructures technology business, specifically the contribution of advanced schooling institutes. The partnerships among academics and small and medium-sized businesses reveal a healthy attitude toward inspiring inventive undertakings (Dadameah & Costello, 2011). Dadameah and Costello also considered the concerns involving the part of advanced education institutions in economic progress and the issues that both enterprises and academia have, the prevalent issue being a constructive transformation in outlook.

The use of information technologies in an organization's corporate scheme techniques is a crucial and undisputed success factor in the marketplace (Jabbari Sabegh & Motlagh, 2012). To advance administrative proficiency and to attain competitive advantage, tools such as alignment of IT with company's corporate policies are necessary (Jabbari Sabegh & Motlagh, 2012; Madhani, 2012). Jabbari Sabegh and Motlagh (2012) ascertained the influence of IT control and competencies on tactical placement amongst corporate and IT, and the magnitude of their impact.

Haimes and Chittister (2012) focused on the handling of risks and insurance for cloud computing. Gold (2012) highlighted a 2011 Cloud Hack episode that happened in the United States, where hackers hacked approximately 100-million consumer account files and penetrated the cloud site, illegally retrieved, and obtained the private and

confidential account information. Schweitzer (2012) and Gold examined the concerns regarding indemnification, improved cyber-security defense expenses, and portfolio the data influenced.

Data security in the cloud is a concern for numerous IT leaders in their administrative planning regardless of the budgetary and economic benefits (Sindhu & Mushtaque, 2014; Srinivasan, 2013). Cloud computing providers have resilient motivations to design solutions that sustain performance and structures while affording robust segregation and safety to maintain competitive advantages (Hyman, 2013; Madhani, 2012; Nanavati et al., 2014). Juels and Oprea (2013) positioned cloud computing as a service model with an emphasis on public cloud data security. Numerous IT leaders hesitate to embrace public clouds because of safekeeping apprehensions, as the motivations for movement is more than encryption of records and information management in the cloud (Juels & Oprea, 2013; Wenge, Lampe, Rensing, & Steinmetz, 2014). Random third-party exploration can introduce safety prominence in cloud computing environments, assuring the IT leaders that the cloud resources are safe and secure (Changsoo, Daewon, & Keunwang, 2013; Juels & Oprea, 2013).

Improved operational efficiencies are a byproduct of cloud computing innovations (Henard & McFadyen, 2012). The outsourcing element of cloud computing reduces operational overheads (Wang & Alexander, 2013). Cloud computing accomplishes business agility without sacrificing the competitive advantage of leveraging the best of breed technology (Pedersen, Pedersen, & Riis, 2013).

Cloud computing enables IT leaders to operate a lean IT infrastructure in-house and use external infrastructure building blocks to support business development initiatives (Pedersen et al., 2013). Numerous cloud providers exist in the marketplace with a variety of cloud offerings, and major players to include Amazon, Microsoft, Verizon, and AT&T. Existing literature reviews point the scope of this study regarding the strategies that IT leaders use concerning the adoption of cloud computing for their organizations.

The elements of a literature review, including, application of cloud computing, innovation, competitive advantage, and constituting elements of cloud computing establish an understanding of the goals of this research study. Cost reduction and positive social change may be the byproduct of innovations in IT infrastructure (Neumann, 2014). In this research study, I leveraged the existing body of knowledge and explored the lived experiences of IT leaders regarding the strategies that they used to adopt of cloud computing for their organization.

Transition and Summary

Section 1 contains the problem statement, purpose of research, nature of the study, and use of literature review to deliver alignment with the need of exploring the strategies that IT leaders use regarding adoption of cloud computing. Section 2 also includes the details of the project such as purpose statement, the role of the researcher, and the targeted participants, research methods and design, population sampling, data collection, data analysis, and provide a supplementary demonstration of the research

design validation. Section 3 of this research study contains the areas for prospect research by themes within the data and summarizes the research study with resilient closing accounts.

Section 2: The Project

The objective of this qualitative single case study was to explore how IT leaders strategize to adopt cloud computing to gain competitive advantage. Section 2 includes the research design, design selection foundations, participant selection criteria, participant population, data collection procedures, and data analysis procedures. This section includes information regarding the consent form, research and interview questions, and an explanation of reliability and validity in data collection.

Purpose Statement

The purpose of this qualitative single-case study was to explore the available strategies IT leaders in IT organizations may use for adopting cloud computing for their organizations. The target population consisted of a single organization with IT leaders who have a working knowledge of strategies to adopt cloud computing and successfully implemented cloud computing within last 2 years located in Long Island, New York. This population was appropriate for the study because IT leaders who are not leveraging cloud computing may lose an average of over $1 million per year by paying more for IT services than their counterparts who are leveraging cloud computing (Moyano et al., 2013; Yoo et al., 2012). The application of the findings from this study may contribute to social change by providing insights and strategies for IT leaders in small and medium sized organizations to save money while gaining competitive advantage and ensure sustainable business growth that could potentially enhance community standards of living.

Role of the Researcher

The researcher's role is to collect, evaluate, and present the data in an organized manner (Wulf-Andersen, Holger Mogensen, & Hjort-Madsen, 2013). Qualitative case study researchers gather data from multiple resources such as interviews, documentation, artifacts, and records (Yin, 2014). I recorded the procedures and the probing questions as part of planning for the interviews. As per instructions of Walden Office of Research Integrity and Compliance (2014) guidelines, I monitored research protocols during the research process to guarantee the preservation of ethical standards during the procedure. I obtained the appropriate consent to assure that the interview method produce data associated with the adoption of cloud computing while pursuing insights from the contributors.

As a senior IT professional with more than 5 years of cloud computing experience, I am familiar with the topic. My role as the researcher was to use the qualitative method of inquiry to develop an understanding of the perceptions of IT leaders on adoption of cloud computing. I preserved all ethical standards throughout the study by operating in accordance with the Belmont Report, which was published by National Commission for the Protection of Human Subjects in Biomedical and Behavioral Research (1979). My IT experience may have inadvertently affected the results of this research study by biased assumptions, appraisal techniques, and performance standards needed for the IT infrastructure. To reduce the chances of bias during the research study, I used NVivo 11 to employ unbiased data coding, an impartial

word analysis, and methodical trend discovery. To enrich each interview session, I used suitable interview protocol that I used with all of the research participants.

Participants

The participants of this study were IT leaders who have experience with designing and deploying cloud computing solutions at an organization located in Long Island, New York. I used purposeful sampling strategy to select the participants. Purposeful sampling involves the appropriate selection of participants based on specific characteristics of population size, selection criteria, and knowledge of the area (Kipkulei, 2013; Sinkovics & Alfoldi, 2012; Yin, 2014).

In this qualitative single-case study, I relied on information gathered from multiple sources, including a purposeful sample of 15 IT leaders of at least 18 years of age working in the IT profession for 5 or more years. I also gathered data from standard operating procedures, policies, meeting minutes, and guidelines related to cloud computing implementation.

I requested the human resources department of the selected organization to give me permission to contact staff members involved in the adoption and implementation of cloud computing. The development of a trusting relationship begins by treating the participants with respect, by honoring their time, and by protecting the information about their best practice strategies (Bernard, 2013; Maxwell, 2013). According to Maxwell (2013), acquiring early access to the participants is essential for an effective study, which

helps form relationships with the participants to attain the information needed to answer the research question.

A reasonable number of participants to achieve the point of saturation in a qualitative case study ranges from 15 to 20 (Sinkovics & Alfoldi, 2012; Quinlan, 2011). This study included a selection of one IT organization located in Long Island, New York. I selected an organization through which I was able to access relevant documents and IT leaders involved in cloud computing adoption and implementation.

The participants shared their experience with cloud computing implementation by answering the interview questions. According to Quinlan (2011), about 10 to 12 participants is reasonable when conducting a case study. B. Marshall, Cardon, Poddar, and Fontenot (2013) suggested that case studies should include 15 to 30 participants. C. Marshall and Rossman (2011) suggested a number between 7 and 10 participants for qualitative case studies. Based on the recommendations by C. Marshall and Rossman, B. Marshall et al., and Quinlan, I selected a sample of 15 participants to participate in semistructured interviews.

The participants selected for an interview had at least 5 years of experience of working in IT. As these participants were IT leaders, they shared a wealth of information with me during the interviews. The information gathered from the 15 participants, in combination with the documents collected from the organization, were adequate for this study.

Research Method

I selected a qualitative method for this study. A qualitative method was suitable for this study because it enables researchers to explore participants' challenges and create themes from the exploration of data (Sinkovics & Alfoldi, 2012). Data for this study came from interviews with a purposeful sample of 15 participants, participant observation, and through the analysis of organizational documents. Interviewing continued until I achieved data saturation.

A quantitative method did not suit the needs of this study because the method involves the collection of numerical data (Bernard, 2013). Data required for this study came from exploring the strategies the IT leaders use to adopt cloud computing and through the exploration of documents. The mixed method did not suit the requirements of this study because the method includes the use of a quantitative element to test hypotheses and a qualitative component as a basis for collection data using interviews and observations (Hayes et al., 2013). Testing a hypothesis was not the goal of this study.

Research Design

I selected the exploratory single case study design for this study. The single case study design suited the needs of this study because the research supports the exploration of a phenomenon using multiple sources of information (Yin, 2014). There are five research design approaches in qualitative methodology, including: (a) grounded theory, (b) ethnographic design, (c) phenomenological design, (d) narrative design, and (e) case

study design (Cambra-Fierro & Wilson, 2011; Gioia, Corley, & Hamilton, 2013).

Ground theory design was not appropriate to this study because it focuses on systemically discerning theories within the data (Walker, 2012), which was not the primary goal of this study. Ethnographic design was not suited to this study because it emphasizes small-scale social orders and their philosophies (Schultz, 2012). This study did not focus on a past phenomenon; therefore, a phenomenological design was not suitable. The narrative design focuses on lived and told stories of individuals; the goals of this research design were to extract information from experienced IT leaders about the strategies that they use to adopt cloud computing. This task required specific information from participants, not a detailed story; therefore, the narrative approach was not suitable for this study.

Selection criteria for research design depended on (a) the research question, (b) the extent of control the researcher may have over the actual social event, and (c) the degree of focus on contemporary events (Yin, 2014). A case study is appropriate when (a) the research questions concern *how*, *what*, and *why* inquiries; (b) the researcher does not have control over social dealings; and (c) the focus is on current events (Yin, 2014).

Data saturation is achieved when no new data is collected, no new themes emerge, and there is enough information to replicate the study (Dworkin, 2012; Walker, 2012; Yin, 2014). Data collection did not stop until additional data collection resulted in more of the same findings; data validity was achieved when no new insights occurred (Marshall & Rossman, 2011). To ensure data saturation, I interviewed the chosen 15 IT

leaders until no new themes or ideas emerged.

Population and Sampling

The target population 15 IT leaders from a single organization in Long Island, New York who had strategies to adopt cloud computing and successfully implemented cloud computing within last 2 years. The information from these 15 participants also provided data saturation for the phenomenon under study. According to Tirgari (2012), an average of 10 contributors permits the researcher to grasp thematic saturation. Sample sizes for qualitative explorations are much smaller than those used in quantitative studies. Additionally, data for a case study may come from several sources including documents, interviews, direct observations, and participant observations, which removes the necessity for a large sample size (Dworkin, 2012; Yin, 2014).

According to Quinlan (2011), about 10 to 12 participants is a reasonable number of participants when conducting a case study. B. Marshall et al. (2013) suggested that case studies comprise of 15 to 30 participants. C. Marshall and Rossman (2011) suggested a number between seven and 10 participants for qualitative case studies. Based on the recommendations by C. Marshall and Rossman, B. Marshall et al., and Quinlan, I selected a sample of 15 participants to volunteer in semistructured interviews.

In a qualitative research study, a sample size of 15 participants satisfies the requirements of acquiring significant information (Dworkin, 2012). A researcher's work attains data saturation when no new data is collected, no new themes emerge, and there is enough information to replicate the study (Dworkin, 2012; Walker, 2012; Yin, 2014). I

selected participants through a purposeful sampling, which allows researchers to sample a group of people who have the best information about the problem under investigation intentionally (Dworkin, 2012; Walker, 2012; Yin, 2014). I collected organizational documents such as policies, guidelines, meeting minutes, and technical whitepapers related to cloud computing implementation. In this study, I relied on the participants' level of aptitude and the clarity of understanding and communication.

The interview setting offered a relaxed and nonthreatening atmosphere, allowing participants to be open and truthful about their individual experiences. Criteria to participate in this study included IT leaders with 5 or more years of IT infrastructure and data center experience and involvement in design, architecture, and implementation of cloud computing. Criteria also included participants from different IT departments such as application development, infrastructure, networking, operations support, vendor management, and finance.

Ethical Research

To maintain the ethical principles of research and to protect the privacy of the participants, I informed the participants in the letter of introduction and at the beginning of each interview that their participation was voluntary and that they could withdraw from the interview at any point in time. Once the participants expressed their comfort with all questions in the interview, I then accepted the signed consent form. I furthermore informed the participants that because of the voluntary nature of this study, there would be no reimbursement or enticements for their contribution.

I requested permission from the Walden University Institutional Review Board (IRB) for the ethical protection of the research participants. Upon receiving IRB approval number 03-30-16-0117784, I sent each participant a Walden University letter of introduction identifying myself as a Walden University Doctor of Business Administration (DBA) candidate with an invitation to participate in this study (see Appendix A). There was no probability of participants suffering any maltreatment or encountering ethical issues throughout this study. For the highest moral and psychological welfare of each participant, all questions directly explored the impact and adoption of cloud computing only. Confidentiality refers to all information concealed from everyone excluding the principal researcher (Desai, 2013; Saunders, Kitzinger, & Kitzinger, 2015; Yin, 2014). Yin (2014) recommended using numeric identifiers to replace the participants' names in the data. All participants remained confidential throughout the study, where I coded the names as participant P1, P2, and so on for identification purposes only.

I have retained the collected research data, as well as signed consent forms for 5 years after the published research date, saved to protect the confidentiality of the participants in a secure area. Additionally, I have backed up the data in soft copy and have printed the data in hard copy for retention. I have safeguarded the digital copy by encrypting it and protected the print data by locking it in a safe location.

Data Collection

Instruments

I was the primary instrument for this doctoral study. According to C. Marshall and Rossman (2011), there are four methods of collecting information, which include (a) participating in the environment, (b) direct observation, (c) in depth interviews, or (d) analyzing documents. I used two main data sources, interviews and documentation.

Interviews. I recorded responses from the interview questions with a handheld digital audio device. As recommended by C. Marshall and Rossman (2011), I consolidated and tagged the data with unique identifiers. I provided a summary of individual transcripts to each participant to review for data accuracy in the descriptions and details. The interview questions guided the process and captured all responses provided by each participant on paper, where these interviews also included an audio recording (Cambra-Fierro & Wilson, 2011). To maintain consistency, each participant responded to the same interview questions (Lamb, Sandberg, & Liesch, 2011). The intent of the instrument was to acquire data from the IT leaders concerning their observations on the impacted elements of their IT infrastructure by cloud computing that affect its adoption (Franzosi et al., 2013). I sent the informed consent forms and research question to the participants one week before the interview via email. I contacted the participants three to five days before the interview via phone to explain the purpose of the interview and privacy. I posted reminders in my calendar for one day before the interview date.

Documentation. In addition to the in-person interviews, I collected organizational documents such as policies, guidelines, meeting minutes, and technical whitepapers related to cloud computing implementation. Heale and Forbes (2013) and Yin (2014) contended that multiple data sources enable the triangulation of evidence, which can increase the reliability of the data collection process.

Member checking and transcript review. I conducted member checking by asking the participants if the results were reasonable. Member checking reduces the risk of misunderstanding (Morse & McEvoy, 2014). Additionally, member checking reduces prejudices, and the guiding principle is to pursue the accurate information (Maxwell, 2013). The advantage of performing member checking is the verification of findings, which helps to increase the validity and accuracy in the development of codes and themes (Barratt et al., 2011; Sinkovics & Alfoldi, 2012). I performed both transcript review and member checking to ensure accuracy and enhance reliability and validity of the participants' interview transcript data and organizational documentation.

I explored the documented organizational data and a detailed interview protocol with related questions connected to the strategies that IT leaders use regarding adoption of cloud computing (see Appendix B). Additional goals included the ability to conduct face-to-face interviews with selected IT professional participants leveraging acknowledged interview questions as the data collection instrument (see Appendix C). The interview instrument included a paper-based list of eight questions established to explore the IT professional's perceptions.

Data Collection Technique

Qualitative researchers collect data through transcribed interviews (Yin, 2014). The techniques that I used for data collection in this study were interviews and documentation. I transcribed the data collected through the interviews as text.

Interviews. The semistructured interviews were an appropriate interviewing strategy because the researcher and the participants were highly knowledgeable about this research topic (Lamb et al., 2011; Yin, 2014). A researcher requires investigative abilities, mindfulness of the probable threats presented by the research, and emotional consciousness during the qualitative research (Lamb et al., 2011). I recorded responses from the interview questions with a handheld digital audio device.

As recommended by C. Marshall and Rossman (2011), I consolidated and tagged the data with unique identifiers. I provided a summary of individual transcripts to each participant to review for data accuracy in the descriptions and details. The interview questions guided the process and captured all responses provided by each participant on paper, where these interviews also included an audio recording (Cambra-Fierro & Wilson, 2011). To maintain consistency, each participant responded to the same interview questions (Lamb et al., 2011).

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There were certain advantages and disadvantages of these data collection techniques. Semistructured interviews included the contextually relevant and rich information, captured the participants' perceptions and the particulars of the specific case, and reduced certain bias encountered in unstructured interviews (Yin, 2014). The semistructured interviews assisted with the exploration of comprehensive experiences (Petty et al., 2012). Dworkin (2012) also suggested that semistructured interviews are best when the goal is to obtain knowledge on a specific topic with a set number of questions. Yin (2014) indicated some limitations, including (a) increased costs of traveling to the interview site (b) respondents becoming uncomfortable and withdrawing from the interview process, and (c) increased personal bias as respondents may avoid offending the researcher.

The researchers can triangulate secondary data from documents in a case study design (Morse & McEvoy, 2014). According to C. Marshall and Rossman (2011), the

use of secondary data verifies consistency. The documentary data can validate data from other sources and provide in-depth content about a complex environment (Maxwell, 2013). The limitations of document reviews included biased selectivity and difficulty in retrieving.

Yin (2014) contended that the main reason for a pilot study involves developing and testing the suitability of a research instrument. My over 10 years of IT operations, business support, and architecture experience diminished the need for a pilot study. Based on the exposure to numerous IT infrastructures and business models a core understanding existed that the research of this nature can start without initiating a trial.

I conducted member checking by asking the participants if the results were reasonable. Member checking reduced the risk of misunderstanding (Morse & McEvoy, 2014). Additionally, member checking reduced prejudices, and the guiding principle was to pursue the accurate information (Maxwell, 2013). The advantage of performing member checking is the verification of findings, which helps to increase the validity and accuracy in the development of codes and themes (Barratt et al., 2011; Sinkovics & Alfoldi, 2012). I performed both transcript review and member checking to ensure complete accuracy in the understanding of the participants' data.

Data Organization Techniques

I used electronic folders to keep track of the data. I used NVivo software as the main system to keep track of data, emerging understandings such as research logs, reflective journals, and cataloging/labeling systems. I compared the transcribed data with

the audio recording for comprehensiveness and then consolidated the results into themes using NVivo at the end of the data collection process. NVivo data analysis software supports qualitative researchers by assisting researchers gather, organize and explore content from interviews, document review, and field notes into codes and themes (Ali & Yusof, 2011; Franzosi et al., 2013; Yin, 2014). The purpose of NVivo software is to carry out the thematic analysis of the data (Lamb et al., 2011). NVivo included practical reasons for preference, including user friendliness and access to professionals familiar with the software (Franzosi et al., 2013). Such an approach becomes useful, because of a limited availability of explicit information about how to use software programs such as NVivo to facilitate certain types of analysis (Franzosi et al., 2013).

I structured the data into a coding scheme that included the coding of the organization as ABC Company and participant as P1 through P(n). For privacy considerations, the coding scheme had to be in the order of data collected (Yin, 2014). Many Walden Doctoral graduates have used NVivo software in recent doctoral studies for qualitative data organization and analysis. I logged common themes from the data entered, and documented the results for inferences and references. I tracked the interviews to completion to detect any common themes or patterns relating to the goals of this study (Lamb et al., 2011).

I have retained the collected research data in encrypted form, as well as signed consent forms for 5 years after the published research date, saved to protect the rights of the participants. Additionally, I have backed up the data in soft copy and have printed the

data in hard copy for 5-year retention. I have protected the soft copy via encryption and the hard copy by locking it in a safe location. After 5 years of the completion of the study, I will destroy all collected research data by destroying all hard copies by burning them and deleting all soft copies.

Data Analysis

In this qualitative single case study, I used interviews and documentation of data to achieve triangulation. According to Heale and Forbes (2013), methodological triangulation may include two or more sets of data collection using qualitative data sources. Bekhet and Zauszniewski (2012) suggested that methodological triangulation authenticates the research findings, enhances the validity and increases the researchers' comprehension of the phenomenon under study. Heale and Forbes also suggested that methodological triangulation permits the usage of several qualitative methods, including participant observation and interviews. In this study, I leveraged methodological triangulation to understand the multiple sources of data, including interview responses and organizational document review.

Yin (2014) contended that researchers can analyze case studies with the help of any of these five strategies: pattern matching, explanation building, time-series analysis, logic models, and cross-case synthesis. I used the data analysis strategy of pattern matching for emerging themes in this doctoral study in the following logical and sequential process. First, as suggested by Cambra-Fierro and Wilson (2011), data collection and data analysis are concurrent processes in qualitative research. Second, as

suggested by Franzosi et al. (2013), the qualitative data analysis mainly includes classification of items, persons, events, and their characteristics and features. Third, the data analysis process involves developing codes and using them to classify the data (Cambra-Fierro & Wilson, 2011; Franzosi et al., 2013; Morse & McEvoy, 2014).

The codes included categories pertinent to the problem statement, purpose statement, research question, and interview questions that emanated from the data (Ali & Yusof, 2011; Cambra-Fierro & Wilson, 2011; Franzosi et al., 2013). I answered the main research question by finding and explaining patterns and themes from the viewpoint of the respondents and documentation. Explaining and discussing these patterns and themes helped with answering the research question and achieving the purpose of the study.

I listened to all the interview audio recordings and transcribed them in NVivo for data analysis. NVivo helped in identifying themes in the interview data and documentation. The goal of the theme identification was to find the answers to the research questions. Matching each identified theme to the research question. The interview recordings were one of two the major sources of data for this single-case study to observe the strategies that IT leaders leverage for the adoption of cloud computing. In addition to interviews, I gathered and explored data from documents such as company policies, guideline, standard operating procedures, meeting minutes, and technical whitepapers.

Processing in NVivo included the step of integrating the data outcomes into a narrative of the IT professional observations for general demonstration and relevance

with the research question. NVivo also supports reflections and notes from documentation review. Analysis of the data included checking for the similarities between participant statements and the conceptual framework used in this research for meaningful analysis (Yin, 2014). The disruptive innovation theory was the conceptual framework for this study (Christensen, 2011). I used the disruptive innovation theory to provide explanations regarding the strategies that IT leaders use to adopt cloud computing.

Reliability and Validity

In academic research, reliability refers to a study's accuracy and precision to produce consistent and replicable results (Sinkovics & Alfoldi, 2012; Street & Ward, 2012). Sinkovics and Alfoldi (2012) suggested that the reliability and validity of a study are vital to attaining dependability, impartiality, transferability, and confirmability, which helps with the integrity and trustworthiness of the study.

Dependability

Using the same semistructured interview instrument consistently may result in enhanced dependability in qualitative studies (Maxwell, 2013). Bernard (2013) suggested that dependability refers to whether or not a researcher gets the same results by using an instrument more than once. In this qualitative study, all participants received same research and interview questions. Semistructured interviews were beneficial in obtaining comprehensive information regarding the best practice strategies of the participants and provided an opportunity to obtain dependable, trustworthy qualitative

data (Ali & Yusof, 2011; Bernard, 2013). Additionally, I leveraged an audio-recording device precisely capturing the participants' responses, obtained the description of events, and got clarifications of a phenomenon.

The notion of assembling dependable data on adoption of cloud computing research such as this relies on the data shared by the participants during the interview process that reflects their experiences with the strategies under observation (Ali & Yusof, 2011). According to Sinkovics and Alfoldi (2012), regularity endorses dependability in the qualitative investigation. C. Marshall and Rossman (2011) suggested that dependability accounts for a researcher's capability to show how the study design, data, and interpretations are resilient and dependable. In this study, I leveraged methodological triangulation to enhance the dependability of the study.

Creditability

Credibility includes forming that the outcomes and results of qualitative research are authentic, mainly from the research participants' viewpoint (Morse & McEvoy, 2014; Street & Ward, 2012; Yin, 2014). For this study, I leveraged methodological triangulation, clarifying the bias, and peer debriefing to strengthen reliability. Member checking is the most valuable way to confirm the creditability of the study (Cambra-Fierro & Wilson, 2011; Morse & McEvoy, 2014). Sinkovics and Alfoldi (2012) suggested the use of triangulation to address reliability by exploring clarifications with participants, by confirming with peers on developing outcomes, and demystify researcher prejudices and expectations.

Transferability

Transferability deals with the generality potentials of the outcomes and results of qualitative research studies outside the study populace (Morse & McEvoy, 2014). To improve transferability of this study, I leveraged a prevailing scheme of explanation through the establishment of detailed descriptions so that anyone interested in transferability has a decent context for assessment (Yin, 2014). The transferability of a qualitative study is the role of the researcher who is transferring the study's processes and instrument to another research setting (Taylor-Ritzler, Suarez-Balcazar, Garcia-Iriarte, Henry, & Balcazar, 2013).

Confirmability

The confirmability of qualitative studies is comparable to objectivity in a quantitative study and is the degree to which another researcher could confirm the results of the study (Street & Ward, 2012). Validity also addresses how the gathered data of this study stand against the participants' opinions and conclusions (Taylor-Ritzler et al., 2013). The researcher can relate results and inferences across a minimum of two industries in previous and current studies (Ali & Yusof, 2011). Strategies that promote confirmability in this study includes an admission of my assumptions, comprehensive methodological explanation to permit the reliability of the outcomes studied, steering and recording an audit trail of the data collection and analysis procedures. Additional steps to ensure confirmability of the study included ensuring participants meet the participation standards and allowing participants to review the interview transcripts from the interview.

Data Saturation

A researcher's work attains data saturation when no new data is collected, no new themes emerge, and there is enough information to replicate the study (Dworkin, 2012; Walker, 2012; Yin, 2014). Data collection does not stop until additional data collection resulted in more of the same findings, and reaching data validity when no new insights occurred (Marshall & Rossman, 2011). For this study, I attained data saturation when participants added no new information and no new themes emerged.

Transition and Summary

In Section 2, I addressed the details of the project such as purpose statement, the role of the researcher, and the targeted participants, research methods and design, population sampling, data collection, data analysis, and provide a supplementary demonstration of the research design validation. Section 3 will include (a) the presentation of the findings, (b) application to professional practice, (c) implications for social change, (d) recommendations for action, (e) recommendations for further study, (f) reflection, and (g) conclusion of the study.

Section 3: Application to Professional Practice and Implications for Change

Section 3 includes the findings of the research study. In addition, Section 3 includes an (a) overview of the study, (b) presentation of the findings, (c) application to professional practice, (d) implication for social change, (e) recommendation for actions, (f) recommendations for further study, (g) reflections, and (h) summary and study conclusion. I presented the findings of the study by main themes.

The purpose of this qualitative exploratory single-case study was to explore the available strategies IT leaders may use for adopting cloud computing for their organizations within the past 2 years. Interviews took place in an environment where participants could feel comfortable with providing detailed responses to eight semistructured interview questions (see Appendix C) that indicated the strategies used by some IT leaders to adopt cloud computing. A review of company documents augmented the data obtained from the interview.

Based on the main research question, data analysis of the interview responses, and the data analysis of company documents, I identified 10 core emergent themes, which I grouped into four main themes. The four main themes were: (a) the essential elements of strategies to adopt cloud computing; (b) most effective strategies, (c) leadership essentials; and (d) barriers, critical factors, and ineffective strategies affecting adoption of cloud computing.

Presentation of the Findings

The overarching research question for this study was: What are the available strategies IT leaders may use for adopting cloud computing for their organizations? I used semistructured interviews to gain an understanding of strategies the participants used to adopt cloud computing. I used a purposeful sample of 15 participants to collect data via semistructured face-to-face interviews in an organization involved in IT services. In addition to semistructured interviews, I also reviewed ABC Company's policy documents, meeting minutes, and other business records regarding the adoption of cloud computing and documented the review as my notes to triangulate and confirm interview data. I scheduled all the interviews in a distraction free conference room at the ABC Company location. The interviews did not last more than 60 minutes.

Yin's (2014) five-step approach formed the basis for data analysis of collected data. After transcribing the 15 interviews and gathering company records, I imported data collected from semistructured interviews and the review of organizational documents into NVivo 11 qualitative data analysis software for coding and documentation. I analyzed all the data and identified 10 core emergent themes. The emergent themes revealed the strategies noted in company documents such as the deployment of documents and meeting minutes and the participants' views, experiences, and perceptions regarding adoption of cloud computing to answer the central research question.

I grouped the 10 themes under four main theme headings. The first main theme was the essential elements of strategies to adopt cloud computing. The second main theme was the most effective strategies in the adoption of cloud computing. The third main theme was the leadership essentials for adopting cloud computing. The fourth main theme referred to barriers, critical factors, and ineffective strategies affecting the adoption of cloud computing.

The conceptual framework of this research project was the disruptive innovation theory. The disruptive innovation theory is the basis for assessing the usefulness of technological innovations in the evaluation process of adoption of innovative services in an organization (Christensen, 2011; Crockett et al., 2013; McMurtry, 2012). Many of the responses made by the participants and the information from the company documentation supported disruptive innovation theory. The goals of the theory are to define the marketplace, leveraged by goods and services created based on the performance profile required by consumers and delivered by the IT leaders (Dan & Chang Chieh, 2010). Within this study, I viewed the disruptive innovation theory as it related to its correlation with the findings to gain a better understanding of the effectiveness and ineffectiveness of strategies, barriers, and other critical factors that influence the adoption of cloud computing.

Theme 1: Essential Elements for Strategies to Adopt Cloud Computing

Essential elements for strategies to adopt cloud computing is the first main theme. Participants' responses to interview questions 1, 2, 5, and 8 indicated the essential

elements for any cloud adoption strategy to be successful. Some themes emerged from the findings as being essential elements for IT leaders to adopt cloud computing.

Data security and cost are important elements for the adoption of cloud computing (Jabbari Sabegh & Motlagh, 2012; Madhani, 2012; Neumann, 2014). Within the first main theme, there are a few themes as identified in all participant responses and the company documentation. This documentation included organizational documents such as policies, guidelines, meeting minutes, and technical whitepapers related to cloud computing implementation. Current research confirmed these themes. P2 stated, "The first number one priority is the security of the data that we do have because that is the intellectual property of the company."

P8 indicated, while referring to the importance of security as an essential element, "The strategies that we used to adopt cloud computing included a focus on the reputation of the cloud vendor, scalability, security, and availability." As related to cost as an essential element for strategies to adopt cloud computing, P9 stated, "we are a lean organization with a focus on cost reduction." Participants' responses and documentation showed the importance of having primary elements for a cloud adoption strategy. These essential elements are security and cost. The review of company's internal policies confirmed the company's focus on IT security and cost reduction. The company's meeting minutes of February 2015 also showed IT leaders discussing the importance of IT security and cost-effective ways of running IT operations.

All respondents (15 out of 15) mentioned that the primary elements for strategies to adopt cloud computing were security and cost. The decision to move other systems to the cloud might improve efficiencies, reduce operating costs, and increase earnings (Nanath & Pillai, 2013). Juels and Oprea (2013) positioned cloud computing as a service model with an emphasis on public cloud data security. All participants mentioned that the adoption of cloud computing was disruptive for their organization as many IT processes have changed. The role of the IT leaders who are managing IT departments has changed from IT infrastructure of an owner to the service provider who provides services on demand in a cost effective and secure manner. The shift in the role of IT leaders conforms to the theory of disruptive innovation, the conceptual framework for this study.

All 15 participants indicated that cost of the cloud solution and the data security in the cloud were the main essential elements of their cloud adoption strategies. Therefore, in addressing the central research question, company documentation and the interview data (see Table 2) indicated that IT leaders must consider the cost of the cloud solution as well as the security of their data as the core elements of their cloud adoption strategies.

Table 2

Frequencies of Theme for Essential Elements for Strategies to Adopt Cloud Computing

Theme	*n*
Security	91
Cost	89

Note. *n* = frequency or number of coding references

The number of coding references represents the number of times the participants mentioned or referred to security and cost. As Table 2 indicates, the frequency of occurrence of the core theme demonstrated *security* and *cost* as the essential elements for strategies to adopt cloud computing. P5 and P7 also referred to the importance of security and cost effectiveness of IT operations in the cloud computing environments. ABC Company's guidelines and meeting minutes of November 2014 showed that IT security and cost effectiveness of IT operations are important for the adoption of cloud computing.

According to the ABC Company's meeting minutes of November 2014, "Security and privacy are major considerations when evaluating application and data deployment and the data being used. IT should understand compliance requirements and establish cloud deployment policies." According to ABC Company's cloud implementation guide, "The cost associated with hosting the application over the term of usage is a key factor when considering application and data deployment. Thorough understanding of private cloud services costs (e.g., monthly server cost) and understanding public cloud variable costs, such as outbound internet bandwidth usage, is critical to establishing an apples-to-apples comparison. The costs of developing and maintaining application capabilities in-

house also need to be compared with the alternative of using off-the-shelf cloud services with an ongoing subscription model." Through participant responses and company documents, including company's vendor evaluation policies, cloud computing implementation guides, and meeting minutes, the findings of the study revealed the essential elements needed for successful cloud computing adoption efforts. These findings align with previous research (Andersen et al., 2013; Mazhelis & Tyrväinen, 2012; Nanath & Pillai, 2013).

Theme 2: Most Effective Strategies to Adopt Cloud Computing

Most effective strategies in the adoption of cloud computing were the second main theme. Participants' responses to questions 1, 4, and 8 revealed the most effective strategies to adopt cloud computing. Within this theme, there was one main strategy mentioned by all participants, found in company documents, and confirmed by previous research. All participants indicated that the most efficient strategy to adopt cloud computing was the hybrid cloud strategy.

The hybrid cloud approach combines the private, community, and public cloud approaches into a single model (Katzan, 2010). Hybrid clouds enable IT leaders to control their mission-critical data and applications while leveraging the scalability and flexibility of internal and external cloud computing resources (Chandrashekhar et al., 2015; Goutas et al., 2016). Hybrid cloud approach also enables IT leaders to leverage their existing IT expertise and experience to make better future IT investment decisions.

P2 stated, while referring to the hybrid cloud strategy as the most effective strategy to adopt cloud computing, "Hybrid model has worked for us, so we're going to kind of stick with it." P7 stated, while commenting on their cloud adoption strategy, "we went with a hybrid model." P2 stated, while commenting on their time-to-market, "our developers develop applications faster in the cloud." P3 stated, while commenting on their time-to-market, "we develop fast in our hybrid cloud." P8 stated, while commenting on their time-to-market, "our hybrid cloud helped us reduce our time-to-value." P10 stated, while commenting on their time-to-market, "our hybrid cloud strategy allows us to develop fast off-prem and on-prem." ABC Company's cloud implementation guides indicated the implementation of hybrid cloud strategies. Meeting minutes of December 2013, January 2014, and March 2014 also confirmed the effectiveness of hybrid cloud strategy as the most effective strategy for cloud adoption.

All participants mentioned that hybrid cloud strategy had enabled their company to leverage existing on-premise IT resources as well as off-premise resources to meet the demands of their new application development initiatives. Cloud computing's shared service models, including IaaS, SaaS, and PaaS, apply to many cloud computing models, including public, private, hybrid, and community cloud offerings (Chao, 2014; Young Bae et al., 2013). Table 3 reveals the core theme that emerged from the data analysis regarding the most effective strategies to adopt cloud computing.

Table 3

Frequencies of Theme for Most Effective Strategies to Adopt Cloud Computing

Theme	*n*
Hybrid Cloud	80

Note. *n* = frequency or number of coding references

The number of coding references represents the number of times the participants mentioned or referred to the hybrid cloud. The hybrid cloud model leverages the interoperability as the minimum common factor between private, public, and community approaches (Chandrashekhar et al., 2015; Goutas et al., 2016; Katzan, 2010). As Table 3 indicates, the frequency of occurrences of core theme revealed hybrid cloud strategies as the most effective strategies for adopting cloud computing. Previous research supports these findings (Chandrashekhar et al., 2015; Goutas et al., 2016; Katzan, 2010).

Theme 3: Leadership Essentials to Adopting Cloud Computing

Leadership essentials to adopting cloud computing were the third core theme. Interview question 5 addressed other strategies and leadership characteristics beneficial for adopting cloud computing. Within this theme, there was one main strategy mentioned by P1 through P15, in company documents, and confirmed by previous research.

All participants indicated that by being a consumer of their cloud services, they were able to evaluate themselves and take the leadership stance by being their first customers. All the participants mentioned that they regularly evaluate themselves to improve their service offerings along with evaluating external cloud service providers. Participants P2, P4, P5, P7, and P8 mentioned that they evaluate external cloud service

providers by reviewing their market reputation, their financial stability, and security offerings. A review of ABC Company's vendor evaluation policies validated P2, P4, P5, P7, and P8 remarks by uncovering that the cloud vendors are evaluated based on their reputation in the market, their financial stability and security capabilities of their solutions.

P2 indicated, while referring to their leadership characteristics they used that were beneficial in their adoption of cloud computing, "you have to treat yourself as a cloud customer of your own." P2 further added that by treating their internal users as their customers, they were able to conduct self-evaluations to improve their service offerings. P4 stated, while commenting on their cloud vendor evaluation criteria, "we evaluate the vendors by reviewing their reputation in news media and keeping an eye on how they are doing in the stock market."

Meeting notes of July 2015 validated P2 and P4 by focusing on the reputation, security, and finances of cloud vendors. Table 4 shows the core theme that emerged from data analysis regarding leadership essentials to adopt cloud computing. Cloud vendor evaluation, including self-evaluation, was the strategy that emerged from the data analysis.

Table 4

Frequencies of Theme for Leadership Essentials to Adopting Cloud Computing

Theme	*n*
Cloud vendor evaluation	52

Note. *n* = frequency or number of coding references

As Table 4 indicates, the frequency of occurrence of core theme demonstrated the cloud vendor evaluation as the leadership essentials to adopt cloud computing. The number of coding references represents the number of times the participants mentioned or referred to cloud vendor evaluation. Through participant responses and company's vendor evaluation policy, the findings of the study revealed the leadership practices needed for successful cloud computing adoption efforts. These findings align with previous research (Carcary et al., 2014; Lin & Chang, 2013; Song et al., 2013).

Theme 4: Barriers, Critical Factors, and Ineffective Strategies Affecting the Adoption of Cloud Computing

Barriers, critical factors, and ineffective strategies affecting the adoption of cloud computing was the fourth main theme. Barriers included lack of interoperability of legacy application in the public cloud offering. Critical factors included the data mobility and data availability along with performance and scalability in the cloud adoption strategies.

Ineffective strategies included the lack of having effective exit strategies while planning a cloud adoption strategy. Interview questions 3, 6, and 7 revealed that barriers prohibited cloud adoption strategies from being successful. As the findings indicated, some strategies are most effective in the adoption of cloud computing, and then there are ineffective strategies, barriers, concerns, and other factors that inhibit effective implementation of strategies.

The findings of this study indicated that IT leaders should understand the factors that prevent cloud computing adoption strategies from being effective. P10 stated, while referring to the critical factors that affected their adoption of cloud computing, "Our main concern with all of our data is security and ease of access." P3 stated, while referring to their corporate email deployment in the cloud, "it is highly available." ABC Company's cloud implementation guide and meeting minutes of December 2014 revealed that ABC Company's IT leaders would not implement any cloud offerings that lacked data mobility and availability.

The lack of data mobility and availability is a critical factor in a company's IT leaders' ability to adopt cloud computing. Therefore, IT leaders should ensure data mobility and availability before executing on a cloud adoption strategy. The availability and reliability of cloud computing resources also affect the performance of a cloud computing platform (Katzan, 2010). Availability of resources signifies the user's desired level of access to cloud computing resources and reliability deals with the accuracy of information or data requested by the end user (Mohlameane & Ruxwana, 2014).

Also, all participants, P1 through P15, mentioned that a lack of an exit strategy also gravely influences the effectiveness of a cloud adoption strategy. P4 stated, while referring to the lack of exit strategy as ineffective strategies, "Let's say, you weren't getting the performance that you needed for the applications in the cloud, we needed to make sure that our costumes have an exit point." P8 also indicated, while discussing the ineffective strategies, "I need to be able to exit the cloud if the need arises." Meeting

minutes of May 2014 and October 2014 validated P4 and P8 that exit strategy is vital for a successful cloud implementation.

Therefore, IT leaders should incorporate an exit strategy as part of the cloud adoption strategy. According to Schaffer (2014), many IT leaders fail to consider an exit strategy when adopting a new cloud computing solution, because few want to consider the demise of the great solution under implementation with great determination and hope. The exit strategy is critical to plan for unexpected events, such as providing secure and economical ways of recovering and relocating your data from a cloud provider if the need arises (Aleem & Christopher, 2013; Katzan, 2010; Schaffer, 2014).

All participants P1 through P15 indicated that lack of interoperability in the cloud computing environment is another barrier that prevents successful implementation of cloud computing adoption strategies. P4 stated, while referring to the lack of interoperability of legacy applications in the cloud as a barrier to cloud computing adoption, "interoperability within the cloud amongst all the different despaired hardware and software was a barrier." P9 also stated, while referring to the barriers that prohibited their cloud strategies from being successful, "The interoperability with legacy applications and making sure that the old applications as well as the new ones, that are being developed, worked."

A review of ABC Company's cloud computing implementation guides and meeting minutes of January 2014 validated P4 and P9 remarks by uncovering that lack of interoperability excluded numerous legacy application from cloud implementation. IT

leaders, who embrace cloud computing, face challenges, including, security, interoperability, and restrictions on the adaptation of enterprise resource (Abouelhoda et al., 2012; Katzan, 2010). The propagation of cloud computing presents issues with interoperability, transportability, and relocation of data and resources (Benedict, 2013; Sultan, 2014).

Also, all participants, P1 through P15, mentioned that performance considerations and lack of scalability of a cloud solution could hinder the successful execution of a cloud adoption strategy as well. P2 stated, which referring to performance in the cloud, "we were initially hesitant to go to the cloud because we are concerned about some performance in the cloud." P5 indicated, while commenting on the critical factors affecting the adoption of cloud computing, "the concerns about the availability, scalability, and security and stuff like that are very important."

A review of ABC Company's vendor evaluation guide and meeting minutes from October 2015 revealed that application performance and scalability were important factors for evaluating any cloud vendor offerings. Without scalability of performance, cloud computing platforms cannot meet the needs of current workloads and applications (Benedict, 2013). Performance scalability enables IT leaders to extend the usability of their hardware, software, and storage components (Mauch et al., 2012; Mohlameane & Ruxwana, 2014).

Table 5 shows the core themes that emerged from the data analysis regarding the barriers, critical factors, and ineffective strategies. The cloud computing adoption

strategies that emerged from the data analysis were (a) data mobility and availability, (b) exit strategy, (c) interoperability, and (d) performance and scalability.

Table 5

Frequencies of Theme for Barriers, Critical Factors, and Ineffective Strategies Affecting the Adoption of Cloud Computing

Theme	Elements	*n*
Barriers	Interoperability	35
Critical Factors	Data Mobility and Availability	67
	Performance and Scalability	25
Ineffective Strategies	Exit Strategy	35

Note. *n* = frequency or number of coding references

As Table 5 indicates, the frequency of occurrence of core themes revealed barriers, critical factors, and ineffective strategies as affecting the cloud adoption strategies along with all associated elements. The number of coding references represents the number of times the participants mentioned or referred to the elements of the barriers, critical factors, and ineffective strategies affecting the adoption of cloud computing. Therefore, through participants' responses and company documents, the findings of the study revealed the barriers to the strategies that IT leaders use to adopt cloud computing. Previous research supported these findings (Mauch et al., 2012; Mohlameane & Ruxwana, 2014).

The findings of this study extend knowledge of the strategies that IT leaders use to adopt cloud computing when compared with the new peer-reviewed studies that have been published since writing the proposal. According to Kuang-Hua, Fu-Hsiang, and Wei-Jhou (2016), cloud computing has many benefits such as lower cost, instant access

to hardware resources, and higher scalability. Liu, Yang, Qu, and Liu (2016) suggested that besides the cost benefits, the value creation aspect of cloud computing should also be emphasized in research and practice. Ullrich, Cropper, Frühwirt, and Weippl (2016) suggested that in light of these changing paradigms with cloud computing, it is of utter importance to reconsider security.

The findings of the study were consistent with the purpose and significance of the study related to the Christensen's (1997) disruptive innovation theory. The findings from this study were also aligned to disruptive innovation theory as it pertains to the usefulness of technological innovations in the evaluation process of adoption of cloud computing in an organization (Christensen, 2011; Crockett et al., 2013). All the main themes that emerged, as shown in Tables 2, 3, 4, and 5, played a critical role in helping to understand the research phenomenon in addition to addressing the central research question. This study has contributed to the understanding of the strategies IT leaders use to adopt cloud computing.

The findings of this study were also consistent with the existing literature on effective business practices, including security strategies (Sobragi et al., 2014; Young Bae et al., 2013), competitive strategy (Dadameah & Costello, 2011; Liu et al., 2015), exit strategy (Schaffer, 2014), and business innovation strategy (Helland, 2013; Hu et al., 2013). According to Carcary et al. (2014), IT leaders should completely understand the importance of adoption of cloud computing. Sobragi et al. (2014) also suggested that cloud computing's adoption will increase as some of the user adoption concerns,

including security, performance, and interoperability, are addressed. Therefore, the understanding of the strategies to adopt cloud computing is as important for the end users as it is for the IT leaders. The findings of this study indicate that when there are no strategies in place to adopt cloud computing, IT leaders may have a greater challenge in adopting cloud computing and maintaining profitability and sustainability.

Application to Professional Practice

This research is meaningful to cloud computing adoption in many ways. The main objective of the study was to explore participants' views about the strategies IT leaders use to adopt cloud computing. The slow adoption of cloud computing has been an increasing concern for IT leaders (Sobragi et al., 2014). The findings from this study are aligned to disruptive innovation theory as it pertains to the usefulness of technological innovations in the evaluation process of adoption of innovative services in an organization (Christensen, 2011; Crockett et al., 2013; McMurtry, 2012). Strategies to adopt cloud computing benefit the professional practices by (a) adding to business agility, (b) creating new business models, (c) reducing operational issues, (d) improving utilization of resources, and (e) reducing capital expense requirements to support application and IT infrastructure (Alshamaila et al., 2013; Park & Kim, 2014; Trigueros-Preciado et al., 2013).

Services offered by cloud computing are ideal for businesses with growing or fluctuating bandwidth demands (Alshamaila et al., 2013). If the company needs to grow, leaders should find it easy to scale-up the cloud computing infrastructure capacity,

leveraging the standby remote servers in the cloud computing environment (Alshamaila et al., 2013). Similarly, if the IT leaders need to scale down again, they can, by leveraging cloud computing service (Park & Kim, 2014).

IT leaders may enhance business value when making major choices about IT infrastructure by leveraging cloud computing adoption strategies (Park & Kim, 2014). Almost all participants of this research study mentioned that using cloud computing can reduce the dependence on the traditional IT staff. The data indicated that the IT leaders might start using the cloud services at a smaller scale with non-mission critical workloads to evaluate the cloud services offerings by different cloud services providers.

The increased nimbleness, offered by cloud computing, helps the business with quick time-to-market and, as a result, appeal to new consumers promptly (Mohlameane & Ruxwana, 2014; Trigueros-Preciado et al., 2013). The reduced time-to-market not only attracts new customers who otherwise would have gone to competitors, but it also averts those competitors from taking away market share (Katzan, 2010). Therefore, adoption of cloud computing improves the company's competitive strength in the marketplace (Liu et al., 2015). Participants P2, P3, P8, and P10 explicitly stated that the time to market for their application development cycles significantly improved with cloud computing services.

An additional element focuses on the fact that IT organizational spendings are shifting from CapEx (Capital Expenditures) to OpEx (Operational Expenditures) models (Nanath & Pillai, 2013). IT leaders do not have to buy IT assets any longer, but instead,

rent or lease them from cloud computing service providers and consume them in a utility model as long as the customers need them (Andersen et al., 2013; Nanath & Pillai, 2013). Once customers do not require the IT service anymore, IT leaders just discontinue the usage of service with the cloud service provider to optimize the costs (Nanath & Pillai, 2013). All participants in this study mentioned that by leveraging the strategies to adopt cloud computing, they lowered the total costs transition from a fixed cost structure to a variable one while making the valuable IT resources available for strategic initiatives and innovation.

Time to value with cloud computing solutions is considerably lower than with on-premise applications (Bala Subrahmanya, 2013; Henard & McFadyen, 2012). Cloud computing solutions may reduce the time to value from 2 to 3 years to 2 to 3 quarters (Katzan, 2010). Cloud computing solutions reduce implementation time as well as the IT resources required to roll-out the solution (Trigueros-Preciado et al., 2013). All participants in this study mentioned that the time to value with cloud computing solutions was significantly lower than the traditional on-premise application.

In addition, with an appropriately defined exit strategy, the cloud solutions provide an *easy out* if the customer is dissatisfied with the cloud computing services offering, therefore, transferring the risk from the consumer of cloud services to the cloud computing service provider (Dahl, 2011; Henard & McFadyen, 2012; Schaffer, 2014). Last, but not least, mobility becomes more and more critical since the small to mid-size companies are scattered around the world, access from anywhere is crucial for the

success of any small to the medium-sized company (Benedict, 2013; Sultan, 2014). All participants of this study mentioned that data mobility was one of the main elements in their cloud adoption strategies to improve their business practices. As IT leaders understand these strategies, the results of this study may assist IT leaders in developing effective strategies to adopt cloud computing for their organization.

Implications for Social Change

The implication for positive social change includes the potential to upsurge the productivity of businesses and sustain an ecological atmosphere (Carcary et al., 2014; Song et al., 2013). P2 stated, while discussing the positive ecological impact of cloud computing, "They also provide the air conditioning and electricity." P6 and P14 also referred to the reduction of power and cooling requirements in the datacenters due to the adoption of cloud computing. ABC Company's cloud computing implementation guides and meeting minutes from January 2014 also revealed a possible reduction of greenhouse gasses and reduction of power and cooling usage with cloud computing.

Growth in business productivity will make businesses viable and enable business leaders to make positive offerings to society by enhancing fortune of stockholders, creating employment opportunities, and contributing to the government's tax proceeds (Moyano et al., 2013). The collective influence of this study may also stimulate ecologically friendly IT practices as a positive contribution to social change (Moyano et al., 2013). P2 indicated, while referring to the benefits of cloud adoption strategies, "Cloud computing has a direct and indirect positive impact on our environment."

The adoption of cloud computing may lessen the usage of electricity due to a decrease in hardware in the datacenters (Alshamaila et al., 2013). The result might reduce the release of greenhouse gasses and help in ecological sustainability (Trigueros-Preciado et al., 2013). Adoption of cloud computing reduces hardware requirements in developing countries and supports the developing economies (Dadameah & Costello, 2011; Trigueros-Preciado et al., 2013). The adoption of cloud computing may also influence how we communicate, how and where we can access information, and how the news is reported (Dadameah & Costello, 2011).

Adoption of cloud computing based communication has also opened up communication between friends and family who may live thousands of miles away but want to keep in contact frequently (Carcary et al., 2014). Without the exorbitant costs involved in the creation and management of IT infrastructures, critical services and IT leaders and business owners can now get speedy access to the IT support, applications, and data storage they need (Song et al., 2013). The prompt availability of IT resources provided by cloud computing services is enabling IT leaders to develop, progress, and offer superior services to their customers (Moyano et al., 2013). The superior services in turn benefit and help build a strong economy.

The adoption of cloud computing makes it simpler to share information swiftly and securely (Katzan, 2010). This capability benefits public services such as education, healthcare, and law enforcement (Carcary et al., 2014; Song et al., 2013). Researcher and

IT leaders could utilize the findings of this study to develop a greater understanding of effective strategies for the adoption of cloud computing in all sectors.

Recommendations for Action

IT leaders may consider assessing their strategies against those listed in the first and second main theme, which are the essential elements and effective strategies to adopt cloud computing. IT leaders need to start pursuing effective strategies to adopt cloud computing to sustain productivity, growth, and competitive advantage (Mohlameane & Ruxwana, 2014). If strategies do not exist within the organization, IT leaders should create most effective strategies to adopt cloud computing for their organization. If the IT leaders choose to execute the cloud computing adoption strategies, they should consider assessing their strategies against generally known effective cloud adoption strategies. IT leaders should also evaluate the financial plans and budgets to allocated funding to support cloud computing adoption strategies. IT leaders must align their strategies with the corporate business objectives.

Results from this study are valuable to researchers, company owners, IT leaders, and IT services consumers. The application of effective cloud adoption strategies may enable IT leaders to use tangible procedures to strategize effectively to adopt cloud computing and sustain productivity for their organization. Furthermore, all company stakeholders involved in the consumption and IT services may be interested in the findings of this study.

Understanding the result of this study may be particularly beneficial to current IT leaders, by exposing the strategies that IT leaders may have in place to adopt cloud computing for their organization. I will distribute the results of the study through conferences, scholarly journals, and business journals. Additionally, I may socialize the results of this study through training and seminars regarding the effective strategies that IT leaders may use to adopt cloud computing.

Recommendations for Further Research

The results from this study merit further exploration of strategies that IT leaders use to adopt cloud computing for their organization to sustain productivity, growth, and competitive advantage (Nanavati et al., 2014). Following are my recommendations for further research:

1. The findings of this study warrant exploration of cloud computing adoption strategies needed from the view of consumers of IT services, and not just those in IT leadership positions.
2. Similarly, since this study was focused on the Long Island, NY area, I recommend exploring the necessity for and impact of the strategies that IT leaders use to adopt cloud computing within a different geographic location.
3. I additionally suggest the exploration of strategies to adopt cloud computing with a larger sample size or larger organization. I also propose conducting a study to compare the strategies that IT leaders use to adopt cloud computing in for-profit versus non-profit organizations. A comparison between for-profit and non-profit

business types may expose cloud adoption strategies most appropriate for the budgets allocation and operations for each business classification.

4. The findings of this study merit additional exploration to study critical strategies for all businesses to explore the seminal factors for measuring the effectiveness of different cloud computing adoption strategies.
5. In addition, assessing the effect of cloud computing adoption strategies on an organization's productivity and viability may be explored.

Future research may address the availability of the targeted group limitation of this study by leveraging a video conferencing service such as Skype. By leveraging a video conferencing service, the reseacher can observe the visual aspects of data collection, such as facial expressions of the participant during an interview. Further research may also address the limitation of this study related to the inclusion of only IT leaders. In addition, future research may address the population size limitation of this study by expanding the geographical boundaries of the population sample. The results may also assist IT leaders with the formulation strategies to adopt cloud computing.

Reflections

This study provided me with an opportunity to work closely with IT leaders who are working with cloud adoption strategies and to gain insights into their business and operations. I reviewed various organizational documents such as company policies, technical reports, meeting minutes, and implementation documents for managing applications hosted in a cloud computing infrastructure. This study also helped me with

learning about cloud computing services management. This process was rigorous and time-consuming, but ultimately rewarding.

I work for a global data storage management organization. Almost all products that the leaders in my company build, develop, and sell interface with one or more aspects of cloud computing. IT leaders in my organization also leverage cloud computing services to host our internal applications. Due to the use of cloud computing services in my organization, I had the experience of working with cloud computing infrastructure, mainly as a consumer of cloud computing services. I did not design or implement cloud infrastructure for my organization. Also, I did not outline the processes related to strategies that IT leaders in my organization use to adopt cloud computing.

The discovery of strategies that IT leaders use to adopt cloud computing was a good learning experience for me. I remained very objective and reported information only by data collected. I made a conscious effort to ensure my personal experience and preconceived ideas were not reflected in the study. My background in IT and cloud computing made it easier to understand the terminology and context in which participants spoke. My background also helped me analyze the technical documents collected during this research.

Particular reflections on the findings made me recognize that moving to the cloud computing infrastructure may cause additional attenuations in staff in the organization. Therefore, IT leaders have to realize that they need to invest in marketable job training.

This vocational training may provide employees job skills which may benefit in other roles that may or may not be within the employees' current organization.

Additionally, I learned that costs associated with using cloud computing might not be obvious from hearing some participants' narrative about continuous operation of certain workloads being too costly in the cloud. IT leaders may find it reasonable to add other systems to the cloud. However, IT leaders have to outline precisely what they want to accomplish using cloud computing and how the costs could inhibit certain initiatives.

The interview participants were passionate during interviews. All participants gave me the opportunity of calling them in future for further inquiries and explanation. They were looking forward to seeing the results of the study. This research work was different from my job at the place of my employment. In my workplace, I have never collected and analyzed qualitative data for this volume I have a good understanding of the research process now. I may use these skills at my place of employment in the future projects.

Conclusion

I used this qualitative single-case study to explore the attitudes and opinions of participants about the strategies that IT leaders use to adopt cloud computing for their organization. Fifteen participants (IT leaders) who have experience with designing and deploying cloud computing solutions at their organization located in Long Island, New York participated in interviews and a review of company documents augmented the interview data. Data analysis consisted of using NVivo 11, a qualitative analysis

software tool. I conducted member checking to confirm the responses of the interview recordings. Member checking reduces the risk of misunderstanding (Morse & McEvoy, 2014). I achieved data saturation when there were no new themes emerging.

After collecting and analyzing data, four main themes emerged from the data, including (a) the essential elements for strategies to adopt cloud computing, (b) most effective strategies, (c) leadership essentials, and (d) barriers, critical factors and ineffective strategies affecting adoption of cloud computing. My findings of the study indicated that IT leaders need strategies such as hybrid cloud, exit strategy, and cloud vendor evaluation. The results also showed that the critical elements for the effective strategies included (a) cost, (b) security, (c) data mobility and availability, (d) performance and scalability, and (e) interoperability with existing application and infrastructure. The findings also indicated that IT leaders should understand the effective strategies and address any barriers preventing the success of cloud adoption strategies.

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Appendix A: Letter of Invitation

Dear <Participant>:

I would like to invite you to participate in a research study I am conducting to explore the perceptions of IT Professionals about the lived experiences of IT leaders regarding adoption of cloud computing. I am conducting this study as the final stage of my Doctor of Business Administration dissertation through Walden University. Please read this form carefully and ask any questions that you may have before acting on this invitation to participate in this study. You have been selected to participate because of your expertise in IT infrastructure, which consists of software, hardware and/or communications networks. You were also selected because you have more than 5 years IT experience and have working knowledge of strategies to adopt cloud computing for your organization. Your responses will be combined with data from other participants for analysis purposes only.

The goal of this voluntary study is to obtain at least 15 respondents. As a researcher, I will be asking eight documented open-ended questions to explore the perceptions of IT Professionals about the lived experiences of IT leaders regarding adoption of cloud computing. This is a very low-risk study, and no harm is anticipated to you for participating. Conversely, there will be no penalties or harm should you choose to not participate at any time. The anticipated benefits of this study would be positive social change, improved efficiencies, and IT infrastructure cost reductions. I am including the consent form with this invitation email that you can sign and send back to me confirming your willingness to participate in the study.

Sincerely,

Zeeshan Khan
Doctor of Business Administration Candidate

Appendix B: Interview Protocol

Interview: Exploring the perceptions of IT professionals regarding the lived experiences of IT leaders regarding the adoption of cloud computing.

A. I will greet the participant and identify myself as Zeeshan Khan, a doctoral student of Walden University, conducting a study on the perceptions of IT Professionals about the lived experiences of IT leaders regarding adoption of cloud computing.

B. The participant will be thanked for taking the time to meet and respond to the interview questions on lived experiences of IT leaders regarding adoption of cloud computing.

C. Participants will be asked to read the consent form, ask any questions they may have and sign the consent form.

D. The participant will be given a copy of the consent form for their records.

E. The tape recorder will be turned on, and I will note the date, time, and location.

F. The coded sequential interpretation of the participant's name such as 'participant S001' will be stated for the tape recorder, documented on my copy of the consent form and the interview will begin.

G. The interview is expected to last 60 minutes to respond to the 8 questions. This may take less time, but follow-up questions may be required as I explore the answers.

H. At the end of the interview, the participant will be thanked for their time. The participant will be asked if they would like to have an executive summary of the research findings, and the recorder will be turned off.

Appendix C: Personal Interview Instrument Questions

Open ended questions for personal interviews

Name: _____

Name of the Organization: _____

Position within the Organization: _____

Please provide as much detail and as many examples as possible.

Definitions:
Information Technology (IT) infrastructure: The IT software, hardware, and communications network environment.

Emerging Information Technologies: New and leading edge software, hardware or communications network developments, which are placed on the market for sale, including cloud, computing.

The space below will be used to document the interview responses.

1. What were the strategies that you used to adopt cloud computing, and why?

2. How did your cloud adoption strategies align with your business objectives?

3. What strategies did you use that were least effective in the adoption of cloud computing, and why?

4. What strategies did you use that were most effective in the adoption of cloud computing, and why?

5. What other strategies and leadership characteristics did you use that were beneficial in the adoption of cloud computing, and why?

6. In your experience, what barriers prohibit cloud adoption strategies from being successful, and why?

7. What were your main concerns in your approach to cloud computing, and how did you address these concerns?

8. What more can you add to shed light on the strategies IT leaders use to adopt cloud computing?

Participant Code: Researcher Name:

Interview Date: Interview Time:

Interview Location:

Appendix D: Thank you Email

Dear <Participant>:

Thank you for participating in my study on the lived experiences of IT leaders regarding the adoption of cloud computing. I recognize how busy you are and truly appreciate your time and effort. The results of the study are currently being assembled and explored. I look forward to sharing the compiled results of my study in a one to two page summary with you very soon.

Sincerely, and thank you again!

Zeeshan Khan

Doctor of Business Administration Candidate

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