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An Analysis of the Technological, Organizational, and Environmental Factors Influencing Cloud Adoption

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This is to certify that the doctoral study by

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Abstract

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MBA, American Intercontinental University, 2007

MS, University of Connecticut, 1995

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Cloud computing provides an answer to the increasing costs of managing information technology (IT), and has become a model that aligns IT services with an organization's business strategies. However, concerns and uncertainties associated with cloud computing are deterring IT decision makers from making sound decisions regarding the adoption of the technology. The purpose of this online survey study was to examine the relationship between relative advantage, compatibility, organizational size, top management support, organizational readiness, mimetic pressure, normative pressures, coercive pressure, and the IT decision makers' intent to adopt cloud computing. The theoretical framework incorporated the diffusion of innovations theory, a technology-organization-environment framework, and institutional theory. The survey participants were 136 IT decision makers from different U.S. industries. The Pearson's coefficient analysis indicated a significant correlation between the dependent variable (intent to adopt) and all independent variables except organizational size. The regression model was a statistically significant predictor of the dependent variable and accounted for approximately 74% of the variance in the dependent variable, primarily predicted by top management support, normative pressure, relative advantage, and organization readiness. The implications for positive social change include the potential of implementing innovations that would augment technology efficiency, decrease workplace personnel issues, and create a more desirable and flexible workplace. Flexibility at work enables employees to be able to participate in other nonwork roles such as family, child, and elder care, or education.

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Section 1: Foundation of the Study

One of the goals of using information technology (IT) is to increase the innovativeness, effectiveness, and productivity of businesses (Alali & Yeh, 2012). IT delivers these goals using commoditization, especially with IT departments in large companies that extend beyond the country of origin and offer services worldwide (Aljabre, 2012) (CITATION). Types of IT commoditization include forms of outsourcing, subcontracting, and other sources of external services procurement of unessential requirements (Markus & Loebbecke, 2013).

For business leaders to succeed in the fierce international competition of today's markets, they need to be able to increase productivity, cut costs, and increase profitability (Misra & Mondal, 2011). These requirements place excessive pressure on IT managers and decision makers to implement the newest innovations and technological advances that support their approach to sustaining competitive advantage, improving the bottom line, and reducing costs. Cloud computing has become a growing area of interest for meeting these needs (Fan, Chen, Wu, & Fang, 2015).

Background of the Problem

As an answer to the increasing costs of managing IT, cloud computing provides a model that aligns IT tools and services with the organization's business strategies. This alignment takes place through the development of rapid provisioning of systems and other utilities and services (Moreno-Vozmediano, Montero, & Llorente, 2013). As cloud computing becomes more prevalent, some corporations are considering moving mission-critical workloads to cloud computing services (Bartholomy, Greenlee, & Sylvia, 2013).

However, uncertainty and barriers to the adoption of the technology persist because of concerns about security, compliance, and business risks(Lombardi & Di Pietro, 2011). Other factors slowing the adoption of cloud computing include the lack of a functional design to define and quantify the IT risks inherent in cloud computing services (Lombardi & Di Pietro, 2011). Consequently, companies that have an interest in adopting the technology because of its potential benefits often move forward cautiously (Salah, Calero, Zeadally, Al-Mulla, & Alzaabi, 2013).

For technology investments to provide the maximum return on investment (ROI), management needs to implement structured innovation management along with it. Therefore, further research is necessary to support IT decision makers in making the right decisions on the type of technology and providers for their enterprises (Raskino & Lopez, 2012). To investigate the influential factors regarding the decision of adopting new technological advances, such as cloud computing, researchers need to proceed with an integrated methodology (Morgan & Conboy, 2013). Users of such a methodology should consider the organizational, technological, and environmental factors (Yoon & George, 2013). IT managers who have full knowledge of the influence of these factors should be more effective in their decision-making regarding the adoption of cloud computing (Chebrolu, 2010; Low, Chen, & Wu, 2011).

Problem Statement

In a 2012 IBM study, more than 50% of CEOs thought that their IT departments were not prepared to support the future business needs of their organizations (Venters & Whitley, 2012). Companies that are not prepared in this fashion risk losing business

productivity and cost reduction; IT reliability and efficiency; business process re-engineering; IT and business alignment; and business agility and speed to market (Luftman & Zadeh, 2011). A 2016 survey showed that 70% of the interviewed companies believed cloud computing would make their business flexible, and 62% thought it would help them react quickly to market conditions (Wang, Wood, Abdul-Rahman, & Lee, 2016). The general business problem is that IT decision makers are generally reluctant to adopt cloud computing. The specific business problem is some IT managers do not know if a relationship exists between technological, organizational, and environmental factors, and IT decision makers' intent to adopt cloud computing.

Purpose Statement

The purpose of this quantitative correlational study was to examine the relationship between the technological, organizational, environmental factors, and IT decision makers' intent to adopt cloud computing. The independent variables were compatibility (CMPT), relative advantage (RLAD), organizational readiness (ORRD), organizational size (EMPL), top management support (TPMS), normative pressure (NRPR), coercive pressure (CRPR), and mimetic pressure (MMPR). The dependent variable was the decision makers' intent to adopt cloud computing (ADPT). The targeted population consisted of IT managers of U.S.-based companies. This study was designed to contribute to the knowledge of cloud computing by providing an integrated stand on its adoption, and to determine key factors that influence decision makers' intents in the adoption. The findings are designed to assist IT managers in making informed decisions

on the adoption of cloud computing and establish its value to reduce an overestimation of cloud capabilities.

This study's implications for positive social change include the potential of implementing innovations that would augment technology efficiency, decrease workplace personnel issues, and create a more desirable and flexible workplace. With a desirable and flexible workplace, businesses achieve a higher employee retention rate, and a higher number of satisfied employees that could provide better care for their families (Fiksenbaum, 2014). Flexibility at work enables employees to be able to participate in other nonwork roles such as family, child, and elder care, or education (Ellen, Kalliath, & Kalliath, 2012).

Nature of the Study

I chose a quantitative methodology for this study. Quantitative research is a systematic, formal, and objective method that uses arithmetical information to gain knowledge regarding the world (Haegeman, Marinelli, Scapolo, Ricci, & Sokolov, 2013). For this reason, generalizability, numbers, objectivity, and deductive reasoning are classifications that often relate to quantitative research studies (Wahyuni, 2012). Quantitative methods are typically deductive and are used to test theories, while qualitative research uses inductive methods to construct theories (Lewis, 2015; Wahyuni, 2012). For this reason, a quantitative approach is the best method when the problem is to determine the elements that influence the outcome or understand the best predictors of outcomes (Rubin & Babbie, 2016), as was the case in this study.

Quantitative research studies are designed to produce results that can be generalized, whereas qualitative studies inherently produce results that are less susceptible to generalization (Wahyuni, 2012). Although quantitative terminology is generalizable, qualitative terminology is more adaptable (Rubin & Babbie, 2016). A quantitative method is a better tool to determine the relationship between two or more quantifiable variables than a qualitative method (Haegeman et al., 2013). Sample sizes used in quantitative studies are much larger than those in qualitative studies to enable statistical methods to make use of particular samples that are representative (Haegeman et al., 2013; Lewis, 2015). These factors led my selecting a quantitative correlation design was used in this study.

The goal of correlational studies is to examine the extent to which changes in one variable or characteristic correlate to the changes in one or more other variables or characteristics (Labaree, 2011). A relationship occurs when an increase in one variable leads to an increase or decrease of another in a somewhat expected manner (Leedy & Ormrod, 2012). Examining the relationship between the decision makers' intent to adopt cloud computing and the factors affecting the decision, without offering any manipulation or treatment to the dependent variable, was in line with the requirements of a correlational design (Van der Stede, 2014). A correlational study is a nonexperimental design that does not identify cause-and-effect relationships (Leedy & Ormrod, 2012; Van der Stede, 2014). The specific strategy of inquiry for this research study was a cross-sectional, correlational, survey study.

Research Question

The objective of this study was to examine the business issues associated with cloud computing. In the business world, where downturn and losses occur every day, an enormous need exists for reliable, yet affordable technology; cloud computing fills that need (Aljabre, 2012). Cloud computing offers its customers a reliable service at flexible and affordable prices (Lombardi & Di Pietro, 2011). However, as reliable and innovative as cloud computing may be, it does not necessarily mean that cloud computing suits the needs of all businesses (Aljabre, 2012).

The purpose of this study was to assess the factors associated with the IT decision makers' intent to adopt cloud computing. To accomplish the purpose of the study, the primary research question (RQ) asked "To what extent, if any, do RLAD, CMPT, TPMS, EMPL, ORRD, MMPR, CRPR, and NRPR influence the ADPT?" Where RLAD is relative advantage, CMPT is compatibility, TPMS is top management support, EMPL is organizational size, ORRD is organizational readiness, MMPR is mimetic pressure, CRPR is coercive pressure, NRPR is normative pressure, and ADPT is IT decision makers' intent to adopt cloud computing.

The following specific secondary research questions were used to examine the relationship between each of the independent variables and the dependent variable:

- RQ1. To what extent, if any, does RLAD relate to ADPT?
- RQ2. To what extent, if any, does CMPT relate to ADPT?
- RQ3. To what extent, if any, does TPMS relate to ADPT?

- RQ4. To what extent, if any, does EMPL relate to ADPT?
- RQ5. To what extent, if any, does ORRD relate to ADPT?
- RQ6. To what extent, if any, does MMPR relate to ADPT?
- RQ7. To what extent, if any, does CRPR relate to ADPT?
- RQ8. To what extent, if any, does NRPR relate to ADPT?

Hypotheses

Hypotheses are practical conjectures, educated guesses, and reasonable assumptions. These tools offer a tentative justification for a phenomenon under examination. They can direct the researcher's thoughts to potential sources of information that may help in finding solutions to one or more sub-problems and potentially the principle research problem (Leedy & Ormrod, 2012). Researchers formulate hypotheses for analysis to be adequately structured to assess the significance of the relationship between variables (Fetters, Curry, & Creswell, 2013).

Hypotheses are explicit statements of prediction. The goals of these tools are to describe in concrete terms, instead of theoretical, what the researcher expects to happen in the study. Hypotheses do not exist in all studies. Qualitative studies are more exploratory in nature (Rubin & Babbie, 2016). The purpose of qualitative studies may be to explore some areas, more thoroughly, to develop accurate predictions or hypotheses that researchers can test in future studies (Fetters et al., 2013; Lewis, 2015).

The following null and alternative hypotheses were constructed based on the RQs of the study:

Hypothesis 1

Hl_0: No correlation exists between RLAD and ADPT.

Hla: RLAD correlates with ADPT.

Hypothesis 2

$H2_0$: No correlation exists between CMPT and ADPT.

H2a: CMPT correlates with ADPT.

Hypothesis 3

$H3_0$: No correlation exists between TPMS and ADPT.

H3a: TPMS correlates with ADPT.

Hypothesis 4

$H4_0$: No correlation exists between EMPL and ADPT.

H4a: EMPL correlates with ADPT.

Hypothesis 5

$H5_0$: No correlation exists between ORRD and ADPT.

H5a: ORRD correlates with ADPT.

Hypothesis 6

$H6_0$: No correlation exists between MMPR and ADPT.

H6a: MMPR correlates with ADPT.

Hypothesis 7

$H7_0$: No correlation exists between CRPR and ADPT.

H7a: CRPR correlates with ADPT.

Hypothesis 8

$H8_0$: No correlation exists between NRPR and ADPT.

H8a: NRPR correlates with ADPT.

Theoretical Framework

The technology-organization-environment (TOE) framework, diffusion of innovations theory (DOI), and institutional theory grounded this study. Rogers (1962) developed the DOI theory to explain how a product or idea gains momentum and spreads over time through a social network. The characteristics of the DOI theory are: (a) compatibility, (b) relative advantage, (c) trialability, (d) complexity, (e) uncertainty, and (f) observability. In this study, I included only compatibility and relative advantage factors as indicators in the context of cloud computing adoption. According to this theory, consumers adopt a new product as a result of the diffusion process. In the context of this study, IT decision makers were the potential adopters, and cloud computing was the innovation availabe for adoption.

I also used the TOE framework developed by Tornatzky and Fleischer (1982), which is another adoption theory. Tornatzky and Fleischer identified three contextual aspects that influence the adoption of technological innovation: (a) technological context, (b) organizational context, and (c) environmental context. The focus of the TOE framework is on internal organizational attributes such as top management support, organizational size, and technological and financial readiness of the organization. In this

study, I used the four attributes to hypothesize and evaluate their effect on the adoption of cloud computing.

I also incorporated the premises of DiMaggio and Powell's (1983) institutional theory into the theoretical framework. This thory describes three kinds of pressures that sway innovation adoption decisions: (a) mimetic, (b) coercive, and (c) normative institutional pressures. The use of institutional theory supplements the use of DOI and TOE by delivering an extra dimension in investigating the impact of environmental pressures on the adoption of cloud computing. In this study, I used the three types of pressure to hypothesize and evaluate their effect on the adoption of cloud computing.

Definition of Terms

Cloud computing: An IT delivery model that delivers computing, storage, and network services as a service rather than as a product whereby virtualized shared resources, software, and information get delivered as a utility over a network (typically the Internet; Johnson, 2013).

Cloud provider: A supplier of cloud infrastructure as a service (IaaS) that sells the service on a utility computing basis. Examples of cloud providers are Amazon, Rackspace, and IBM (Son, Jung, & Jun, 2013).

Cloud provisioning: The deployment of the company's cloud computing strategy. The process typically starts by selecting first which applications and services will exist in a public cloud and which will remain on-site behind the firewall in a private cloud (Ranjan & Zhao, 2013).

Community cloud: A cloud infrastructure collectively supporting organizations that have a shared affinity, concern, or purpose (Sharma, Garg, & Sharma, 2013).

Hybrid cloud: A cloud infrastructure comprising two or more clouds (private, community, or public) that work together as one network to enable data and application portability (Malawski, Figiela, & Nabrzyski, 2013).

On-demand self-service: A customer's unilaterally provisioned computing capabilities as needed without requiring a service provider human interaction (Lin & Chen, 2012).

Multi-tenant: In the context of this study, many customers using the same public cloud (Khan, Erradi, Alhazbi, & Han 2013).

Private cloud: A cloud infrastructure operated exclusively for a sole organization (Azodolmolky, Wieder, & Yahyapour, 2013).

Public cloud: A cloud infrastructure commercially available to the general public or a large industry group (Azodolmolky et al., 2013).

Rapid elasticity: The seemingly unlimited dynamic and instant provisioning of computing resources that scale (up or down) to satisfy consumer demand (Brender & Markov, 2013).

Assumptions, Limitations, and Delimitations

Assumptions are conditions researchers take for granted, without which the research project would be useless (Leedy & Ormrod, 2010). Researchers should present their assumptions as the foundation at which their study must rely on (Leedy & Ormrod, 2010). It is essential that the readers know what the researcher has assumed to be true

with respect to the research project (Haegeman et al., 2013; Rubin & Babbie, 2016). Stating limitations of the study is useful in providing a method to identify probable errors or difficulties in understanding the study's results. Revealing the assumptions, limitations, and delimitations pertained to the study enhances the reader's understanding. (Alvesson & Sandberg, 2013; Labaree, 2011).

Assumptions

The goal of the assumptions is to identify the unverified facts, which are assumed to be true, that might cause potential risks (Alvesson & Sandberg, 2013). The first assumption in this study was that the answers of the survey were honest and present the best and unbiased opinions of the participants. The second assumption was that the participants of the survey had some knowledge of and intended to adopt cloud computing and its benefits. The third assumption was that the survey sufficiently measured the constructs.

Limitations

The goal of identifying limitations is to discover areas of constraints and potential deficiency areas (Alvesson & Sandberg, 2013). One limitation of this study was that the population of this study came from enterprises where their headquarters were within the United States. Also, there was only a few participants from each of the surveyed industry types, and, thus, the results might not represent the entire industry. Consequently, this limitation restricted, to some degree, the ability to generalize the results of the study further. Another limitation came from the selected research design; correlational study designs do not classify the reasons for behaviors (Labaree, 2011). With this study design,

it is not possible to conclude more than a correlation between variables, instead of cause and effect (Leedy & Ormrod, 2012); hence, I could not identify a conclusive causality with this design. Also, the variables in this study were only measured, but not manipulated.

Delimitations

The goal of delimitations is to outline the scope and boundaries of the study. One delimiting measure of the study was the scope of the study (Haegeman et al., 2013; Rubin & Babbie, 2016). The scope was limited to the decision makers' intent to adopt cloud computing and did not include the implementation of the technology itself. An additional delimiting measure was the participation of the survey. The participation was limited to IT decision makers and managers who had a role in their enterprises to allow them to influence the adoption decision process. Screening measures were in place to make sure that participants met this delimiting measure.

Significance of the Study

Contribution to Business Practice

One of the primary objectives of the study was to explore the business issues related to cloud computing. In the business world, where downturn and losses happen every day, there is an enormous need for reliable yet affordable technology more than ever; cloud computing fills that void. However, as reliable and innovative as cloud computing may be, this strategy does not necessarily mean that cloud computing suits the needs of all businesses (Aljabre, 2012).

The significance of the study was that it indicated the correlation between the intent of IT decision makers and managers to use cloud computing and some of the technological, organizational, and environmental factors facing them. The new knowledge that came out of the study might help the IT decision maker in assessing the strategies of adopting new technologies that satisfy their organization's computing and data management needs (Misra & Mondal, 2011). Information about the factors impacting the decision-making process might assist cloud computing providers in providing strategies aimed at enterprises that are less motivated to adopt cloud computing (Fan et al., 2015; Ranjan, Benatallah, Dustdar, & Papazoglou, 2015).

Implications for Social Change

The outcomes of the study included the benefits and risks related to cloud computing adoption, which might prove beneficial to both cloud providers and IT management in their strategic planning. The study provided guidance in rationalizing risks accompanied with cloud computing environments in a way to promote a better understanding of cloud services. Another benefit of the study is the contribution to the body of knowledge by measuring and publishing empirical evidence of benefits and risks of factors influencing cloud adoption.

A Review of the Professional and Academic Literature

The purpose of this quantitative correlational research study was to examine the relationship between the technological, organizational, environmental factors, and decision makers' intent to adopt cloud computing. The purpose of this section is to offer a synopsis of the recent and historical works linked to the adoption of new IT innovations,

such as cloud computing, and several of the adoption factors and theoretical positions that other researchers have examined in the literature.

This literature review is structured includes the following topics: history of cloud computing, definition of cloud computing, characteristics of cloud computing, key benefits of cloud computing, cloud computing service models, cloud computing deployment models, cloud computing key technologies, cloud computing security and privacy requirements, cloud computing attacks and threats, and technology adoption theoretical foundations. Online databases were the main source of literature: I identified research using Google Scholar, Business Source Complete, ABI/INFORM Complete, ACM Digital Library, Computers & Applied Sciences Complete, Business Source Complete/Premier, IEEE Xplore Digital Library, ProQuest, and SAGE Research Methods Online. The focus of the literature search was on articles related to the benefits and concerns regarding cloud computing adoption that other researchers have published in peer-reviewed journals such as International Journal of Information Management, Journal of Information Technology, Journal of Management Information Systems, Communications of the ACM, and others.

The online search for articles included the following terms: history of cloud computing, definition of cloud computing, characteristics of cloud computing, key benefits of cloud computing, cloud computing service models, cloud computing deployment models, cloud computing key technologies, cloud computing security and privacy requirements, cloud computing attacks and threats, technology adoption, IT innovations, cloud computing, adoption factors, innovation theory, TOE framework,

institutional theory, compatibility, environmental pressures, organizational size, competitive pressures, organizational readiness, relative advantage, and top management support.

This review of the professional and academic literature included a detailed evaluation of 136 different sources. Out of the 136 articles, 123 (or 90.44%) were published within the past five years. Out of the 13 remaining documents, seven were seminal, and six provided indispensable and significant value to the study based on their content. Out of the 136 sources, 132 (or 97.06%) were refereed or peer-reviewed articles. I verified the refereed status of 123 articles using Ulrichsweb; the remaining nine sources were doctoral dissertations. Three references were books and not considered as peer-reviewed; nevertheless, they were intrinsically valuable to this study because of their content of new technologies adoption theories.

The RQ guiding this study was the following: To what extent, if any, do RLAD, CMPT, TPMS, EMPL, ORRD, MMPR, CRPR, and NRPR influence the decision makers' intent to adopt cloud computing? Eight research sub-questions prompted testable hypotheses:

RQ1. To what extent, if any, does RLAD relate to ADPT?

RQ2. To what extent, if any, does CMPT relate to ADPT?

RQ3. To what extent, if any, does TPMS relate to ADPT?

RQ4. To what extent, if any, does EMPL relate to ADPT?

RQ5. To what extent, if any, does ORRD relate to ADPT?

RQ6. To what extent, if any, does MMPR relate to ADPT?

RQ7. To what extent, if any, does CRPR relate to ADPT?

RQ8. To what extent, if any, does NRPR relate to ADPT?

To investigate the RQ and subquestions, I constructed eight null hypotheses. The assumption of the first null hypothesis was that there was no correlation between RLAD and ADPT. The assumption of the second null hypothesis was that no correlation existed between CMPT and ADPT. The assumption of the third null hypothesis was that no correlation existed between TPMS and ADPT. The assumption of the fourth null hypothesis was that no correlation existed between EMPL and ADPT. The assumption of the fifth null hypothesis was that no correlation existed between ORRD and ADPT. The assumption of the sixth null hypothesis was that no correlation existed between MMPR and ADPT. The assumption of the seventh null hypothesis was that no correlation existed between CRPR and ADPT. The assumption of the eighth null hypothesis was that no correlation existed between NRPR and ADPT.

History of Cloud Computing

Cloud computing technology combines different computing models and is a hybrid model that has been developed progressively over several decades. McCarthy (1960) predicted that future consumers would be able to order computing powers as a public utility. The concept of cloud computing dates back to the time of mainframe, where numerous employees within the corporate campus shared and used powerful centralized computers with computing elements such as memory, processing capabilities, and drivers (Naghavi, 2012). Cloud computing is an evolved paradigm in the modern

computing environment (Singh, Bhisikar, & Singh, 2013). According to Singh et al. (2013), the evolution of computing is divided into 10 phases :

- Phase 1 - Calculating machine (Wilhelm Schickard, 1623),
- Phase 2 - Analytical engine (Charles Babbage, Allan Marquand, Herman Hollerith, Benjamin Burack, 1837-1936),
- Phase 3 - Modern computer (Konrad Zuse, 1941, John Mauchley and J. Presper Eckert, 1945, Herman Goldstine, 1946),
- Phase 4 - Mainframe computer (IBM, 1947-1964),
- Phase 5 - Mini computer (Intel, IBM, Andre Thi Truong, Altair, 1969-1981),
- Phase 6 - Internet (ARPANET, NSFnet, private companies, 1969-1980),
- Phase 7 - World wide web (WWW) (Tim Berners-Lee, National Center for Supercomputing Applications [NCSA], 1989),
- Phase 8 - Application service providers (ASPs) (1990-2000),
- Phase 9 - Grid computing (1990), and
- Phase 10 - Cloud computing (Google and IBM, 2007).

Definition of Cloud Computing

Cloud computing is an IT delivery plan where computing services (applications and infrastructure) are supplied as required to consumers using the Internet. The service is now ubiquitous, self-managed fashion, and can be accessed anywhere using any device (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011). The assets required for delivering the technology are virtual, rapidly provisioned, shared, instantly scalable, and

released with negligible cloud provider contact (Bittencourt, Madeira, & da Fonseca, 2012). The service is charged to the customer as an operating expense and does not require any significant upfront capital spending. Cloud computing service providers utilizs a metering system that provisions computing resources in suitable chunks (Chou & Chiang, 2013).

The National Institute of Standards and Technology (NIST) defined cloud computing as a framework for providing on-demand, with easy-to-reach access to a pool of computing resources (Sidana & Suri, 2013). Cloud computing resources such as servers, networks, applications, and storage can be quickly configured, provisioned, and used with minimal effort in management or interaction by the service provider (Sidana & Suri, 2013).

Characteristics of Cloud Computing

Some of the characteristics of cloud computing services include:

Adaptable and elastic. Cloud computing services are adaptable and elastic. For this reason, the service can quickly respond to demand by increasing or decreasing the available computing power and resources to meet the needs of the business (Garg, Versteeg, & Buyya, 2013).

Easy-to-use. Cloud computing services are easy to use, which means it takes little time for new users to learn and operate the service (Gupta, Seetharaman, & Raj 2013).

Ubiquitous. Cloud computing services are accessible anywhere in the world at any time using any device (such as tablets, mobile phones, laptops, and desktops) (Gupta & Chandelkar, 2013).

Scalable and agile. Cloud computing services are scalable and agile as they can expand and adapt quickly and dynamically in response to demand without acquiring any additional or overhead costs (Bittencourt et al., 2012).

Convenient and on-demand. Cloud computing services are available when and as needed by the customers. For this reason, there is no need to go through a lengthy process, or require help from the service provider (Lin & Chen, 2012).

Pay-per-use. Cloud computing services employ a pay-as-you-go model that allows customers to pay for just the services they use (Chou & Chiang, 2013; Espadas et al., 2013).

Versatile. Cloud computing services are versatile. They offer three primary services: (a) software-as-a-service (SaaS), (b) platform-as-a-service (PaaS), and (c) infrastructure-as-a-service (IaaS), and each service can provide various applications running at the same time (Flahive, Taniar, & Rahayu, 2013; Johnson, 2013).

Shared resources. Cloud resources are shared among multiple customers (multi-tenant), which allow unused resources to suit different needs for different customers (Khan et al., 2013).

Secured. Cloud computing services are centrally managed by service providers that employ experts in the cyber security field, and hence, in theory, security is better in these environments. However, security in complex environments is difficult to manage because of the fact that data is stored and processed in unknown places, and shared by unrelated users (Lombardi & Di Pietro, 2011; Salah et al., 2013).

Reliable. Cloud computing supports reliability by adding redundant sites in case an error or attack happens (Gangwar, Date, & Ramaswamy, 2015; Khorshed, Ali, & Wasimi, 2012).

Key Benefits of Cloud Computing

Cloud computing significantly reduces the cost-of-entry for small businesses that strive to utilize the benefits of business analytics that are usually compute-intensive and have historically been available only to leading companies (Marston et al., 2011). Most of the leading companies have suffered from serious IT infrastructure costs, and cloud computing plays a role in lowering the costs of these infrastructures (Aljabre, 2012). Cloud computing delivers instant access to infrastructure assets, with no initial capital investments for consumers that in turn can facilitate a faster time-to-market in many businesses (Aljabre, 2012). Once company IT departments have instant access to the powerful computing resources of the cloud, there is no need for companies to invest in an enormous number of powerful computers (Khanghahi, Nasiri, & Davoudi, 2014).

Cloud computing greatly reduces the upfront costs of corporate computing by treating IT as an operational expense rather than capital, and also through lowering software costs (Aljabre, 2012). Some software applications are already available on the cloud and can be easily accessed by company employees via the Internet. When using cloud software, companies do not need to purchase individual or corporate software licenses for each PC in the company, thus eliminating the cost of the software. Cloud computing also delivers a greater size of memory storage than traditional computing,

freeing consumers from being overly concerned about the memory capacity of their computers and eliminating the cost of adding additional hardware (Sharma et al., 2013).

Cloud computing is an elastic infrastructure that can be used and shared by many users, and each customer might end up using it in a distinctly different approach (Marston et al., 2011). The consumers are entirely separate from each other, and the elasticity of the system permits for computing loads to be provisioned instantly to other clients using the system (Gupta et al., 2013). Cloud computing can eliminate or significantly reduce IT barriers to innovation. Many of the innovativecompanies provide evidence of that. Such companies include Facebook and YouTube, with global online applications, TripIt, for travel plan management, and Mint, for personal finances management (Bohling, Kumar, & Shah, 2013).

Cloud computing provides a collaborative environment for companies, especially multinational companies, which offer employees the ability for multiple users to share and work together on the same projects or documents in the cloud at the same time. The technology allows employees to work together and collaborate remotely and efficiently by using the cloud (Kumar, Raheja, & Sodhi, 2013). Cloud computing allows for ubiquitous accessing, the ability to access documents from anywhere in the world (Aljabre, 2012).

Cloud Computing Service Models

There are three major cloud computing service models.

Software-as-a-service (SaaS). The user accesses an application, most of the time as a form of web-based applications but does not have any control over the infrastructure

(i.e., OS, network, or hardware) on which it is running. SaaS gives remote access to applications that could run as services on a pay-per-use basis. Securing the applications is the responsibility of the SaaS provider, but the operational security processes are usually the responsibility of the customers (Chou & Chiang, 2013; Espadas et al., 2013).

Platform-as-a-service (PaaS). PaaS provides the environment that facilitates product lifecycle (PLC) activities (e.g., programming, designing, development, deployment, testing, and hosting). In addition, PaaS offers other services, such as database integration, team collaboration, security scalability, web service integration, and application instrumentation (Flahive et al., 2013; Johnson, 2013). The users have access to the environment that is designed to host their applications. The users have control over the software that run in the environment and some provided control over the hosting environment. The users are not allowed to access or control any of the infrastructure components (e.g., OS, network, and hardware; Catherine & Edwin, 2013; Sultan, 2011).

Infrastructure-as-a-service (IaaS). The users have access to critical resources required for computing such as CPUs, memory, storage, middleware, or networking components. The users have control over the running OS, memory storage, programs, and configured networking components (such as load balancers and firewalls). Nevertheless, the users are not allowed to administer the cloud infrastructure beneath them (Abrishami, Naghibzadeh, & Epema, 2013). IaaS provides access to the top-of-the-line and up-to-date technology with respect to computer infrastructure, which allows users to gain faster services. On-demand scaling via resource virtualization and user-based billing makes IaaS competent enough for any business (Naghavi, 2012).

Cloud Computing Deployment Models

Public model. Public clouds are operated, managed, and owned by third parties or cloud providers (Azodolmolky et al., 2013). Programs from various distinct users will share the storage systems, servers, and networks of the cloud. The cloud provider offers applications via Web browsers or Web services that provide computing resources to be dynamically provisioned and offered to the customers. Public clouds are hosted on the service provider's data center and not on the customer premises. For this reason, public clouds reduce the customers' cost and risk by allowing them access to a flexible enterprise infrastructure (Kumar et al., 2013). With the tremendous benefits provided by the public cloud model, a myriad of security concerns exists and needs to be addressed (Malawski et al., 2013).

Private model. A private cloud is a customer-devoted cloud. It is built exclusively for the use of a particular customer to provide the highest control over security, quality of service, and data (Azodolmolky et al., 2013). The client possesses the system (hardware and software) and decides what and how applications should run on it. Possible security issues are seriously addressed and reduced when the private cloud is correctly performed and implemented (Malawski et al., 2013). A private cloud can be hosted and operated by the enterprise or a third party (managed private cloud). In the case of a managed-private cloud, the customer may be able to negotiate a more appropriate contractual agreement with a third party provider (Kumar et al., 2013).

Hybrid model. A mix of public and private cloud models is called a hybrid cloud. A hybrid cloud helps to supplement a private cloud with the resources of a public cloud

to sustain service levels to address and deal with any rapid workload spikes (Azodolmolky et al., 2013). The main benefit of a hybrid cloud is to help a private cloud get support from a public cloud to sustain a peak demand (Malawski et al., 2013). To describe the purpose of a hybrid cloud, consider a private cloud that stores and processes sensitive data, and utilizes public cloud resources, such as Web servers, to display nonsensitive data (Kumar et al., 2013).

Community model. Particular industries such as healthcare, finance, and government join forces to create a community of users that share the same cloud. The cloud becomes a community cloud that offers a variety of services like SaaS, IaaS, PaaS, DbaaS. A community cloud is a private cloud shared by businesses that need to process or store data of comparable sensitivity and security needs (Sharma et al., 2013; Sultan, 2011). The community model is similar to the hybrid model; it intends to reap the benefits of a private cloud from the security perspective and the advantages of a public cloud from an economic perspective (Caytiles & Sunguk, 2012). Many agencies of the government, sharing a private cloud, is an example of a community cloud. Another case includes many social networking websites like Facebook and Twitter sharing the same private cloud (Rajendra, Lakshman, & Bapuji, 2013).

Cloud Computing Key Technologies

The key technologies used in cloud computing include: Service-oriented architecture (SOA), automation, virtualization, Web 2.0, Mashup, SOA and multi-tenancy, etc. Most of these technologies have matured in recent years to enable the emergence of cloud computing in real applications (Zheng, 2012).

Service-oriented architecture (SOA). According to the information technology infrastructure library (ITIL) V3, a service is a way of providing value to users by providing results that users would like to achieve without the ownership of specific costs and risks. Some of the features of the service include that it has a published interface and is defined using a standard definition language (White, Reichherzer, Coffey, Wilde, & Simmons, 2013). Service orientation is a concept that is concerned with the developments, deployments and outcomes of services. Service orientation allows cloud computing to offer a global access to applications, and simplifies the integration of resources and various services at run-time. This occurs regardless of how the services were implemented, and by what programming language they were developed (Zorrilla & García-Saiz, 2013).

SOA is an architectural design that is driven by the idea of service orientation with the goal of satisfying the needs for the following: (a) protocol-independent, standards-based, and loosely coupled distributed computing, and (b) mapping the enterprise information systems (EIS) appropriately to the overall business process flow (Delen & Demirkan, 2013). In an SOA, software applications are provided as services, which are independent of the framework or condition of other services, well-defined, and enclosed components that provide common business functionality. As in SOA, cloud services leverage network-based software through standards-based interfaces (Zorrilla & García-Saiz, 2013).

Web 2.0. Web 2.0 is said to be a set of services that lets Web users easily share their opinions and resources (Yakovlev, 2007; Zheng, 2012). Web 2.0 components

include Blogs (or weblogs), image sharing, Wikipedia and Wikis, RSS feeds, social networks, mashups, podcasts and vodcasts, and tagging. Sharing and exchanging resources and information are one of the main benefits provided by the applications of Web 2.0 (Huang, Ku, Chao, Lin, & Chen, 2012). Web feed and Web API are samples of the shared resources, which can be employed as cloud resources. SaaS architects make use of these resources by integrating them into their programs to supplement and enhance the abilities of their existing solutions or add new ones (Zheng, 2012).

Virtualization. Virtualization is the emulation of computing resources including operating system, network servers, and storage (Krieger & Douglis, 2013). Virtualization encompasses the utilization of a program called a hypervisor or virtual machine (VM) monitor (Pearce, Zeadally, & Hunt, 2013). VMs encapsulate or cover operating systems to provide similar behavior (inputs and outputs) that is produced by physical or tangible computers. Virtualization produces several logical resources that can be used by users, applications or systems (Pearce et al., 2013).

The independence of a VM from the state of the actual physical hardware allows multiple VMs to be performed on the same set of hardware (Krieger & Douglis, 2013). Virtualization provides comprehensive security benefits because of the separation of the physical and logical states of the hardware. These benefits help to address numerous issues, such as scalability, mobility, fault containment, elasticity, high availability, security, and efficiency (Xu, 2012).

Technology Adoption Theoretical Foundations

Cloud computing adoption is a new research topic, although growing rapidly, and the number of the published studies is limited (Hailu, 2012; Opala, 2012). The concentration of the previous research studies were more on either some of the IT technical aspects or the financial aspects, instead of using a wider range of factors that may influence the interest of IT managers in adopting cloud computing (Paquet, 2013). The IT technical aspects include elements such as security, privacy, reliability, compliance, and IT effectiveness (Pauley, 2012**;** Tanque, 2012). The financial aspects include elements such as cost and ROI (Chebrolu, 2010; Ross, 2010).

For business leaders to succeed in such fierce international competition, they need to be able to increase productivity, cut costs, and increase profitability (Misra & Mondal, 2011). The IT managers and decision makers need to use more comprehensive criteria that include technological, organizational, and environmental factors when making a decision to adopt cloud computing (Yoon & George, 2013). Also, to adopt cloud computing without considering its effect on their organizations, IT managers and decision makers will find it challenging to make a business case and recognize the ROI (Marston, et al. 2011; Moreno-Vozmediano et al., 2013).

The ability of organizations leaders to gain a competitive edge depends significantly on their ability to adopt new and innovative technologies and effectively manage their IT resources (Alali & Yeh, 2012). However, lacking the ability to adopt an innovation and new technological advances is a common issue for organizations leaders (Markus & Loebbecke, 2013). The uncertainties regarding the ROI and expected business

value (EBV), derived from the new technology, make the decision of adopting the new technology difficult and challenging (Lombardi & Di Pietro, 2011; Ross, 2010).

To study the factors that have an effect on the adoption of new technology, researchers developed several theories and frameworks. Two main types of adoption theories exist: one type that works at the individual level and another that works at the firm level (Marston et al., 2011). The theories that work at the individual level comprise the technology acceptance model (TAM), the theory of planned behavior (TPB), and unified theory of acceptance and use of technology (UTAUT). The theories that work at the firm level include the DOI and the TOE framework (Oliveira et al., 2014).

The DOI and TOE theories predominately guide research on most of IT adoption of new technologies (Alatawi, Dwivedi, & Williams, 2013; Oliveira et al., 2014; Zhai & Liu, 2013). Zhang and Dhaliwal (2009) argued that the institution theory, which lacked by prior cloud computing adoption research studies, covers the effect of institutional view on the decision makers to adopt new technology. According to Oliveira et al. (2014), combining concepts from different models provides increased ability to improve the understanding of the adoption of new technologies and innovations.

In studying the rapid growth of IT technology, cloud computing has recently gained substantial consideration (Marston et al., 2011). The significant attention in studying the factors affecting the adoption of new IT technologies caused the emergence of several adoption models (Hameed, Counsell, & Swift, 2012). While there are several theoretical models to study the adoption of new IT technology, I will use only the firm

level theories in this study. The theories that will serve as the theoretical foundations for this study are (a) DOI, (b) TOE, and (c) institutional theory.

Diffusion of Innovations (DOI) Theory

The DOI theory, developed by Everett M. Rogers in 1962, is one of the oldest and most applied social science adoption theories in a vast array of disciplines (Alatawi et al., 2013). According to the DOI theory, the perceptions of the benefits and features of innovation by the adopters are further significant than the real measures of these characteristics, and hence have a strong influence on their adoption decisions (Rogers, 2003). In mapping the characteristics of the DOI theory to this study, the IT managers and decision makers are the potential adopters, and cloud computing is the innovation.

The topic of technology diffusion encompasses a sequence of processes throughout the PLC that starts from research and development (R&D) and proceeds to the commercialization of the product, which comprises advertising, marketing, and promotion. By gaining insight into the diffusion process and understanding of the dynamics of technology development, firms can build better and more predictive models that can support timely and effective decision makings (Hameed et al., 2012). Technology diffusion produces multiple modifications that affect the long-term growth of the economy with the potential to change and shape the society. Such effects include improving the efficiency of inputs as capital or labor, which in turn reduces unit costs and improves profits (Nan, Zmud, & Yetgin, 2014).

The DOI theory describes why, how, and at what rate new technology and ideas, operating at the firm and individual levels, infuse cultures (Oliveira et al., 2014).

According to the DOI theory, there are four main factors that play a role in the diffusion practice. The four factors are innovation, time, communication, and social system (Rogers, 2003). In this study, I employed only the elements of innovation, as many studies, according to Tweel (2012), did not explicitly apply the other factors of the DOI. The innovation element of the DOI theory has six main characteristics that influence the decision to adopt any innovations. These characteristics are the following: (a) compatibility, (b) relative advantage, (c) trialability, (d) complexity, (e) uncertainty, and (f) observability. These characteristics, except uncertainty and complexity, have a positive impact on the rate of adoption of innovations and technologies (Bose & Luo, 2011; Risselada, Verhoef, & Bijmolt, 2014). The following section is a review of some of the recent studies that have utilized the DOI theory.

Using the characteristics of the DOI theory, Yunus (2014) and Gerpott (2011) conducted separate investigations to study the diffusion of innovations on the use of mobile banking and mobile Internet. Yunus investigated the effect of some of the characteristics of diffusion of innovations (i.e., compatibility, relative advantage, and trial-ability) on the use of mobile banking through the consumer attitudes in Indonesia. The respondents of the study were 100 of the mobile banking users in Banda Aceh. The sampling method used in the study was purposive sampling and the data were analyzed using path analysis technique. On the other hand, Gerpott (2011) combined DOI with TAM to study the reception of mobile Internet (MI) by the mobile users in Germany. Through a market research company, Gerpott, in collaboration with one of the four firms

operating GSM/UMTS networks in Germany, gathered 1,502 responses using an e-mail survey.

The results of Yunus's study indicated that compatibility, relative advantage, and trial-ability had a major positive effect on the intention to use mobile banking, whereas Gerpott found that perceptions that are based on direct experience with new technology innovations have more effect on usage performance and intention to use than perceptions that are drawn from marketing campaigns or social contacts. Both Yunus and Gerpott found that the attributes of the diffusion of innovations (compatibility, relative advantage, and trial-ability) had strong impacts on the intention of using the innovation. However, differences lied in the type of participants used by the two authors. Gerpott used two groups of participants, effective and potential MI users, whereas Yunus used just potential users. Also, Yunus used only the characteristics of the DOI theory, whereas Gerpott used a combination of TAM and DOI.

Similarly, Archibald and Clark (2014) and Gulati and Williams (2013) conducted separate investigations grounded in DOI theory to study social media adoption. Using data from other studies such as Cain et al. (2010), Ferguson (2013), Jones & Hayter (2013), O'Connoret al. (2014), Redfern (2013), Robinson (2013), Statistics Brain (2012), Taylor et al. (2010), and Toole et al., (2012), as shown in Archibald & Clark (2014), Archibald and Clark used the DOI theory to provide an examination of Twitter's adoption by nurses and researchers. Archibald and Clark measured the five characteristics of innovation: (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability to answer the following question: Do nurses understand the potential

benefits of Twitter? They claimed that the more benefits of the use of Twitter nurses are aware of, the more they will use it in their profession. However, Booth and Oudshoorn (2014) had a different opinion regarding the findings of Archibald and Clark. Booth and Oudshoorn argued that Archibald and Clark did not consider the socio-technical forces that impact the nursing researchers when adopting social media such as Twitter, and that social media platforms do not conform to the logic of traditional innovation diffusion.

Gulati and Williams (2013) used the DOI theory to study the adoption of Facebook in the 2012 campaigns for the U.S. Congress election. Gulati and Williams claimed both the Democrats and Republicans used the same models of Facebook adoption for House candidates. Gulati and Williams also indicated the characteristics for those who did not adopt Facebook were: (a) more likely candidates in noncompetitive races, (b) poorly financed candidates, (c) challengers or open-seat candidates, or (d) older candidates. Gulati and Williams claimed that the awareness of the attributes of the diffusion of innovations had a strong impact on the intention of using the innovation.

Lee, Hsieh, and Hsu (2011) and Wu (2011) also conducted separate investigations grounded in both of the DOI and TAM theories. Lee et al. examined the factors impacting the employees' intentions of using e-learning applications, whereas Wu used the DOI theory to develop an explorative model to examine the significant factors impacting the adoption of the cloud computing offering of SaaS. The results of Lee et al.'s study indicated that relative advantage, complexity, compatibility, and trialability had significant effects on the perceived effectiveness and ease of use of e-learning, whereas Wu concluded that perceived usefulness, followed by perceived ease of use,

attitude toward technology innovations, security and trust, perceived benefits, and social influence consecutively had significant effects on the behavioral intention of using SaaS. Similar to the other mentioned studies (Archibald & Clark, 2014; Gerpott, 2011; Islam, 2014; Tweel, 2012; Yoon & George, 2013; Yunus, 2014), Lee et al. (2011) and Wu (2011) reported that the diffusion of innovations attributes have substantial influence on the intention of using the innovation.

In another study, Islam (2014), using a discrete choice experiment (DCE) and survey, collected data from 298 respondents, and employed the innovation diffusion model to predict the adoption of the PV (photovoltaic) solar panels by households in Canada. Islam used the concept of technology diffusion to link two major concerns of any household new technology: (a) do the consumers like the features of the new technology, and (b) when will the consumers adopt (if at all)? Islam claimed that energy cost savings and technology awareness play an important role in the adoption of the PV Panels, and suggested that marketing campaigns should educate consumers more on feed-in tariffs, investment criteria, and environmental attributes.

In conclusion, the characteristics of the DOI theory are the following: (a) compatibility, (b) relative advantage, (c) trialability, (d) complexity, (e) uncertainty, and (f) observability. Although some of the reviewed studies above (Lee et al., 2011; Wu, 2011; Yoon & George, 2013) have used observability, complexity, and trialability as constructs to measure the intent to adopt technological innovations, for cloud computing adoption the majority of the previous studies indicated that these factors seem to be less effective (Archibald & Clark, 2014; Gerpott, 2011; Lee et al., 2011; Tweel, 2012; Wu,

2011; Yoon & George, 2013; Yunus, 2014). Therefore, in this study I included only compatibility and relative advantage factors as indicators in the context of cloud computing adoption. Relative advantage and compatibility will be discussed in more details in the Research Model and Hypotheses section.

Technology-Organization-Environment Framework (TOE)

Another adoption theory that works at the firm level is the TOE framework (Tornatzky & Fleischer, 1982). Tornatzky and Fleischer (1982) identified three contextual aspects that can influence the adoption of technological innovation: technological context, organizational context, and environmental context. The technological context refers to both of the organization's internal and external technologies or both of the existing and prospective technologies (Low et al., 2011).

The emphasis of the technological context is on how technological features may influence the decision of adoption. These features include the following factors: (a) perceived benefits or relative advantages, (b) perceived barriers, (c) compatibility, (d) perceived importance of compliance, (e) complexity, (f) trialability, (g) perceived risks, and (h) perceived ease of use (Oliveira et al., 2014).

The emphasis of the organizational aspect is on the building blocks of the structure of the enterprise such as the company size, the number of employees, the communication processes including the level of centralization and formalization. Organizational structure is a key factor in technology adoption and has an impact on the social interaction among the company's employees (Baker, Dwivedi, Wade, & Schneberger, 2012). According to Oliveira et al. (2014), companies with flatter or

decentralized structure use cutting edge technology better than others. Those companies do this by adopting new and more advanced technologies to improve the coordination and communication processes inside the company and outside with their partners (Venkatesh et al., 2012).

The emphasis of the environment aspect is on the characteristics of the industry, constraints and opportunities, practices, and legal regulations that may impact the innovation adoption decision process (Oliveira et al., 2014; Zhai & Liu, 2013). External pressures, such as competitor pressure and customer pressure, may influence decision makers to respond to their surrounding environment, copy industry leaders, and abide by standard organizational practices (Zhai & Liu, 2013). Researchers such as Zhang and Dhaliwal (2009) and Zorn, Flanagin, and Shoham (2011) demonstrated that external pressures affect the likelihood of facilitating the advancement of technology adoption. The following section is a review of some of the recent studies that have used the TOE theory.

Yoon and George (2013) and Low et al. (2011) conducted separate investigations grounded in TOE theory. Yoon and George studied the factors that influence organizational adoption of virtual worlds using the TOE framework, whereas Low et al. studied the effect of relative advantage, compatibility, technology readiness, complexity, firm size, top management support, trading partner, and competitive pressure on the adoption of cloud computing. Yoon and George indicated, using responses from 178 participants in their survey, that normative pressures and mimetic pressures had a strong effect on organizations in adopting virtual worlds. On the other hand, Low et al.

indicated, using data from participants from111 high-tech companies in Taiwan, that competitive pressure, top management support, trading partner, competitive pressure, relative advantage, and firm size factors have a substantial influence on the adoption of cloud computing. The two studies were similar in confirming the effect of normative and mimetic pressures on the adoption of innovations. The difference between the two studies was that Low et al. used a combination of DOI and TOE theories in their study, whereas Yoon and George used only TOE.

Similarly, Tsou and Hsu (2015) and Lin (2014) conducted separate investigations grounded in TOE theory. Tsou and Hsu examined the relationships between TOE openness, digital-resource readiness, service co-production, and firm performance in IT industry in Taiwan, whereas Lin examined the effect of (a) perceived costs and benefits (technological context), (b) top management support, firm size, and absorptive capacity (organizational context), and (c) competitive advantage and trading partners (environmental context) on the adoption of e-SCM in Taiwan. Tsou and Hsu concluded, after analyzing the responses from 210 IT-service managers, that service co-production plays a mediating role in the relationships between the openness of organization and environment and firm performance. On the other hand, Lin concluded, using responses from 283 IS managers from large Taiwanese firms, that the organizational and environmental contexts play a significant role in the adoption of e-SCM. The two studies were similar in confirming the impact of the TOE framework on the adoption of innovations. The difference between the two studies was that Tsou and Hsu realized that the majority of the TOE research studies covered e-businesses and innovation adoption,

but rarely addressed the openness issues. Tsou and Hsu suggested to connect the concept of openness to the TOE framework by adding three new variables openness of technology, openness of corporate culture, and openness to the external environment (Tsou & Hsu, 2015).

Aboelmaged (2014) studied the effect of TOE determinants on e-maintenance technology readiness in manufacturing firms. Using survey responses from 308 managers from different manufacturing companies, Aboelmaged indicated that measurements of e-maintenance technology readiness in manufacturing firms are mainly influenced by the TOE determinants, including the following: (a) technological competence and infrastructure, (b) firm size and ownership, and (c) challenges and expected benefits of e-maintenance.

Other studies grounded in TOE include the study of the impact of the TOE framework on the information and communication technology (ICT) (Leung et al., 2015), the investigation of the factors that play a role in firms in the European Union (EU) countries to adopt the use of e-business by likening the influence through two dissimilar industries: tourism and telecommunications (Oliveira et al., 2014), the inspection of the features inside the TOE framework that impact the ERP adoption decision within the communications industry in Taiwan (Pan & Jang, 2008), and the study of the factors that impact the adoption of the RosettaNet standard (Palacios-Marqués et al., 2015). The TOE framework has been applied to explore the adoption of innovations in several industries, including healthcare, wholesale, manufacturing, financial services, and retail.

Additionally, the TOE framework has been used in American, Asian, and European contexts, besides in both developing and developed countries (Baker, 2012).

In conclusion, the focus of the TOE framework is on internal organizational attributes such as top management support, organizational size, technology and financial readiness of the organization. Based on the previously reviewed research studies, (Aboelmaged, 2014; George & Yoon, 2013; Leung et al., 2015; Lin, 2014; Low et al., 2011; Oliveira et al., 2014; Palacios-Marqués et al., 2015; Pan & Jang, 2008; Tsou & Hsu, 2015; Tweel, 2012; Venkatesh et al., 2012) and many others, these factors are often found to be significant and positively influence adoption decisions. For this reason, it is reasonable to hypothesize and evaluate their effect on the adoption of cloud computing.

Institutional Theory

The other theoretical foundation that could provide a useful research view for cloud computing adoption is institutional theory (DiMaggio & Powell, 1983). DiMaggio and Powell (1983) indicated that rational goals of efficiency are not the only driver of organizational decisions, but other drivers exist such as cultural and social factors and concerns for legitimacy. Institutions and organizations are conveyed by routines, structures, and cultures, and run at several levels. The premise of the theory is that organizations turn out to be more comparable as a result of pressures for legitimacy and isomorphic pressures (DiMaggio & Powell, 1983). The external pressures sway the actions of the decision makers and compel them to react to their surrounding environment, conform to general organizational procedures, and mimic industry leaders, meaning decision makers tend to embrace the same technologies similar to those

embraced by other companies encountering similar challenges or in the same field (Oliveira et al., 2014).

Institutional theory has three different kinds of pressures that could sway the adoption decisions: (a) mimetic, (b) coercive, and (c) normative institutional pressures (Oliveira et al., 2014). New technologies that increase the legitimacy are necessary, especially under conditions of uncertainty, where performers could not be so sure of what the results of the adoption of other systems or processes are going to be (Zhu et al., 2012). This act may occur without any strong indicator of performance enhancements (Gauthier, 2013).

The use of mimetic forces explains the broad adoption of technologies with little reliable information regarding the effect of the operation of the organization (Tweel, 2012). Mimetic pressures exist as the leaders of organizations embrace an innovation or a practice mimicking competitors to meet some industry benchmarks or regulations (Oliveira et al., 2014). Coercive forces, according to Gauthier (2013), are the external pressures exercised by legal, government, or any other official organizations to adopt the systems or structures that they favor. Normative forces refer to the impact of professional standards and the impact of professional communities, such as publications, conferences, and associations, on the organization (Zorn et al., 2011). The following section is a review of some of the recent studies that have utilized institutional theory.

Zheng, Chen, Huang, and Zhang (2013) and Tsai, Lai, and Hsu (2013) conducted separate investigations grounded in institutional theory in China and Taiwan. Zheng et al. used institutional theory to investigate the government to government (G2G) information

systems adoption in public administration organizations in China, whereas Tsai et al. used institutional theory to study the factors that influence the adoption intention of radio frequency identification (RFID) by retailers' suppliers in Taiwan. Zheng et al. investigated how top management commitment mediated the effect of external institutional pressures on internal organizational resource allocation, which in turn led to the decision of adoption. Tsai et al. adopted five constructs to examine the effects of institutional pressures on the retailer's suppliers for the relational investment on inter-organizational information sharing. The five constructs were coercive/noncoercive pressure, mimetic pressure, normative pressure, relational investment, and organizational readiness. Zheng et al., using data from 148 public administration organizations, reported that normative and coercive pressures had a positive impact on top management commitment to adopt new technologies, which in turn had a positive impact on IT and financial, human resources in the G2G adoption process. Tsai et al., using data from 130 suppliers in Taiwan, found that relational investment was the most critical adoption factor, and (non)coercive pressure was the dominant power driver, followed by mimetic and normative pressures. Although Tsai et al. reported that mimetic pressure had an impact on the adoption of RFID, Zheng et al. claimed that mimetic pressures did not have any direct impact on top management commitment to the G2G adoption process.

Zorn et al. (2011) and Jan, Lu, and Chou (2012) also conducted separate investigations grounded in institutional theory. Zorn et al. employed institutional theory to study the factors that affect the adoption and use of information and communication technologies (ICTs) by nonprofit organizations (NPOs) in New Zealand, whereas Jan et

al. used institutional theory to examine the impact of coercive, mimetic, and normative pressures on the adoption of e-learning. Zorn et al. used three groups of independent variables, institutional isomorphism, organizational characteristics, and environmental factors. Zorn et al., using survey data from 1,046 organizations, reported that competitor scanning and expected practice, which are two mimetic forces, had a significant impact on the adoption decision of ICT by NPOs. On the other hand, Jan et al., using responses from 172 participants, concluded that mimetic and normative pressures had a major influence on the attitude and adoption intention of e-learning. Although the two studies were similar in confirming the effect of both mimetic and normative pressures on the adoption process, Jan et al. reported that coercive pressures did not have any impact on the adoption of e-learning.

Other studies grounded in institutional theory include the investigation of the factors that affect the virtual world adoption (Yoon, 2009), and the study of the adoption decision process of grid computing in Germany (Messerschmidt & Hinz, 2013). Yoon verified that normative and mimetic pressures had a strong influence on the IT decision makers' intent to adopt virtual worlds, whereas Messerschmidt and Hinz (2013), with feedback from 233 participants from different industries in Germany, reported that organizational capabilities such as IT department size, firm innovativeness, trust, and tendency to outsource had a positive impact on the adoption of grid computing. Similar to Yoon (2009), Messerschmidt and Hinz also reported that mimetic pressures and trust played significant roles in the adoption of grid computing.

Institutional theory delivers a solid theoretical support relating to the adoption of innovative and new technologies such as cloud computing (Tweel, 2012). Many researchers who confirmed the effect of mimetic, normative, and coercive pressures on the adoption of new technologies, (Jan et al., 2012; Messerschmidt & Hinz, 2013; Tsai et al., 2013; Yoon, 2009; Zhang & Dhaliwal, 2009; Zheng et al., 2013; Zorn et al., 2011), have utilized an institutional approach. The researchers of the studies mentioned above and many other earlier studies demonstrate the significance of institutional theory in providing a deeper understanding of the adoption of new technologies such as cloud computing. For this reason, the use of institutional theory supplements the use of DOI and TOE by delivering an extra dimension in investigating the impact of environmental pressures and forming an integrated framework for studying the adoption of cloud computing.

Other adoption theories that other researchers have used include TAM, TPB, theory of reasoned action (TRA), and the UTAUT. The authors of the TAM suggest that behavioral intentions to accept IT solutions are determined by the perceptions of usefulness and ease of use (Wallace & Sheetz, 2014). TAM enhanced the TRA by the use of hypotheses to anticipate the adoption of innovations according to the supposed ease of use and usefulness (Wallace & Sheetz, 2014).

The adopters of the TAM argue that the perceived usefulness, need, functionality, and ease of use of the new technology control the individual's behavioral intentions to adopt the technology (Svendsen, Johnsen, Almas-Sorensen, & Vitterso, 2013). Similar to TAM, TRA depends on the intentions, beliefs, and attitudes of the end user in accepting

innovations (Svendsen et al., 2013). For example, the belief of the end users regarding the usefulness of a new IT technology could influence their affection for, or attitudes toward, adopting the new technology. Whereas a positive or negative attitude towards its effectiveness would control the intent to adopt the technology (Chang, 2014). The use of TAM, TPB, TRA, and the UTAUT were not relevant to the study, since the goals of the study does not include searching for a relationship between the IT decision makers' beliefs, attitude, behavior, or perceptions of usefulness and ease of use of cloud computing and their intent to adopt the technology.

Research Model and Hypotheses

This section describes the theoretical adoption framework to construct a group of hypotheses concerning the factors that impact the IT managers' decision in adopting cloud computing. TOE framework, DOI, and institutional theory are the principal theoretical base for the study. Technology adoption researchers have widely implemented these theories in several different models to investigate the adoption patterns in several fields including IT (Oliveira et al., 2014; Zhu et al., 2012).

The review of numerous technology adoption studies indicated that some factors were fairly dominant among most of the research studies. The result of the literature review indicates that the adoption factors can be gathered in three groups: (a) technological, (b) organizational, and (c) environmental (Baker et al., 2012; Zhang & Dhaliwal, 2009). Therefore, in this research study I suggested and classified eight factors grouped into three different categories. The three categories (Figure 1) are the following: (a) technological factors group that includes relative advantage and compatibility, (b)

organizational factors group that includes top management support, organizational size, and organizational readiness, and (c) environmental factors group that includes mimetic pressure, coercive pressure, and normative pressure (Low et al., 2011; Yoon & George, 2013). The purpose of the theoretical model is to find out if there is a relationship between each of the adoption factors, the independent variables, and the IT decision makers' intent to adopt cloud computing, the dependent variable.

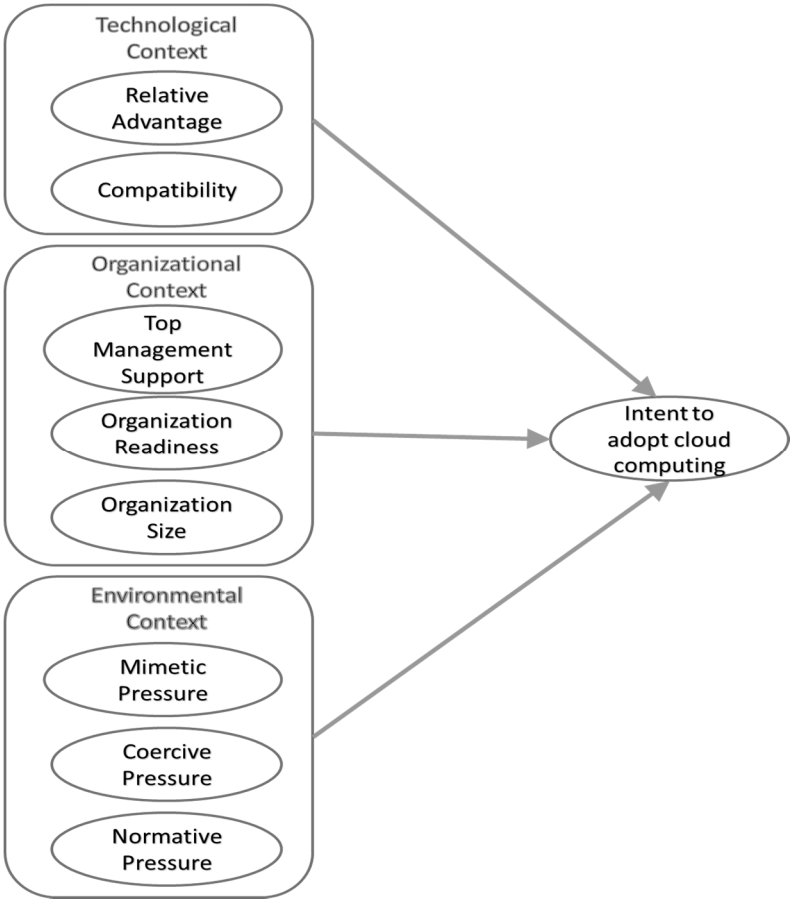

Figure 1. Research model for cloud computing adoption

Intention to adopt. In this study, I employed intent to adopt (interest in adopting) as the dependent variable, which what most of the researchers of IT adoption studies have

used as being considered a predictor of behavior (Arts, Frambach, & Bijmolt, 2011, Yoon, 2009). Behavioral intentions, the most influential predictors of behavior, are factors that predict the level of inclination of consumers to attempt to perform a behavior (Teo, 2012). Armitage and Conner (2001) (qtd. Teo, 2012) examined 185 empirical studies using the TPB and concluded that *intention* was the most influential predictor of behavior.

Relative advantage of cloud computing. A rising demand exists in computing usage for governmental, educational, and business purposes (Bojanova, Zhang, & Voas, 2013). Meanwhile, global markets and global competition have increased because of the global nature of the Internet. The mixture of the increasing computing usage, global competition and collaboration led to a corresponding need to take full advantage of the use of available resources while reducing costs (Gupta et al., 2013). To help IT managers, in adapting to the ever-changing business, needs, cloud computing is an emerging economy-of-scale that makes possible the commoditization of IT services (Alali & Yeh, 2012; Ryan, 2013). Cloud computing is a technique that delivers IT capabilities and services through a centralized provider, which holds and manages the physical computing resources, to an organization or individual over the Internet (Bittencourt et al., 2012; Bojanova et al., 2013). Cloud computing has a number of distinguishing characteristics such as being on-demand, ubiquitous, elastically scalable, able to be self-service, and features pay-per-use procurement of IT via the Internet (Bittencourt et al., 2012; Lin & Chen, 2012).

Relative advantage, often articulated in societal importance, economic value, and other useful features, is a measure of how motivated a decision-maker is to adopt a new technology on account of its supposed improvement over current technologies (Rogers, 2003; Venkatesh et al., 2012). Previous technology adoption studies indicated that optimistic opinions and attitudes by prospective adopters of innovations offered an incentive for the adoption of emerging technologies (Arts et al., 2011, Roger, 2003). Relative advantage, in the context of this study, was a function of improving quality, working easier, performing tasks quicker, increasing productivity, improving performance, and enhancing the effectiveness of the user of the technology. Therefore, it was reasonable to assume that IT decision makers might consider that cloud computing services would provide them with more strategic advantage than traditional IT services and that would impact their intent in adopting cloud computing, which led to the study's hypothesis 1: RLAD correlates with ADPT (H1a).

Compatibility of cloud computing. Compatibility identifies whether the latest innovation is consistent with current industry practice and values or not (Rogers, 2003). Compatibility, the second characteristic of the DOI theory, is a measure of the alignment of the new technology with the needs and values of the enterprise (Oliveira et al., 2014). According to Bose and Luo (2011), compatibility is a measure of the effectiveness of how well the technology fits the job that it intends to run, culture where it is going to work, and experiences and needs of future adopters. The less compatible an innovation is, the higher the uncertainty associated with the adoption process (Oliveira et al., 2014).

The terms referred to by compatibility in this study were infrastructures of the organization, business strategies, and current practices and policies. Compatibility also refers to how different is the behavior, work style, and work patterns required by cloud computing based services for the IT managers compared to the traditional behavior, work style, and work patterns using the traditional IT services and processes (Oliveira et al., 2014). Compatible technologies would save organizations money and time, from the adopters' perspective, as they would need to make minimal changes and adjustments to the existing systems and processes instead of deconstructing and replacing them if they would adopt an incompatible technology (Yoon & George, 2013). Improved compatibility between the requirements of the prospective adopters and the new technology could lead to a seamless and smooth integration with the business practices and functions (Bose & Luo, 2011). Therefore, it was reasonable to assume that a high level of compatibility of cloud computing, as perceived by IT decision makers, might influence their decision of adopting cloud computing, which led to the study's hypothesis 2: CMPT correlates with ADPT (H2a).

Top management support. The result of previous studies indicated that for the adoption of new technologies and innovations to be successful, top management of the company must provide their full commitment and support to the process to be successful (Hutchinson, Gilmore, & Reid, 2015; Lee, Shiue, & Chen, 2016; Low et al., 2011). In general, top managers are in charge of guiding the enterprise's technology leadership and strategy. Top managers typically support initiatives and get involved in making the decision of adopting new technologies (Bose & Luo, 2011). Usually, researchers evaluate

this variable by the level at which senior managers actively spearhead new initiatives and get involved in defining the role new technology will play within the organization (Hutchinson et al., 2015). Support of top management is one of the main drivers of competition (Oliveira et al., 2014). Therefore, it was reasonable to assume that a high level of top management support, as perceived by IT decision makers, might influence their decision of adopting cloud computing, which led to the study's hypothesis 3: TPMS correlates with ADPT (H3a).

Organizational size. The influence of organizational size on the acceptance of new technologies has gained significant consideration and been as a main factor in the success of the adoption of many technological innovations (Hameed et al., 2012; Hutchinson et al., 2015). One probable reason for the considerably constructive relationship between IT innovation adoption and organizational size is that, most likely, the larger the organization is, the more resources (e.g., technical, financial, and personnel) they have, and hence can assign greater resources to the adoption of new technology, and absorb more risk as well (Yoon & George, 2013).

Large corporations have been the early adopters of innovations, such as cloud computing, to gain greater economic value and competitive advantage (Alali & Yeh, 2012; Markus & Loebbecke, 2013; Misra & Mondal, 2011). Because of the many advantages cloud computing provides to small businesses, such as scalability, pay-per-use, and lower overhead cost, it was expected that small businesses with limited resources to adopt cloud computing (Sultan, 2011). Nevertheless, Powelson (2012) indicated that with the exception of limited cloud computing services such as hosted e-

mail accounts, small businesses have not been early adopters of cloud computing, which agrees with the assumption that organizational size has a significant impact on the adoption of cloud computing. Therefore, it was reasonable to assume that the size of the organization might influence the decision of adopting cloud computing, which led to the study's hypothesis 4: EMPL correlates with ADPT (H4a).

Organizational readiness. Organizational readiness refers to the ability of an organization to manage and invest in the adoption of cloud computing by having the proper technical IT management, resources, and expertise (Taxman, Henderson, Young, & Farrell, 2014; Yoon & George, 2013). Previous research shows that the successful adoption of a new technology relies heavily on the organization's preparation for the technology (Oliveira et al., 2014). For example, Tsai et al. (2013) claimed that organizational readiness, measured by the competencies of an organization to adopt shared systems with supply chain partners, was a significant determinant of the adoption of RFID. Tsai et al. (2013) also argued that organizations will not be able to successfully implement information sharing system unless they spend adequate organizational assets (e.g., funding and technical skills or developer and user time) first on motivation and then on sustaining of the implementation. Therefore, it was reasonable to assume that a high level of organizational readiness, as perceived by IT decision makers, might influence their decision of adopting cloud computing, which led to the study's hypothesis 5: ORRD correlates with ADPT (H5a).

Mimetic pressure—competitors. According to institutional theory, mimetic pressures are pressures that drive companies to replicate actions done by other companies

in their business domain (DiMaggio & Powell, 1983). Mimetic pressure is the pressure that comes in from the industry's competitors, and places top managers in a position to be concerned about being perceived, amongst their peers, as lagging behind their competitors or suffering financial losses (Mellat-Parast, 2015). The results of prior technology adoption studies show that such competitive pressures positively influence innovation adoptions (Cavusoglu, Cavusoglu, Son, & Benbasat, 2015; Zhu et al., 2013). For example, Yoon and George (2012) indicated in their research study that mimetic pressures and normative pressures exhibit the strongest effects on organizational intent to adopt virtual worlds. Nevertheless, Gholami, Sulaiman, Ramayah, and Molla (2013) argued that mimetic pressure did not influence the attitude toward Green IS adoption. IT decision makers could face mimetic pressure if their counterparts in other companies adopt cloud computing, and they observe it be advantageous and effective. Thus, IT decision makers will most likely do the same as they would recognize that cloud computing adoption is a strategic requirement to lead in their business. Therefore, it was reasonable to assume that a high level of mimetic pressure, as perceived by IT decision makers, might influence their decision of adopting cloud computing, which led to the study's hypothesis 6: MMPR correlates with ADPT (H6a).

Coercive pressure—customers. Institutional theory defines coercive pressure as the pressure that stakeholders of an organization (e.g., suppliers, customers and government agencies) exert on the organization to embrace new business processes and practices (DiMaggio & Powell, 1983). Coercive forces, according to Gauthier (2013), are the external pressures exercised by legal, government, or any other official organizations

to adopt the systems or structures that they favor. These pressures, usually mandated by health and safety regulations, legal requirements, and other regulations, may also come from contractual commitments (Mellat-Parast, 2015; Zorn et al., 2011). The presence of coercive forces in institutional theory indicates the influence of political, instead of technical, reasons for the decision of adopting new technologies and innovations (Gauthier, 2013). Prior studies (Cavusoglu et al., 2015; Gholami et al., 2013; Zhu et al., 2013) have indicated a strong influence of coercive pressures on the decision makers of technology adoption. For example, Zhu et al. (2013) studied the impact of coercive pressure on 396 Chinese manufacturing enterprises to pursue green supply chain management (GSCM) practices. Zhu et al. (2013) showed that coercive pressure had a positive impact and drove the manufacturer adoption of GSCM practices.

Organizations such as medical supplies and equipment, pharmaceutical, and healthcare organizations normally receive strong coercive pressures by the government to ensure compliance of their products with local laws and policies (Zorn et al., 2011). When businesses recognize that their key customers demand, anticipate, or drive them to adopt new technologies, they approve it in order to maintain the acceptability of their customers (Yoon & George, 2013). Therefore, it was reasonable to assume that a high level of coercive pressure, as perceived by IT decision makers, might influence their decision of adopting cloud computing, which led to the study's hypothesis 7: CRPR correlates with ADPT (H7a).

Normative pressure. Normative forces refer to the impact of general practices and norms promoted by professional standards and professional communities, such as

publications, conferences, and associations, on the organization (Zorn et al., 2011). Sources of normative pressure include trade partners, media, and business, and professional associations (Yoon & George). The goal of these forces is to describe the methods in which companies adapt to principles of professionalism and embrace techniques and systems identified to be legitimate by relevant professional groupings (Mellat-Parast, 2015).

For business leaders to succeed in such a fierce international competition, they need to be able to increase productivity, cut costs, and increase profitability (Misra & Mondal, 2011). For this reason, normative pressure compels executives to follow and line up their business practices to the industry standards. Because more businesses are embracing cloud computing, IT decision makers experience heavy normative pressure to adopt cloud computing to gain their companies a higher return on technology investment (Marston et al. 2011). For the previous reasons and others, it was reasonable to assume that a high level of normative pressure, as perceived by IT decision makers, might influence their decision of adopting cloud computing, which led to the study's hypothesis 8: NRPR correlates with ADPT (H8a).

Transition and Summary

The goals of Section 1 were to introduce the key issues surrounding the need for studying the relationship between the IT decision makers' interest in the adoption of cloud computing, and the technological, organizational, and environmental factors. Literature review and previous research studies indicated that many organizations evaluate cloud computing primarily from the viewpoint of cost and security, which alone

are not sufficient enough to make a decision regarding the adoption of cloud computing. To address this deficiency, I used Tornatzky and Fleischer's (1982) TOE framework, along with the DOI theory, and institutional theory, to examine the factors influencing cloud computing adoption.

As examining the RQs required examining the correlation between two different sets of variables, by statistically evaluating arithmetical data through noninterpretative measures, a quantitative method and a correlational design were the selected research method and design (Labaree, 2011). The goal of Section 2 is to provide a complete detail of the chosen methodology for the study. The section includes a review of the methods of data collection, data analysis, instruments that I used to collect data and examine the validity and dependability of the instruments. In addition, in Section 3, I present the research study findings and results, in addition to their application to professional practice and implication for social change.

Section 2: The Project

Section 2 outlines the methodology of the research study comprising the way I made the study and what events I completed. At the start of this section, there is a reiteration of the purpose statement to reinforce the reasons for the study and the expected accomplishments. This is followed by a discussion of my specific role as the researcher and the participants' roles, followed by a complete analysis of the selected research method, design, target population, sampling technique, data collection process, data analysis techniques, and the study's reliability and validity.

Purpose Statement

The purpose of this quantitative correlation study was to examine the relationship between the technological, organizational, and environmental factors, and decision makers' intent to adopt cloud computing. The independent variables were relative advantage, compatibility, organizational readiness, organizational size, support of top management, normative pressure, coercive pressure, and mimetic pressure. The dependent variable was the decision makers' intent to adopt cloud computing. The targeted population consisted of IT managers of U.S.-based companies. This study was designed to expand knowledge of cloud computing by providing an integrated stand on its adoption, and might also determine key factors that influence decision makers' intent in the adoption. The findings are intended for use in assisting IT managers in making informed decisions on the adoption of cloud computing and establish its value to reduce an overestimation of cloud capabilities.

Role of the Researcher

Rubin and Babbie (2016) theorized that a researcher does not actually have an active role in a quantitative study. According to these authors, participants in a precise quantitative study perform self-sufficiently of the researcher, as if the researcher was not there. In an ideal world, quantitative studies should be reproducible by other researchers and, if the same conditions exist, should produce similar outcomes.

In correlational studies such as this study, data are gathered and analyzed without any concerns of biases by the researcher or the participants (Labaree, 2011). The design of the study included a quantitative cross-sectional survey using a self-administered online survey. My role in the process of data collection was bounded to the following activities: (a) setting up and configuring a self-administered online survey instrument that satisfied the requirements of ethical disclosure and consent acknowledgement, and (b) collecting the anonymous survey responses for data analysis.

I have more than 25 years of experience in the software, IT, and consulting businesses. This experience augments my consciousness, sensitivity, and familiarity with many of the issues and challenges related to strategic and tactical IT revolutions and innovations, as well as the importance IT agility for business sustainability and continuity. A conscious effort was vigorously made to ensure objectivity and eliminate the possibility of researcher bias that could have affected the data collection and analysis activities.

Participants

The target population for this study included more than 30,000 IT managers and decision makers. The participants of the study were professionals who worked in the IT field and played a role in making the decision to adopt new technologies and innovations. IT decision makers included chief technology officers (CTOs), chief information officers (CIOs), IT VPs and directors, data center managers, network managers, and other IT operation and service leaders from various U.S. industries. The participants were anticipated to have sufficient knowledge of the evolving cloud computing technology and some interest in implementing the technology as stipulated in the assumptions section of the study. SurveyMonkey provided the survey participants that came from different industries in the United States through a service called SurveyMonkey Audience. SurveyMonkey is a market research service that collects and maintains contact information from the SurveyMonkey users. SurveyMonkey Audience is a service provided by SurveyMonkey that helps researchers reach a targeted audience for their surveys.

Using the participants' email contact information, SurveyMonkey issued an e-mail announcement to the IT leaders asking for their participation in the study. The study participants were provided with information about the purpose and scope of the study, in addition to, the opt-in admission to the online survey. SurveyMonkey also provided the participants with information about ethical compliance with the Walden University's internal review board (IRB) requirements, including an assurance of participant anonymity. These IT leaders came from a variety of U.S.-based organization sectors: (a)

the U.S. government, (b) utilities, (c) manufacturing, (d) healthcare, (e) education, (f) transportation, (g) services (e.g., financial, insurance, and retail), and (h) others (e.g., food services).

Research Method and Design

Information systems researchers, according to Venkatesh, Brown, and Bala (2013), have engaged with many different research methods that can be classified into two major categories of methods: qualitative and quantitative. The quantitative worldview, which I used for this study, is described as being *positivist* or *realist*, while the worldview supporting qualitative research is recognized as being *subjectivist* (Lewis, 2015; Muijs, 2010).

Realists believe that the main job of a research project is to expose an existing reality (Muijs, 2010). According to this worldview, the researcher should be separated from the research project and employ methods that make the most of objectivity to reduce the role of the researcher in the research study project (Tufford & Newman, 2012). Positivism is a form of realism that states that the world works as stated by permanent laws of cause and effect (Muijs, 2010). The role of positivist research is to test theories and either accept or reject them. By contrast, qualitative researchers are generally subjectivists; they adopt the human subjectivity role in the research process (Muijs, 2010). Subjectivists believe that reality is partly created by the researchers and their interpretations and do not believe in present objective reality that needs to be witnessed (Haegeman et al., 2013; Rubin & Babbie, 2016).

Method

I chose a quantitative methodology for this study over a qualitative method approach. Quantitative research is about verifying theories by collecting numerical data that can be analyzed using mathematical methods such as statistics. Quantitative research is a systematic, formal, and objective procedure where arithmetical data is used to gain knowledge regarding the world (Rubin & Babbie, 2016). Therefore, generalizability, numbers, objectivity, and deductiveness are classifications often related to quantitative research studies (Wahyuni, 2012).

According to Rubin and Babbie (2016), a quantitative method is a better tool to determine the relationship between two or more quantifiable variables than a qualitative method. A quantitative approach is the best method when the purpose of the research is to identify factors that impact the outcome or understand the best predictors of an outcome (Christensen, Johnson, & Turner, 2013). Quantitative research studies are typically deductive research studies; they test theories. Qualitative research studies are inductive research studies; they build theories. While quantitative research studies produce results that can be generalized, qualitative research studies produce results that are less susceptible to being generalized (Haegeman et al., 2013; Rubin & Babbie, 2016).

Quantitative methods are not the answer to every research study project, as it will fail to tackle different types of research (Christensen et al., 2013; Punch, 2013). The first case, where quantitative research fails, is when a problem needs to be explored in depth. Providing a wide range of information is where quantitative research is a terrific fit, but when the research study is to discover a concept or problem in depth, quantitative

methods turn out to be too shallow. Second, quantitative methods are not suitable for developing theories and hypotheses. Hypotheses may come from a review of the literature or theory and may as well be found by an exploratory qualitative research. Third, if the RQs are predominantly complex, a comprehensive qualitative study (such as a case study) is a better fit than a quantitative study. Finally, although quantitative methods are more suitable for examining cause and effect, qualitative methods are best for analyzing the importance of particular circumstances or events (Christensen et al., 2013; Rubin & Babbie, 2016).

While quantitative research depends on numerical data, analyzed statistically, qualitative research uses nonnumerical data. Qualitative research is an umbrella term encompassing a wide range of methods, such as interviews, case studies, ethnographic research, and discourse analysis, to name just some examples (Haegeman et al., 2013; Lapan et al., 2011). Qualitative research allows gaining insight into people's value systems, behaviors, attitudes, motivations, concerns, culture, lifestyles, and aspirations (Punch, 2013). A qualitative research concentrates on the importance of real-life events, not just the occurrence or the rate of the events (Myers, 2013; Punch, 2013). A quantitative design allows access to a larger number of participants, allowing a structural format, whereby quantifiable data are obtained and statistically analyzed (Christensen et al., 2013; Rubin & Babbie, 2016).

Research Design

I selected a quantitative method with a descriptive correlational design as the research method and design for the study. I employed the design to determine the

correlation between the technological, organizational, and environmental factors and IT decision makers' intent to adopt cloud computing. I used a cross-sectional survey, hosted by SurveyMonkey.com, to collect data related to the RQs from the survey participants, and used both inferential and descriptive statistics to examine the online survey data.

Quantifying relationships between variables is what quantitative research is all about (Hopkins, 2000). The researcher's target in quantitative research is to determine the correlation between one or more independent variable and the outcome or dependent variable in a sample. Quantitative research offers fewer design methods than qualitative research methods. According to Lewis (2015), there are at least five main designs in qualitative research methods: (a) ethnography, (b) grounded theory, (c) phenomenology, (d) narrative, and (e) case studies. In contrast, according to Muijs (2010), quantitative research comprises three methods: (a) nonexperimental, (b) quasi-experimental, and (c) experimental. Hopkins (2000) indicated that quantitative studies are of two types: descriptive and experimental.

Campbell and Stanley (1963) presented many different experimental and quasi-experimental design methods, whereas Christensen et al. (2013) presented two nonexperimental survey methods: longitudinal and cross-sectional. Also, Leedy and Ormrod (2005) gave three broad classifications of quantitative research: (a) descriptive, (b) experimental, and (c) causal-comparative. According to Hopkins (2000), the researcher measures things as they are, in a descriptive study, and makes no attempt to modify the behavior or conditions. By contrast, a researcher using an experimental design takes measurements, makes changes, and takes measurements for a second time to find

out whatever transpired. Descriptive studies are also known as observational studies as the researcher does not interfere but only observes the participants (Liang, Fulmer, Majerich, Clevenstine, & Howanski, 2012). Causal-comparative designs usually include the use of derived or pre-existing groups to discover dissimilarities among those groups on dependent variables (Liang et al., 2012). Commonly, researchers that use causal-comparative designs cannot experimentally manipulate the variables for ethical or practical matters (Liang et al., 2012).

Descriptive quantitative research, according to Leedy and Ormrod (2005), includes either discovering possible relationships among two or more phenomena or recognizing the characteristics of an observed phenomenon. In all cases, descriptive research tests a condition as-is and does not change or modify the condition under examination, nor it is envisioned to determine cause-and-effect associations. A *case* is a simple descriptive study, where the goal is to examine the information on one topic only. When more cases are involved in the study, a descriptive study is called *case series*. In a cross-sectional study, the researcher examines the variables of interest in a sample of topics once and then determines the correlations among them (Hopkins, 2000).

The quantitative cross-sectional survey design includes four components: (a) variables and theoretical hypotheses, (b) population sampling measures, (c) data collection method through a survey tool, and (d) data analysis and interpretation. The difference between a longitudinal survey design and a cross-sectional approach exists in the process of collecting data. The cross-sectional survey collects data at a point in time,

whereas the longitudinal survey collects data at different points over an extended period of time (Lebo & Weber, 2015).

There are two main ways to collect data in a quantitative survey: either by conducting interviews with the participants or via self-administered surveys (Schober & Conrad, 2015). The method of structured interviews is preferred if the researcher is looking for collecting other visible data in the process, or if the self-administered survey is not suitable for the type of participants used in the study (Schober & Conrad, 2015). A cross-sectional, self-administered, quantitative survey design approach is more suitable than a structured interview strategy in measuring the requisite sample size more efficiently, in a timely manner, and cost effectively (Bryman, 2015).

A correlational design approach allows collecting data out of a large number of members, who will meet specific credentials, offer a method of describing composite data, and permit for statistical inference on observations from a sample of the population (Vogt & Johnson, 2011). A cross-sectional survey is more appropriate than other quantitative research design methods when certain conditions are met: (a) examining correlations among two or more variables, (b) having an enormous amount of data, and (c) generalizing about the larger population. Even though a cross-sectional approach does not provide assistance in inferring causality, this design allows generalization of the results to the extended population of IT decision makers (Vogt & Johnson, 2011).

A literature review of the correlational design using a cross-section survey indicated that the design has been extensively used to investigate other hypotheses in similar research studies (Chebrolu, 2010; Ross, 2010; Tweel, 2012, Yoon, 2009; Zorn et

al., 2011). Ross (2010) used a correlational design to study the correlation between cost and security and the adoption of cloud computing. Chebrolu (2010) applied a similar method to discover the correlation between the IT organizations usefulness in relation to the strategic alignment with business and cloud adoption by them. Tweel (2012) also used the same methodology to study the correlation between the technological, organizational, and environmental factors and IT decision makers' intent in adopting cloud computing.

Population and Sampling

The participants of the study were professionals who worked in the IT field and played a role in making the decision of adopting new technologies and innovations in their respective companies. Decision makers included CTOs, CIOs, IT VPs and directors, data center managers, and network managers, in addition to other IT operations and services leaders from multiple U.S. industries. The sample set was IT managers who participated in SurveyMonkey surveys based on a database that SurveyMonkey maintains. From this sample frame, SurveyMonkey performed a simple random sample to produce the participants for this study based on the requirements of the study. To make sure the proper participants with the necessary responsibility and experience complete the survey, there was a screening question to verify these elements at the start of the survey.

Using G*Power 3.1 software, I conducted a power analysis to determine the appropriate sample size for the study. An apriori power analysis, assuming a medium effect size (f = .15), and a = .05, indicated a minimum sample size of 109 participants is required to achieve a power of .80. Increasing the sample size to 160 would have

increased power to .95. For this reason, I sought between 109 and 160 participants for the study. The actual number of participants of this study was 136 (Figure 2).

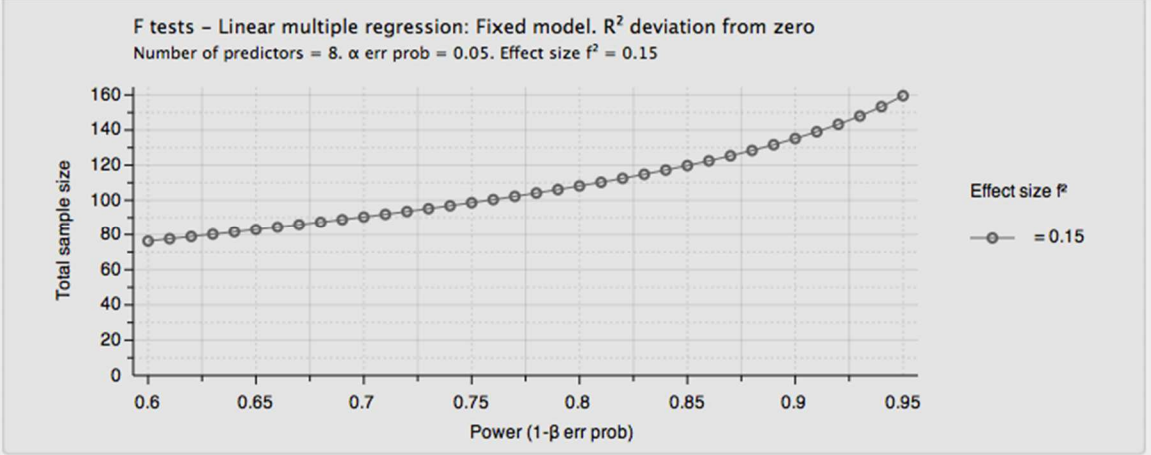

Figure 2. Power as a function of sample size.

Ethical Research

Ethical measures and practices ensured that the study followed approved research protocols and guidelines. The ethical measures included the following: (a) participant agreement and opt-out procedure, (b) declaration of incentives, (d) information protection practices, and (e) compliance with Walden University's IRB guidelines. The survey included a declaration revealing the study purpose and petition for participation in the study. SurveyMonkey e-mailed invitation statement that included a uniform resource locator (URL) link for the participants to take part in the research study survey, hosted by SurveyMonkey.com.

As a requirement to the online survey, the survey provided the participants with data concerning the study's purpose, scope, ethics, and confidentiality disclosure consent requirements, as well as participation qualifications. In compliance with Walden

University's IRB requirements, disclosure was provided to the participants concerning ethical information including participant anonymity surety. SurveyMonkey contact information was available for resolving any privacy or rights concerns or questions raised by the participants. In addition, contact information to a Walden University representative was available in case any participants had ethical concerns.

The study participants could print a copy of the ethics and confidentiality disclosure. All participants were instructed that at any time throughout the survey process they could stop the survey and exit out of the SurveyMonkey website by closing the Internet browser. If a participant considered any question on the survey to be too personal, he or she was instructed to skip the question.

The ethics and confidentiality disclosure statement specified that the incentives to participants were only the personal gratification of participation in the outcomes of the study with the opportunity to obtain a copy of the results of the study. The study did not include any other benefits or incentives to participants. I stored the collected data in a safe and confidential manner in a secure place, and will keep it there for at least 5 years, to protect the rights of the participants. There was no identification of the participants, companies, or other classifying information collected or saved within the survey data.

Data Collection

Instruments

A quantitative method with a correlational design using a cross-sectional survey was the methodology of the study. For the study, I utilized the Cloud Computing Adoption Survey survey instrument designed by Yoon (2009) and adapted by Tweel (2012) to

examine factors influencing the adoption of cloud computing. In addition, for the study, I used identical construct measurements without altering, adding, or removing any of the items. Tweel suggested and confirmed the suitability of adopting the validated survey instrument by Yoon (2009, as cited by Tweel, 2012). The constructs were RLAD, CMPT, EMPL, TPMS, ORRD, MMPR, NRPRs, CRPR, and ADPT, which I described in details below.

According to Tweel (2012), Yoon effectively verified, piloted, and refined the survey instrument for reliability and validity. Furthermore, Yoon completed confirmatory factor analysis (CFA) and partial least squares (PLS), as cited by many researchers (Hwang, Kettinger, & Yi, 2013; Li, He, & Zuo, 2013; Tweel, 2012; Yasin & Mohammad, 2012; Zhao et al., 2013). All measures taken by Yoon (2009) in the analyses of his study were adequate and sufficiently revealed the original theoretical constructs (Tweel, 2012). All measures were evaluated regarding internal consistency, convergent validity, and discriminant validity. All item loadings were significant at $p < .01$, and higher than the recommended satisfactory value of 0.6. The average variance extracted (AVE) of the satisfactory convergent validity (SVC) of all constructs had at least 0.50, which confirmed adequate convergent validity (Hwang et al., 2013; Li et al., 2013; Tweel, 2012; Yasin & Mohammad, 2012; Yoon, 2009; Zhao et al., 2013).

To assess the internal consistency of the constructs, Yoon (2009) employed Cronbach's alpha and composite reliability. These analyses indicated that all Cronbach's alpha and composite reliabilities surpassed the recommended lowest level of 0.70. Therefore, these results concluded that all constructs exhibited satisfactory internal

consistency. Examined for multi-co-linearity using variance inflation factors (VIF) statistics, Yoon (2009) detected no signs of substantial multicollinearity between the constructs.

The survey included closed-ended, 7-point Likert-type scale, inquiries demonstrating ordinal data values. I held the Likert ordinal scale as yielding interval data to prepare for the possibility of using parametric statistical techniques with these data. Yielding interval data means the intervals between each rating point are the same. In other words, the difference between a rating of 5 versus 4 is the same difference as between a 4 versus 3, 3 versus 2, and 2 versus 1 (Joshi, Kale, Chandel, & Pal, 2015; Van Bennekom, 2002). Scientists believe Likert scales with neutral points and responses in excess of five to be the interval-level response formats (Li, 2012). When the data of the Likert-type scale response include a normal distribution, and the distance between choices is meaningful, it is standard to consider Likert-type scales to be interval-level measures (Van Bennekom, 2002). Therefore, the independent and dependent variables of the study were considered to be gauged at an interval level of measurement (Azzopardi & Nash, 2013; Joshi et al., 2015).

The main objective of the survey was the measurement of the independent variables (i.e., RLAD, CMPT, ORRD, EMPL, TPMS, NRPRs, CRPR, and MMPR), and the dependent construct (i.e., ADPT). All the applied measurements to operationalize the variables of the study were adapted from validated measures (Tweel, 2012).

Operational Definitions of Variables

There were eight independent variables and one dependent variable in this study. The independent variables were grouped into three categories: technological, organizational, and environmental. The variables related to the technological group were RLAD and CMPT. The variables related to the organizational group were TPMS, ORRD, and EMPL. The variables related to the environmental group were NRPR, CRPR, and MMPR. The dependent variable was ADPT. The Likert ordinal scale was used as the yielding interval data (Van Bennekom, 2002). The variables were measured by adapting reliable and validated measurements (Tweel, 2012; Yoon, 2009).

Relative advantage (RLAD). Relative advantage has been established as a factor in the adoption of innovations and technologies (Rogers, 2003; Venkatesh et al., 2012). This construct measures the extent to which a new technology is more superior to its precursor (Arts et al., 2011). The measurement of this variable was in terms of the expected gains that were in the literature and trade publications of cloud computing. The evaluation of this variable was on a 7-point Likert-type scale of equal units, as ordinal data. Participants indicated the extent to which they 1 = strongly disagreed to 7 = strongly agreed with each of the following statements:

"Adopting cloud computing will do the following:

1. Increase the profitability of our organization,
2. Allow us to enter new businesses or markets,
3. Allow for reduced operational costs,
4. Allow better communication with our customers,

5. Require no up-front capital investment, and
6. Provide dynamic and high service availability."

Compatibility (CMPT). Compatibility is defined as whether the latest innovation is consistent with current industry practice and values. The evaluation of this variable was on a 7-point Likert-type scale of equal units, as ordinal data. Participants indicated the extent to which they 1 = strongly disagreed to 7 = strongly agreed with the following statements:

1. Cloud computing adoption is consistent with my organization's beliefs and values.
2. Attitudes toward cloud computing adoption in my organization are favorable.
3. Cloud computing adoption is compatible with my organization's IT infrastructure.
4. Cloud computing adoption is consistent with my organization's business strategy.

Top management support (TPMS). In general, top managers are in charge of guiding the enterprise's technology leadership and strategy. Top managers typically support initiatives and get involved in making the decision of adopting new technologies (Bose & Luo, 2011). Usually, this variable is evaluated by the level at which senior managers actively spearhead new initiatives and get involved in defining the role new technology will play within the organization (Hutchinson et al., 2015). The evaluation of this variable was on a 7-point Likert-type scale of equal units, as ordinal data. Participants indicated the extent to which they 1 = strongly disagreed to 7 = strongly agreed with the following statements:

1. Top management is interested in adopting cloud computing,
2. Top management considers cloud computing adoption important, and

3. Top management has shown support for cloud computing adoption.

Organizational size (EMPL). Prior studies indicate that organizational size has a positive impact on adopting innovations and new technologies. Large enterprises usually involve sufficient resources to supply innovations. In large enterprises, it is usually easier to use economies of scale for new technologies than small ones (Alali & Yeh, 2012; Markus & Loebbecke, 2013; Misra & Mondal, 2011; Prajogo, McDermott, & McDermott, 2013). The size of the workforce employed by the company commonly defines the size of the organization (Gong, Zhou, & Chang, 2013). The study captured organizational size on 1 to 7 scale. These data were interval scale that represented organizational sizes of 1-50, 51-100, 101-500, 501-1,000, 1,001-5,000, 5,001-10,000, and more than 10,000 employees.

Organizational readiness (ORRD). Organizational readiness refers to the ability of an organization to manage and invest in the adoption of cloud computing by having the technical IT resources and expertise (Taxman et al., 2014; Yoon & George, 2013). The evaluation of this variable was on a 7-point Likert-type scale of equal units, representing ordinal data. Participants rated the extent to which IT is considered significant in fulfilling organizational goals and the approach of their top managers to positioning of innovations in their enterprise. The measurement elements comprised the following:

1. Reduction of operational costs,
2. Productivity improvement,
3. Improved access to information,

4. Improved quality of decision-making,
5. Improved competitiveness,
6. Improved service to customers, and
7. Personnel reduction.

Mimetic pressure (MMPR). Mimetic pressure is the pressure that comes in from the industry's competitors that places top managers in a position to be concerned about being perceived, amongst their peers, as lagging behind their competitors or suffering financial losses (Cavusoglu et al., 2015; Mellat-Parast, 2015). The evaluation of this variable was on a 7-point Likert-type scale of equal units, representing ordinal data. Participants indicated the extent to which they 1 = strongly disagreed to 7 = strongly agreed with the following statements:

1. Many of our competitors are currently adopting cloud computing.
2. Many of our competitors will be adopting cloud computing in the near future.
3. Our key competitors are currently adopting cloud computing.
4. Our competitors that adopt cloud computing are benefiting greatly.
5. Our competitors that adopt cloud computing are perceived favorably by others in our industry.
6. Our competitors that adopt cloud computing are perceived favorably by their customers.

Coercive pressure (CRPR). Coercive pressure is the pressure put forth on managers of IT departments from other organizations in which they are dependent upon.

For example, such pressure can come from U.S. governmental mandates, financial reporting requirements, or contract law. Large businesses can apply the same kind of pressure their suppliers or subsidiaries (Zorn et al., 2011). The evaluation of this variable was on a 7-point Likert-type scale of equal units, representing ordinal data. Participants indicated the extent to which they 1 = strongly disagreed to 7 = strongly agreed with the following statements:

1. Customers that matter to us expect that we use cloud computing.
2. We may not retain our important customers without cloud computing.
3. Customers that are crucial to us encourage us to use cloud computing.

Normative pressure (NMPR). Normative pressure is the pressure put forth by professional and trade societies to fit industry best practices or standards (DiMaggio & Powell, 1983). The evaluation of this variable was on a 7-point Likert-type scale of equal units, representing ordinal data. Participants indicated the extent to which they 1 = strongly disagreed to 7 = strongly agreed with the following statements:

1. Many of our customers are currently adopting cloud computing.
2. Many of our customers will be adopting cloud computing.
3. Many of our suppliers are currently adopting cloud computing.
4. Many of our suppliers will be adopting cloud computing.
5. Large pressure is placed on our organization, by industry sources, to adopt cloud computing.
6. We actively participate in industry, trade, or professional associations that promote cloud computing.

7. We often receive information regarding cloud computing from sources outside of our organization.

IT managers' interest in adopting cloud computing (ADPT). This dependent variable referd to the IT manager's interest in adopting cloud computing. The evaluation of this variable was on a 7-point Likert-type scale of equal units, representing ordinal data. Participants indicated the extent to which they 1 = strongly disagreed to 7 = strongly agreed with the following statements:

1. My organization intends to adopt cloud computing.
2. It is likely that my organizations will take some steps to adopt cloud computing.
3. It is likely that my organization will adopt cloud computing within the next 12 months.

Data Collection Technique

Survey research has gone through a number of evolutions considering the process of data collection (Weigold, Weigold, & Russell, 2013). The rapid development of technology and inexpensive computing produced new atmospheres for conducting survey research such as online surveys (Weigold et al., 2013). The use of the online surveys increased because of the struggle the researchers have in finding affordable ways of obtaining input from their constituents (Vaske, 2011). The advantages of the online surveys include the following: (a) economy, (b) convenience, (c) simplicity, and (d) speed. The disadvantages include the following: (a) the unavailability of a sampling frame, and (b) the use of filters in most of e-mail program that can flag unsolicited e-

mails as junk mail or gray- or blacklisting (Sue & Ritter, 2012). Additionally, too many e-mail surveys could be received by the same recipients from different researchers because of the advantages of the online surveys mentioned before (Sue & Ritter, 2012). Researchers must maintain the strictest rigor and avoid open access convenience surveys when implementing Internet surveys (Vaske, 2011).

The main method of gathering the quantitative data for the study was a survey, validated and adopted by Yoon (2009) and Tweel (2012) (Appendix A). The survey was web-based, hosted by SurveyMonkey.com, and accessed through a URL that SurveyMonkey.com e-mailed to all the participants. The introductory page of the survey presented the informed consent form. The participants needed to answer a qualifying question about whether they have IT knowledge and play a key role in influencing technology adoption decisions. After the participants confirmed that they meet these criteria, they needed to specify their position with the company, at what region their organization is located, primary industry to which their organization belongs, and what year was their organization founded. The participants then completed the survey.

Before collecting the data, I received the IRB approval letter, number 05-19-15-0338390 with an expiration date of May 18, 2016, from the Walden university. In accordance with Walden University's IRB standards, the ethical consensus, comprising the surety of participant anonymity, were confirmed as essential actions in participating in the online survey. My contact information was made available to participants to address any study issues, concerns, and questions. The participants of the survey had the option to cancel the survey at any step throughout the process. In addition, the

participants were provided the option to skip any question they choose not to or do not feel comfortable to answer. The participants were able to review their responses and change them before submission.

Data Organization Techniques

After the online survey data collection period was over, I copied the survey data from the SurveyMonkey.com website for preservation and analysis. I encoded the survey data and saved it to an external hard drive. The data were transferred into an Excel spreadsheet before integrating it into the Windows-based SPSS program to convert into an SPSS native file format. In addition, SPSS log research design files were retained as an audit trail of the computed variables, data transformations, and other statistical manipulations. The SPSS process log files and datasets will be stored, for at least 5 years, with the research data documents and records to support research integrity and security purposes.

Data Analysis Technique

The main RQ guiding the study was the following: To what extent, if any, do RLAD, CMPT, TPMS, EMPL, ORRD, MMPR, CRPR, and NRPR influence ADPT? The following specific RQs lead the study in examining the relationship between each of the independent variables composing the technological, organizational, and environmental factors and the dependent variable, the decision makers' intent to adopt cloud computing technology:

RQ1. To what extent, if any, does RLAD relate to ADPT?

RQ2. To what extent, if any, does CMPT relate to ADPT?

RQ3. To what extent, if any, does TPMS relate to ADPT?

RQ4. To what extent, if any, does EMPL relate to ADPT?

RQ5. To what extent, if any, does ORRD relate to ADPT?

RQ6. To what extent, if any, does MMPR relate to ADPT?

RQ7. To what extent, if any, does CRPR relate to ADPT?

RQ8. To what extent, if any, does NRPR relate to ADPT?

The following null and alternative hypotheses were constructed based on the RQs by the study:

Hypothesis 1

$H1_0$: No correlation exists between RLAD and ADPT.

H1a: RLAD correlates with ADPT.

Hypothesis 2

$H2_0$: No correlation exists between CMPT and ADPT.

H2a: CMPT correlates with ADPT.

Hypothesis 3

$H3_0$: No correlation exists between TPMS and ADPT.

H3a: TPMS correlates with ADPT.

Hypothesis 4

$H4_0$: No correlation exists between EMPL and ADPT.

H4a: EMPL correlates with ADPT.

Hypothesis 5

$H5_0$: No correlation exists between ORRD and ADPT.

H5a: ORRD correlates with ADPT.

Hypothesis 6

$H6_0$: No correlation exists between MMPR and ADPT.

H6a: MMPR correlates with ADPT.

Hypothesis 7

$H7_0$: No correlation exists between CRPR and ADPT.

H7a: CRPR correlates with ADPT.

Hypothesis 8

$H8_0$: No correlation exists between NRPR and ADPT.

H8a: NRPR correlates with ADPT.

The data analysis methods included inferential and descriptive statistics through the SPSS. The data analysis began with screening the data to include identification of the missing data, variables, outliers, normality, linearity, multicollinearity, homoscedasticity, and independence of residuals. Demographic information such as organizational age and industry type, parametric statistics, and descriptive statistics like standard deviation, mean, and frequency were employed to demonstrate and evaluate the representativeness of the sample and the characteristics of the survey data. These items of the survey statistics were tabulated, summarized, and reported.

I used a regression analysis as an appropriate approach to examining the data, because the goal of the study was to evaluate the correlation between the projected factors and IT decision makers' intent in adopting cloud computing (Palacios-Marqués et al., 2015). Many previous innovation and new technology adoption research studies that

examined research design including interval data employed regression analysis methods (Chebrolu, 2010; Opala, 2012; Ross, 2010; Zorn et al., 2011). Regression analysis aids researchers in defining the relationship among various independent variables and dependent variables (Azzopardi & Nash, 2013; Vogt & Johnson, 2011).

I examined the collected data to confirm the underlying assumptions, normality, linearity, independence of residuals, and lack of multicollinearity. For example, I used scatter plots to help in testing for normality and linearity before performing multiple regression analysis. Scatter plots represented each independent variable against each dependent variable. I also conducted an exploratory data analysis based on the inspection of kurtosis values and skewness values to find out if all variables were normally distributed, as suggested in Savickas and Porfeli (2012). Furthermore, I examined multicollinearity through a correlation matrix, to examine the strong suit of correlation among the independent variables of the study. I used SPSS to create regression diagnostics, which helped to identify multicollinearity and any other problems related to the data that might alter the investigation.

Variance of inflation factor (VIF) was also a valuable pointer to any multicollinearity (correlation between predictors) issues. The variance inflation factor (VIF) is one of the most popular conventional collinearity diagnostic techniques, and is mainly aimed at ordinary or weighted least squares regressions. VIF measures how much the variance of the estimated regression coefficient is inflated as compared to when the predictor variable is not linearly related. VIF is used to describe how much

multicollinearity exists in a regression analysis (García, García, López Martín, & Salmerón, 2015).

To examine the hypotheses of the study, I used methods such as data provision, examinations of relationships using multiple linear regression, analysis of variance, correlation analysis, and assessment of reliability of measures. I used Pearson correlation and beta coefficients to examine if a correlation existed among the independent and dependent variables. These processes helped to assess the extent to which a change in one of the independent variables could wholly or partially describe a change in the dependent variable. By producing scatter plots for each dependent construct variable against each independent construct variable, I was able to test for normality and linearity before performing multiple regression analysis.

Reliability and Validity

Reliability and validity were essential components of the study and were tested and confirmed all the way through the study, beginning with the initial study design and closing with the study findings and future suggestions. Mitigating reliability and validity concerns were essential to the survey and the overall study integrity. The reliability and validity of the survey instrument have already been mentioned in the Data Collection section, under Instrument Integrity subsection, and in the Data Analysis Technique section, under the Reliability and Validity Confirmation subsection. The next section will be a recap of reliability and validity of the survey instrument as well as the internal and external validity of the study.

Reliability

Reliability is the accuracy level to which an instrument yields consistent and stable outcomes (Rubin & Babbie, 2016). Types of reliability tests include test-retest reliability, parallel forms reliability, inter-rater reliability, and internal consistency reliability (Rubin & Babbie, 2016). According to Riff, Lacy, and Fico (2014), reliability of a quantitative research method is the assertion of the internal consistency of the test administration and item measures. I adopted the survey instrument of the study from Tweel (2012) and Yoon (2009). According to Tweel (2012) Tweel (2012) and Yoon (2009). According to Tweel (2012), Yoon effectively verified, piloted, and refined the survey instrument for reliability and validity. Additionally, Yoon completed confirmatory factor analysis (CFA) and partial least squares (PLS) analysis. All measures taken by Yoon in the analyses of his study were adequate and sufficiently revealed the original theoretical constructs (as cited in Tweel, 2012). All measures were evaluated regarding internal consistency, convergent validity, and discriminant validity. All item loadings were significant at $p < .01$, and higher than the recommended satisfactory value of 0.6. The AVE of the SVC of all constructs had at least 0.50, which confirmed adequate convergent validity (Hwang et al., 2013; Li et al., 2013; Tweel, 2012; Yasin & Mohammad, 2012; Yoon, 2009; Zhao et al., 2013).

To assess the internal consistency of the constructs, Yoon (2009) employed Cronbach's alpha and composite reliability techniques. Cronbach's alpha, by Cronbach (1951) is one of the most-popular estimators of the reliability of tests and scales (Garg & Tai, 2013; Hwang et al., 2013). The purpose of applying Cronbach's alpha is to gauge the

reliability of a survey instrument by determining the average correlation or internal consistency of its items (Peterson & Kim, 2013). Yoon's analysis indicated that the values from both Cronbach's alpha and composite reliabilities analyses surpassed the recommended lowest level of 0.70. This demonstrated that all constructs showed acceptable internal consistency. Examined for multicollinearity using VIF statistics, Yoon detected no signs of significant multicollinearity between the constructs (as cited in Tweel, 2012).

The online web-based survey data collection warrants reliability by alleviating the inconsistency accompanying the in-person survey administration. After collecting the data, I performed Cronbach's alpha reliability analysis, as a preliminary stage of the data analysis, to make sure the survey had sustained reliability. Furthermore, I tested the RQ hypotheses using SPSS's regression techniques, as described in the section of Hypotheses Testing Analysis Techniques.

Validity

According to Riff et al. (2014), validity is the assertion of deriving meaningful inferences from the scores of the instrument. Internal issues, construct adequacy, statistical conclusions, and external factors are cases of threats to the validity of quantitative research methods. Internal validity includes assuring the consistency of the relationships among the dependent and independent variables. The goals of external validity are to confirm the generalizability, beyond the contexts of the study setting, of the study variable relationships (Onwuegbuzie et al., 2009).

The validity of the constructs is determined by the competence of the definitions of the study measures and variables. The statistical conclusion validity is established, based on statistical power and underlying assumptions, by the precision of inferences extracted from the data (Riff et al., 2014). There are many threats related to the experimental design of the quantitative research method that include maturation, history, diffusion of treatment, mortality, treatment, setting, interactions, and selection. These threats are not valid for the nonexperimental cross-sectional survey design approach (Campbell & Stanley, 1963).

The potential internal validity threat to the study included the regression and selection issues. Regression validity issues emerge from extreme participant scores, while selection validity issues come from predisposition participants. To address regression validity concerns, I conducted iterative statistical functions and descriptive statistics, as previously mentioned in the Data Analysis Technique section. In addition, I conducted the factor analysis function in SPSS, as stated in the section of Data Analysis Techniques, to confirm the validity of the construct of the survey (Riff et al. (2014).

Transition and Summary

Section 2 described the mechanics of the research study by describing the project's processes and how the study was managed. The objective of this quantitative, correlational, nonexperimental study was to examine the relationship between the technological, organizational, and environmental factors and the IT managers' intent to adopt cloud computing. My main role in this research study was to focus on monitoring

and supporting the reliability and validity of the study throughout the entire process of the study.

The participants of the study were people who worked in the IT field and played a role in making the decision of adopting new technologies and innovations. Decision makers such as CTOs, CIOs, IT VPs and directors, data center managers, and network managers, in addition to other IT operations and services leaders from various U.S. industries, were the target participants for this study. The basis for a quantitative method selection was described in the context of the research problem and questions. Moreover, the appropriateness of using self-administered web-based cross-sectional survey design was confirmed.

Tweel's (2012) cloud computing adoption survey served as the research instrument, which was thoroughly described including operational definition for the eight independent and one dependent measurement constructs. The measures, used to protect the data and safeguard its integrity comprising encrypting permanent archives, were revealed. The reliability and validity of the survey and the overall study were confirmed through research design practices, statistical techniques, and additional quality assurance procedures.

The data analysis interpretation and the findings of the study, comprising the conclusions related to each RQs, are shown and linked to applications for professional practices in Section 3. The composed data in the context of the theoretical framework lead the findings and conclusions of the study. Section 3 also provides the findings'

applications to the IT industry, social implications, and recommendations for action and future research.

Section 3: Application to Professional Practice and Implications for Change

This section includes a brief summary of the findings, an overview of the study, a presentation of findings, an exploration of how the findings are related to the professional practice, and a discussion of how the results may impact an IT manager's decision-making process to adopt cloud computing. This section also includes recommendations for action and further research, and ends with a personal reflection on this study with some closing remarks.

Introduction

The purpose of this quantitative correlational study was to examine the relationship between the technological, organizational, and environmental factors, and IT decision makers' intent to adopt cloud computing. This study included the use of inferential statistics (Pearson's coefficient and multiple linear regression analysis) to test for the existence of a relationship between the independent variables of RLAD, CMPT, ORRD, EMPL, TPMS, NRPR, CRPR, and MMPR, and the dependent variable of ADPT.

To ensure that the results were statistically valid, the *p*-value for this test was set to 0.05. The Pearson's coefficient analysis showed a significant correlation between the IT decision makers' intent to adopt cloud computing (ADPT) and all of the independent variables except for the organizational size (EMPL). There were significant correlations between the IT decision makers' intent to adopt cloud computing (ADPT) and relative advantage (RLAD), $r(136) = .768$, $p < .01$, compatibility (CMPT), $r(136) = .754$, $p < .01$, organizational readiness (ORRD), $r(136) = .659$, $p < .01$, top management support (TPMS), $r(136) = .805$, $p < .01$, mimetic pressure (MMPR), $r(136) = .719$, $p < .01$,

coercive pressure (CRPR), $r(136) = .616$, $p < .01$, normative pressure (NRPR), $r(136) = .757$, $p < .01$. There was no significant correlation between the IT decision makers' intent to adopt cloud computing (ADPT) and organizational size (EMPL), $r(136) = .074$, $p = .389$.

The regression model was a statistically significant predictor of the IT decision makers' intent to adopt cloud computing [(ADPT), $F(8, 127) = 44.626$, $p < .001$, $R^2 = .738$, adjusted $R^2 = .721$] and accounted for approximately 74% of the variance in the IT decision makers' intent to adopt cloud computing (ADPT). The IT decision makers' intent to adopt cloud computing (ADPT) was primarily predicted by top management support (TMSP) ($\beta = .408$, $p < .01$), and normative pressure (NRPR) ($\beta = .408$, $p = .037$), and secondarily predicted by relative advantage (RLAD) ($\beta = .163$, $p = .150$), and organization readiness (ORRD) ($\beta = .143$, $p = .117$). Compatibility (CMPT) ($\beta = .057$, $p = .565$), mimetic pressure (MMPR) ($\beta = .049$, $p = .647$, and coercive pressure (CRPR) ($\beta = -.036$, $p = .646$) were not significant predictors of the IT decision makers' intent to adopt cloud computing (ADPT).

Presentation of the Findings

In an attempt to improve the incomplete understanding IT decision makers have about the factors affecting the adoption of cloud computing, this study focused on answering the primary research question: To what extent, if any, do RLAD, CMPT, TPMS, EMPL, ORRD, MMPR, CRPR, and NRPR influence ADPT? The hypotheses for this study were the following:

$H1_0$: No correlation exists between RLAD and ADPT.

Hl_a: RLAD correlates with ADPT.

$H2_0$: No correlation exists between CMPT and ADPT.

$H2_a$: CMPT correlates with ADPT.

$H3_0$: No correlation exists between TPMS and ADPT.

$H3_a$: TPMS correlates with ADPT.

$H4_0$: No correlation exists between EMPL and ADPT.

$H4_a$: EMPL correlates with ADPT.

$H5_0$: No correlation exists between ORRD and ADPT.

$H5_a$: ORRD correlates with ADPT.

$H6_0$: No correlation exists between MMPR and ADPT.

$H6_a$: MMPR correlates with ADPT.

$H7_0$: No correlation exists between CRPR and ADPT.

$H7_a$: CRPR correlates with ADPT.

$H8_0$: No correlation exists between NRPR and ADPT.

$H8_a$: NRPR correlates with ADPT.

An online survey (Appendix A) generated the data used to test for a relationship between the variables of RLAD, CMPT, ORRD, EMPL, TPMS, MMPR, CRPR, NRPR, and ADPT. Tests included Pearson's coefficient and multiple linear regression analysis. Data collection occurred over a 2-week period, and 158 IT decision makers from different industries in the United States have participated in the survey. Out of the 158 participants, 22 participants answered "No" to this prompt designed to determine if they were qualified: "For the purpose of this survey, the participant is expected to have IT

knowledge and play a critical role in influencing technology adoption decisions. Please indicate whether you meet this profile." The 136 participants who answered "Yes" completed the survey with no missing values. The number of 136 surveys exceeded the required number of 109 participants as determined by the G*Power 3.1 software analysis discussed in section2.

Participant Characteristics

The participants' characteristics are summarized in Table 1. The demographic indicates that:

- 53 (39%) had senior manager or manager titles,
- 46 (33.8%) had senior director or director titles,
- 27 (19.9%) of the participants had Senior VP or VP titles, and
- 10 (7.4%) had other titles.

Table 1

Participants' Demographics by Title

Title	*n*	%
Sr.VP / VP	27	19.9
Sr. Director / Director	46	33.8
Sr. Manager / Manager	53	39.0
Other	10	7.4
Total	136	100.0

Table 2 shows the U.S. regions in which participants were located. There were:

- 45 (33.1%) from the Northeast,
- 30 (22.1%) participants from the Midwest,
- 29 (21.3%) from the West region,
- 23 (16.9%) from the Southeast, and
- 9 (6.6%) from the Southwest.

Table 2

Participants' Demographics by USA Region

Region	*n*	%
Midwest	30	22.1
Northeast	45	33.1
Southeast	23	16.9
Southwest	9	6.6
West	29	21.3
Total	136	100.0

Table 3 shows the industry that the participants were employed in at the time of the study. There were:

- 35 (25.7%) from other industries,
- 34 (25%) from the manufacturing industry,
- 19 (14%) from the services industry,

- 16 (11.8%) from the financial industry,
- 8 (5.9%) from the healthcare industry,
- 7 (5.1%) from the government,
- 3 (2.2%) from the transportation industry, and
- 14 (10.3%) participants from the education industry.

Table 3

Participants' Demographics by Industry Segment

Industry	*n*	%
Education	14	10.3
Financial	16	11.8
Government	7	5.1
Healthcare	8	5.9
Manufacturing	34	25.0
Services (e.g. Financial, Insurance, Retail)	19	14.0
Transportation	3	2.2
Other	35	25.7
Total	136	100.0

Table 4 shows the size of the organizations where the participants worked at the time of the study, in terms of the number of employees:

- 30 (22.1%) had between 1,001-5,000,
- 28 (20.6%) had between 101-500 employees,
- 27 (19.9%) had between 501-1,000 employees,
- 15 (11%) had between 1-50 employees,
- 12 (8.8%) had between 51-100 employees,
- 13 (9.6%) had more than 10,000 employees, and
- 11 (8.1%) had between 5,001-10,000.

Table 4

Participants' Demographics by Organization Size

Size	*n*	%
1-50	15	11.0
51-100	12	8.8
101-500	28	20.6
501-1,000	27	19.9
1,001-5,000	30	22.1
5,001-10,000	11	8.1
>10,000	13	9.6
Total	136	100.0

The analysis of the characteristics of participants indicated that the government, healthcare, and transportation industries were underrepresented in the sample of the

participants. Also large organizations that have over 5,000 employees were underrepresented compared to the other organization sizes.

Survey Instrument Characteristics

A validated online survey instrument (Appendix A) was used to request responses to four demographic questions and 39 items based on a Likert-type scale. Ranging from 1 (Strongly disagreed) to 7 (Strongly agreed), the 7-point Likert scale was used to measure each item. Table 5 indicates the code used for each for analyses and discussions through this chapter.

Table 5

Survey Constructs and Coding Schema

Code	Item Measure
Relative Advantage	
RLAD1	Adopting cloud computing will allow better communication with our customers
RLAD2	Adopting cloud computing will increase the profitability of our organization
RLAD3	Adopting cloud computing will require no up-front capital Investment
RLAD4	Adopting cloud computing will allow us to enter new businesses or markets
RLAD5	Adopting cloud computing will provide dynamic and high service availability
Compatibility	
CMPT1	Cloud computing adoption is consistent with my organization's beliefs and values
CMPT2	The attitude towards cloud computing adoption in my organization is favorable
CMPT3	Cloud computing adoption is compatible with my organization's information technology (IT) infrastructure
CMPT4	Cloud computing adoption is consistent with my organization's business strategy
Top Management Support	
TPMS1	Top management in my organization is interested to adopt cloud computing
TPMS2	Top management in my organization considers cloud computing adoption important
TPMS3	Top management in my organization has shown support for cloud computing adoption
Organizational size	
EMPL	Approximately how many employees and supplemental workers does your organization have in total?
Organizational Readiness	
ORRD1	The attitude of your top management toward the deployment of information technology in your organization is
ORRD2	To what extent is information technology important for the fulfillment of: Reduction of Operational Costs

Code	Item Measure
ORRD3	To what extent is information technology important for the fulfillment of: Productivity Improvement
ORRD4	To what extent is information technology important for the fulfillment of: Improved Access to Information
ORRD5	To what extent is information technology important for the fulfillment of: Improved Quality of Decision Making
ORRD6	To what extent is information technology important for the fulfillment of: Improved Competitiveness
ORRD7	To what extent is information technology important for the fulfillment of: Improved Service to Customers
ORRD8	To what extent is information technology important for the fulfillment of: Personnel Reduction
Mimetic Pressure	
MMPR1	Many of our competitors are currently adopting cloud Computing
MMPR2	Many of our competitors will be adopting cloud computing in the near future
MMPR3	Our significant competitors are currently adopting cloud computing
MMPR4	Our competitors that have adopted cloud computing are benefiting greatly
MMPR5	Our competitors that have adopted cloud computing are perceived favorably by others in our industry
Coercive Pressure	
CRPR1	Customers that matter to us expect us to use cloud computing
CRPR2	We may not retain our important customers without adopting cloud computing
CRPR3	Customers that are crucial to us encourage us to use cloud Computing
Normative Pressure	
NRPR1	Industry sources (e.g., industry or trade associations) are pressuring our organization to adopt cloud computing
NRPR2	We participate actively in industry, trade, or professional associations that promote cloud world adoption
NRPR3	We often receive information regarding cloud computing from sources outside our organization
NRPR4	Many of our customers are currently adopting cloud Computing
NRPR5	Many of our customers will be adopting cloud computing
NRPR6	Many of our suppliers are currently adopting cloud computing
NRPR7	Many of our suppliers will be adopting cloud computing

Code	Item Measure
IT Decision Makers' Intent to Adopt Cloud Computing	
ADPT1	My organization intends to adopt cloud computing
ADPT2	It is likely that my organization will take steps to adopt cloud computing in the future
ADPT3	It is likely that my organization will adopt cloud computing within the next 12 months

Tests of assumptions and reliability. Although the instrument used for this study has been validated and used in previous studies (Tweel, 2012; Yoon, 2009), it was necessary to confirm the satisfactory level of validity and reliability of the survey before testing for relationships (Chiu, Hsueh, Hsieh, & Hsieh, 2014). Cronbach's alpha measurements were used to assess the reliability of each construct. The purpose of using Cronbach's alpha is to provide a measure of the internal consistency of a test or scale; to show that a group of measured indicators have only one underlying construct. The adopted threshold for the Cronbach's alpha value was 0.7 (Chiu et al., 2014). The Cronbach's alpha for the entire data set was .904 (.924 based on standardized items). This test indicated a satisfactory reliability as the coefficient value surpassed the standard cutoff value of 0.7 set by Kuijpers, Ark, and Croon (2013) and Wang, Hu, and Hu (2013).

Descriptive Statistics

The maximum and minimum values, means, and standard deviations of the dependent variable (ADPT) and the independent variables (RLAD, CMPT, ORRD, EMPL, TPMS, MMPR, CRPR, and NRPR) were calculated (Appendix B). The inferential statistical analyses (Pearson product-moment correlation coefficient analysis

and multiple linear regression analysis) applied in this study presume that the survey data fit the normal probability distribution. The skewness and kurtosis values of the data were examined and analyzed to find out if the variables used in this study were normally distributed. The cutoff values for skewness and kurtosis to assume normality are ±3 and ±10 respectively (Blanca, Arnau, López-Montiel, Bono, & Bendayan, 2015; Garner, Moses, & Waajid, 2013).

After analyzing the normality test results, the values of each variable's skewness and kurtosis test result came within the advised measures of normality. The skewness test values went from -2.376 to 1.72, and the kurtosis test values went from -2.231 to 7.248 for all variables except EMPL. Consequently, the collected survey data were considered normal and there was no need for transformation. Only one variable showed a slight skewness or kurtosis, which was the EMPL variable (EMPL skewness = -2.376, kurtosis = 7.248), representing only a minor deviation from normality. Even if the variable was neither accurately measured nor normally distributed, because of the large size of the data set the means will still follow the normal distribution, and the effect of this minor deviation from normality will be minimal (Motulsky, 2015; Tweel, 2012).

The parametric tests and nearly all of the inferential statistics are robust to an insignificant deviation from the assumption of normality. An insignificant violation would be permitted and the efficiency of the survey is certain when the size of the sample is larger than 100 participants (Barker & Shaw, 2015; Horn et al., 2012). Consequently, for this study with its large sample size of 136 participants, Pearson's correlation

coefficient analysis and multiple linear regression analysis may perhaps bear minor deviations from the assumption of normality and would be considered appropriate.

Besides inspecting the skewness and kurtosis values of the data, I explored the histograms, Q-Q plots, and P-P plots for all variables. The results for the histograms, the Q-Q plots, and P-P plots seemed to match each other. The histograms were bell-shaped, and the data did appear linear in the Q-Q and P-P plots indicating a normal distribution. Based on the analysis of the skewness and kurtosis values and the exploration of the histograms, Q-Q plots, and P-P plots, the assumption of normality of the data set was met.

Inferential Statistics

To examine the relationship between the technological, organizational, environmental factors, and IT decision makers' intent to use cloud computing, the survey data were examined using inferential statistics Pearson product-moment correlation coefficient analysis and multiple linear regression analysis. Table 6 shows the Pearson's correlation coefficient (r) value and the significance value (p) between each independent variable and the dependent variable. The Pearson's coefficient values were positive and ranged from .074 to .805. The highest correlation value was between the IT decision makers' intent to adopt cloud computing (ADPT) and top management support (TPMS) $r(136) = .805$, $p < .01$, and the lowest correlation value was between IT decision makers' intent to adopt cloud computing and organizational size $r(136) = .074$, $p = .389$.

Table 6

Pearson's Correlations between Dependent and Independent Variables

IT decision makers' intent to adopt Cloud Computing	Pearson's Correlation *r*	Significance *p*
RLAD (relative advantage)	.768**	.000
CMPT (compatibility)	.754**	.000
TPMS (top management support)	.805**	.000
EMPL (organizational size)	.074	.389
ORRD (organizational readiness)	.659**	.000
MMPR (mimetic pressure)	.719**	.000
CRPR (coercive pressure)	.616**	.000
NRPR (normative pressure)	.757**	.000

** Correlation is significant at the 0.01 level

Table 7 shows the multiple linear regression analysis results. The prediction model was statistically significant, $F(8, 127) = 44.626$, $p < .001$, and accounted for approximately 74% of the variance cloud adoption ($R^2 = .738$, adjusted $R^2 = .721$). The R^2 of .74 showed that four major variables defined 74% of the variance in the IT decision makers' intent to adopt cloud computing. Cloud adoption was primarily predicted by top management support, normative pressure, relative advantage and organization readiness.

The prediction model is ADPT = .408(TMPS) + .210 (NRPR) + .163 (RLAD) + .143 (ORRD) + .057 (CMPT) + .049 (MMPR) + .033 (EMPL) -.036(CRPR) + .005.

The results of the multiple linear regression analysis revealed that top management support, normative pressure, relative advantage, and organizational readiness were the utmost statistically significant variables that positively impact the IT decision makers' intent to adopt cloud computing. The values of the independent variables' VIFs were assessed to validate the assumption of absence of multi-collinearity. Table 7 shows the calculated VIF values that ranged from 1.03 to 5.59, which is below the common VIF threshold of 10. Therefore, the assumption of absence of multi-collinearity was met (Dormann et al., 2013, García et al., 2015).

Next is an analysis of the practical and statistical significance of the results of the Pearson's correlation coefficient analysis and multiple linear regression analysis, structured by the research subquestions and their corresponding hypotheses.

RQ1 and its corresponding null hypothesis. RQl asked, "To what extent, if any, does RLAD relate to ADPT?" Hl_0 was "No correlation exists between RLAD and ADPT."

The analysis of the data, as described below, indicated that there was a significant relationship between RLAD and ADPT. Therefore, the null hypothesis of the first RQ of this study was rejected.

Table 7

*Results from Multiple Regression Analysis (*N=*136)*

	Unstandardized Coefficients		Standardized Coefficients			
Variable	B	*SE*	Beta	T	Sig.	VIF
(Constant)	.005	.388		.012	.990	
RLAD (Relative Advantage)	.163	.113	.156	1.450	.150	5.587
CMPT (Compatibility)	.057	.099	.055	.576	.565	4.489
TPMS (Top Management Support)	.408	.078	.425	5.255	.000	3.166
EMPL (Organizational size)	.033	.032	.048	1.035	.303	1.031
ORRD (Organizational Readiness)	.143	.090	.108	1.580	.117	2.280
MMPR (Mimetic Pressure)	.049	.107	.045	.458	.647	4.711
CRPR (Coercive Pressure)	-.036	.077	-.041	-.461	.646	3.875
NRPR (Normative Pressure)	.210	.100	.201	2.106	.037	4.398

a. Dependent Variable: ADPT
Note. $R^2 = .738$, Adjusted $R^2 = 0.721$, $F(8, 127) = 44.626$, $p < .001$, Durbin-Watson = 2.206

The independent variable RLAD, representing relative advantage, was constructed in terms of items RLAD1 through RLAD5 that measure different features of relative advantage, as shown in Table 5. The value of RLAD was the mean rating of IT decision makers' response to five Likert-type survey items, RLAD1 through RLAD5. The null hypothesis was tested using Pearson's correlation coefficient test. The analysis of the results from Table 6 and Table 7 indicated that there was a significant relationship between RLAD and ADPT, $r(136) = .768$, $p < .01$. Therefore, the null hypothesis of the first research question of this study was rejected. Additionally, the outcomes of the multiple regression analysis, $\beta = .156$, $t(127) = 1.45$, $p = .15$, showed that RLAD was a significant provider to the variance in ADPT. In the context of cloud computing adoption, this suggested that relative advantage has some practical impact on the IT decision makers in the United States to adopt cloud computing.

RQ2 and its corresponding null hypothesis. RQ2 asked, "To what extent, if any, does CMPT relate to ADPT?" H20 was "No correlation exists between CMPT and ADPT."

The analysis of the data, as described below, indicated that there was a significant relationship between CMPT and ADPT. Therefore, the null hypothesis of the second RQ of this study was rejected.

The independent variable CMPT, representing compatibility, was constructed in terms of items CMPT1 through CMPT4 that measure different features of compatibility between the organization's IT environment and cloud computing, as shown in Table 5. The value of CMPT was the mean rating of IT decision makers' response to four Likert-

type survey items, CMPT1 through CMPT4. The null hypothesis was tested using Pearson's correlation coefficient test. The analysis of the results from Table 6 and Table 7 indicated that there was a significant relationship between CMPT and ADPT, $r(136) = .754$, $p < .01$. Therefore, the null hypothesis of the second RQ of this study was rejected. While the Pearson's coefficient test indicated a statistically significant correlation, the outcomes of the multiple regression analysis, $\beta = .055$, $t(127) = .576$, $p = .565$, showed that CMPT was not a significant provider to the variance in ADPT. In the context of cloud computing adoption, this suggested that compatibility has some, but not major, practical impact on the IT decision makers in the United States to adopt cloud computing.

RQ3 and its corresponding null hypothesis. RQ3 asked, "To what extent, if any, does TPMS relate to ADPT?" H30 was "No correlation exists between TPMS and ADPT."

The analysis of the data, as described below, indicated that there was a significant relationship between TPMS and ADPT. Therefore, the null hypothesis of the third RQ of this study was rejected.

The independent variable TPMS, representing top management support, was constructed in terms of items TPMS1 through TPMS3 that measure different features of top management support of adopting cloud computing, as shown in Table 5. The value of TPMS was the mean rating of IT decision makers' response to three Likert-type survey items, TPMS1 through TPMS3. The null hypothesis was tested using Pearson's correlation coefficient test. The analysis of the results from Table 6 and Table 7 indicated that there was a significant relationship between TPMS and ADPT, $r(136) = .805$, $p <$

.01. Therefore, the null hypothesis of the third RQ of this study was rejected. Additionally, the results of the multiple regression analysis, $\beta = .425$, $t(127) = 5.255$, $p < .01$, showed that TPMS was a significant provider to the variance in ADPT. In the context of cloud computing adoption, this suggested that top management support has a major practical impact on the IT decision makers in the United States to adopt cloud computing.

RQ4 and its corresponding null hypothesis. RQ4 asked, "To what extent, if any, does EMPL relate to ADPT?" H40 was "No correlation exists between EMPL and ADPT."

The analysis of the data, as described below, indicated that there was not a significant relationship between EMPL and ADPT. Therefore, the null hypothesis of the fourth RQ of this study was not rejected.

The independent variable EMPL, representing organizational size, was measured by workforce size as a number of employees, as shown in Table 5. The null hypothesis was tested using Pearson's correlation coefficient test. The analysis of the results from Table 6 and Table 7 indicated that there was not a significant relationship between EMPL and ADPT, $r(136) = .074$, $p = .389$. Therefore, the null hypothesis of the fourth RQ was not rejected. Additionally, the results of the multiple regression analysis, $\beta = .408$, $t(128) = 1.035$, $p = .303$, showed that EMPL was not a significant provider to the variance in ADPT. In the context of cloud computing adoption, this suggested that organizational size has no applied impact on the IT decision makers in the United States to adopt cloud computing.

RQ5 and its corresponding null hypothesis. RQ5 asked, "To what extent, if any, does ORRD relate to ADPT?" H50 was "No correlation exists between ORRD and ADPT."

The analysis of the data, as described below, indicated that there was a significant relationship between ORRD and ADPT. Therefore, the null hypothesis of the fifth RQ of this study was rejected.

The independent variable ORRD, representing organizational readiness, was constructed in terms of items ORRD1 through ORRD8 that measure different features of organizational readiness to adopt cloud computing, as shown in Table 5. The value of ORRD was the mean rating of IT decision makers' response to eight Likert-type survey items, ORRD1 through ORRD8. The null hypothesis was tested using Pearson's correlation coefficient test. The analysis of the results from Table 6 and Table 7 indicated that there was a significant relationship between ORRD and ADPT, $r(136) = .659$, $p < .01$. Therefore, the null hypothesis of the fifth RQ of this study was rejected. Additionally, the results of the multiple regression analysis, $\beta = .108$, $t(127) = .158$, $p = .117$, showed that ORRD was a provider to the variance in ADPT. In the context of cloud computing adoption, this suggested that organizational readiness has some practical impact on the IT decision makers in the United States to adopt cloud computing.

RQ6 and its corresponding null hypothesis. RQ6 asked, "To what extent, if any, does MMPR relate to ADPT?" H60 was "No correlation exists between MMPR and ADPT."

The analysis of the data, as described below, indicated that there was a significant relationship between MMPR and ADPT. Therefore, the null hypothesis of the sixth RQ of this study was rejected.

The independent variable MMPR, representing mimetic pressure, was constructed in terms of items MMPR1 through MMPR6 that measure different features of mimetic pressure applied on the organization to adopt cloud computing, as shown in Table 5. The value of MMPR was the mean rating of IT decision makers' response to six Likert-type survey items, MMPR1 through MMPR6. The analysis of the results from Table 6 and Table 7 indicated that there was a significant relationship between MMPR and ADPT, $r(136) = .719$, $p < .01$. Therefore, the null hypothesis of the sixth RQ of this study was rejected. Additionally, the results of the multiple regression analysis, $\beta = .045$, $t(127) = .458$, $p = .647$, showed that MMPR was not a significant provider to the variance in ADPT. In the context of cloud computing adoption, this suggested that mimetic pressure has some practical impact on the IT decision makers in the United States to adopt cloud computing.

RQ7 and its corresponding null hypothesis. RQ7 asked, "To what extent, if any, does CRPR relate to ADPT?" H70 was "No correlation exists between CRPR and ADPT."

The analysis of the data, as described below, indicated that there was a significant relationship between CRPR and ADPT. Therefore, the null hypothesis of the seventh RQ of this study was rejected.

The independent variable CRPR, representing coercive pressure, was constructed in terms of items CRPR1 through CRPR3 that measure different features coercive pressure applied on the organization to adopt cloud computing, as shown in Table 5. The value of CRPR was the mean rating of IT decision makers' response to three Likert-type survey items, CRPR1 through CRPR3. The analysis of the results from Table 6 and Table 7 indicated that there was a significant relationship between CRPR and ADPT, $r(136) = .616$, $p < .01$. Therefore, the null hypothesis of the seventh question of this research study was rejected. Additionally, the results of the multiple regression analysis, $\beta = -.041$, $t(127) = -.461$, $p = .646$, showed that CRPR was not a significant provider to the variance in ADPT. In the context of cloud computing adoption, this suggested that coercive pressure has some practical but negative impact on the IT decision makers in the United States to adopt cloud computing.

RQ8 and its corresponding null hypothesis. RQ8 asked, "To what extent, if any, does NRPR relate to ADPT?" H80 was "No correlation exists between NRPR and ADPT."

The analysis of the data, as described below, indicated that there was a significant relationship between NRPR and ADPT. Therefore, the null hypothesis of the eighth RQ of this study was rejected.

The independent variable NRPR, representing normative pressure, was constructed in terms of items NRPR1 through NRPR7 that measure different features normative pressure applied on the organization to adopt cloud computing, as shown in Table 5. The value of NRPR was the mean rating of IT decision makers' response to

seven Likert-type survey items, NRPR1 through NRPR7. The analysis of the results from Table 6 and Table 7 indicated that there was a significant relationship between NRPR and ADPT, $r(136) = .757$, $p < .01$. Therefore, the null hypothesis of the eighth question of this research study was rejected. Additionally, the results of the multiple regression analysis, $\beta = .201$, $t(127) = 2.106$, $p = .037$, showed that NRPR was a significant source of the variance in ADPT. In the context of cloud computing adoption, this suggested that normative pressure has a major impact on the IT decision makers in the United States to adopt cloud computing.

Analysis Summary

The purpose of this quantitative correlational study was to examine the relationship between the technological, organizational, environmental factors, and IT decision makers' intent to adopt cloud computing. The inferential statistics analysis outcomes were evaluated according the grounded theoretical framework of the study; cloud computing and technology adoption theories. The results were then contrasted and compared with other peer-reviewed studies from the literature review.

The findings of the study demonstrated significant relationships between several factors and the IT decision makers' intent to adopt cloud computing. All of the independent variables, except the EMPL variable, had significant correlations to and predictors of IT decision makers' intent to adopt cloud computing. The study's theoretical framework, as discussed in the literature review, pointed to a relationship between the dependent variable (ADPT) and the independent variables (RLAD, CMPT, TPMS, ORRD, EMPL, MMPR, CRPR, and NRPRs). Three groups of factors were

identified, as the theoretical framework, that impact the IT decision makers' intent to adopt cloud computing. The three identified groups were technological, organizational, and environmental contexts.

Technological context. Based on the DOI, the technological context comprised two factors that could potentially have an impact on the IT decision makers' intent to adopt cloud computing. The two factors were relative advantage and compatibility. Prior research, as mentioned in Section 1, showed positive associations between the adoption of new technologies and the two factors (Archibald & Clark, 2014; Arts et al., 2011; Bose & Luo, 2011; Gerpott, 2011; Islam, 2014; Lee et al., 2011; Wu, 2011; Yoon & George, 2013; Yunus, 2014).

The findings of the study, in agreement with previous studies, showed a positive and statistically significant relationship between these two independent variables and the dependent variable. Therefore, when relative advantage and compatibility increased, the IT decision makers' intent to adopt cloud computing increased. This positive relationship between relative advantage and compatibility (hypotheses 1 and 2), and the intention to adopt cloud computing was consistent with prior studies discussed in the literature review of new technology adoption theories. The study results also revealed that relative advantage had a stronger correlation with, or a higher impact on, the IT decision makers' intent to adopt cloud computing than compatibility. Nevertheless, the implications of the two factors indicated that the IT decision makers require and seek validation of the expected benefits from implementing the use of cloud computing prior to their

consideration of adopting the technology, especially in a down market or tight budgetary environment.

Organizational context. Organizational context comprised organizational size, top management support, and organizational readiness. Prior studies, as mentioned in Section 1, advocated that the three factors might positively impact the decision making process of adopting new technologies in IT organizations (Aboelmaged, 2014; George & Yoon, 2013; Lin, 2014; Low et al., 2011; Oliveira et al., 2014; Palacios-Marqués et al., 2015; Pan & Jang, 2008; Shirish & Teo, 2010; Tsou & Hsu, 2015; Venkatesh et al., 2012). Between the three factors, top management support (Hypothesis 3) and organizational readiness (Hypothesis 5) had significant relationships with the IT decision makers' intent to adopt cloud computing. Top management support, in particular, has been associated to the adoption of new technologies in IT organizations by numerous research studies (Lin, 2014; Low et al., 2011; Taxman et al. 2014; Tsou & Hsu, 2015; Tweel, 2012; Yigitbasioglu, 2015; Yoon, 2009).

The study results indicated that top management support had the strongest relationship to the IT decision makers' intent to adopt cloud computing. This outcome presented that the support of the c-level management of the organization, such as CEOs, CTOs, CIOs, chief operating officers (COOs), and chief financial officers (CFOs), is crucial and has a huge impact in shaping cloud computing adoption plans and results. Yigitbasioglu (2015) described the importance of top management support in adopting new IT innovations. According to Yigitbasioglu (2015), top management, through their leadership character, (a) make certain that adequate and necessary means are allotted to

new IT initiatives and innovations, and (b) perform as change agents by inspiring their teams.

Another factor in the organizational context of this study is organizational readiness. The analysis results indicated that organizational readiness had a positive relationship to IT the decision makers' intent to adopt cloud computing. The strength of the organizational readiness and top management support revealed their relative importance to IT the decision makers' intent to adopt cloud computing. The correlation coefficient factor of top management support was .805, which made it a dominant factor compared to that of organizational readiness of .659. This suggested that the availability of technical resources and know-how, along with encouraging outlooks from top management, is essential in adopting cloud computing. The positive relationship between organizational readiness and IT decision makers' intent to adopt cloud computing showed that adoption of new technologies or innovation is not always driven by a top-down approach. Meaning, although the support of top management is important in the adoption of new technologies, the availability of technical resources and know-how in the team is as important as well.

Although top management support and organizational readiness were statistically significant factors that positively relate to IT the decision makers' intent to adopt cloud computing, that was not the case with organizational size (Hypothesis 4). The analysis of the data showed that organizational size was not a key factor and a significant predictor of cloud computing adoption. This finding is inconsistent with a number of research studies that have suggested the importance of organizational size as a factor in

technology adoptions as discussed in Section 1. While the finding is opposing to several prior research studies, it is not exceptional. A few technology adoption studies indicated a similar finding to this study (Alshamaila, Papagiannidis, & Li, 2013; Tweel, 2012; Yoon, 2009). The reason for this finding could be that small, medium, and large size companies are interested in cloud computing for different reasons. The economies of scale, may be what makes large organizations interested in cloud computing, while low upfront investment costs and pay per use is what makes small and midsize enterprises (SMEs) interested in cloud computing.

Environmental context. Environmental context in this study comprised coercive pressures (pressures that come from customers), mimetic pressures (pressures that come from competitors), and normative pressures (pressures that come from trade associations). As discussed in Section 1, several prior studies have suggested that these factors have been found to be significant determinants in influencing IT decision makers' intent in adopting new technologies (Jan et al., 2012; Messerschmidt & Hinz, 2013; Tsai et al., 2013; Zheng et al., 2013; Zorn et al., 2011). The analysis of the data suggested that these pressures were significant factors of IT decision makers' intent to adopt cloud computing. This was consistent with the outcomes of Tweel (2012) and Yoon (2009), who have suggested that environmental context factors positively influence IT decision makers' intent to adopt cloud computing.

The Pearson's correlation coefficient values of the three environmental factors indicated equal significant strengths. The analysis of the regression test values, nevertheless, indicated that mimetic and coercive pressures appeared to have a minor

impact on IT decision makers' intent to adopt cloud computing while normative pressure was a significant predictor. In other words, IT decision makers do not make their decision in adopting cloud computing primarily because off the pressure applied by their customers (coercive pressure), or competitors (mimetic pressure). On the other hand, IT managers are influenced by their industry, trade, or professional associations that promote cloud world adoption. According to Yigitbasioglu (2015), when a new technology such cloud computing is offered, normative pressures becomes visible. Followers of an organizational field such as consultants, suppliers, customers, and governments often evaluate and promote new technologies and inventions. A number of countries promote the adoption of cloud computing by their governments. The government in Australia, for example, published cloud implementation initiative in 2012 (Australian Government, 2012), which supported and recommended the adoption of cloud computing throughout the governmental institutions. Similarly, IT companies and consulting firms such as IBM, Amazon, HP, Salesforce, and many others have been constantly promoting cloud computing through user conferences, sales show events and consulting engagements. These types of activities form the normative pressure and are most likely affect the IT decision makers' intent to adopt cloud computing.

In conclusion, the findings of this study indicated that out of the technological, organizational, and environmental factors incorporated in this study, top management support, normative pressure, and relative advantage had the strongest relationships with IT decision makers' intent to adopt cloud computing.

Applications to Professional Practice

The purpose of this study was to understand the impact of the technological, organizational, and environmental factors on the IT manager's decision process of adopting cloud computing. The study offers suggestions to the professional practice, from providers to consumers, involved in the adoption of cloud computing. This study went beyond what previous studies had concentrated on, which included topics such as privacy and security analysis, cost effectiveness, and reliability. There are three important reasons in trying to analyze and understand the impact the technological, organizational, and environmental factors have on IT decision makers' intent to adopt cloud computing. The three reasons have to do with the three groups involved in the adoption of cloud computing who are cloud computing provider, IT managers and decision makers, and new technologies and cloud computing adoption researchers.

For the first group, the providers of cloud computing could use the results of this study to design different sales and marketing strategies to attract businesses that are not so motivated in adopting the technology (Fan et al., 2015; Ranjan et al., 2015). Therefore, the cloud service providers, through understanding the results of this study, could increase the level of cloud computing adoption. For the second group, the results of this study could help IT managers in designing the evaluation process and criteria of adopting cloud computing in order to meet the information management and computing needs of their organizations. Therefore, for IT decision makers who are interested in adopting cloud computing, understanding the factors studies in this study should help them making timely and more effective decisions. For the third group, the results of this study could

facilitate further research in studying other factors that were not covered in this study or study the same factors but on IT managers that work for organizations outside of the United States. The following discussion is regarding the findings and implications related to each factor analyzed in this study and its related RQ.

Relative Advantage

The study revealed a significant relationship between relative advantage and IT decision makers' intent to adopt cloud computing. The IT managers who participated in this study regarded cloud computing as a superior technology that could provide value to their organizations. The values of adopting cloud computing were in the areas of increasing profitability, communicating better with customers, reducing operational costs, lowering upfront capital investment, and increasing service availability. Cloud computing service providers should be able to use this feedback to design their marketing strategies that highlight the benefits gained by organizations that have already adopted cloud computing. Therefore, cloud service providers need to present to potential adapters the relative advantage that could help add value to their organizations, such as the level of contribution cloud computing could provide in reducing operational costs, increasing profitability, enhancing effectiveness, and performance of the organizational. Presenting these values and relative advantages should support the cloud service provider's marketing activities to promote their services.

Compatibility

The study indicated a statistically significant relationship between compatibility and IT decision makers' intent to adopt cloud computing. The IT managers who

participated in this study recognized the adoption of the cloud as a good match for their organization's beliefs and values, IT infrastructure, business strategy, and prior experience. Using this feedback, cloud services providers could look for ways to make their offers fit in and match their potential customer's existing IT practices, infrastructure, and policies. An additional benefit from this feedback could be that services providers should have their product and program managers play a part in the integration and migration efforts at their customers. This might provide the cloud service providers with a wealth of information and rich experiences to create better strategies and processes for implementing their services at potential customers.

Top management support. The study revealed a statistically significant relationship between top management support and IT decision makers' intent to adopt cloud computing. This study and prior studies from the literature review (Lin, 2014; Low et al., 2011; Taxman et al. 2014; Tsou & HSU, 2015; Tweel, 2012; Yigitbasioglu, 2015; Yoon, 2009) made a clear connection and revealed the impact that encouraging and constructive outlook from top management may have on IT leaders' interest and managerial actions to adopt cloud computing. Using these results, cloud services providers should make certain that the top management, such as CEO, CFO, CIO, CTO, and COO, of their potential customers are in favor with adopting cloud computing. Cloud service providers need to establish and cultivate close contacts with the top management inside the different business units of their potential customers. The buy-in from top management should be the goal of founding and nurturing these relationships, and should

concentrate on gaining their trust through understanding their operation and business needs.

Given the influence of top management support on the adoption of cloud computing decision-making process, and the number of cloud services and providers in the market, it is recommended that top management to be extremely cautious about the types of applications to be moved to the cloud considering the cloud's performance and security issues and concerns. Researchers, on the other hand, could use these results to investigate other top management behaviors and or roles that could have different effects in different situations and impacts on the decision making process of adopting cloud computing by the IT managers.

Organizational Size

The literature review has shown that organizations with bigger size usually have more flexibility in their resources, and hence can allocate more resources (e.g., technical, financial, and human resources) to the implementation of new IT innovations. Although larger companies have (a) bigger needs, (b) additional resources, (c) know-how, (d) expertise, and (e) additional capabilities compared to smaller companies, the results of this study did not reveal any significant relationship between organizational size and IT decision makers' intent to adopt cloud computing. This result suggested that IT managers from both large and small companies are intended to adopt cloud computing but for different reasons. One important implication of this finding is for the cloud services providers to have different marketing strategies for different organizational sizes. For example, the economies of scale may be what makes large organizations interested in

cloud computing, while low upfront investment costs and pay-per-use are what makes SMEs interested in cloud computing. Therefore, the marketing strategies for each organizational size need to be different. Another benefit of this result is for the researchers to be able to study, in more depth, the benefits that attract different organizational sizes to adopt cloud computing.

Organizational Readiness

The study revealed a statistically significant relationship between organizational readiness and IT decision makers' intent to adopt cloud computing. This suggested that the availability of technical resources and know-how increases the ability of the organization to evaluate new technologies such as cloud computing and ultimately adopt it. This finding is important for both of the IT managers and cloud services providers. For IT managers; this finding encourages IT managers to provide enough training courses, and facilitate the attendance of technical conferences and presentations for their employees in order for them to be able to evaluate and make recommendations on the adoption of new technologies. For the cloud services providers; this finding encourages them to provide more information, conferences, road shows, demos and presentations, and specs and data sheets for their potential customers to help in increasing their know-how and technical knowledge and skills.

Mimetic Pressure-Competitors

The study revealed a statistically significant relationship between mimetic pressure and IT decision makers' intent to adopt cloud computing. This finding suggests that IT managers do not just rely on their technical expertise to make a technical

evaluation of new technologies, but also evaluate the business environment their organizations are in. In other words, IT managers might embrace cloud computing not just because of its potential benefits and advantages to the organization, but also to match the technology the competition is using. Cloud services providers should make use of this pressure and advertise the success stories by their customers hence other potential customers within the same industry sector could be encouraged to adopt cloud computing.

Coercive Pressure-Customers

The study revealed a statistically significant relationship between coercive pressure and IT decision makers' intent to adopt cloud computing. The regression analysis indicated a negative influence of coercive pressure on the adoption of cloud computing. This might propose that IT decision makers do not certainly sacrifice compatibility and advantage of cloud computing for adapting to pressures coming from the external customers. It appears that IT managers are more determined to variable degrees to the requirements to be competitive than to be legitimate and meet the demands of customers, suppliers, and government regulatory bodies of which they are members. This finding suggests that cloud services providers need to understand the landscape of the atmosphere inside which the IT managers function and how that would impact their intent to adopt cloud computing, and adjust their marketing strategies accordingly.

Normative pressure. The study revealed a statistically significant relationship between normative pressure and IT decision makers' intent to adopt cloud computing. The finding suggests that IT decision makers might be impacted by influences from

professional associations, trading partners, publications and, conferences. Therefore, cloud services providers need to work closely with analysts from technology research organizations such as Gartner, IDC, and Forrester to constantly endorse the benefits of cloud computing.

Implications for Social Change

This study provided a more comprehensive investigation of IT decision makers' intent to adopt cloud computing by evaluating environmental factors combined with organizational and technological factors. This study has implications for organizations, IT managers and decision makers, and cloud computing services providers. For organizations, this study revealed the impact of the organizational isomorphism, which proposes that companies embrace cloud computing if their competitors have already adopted them.

For IT managers, the results of the study indicated the factors that impact IT managers' interest in adopting cloud computing. The findings suggested that IT decision makers need to pay significant attention to their organization's readiness to adopt cloud computing before they commit to such an action. If organizations intend to adopt cloud computing, they must ensure that they have sufficient capability and know-how to do so successfully. Additionally, IT decision makers need to consider institutional factors in their decisions of adopting cloud computing so that to avoid lagging behind their peers in the organizations' industry. For instance, IT decision makers should investigate whether the level of cloud computing adoption by competitors surges, and whether it is advantageous and successful. Nevertheless, IT decision makers need to make certain that

their organizations have sufficient capability and know-how for the adoption of cloud computing to be successful. Also, top managements need to be aware that their attitude and support toward the adoption of cloud computing has a huge impact on the IT decision makers' intent to adopt the technology.

For cloud computing providers, their marketing strategies should present the relative advantage of adopting cloud computing that could help add value to their potential customers. Such as, the level of contribution cloud computing could provide in reducing operational costs, increasing profitability, enhancing effectiveness, and performance of the organizational. Cloud services providers should have their product and program managers play a part in the integration and migration efforts at their customers. Additionally, cloud service providers need to establish and cultivate close relationships with the top management inside the different business units of their potential customers.

Recommendations for Action

The recommendations for action offered in this study were established using a rational response to the study findings' implications for the professional business practice. The empirical evidence of this study showed that nontechnical (such as organizational) factors impact the IT decision makers' and managers' interest in adopting cloud computing. The research and marketing efforts on innovative technologies, such as cloud computing, are dedicated virtually entirely on the technical competences of the technology. Nevertheless, though technical concerns of the competency of cloud computing are essential, it is just as important as how adopting and integrating cloud

computing fits the organization's culture, structure, and strategic goals. Cloud computing addresses these objectives by empowering organizations to make available necessary organizational computing resources by having the option to arrange computational necessities and transfer some of these necessities to be run *in the cloud*.

Similarly, the findings of this study indicated that cloud services providers need to satisfy entirely their customers' requirements for an alternative computing environment for the customer to adopt cloud computing. To do that, the cloud services providers need to employ and position the adoption factors examined in this study, including winning the top management support of the potential customer. Winning the customer's top management support necessitates a multifaceted and collaborative engagement between the cloud services provider and the customer and not just merely providing a catalog of products or services with a pricing sheet. This collaborative effort should include a proactive role of the cloud services provider's product and project managers in the integration and migration efforts at their customers.

Recommendations for Further Research

There are several areas that researchers of future studies can examine to improve further our consideration of the organizational adoption of cloud computing. These areas include: (1) extending the geographic boundary of the research to multiple regions outside of the United States, (2) researching and analyzing other technological, organizational, and environmental factors, (3) studying further the impact of the size of the organization on IT managers' decisions of adopting cloud computing and on what applications and services, (4) addressing further the impact of top management support

and classify any other roles or behaviors by top management that could impact the IT decision-making process of adopting cloud computing, (5) concentrating on a specific industry (education, financial, healthcare, manufacturing, transportation, and others), (6) conducting case studies on organizations that have adopted cloud computing successfully, (7) addressing the security concerns of cloud computing to institute standards for securing the IPs of the adopting organizations, (8) using a qualitative method to achieve comprehensive knowledge of additional variables that impact the adoption of cloud computing.

First, this study was limited to U.S.-based companies; however, researchers of future studies can extend the geographic boundary of the research to multiple regions outside of the United States. Employing a sample with a more diversified population and bigger size, for instance, a global population, can help studying the differences between adoption cultures, varied by the countries of the adopting organizations. Studying cloud computing adoption data from multiple countries may be advantageous in defining whether the results from this study were consistent outside of the United States.

Second, there are other technological, organizational, and environmental factors that researchers of future studies can research and analyze. For example, the impacts of direct measures of financial and market competition characteristics on IT decision makers' intent to adopt cloud computing. Also, the effects of the legal, cultural, and export control laws (ECLs) in cross-country research. ECLs include the International Traffic in Arms Regulations (ITAR) in the United States, Export Control Act (EAR) in

the United Kingdom, and other similar laws around the world, which represent legal issues surrounding international data transmission and storage.

Third, all the independent variables included in this study had significant relationships with of the adoption of cloud computing except for the organizational size. Researchers of future studies can examine if the size of the organization influences IT managers' decisions on what applications and services, such as email and data storage, can be moved to the cloud.

Fourth, researchers of future studies can address further the impact of top management support and classify any other roles or behaviors by top management that could impact the IT decision-making process of adopting cloud computing. Also, researchers of future studies can identify and analyze the factors that impact the level of support provided by the top management.

Fifth, researchers of future studies can concentrate on a specific industry (education, financial, healthcare, manufacturing, transportation, and others). Similarly, researchers of future studies could search specific business size, such as small business, start-up, medium size business, or large size businesses.

Sixth, researchers of future studies can conduct case studies on organizations that have adopted cloud computing successfully. For example, a case study might evaluate the decision making and adoption processes, and the achieved benefits of moving an enterprise resource planning services, or an email application, or any other mission critical applications from on-premise to the cloud. These studies can be beneficial and

provide references and test cases to other organizations that are interested in adopting cloud computing.

Seventh, as discussed in the literature review, cloud computing has a number of distinguishing characteristics that include (a) being on-demand, (b) being ubiquitous, (c) being elastically scalable, (d) including self-service, and (e) having pay-per-use features. Nevertheless, privacy and security issues related to cloud computing are of major concern to organizations and cause a significant hindrance. Employing robust cloud security that guarantees the safety and protection of business intellectual properties (IP) and assets will be most valuable to the adopting organizations. The security inadequacies of the cloud are the greatest apprehension to most of the organizations, regardless of their size. Most of the organizations are not keen to move their infrastructure applications and resources to the cloud without sufficient and acceptable security measures. Researchers of future studies ought to address the security concerns of cloud computing to institute standards for securing the IPs, which might be geographically distributed and indirectly controlled by different cloud computing providers, of the adopting organizations.

Finally, this study was conducted using a quantitative method with a correlational design and an online survey. However, researchers of future studies could use a qualitative method to conduct their analyses, possibly case study or grounded theory, to achieve comprehensive knowledge of additional variables that impact the adoption of cloud computing.

Reflections

As Sir Isaac Newton (1643-1727) once said, “If I have seen further, it is by standing on the shoulders of Giants.” (Fawcett, Holloway, & Rhynas, 2015). This quote was frequently used during the DBA residencies held by the Walden University with a slight change by replacing the word giants with the word scholars. Through the experience I have gained from this research study, I came to know the full meaning of standing on the shoulders of scholars and what research is all about. The research process of this study has been humbling, challenging, informative, and exciting.

With more than two decades of experience in the IT management, services and consulting, I understand how the IT decision-making process works and what factors play a role in influencing the decision of adopting new technologies such as cloud computing. Nevertheless, the empirical results of this study, which are in line with most of the previous new technology adoption research studies, have supported and confirmed what I have thought were just perceptions. Studying the technological, operational, and environmental factors influencing the IT manager decision in adopting cloud computing, and the review of the body of literature have supported and strengthened what I have gained through practical experience. However, through the data analysis process, I had some unbending impressions of the results based on personal experience and previous research findings in IT management and consulting. Nevertheless, these biased concepts did not influence the study results, as I had no involvement in recruiting the survey participants and collecting the data. I was particularly surprised when the results did not reveal any significant relationship between organizational size and IT decision makers’

intent to adopt cloud computing. This result suggested that IT managers from both large and small companies are intended to adopt cloud computing but for different reasons.

The continuous support and response from the members of the DBA committee and the rigorous review of the doctoral study strengthened the academic writing of this research. Also, the guiding principles of the DBA rubric were essential in measuring and benchmarking the development of the study. Developing the study instrument in SurveyMonkey and using the Survey Monkey Audience service to recruit participants to the survey proved advantageous in the data collection and the protection of the participants.

Summary and Study Conclusions

To understand the adoption of cloud computing, it is essential to (a) identify the determinants that impact the decision of adoption, and (b) conduct an insightful analysis to recognize if the same factors have the same impact on different industries for the adoption of cloud computing. Although cloud computing has been considered as a disrupting innovation that can deliver operational and strategic advantages, the high rate of adoption is yet to be seen. Therefore, it is indispensable to study the factors that impact the IT decision makers' intent to adopt cloud computing. The main objective of this quantitative correlational study was to analyze the correlation between the technological, organizational, and environmental factors and IT decision makers' intent to adopt cloud computing.

The findings of this study offer several significant conclusions and implications about the influencing factors of the adoption of cloud computing. First, whether a

business adopts cloud computing relies heavily on the business's technological, organizational, and environmental settings. Second, eight factors were examined. Seven factors (relative advantage, compatibility, top management support, organizational readiness, mimetic pressure, normative pressures, coercive pressure) had statistically significant relationships and determined to be significant factors that impact IT decision makers' intent to adopt cloud computing. Only one variable (organizational size) did not have a statistically significant relationship and determined to be an insignificant factor that can impact IT decision makers' intent to adopt cloud computing. Third, between the seven factors top management support, normative pressure, and relative advantage were determined to be the most significant factors that can influence IT decision makers' intent to adopt cloud computing.

Also, the findings of this study might help both IT decision makers and cloud computing services providers to understand how decisions are really made and what the influencing forces are that need to be well thought-out when considering the decision of adopting cloud computing. Finally, this empirical study contributes to the limited research on the adoption of cloud computing; by offering a broad investigation of the factors that could influence IT decision makers' intent to adopt cloud computing through the assessment of the technological, environmental and organizational aspects of the organization.

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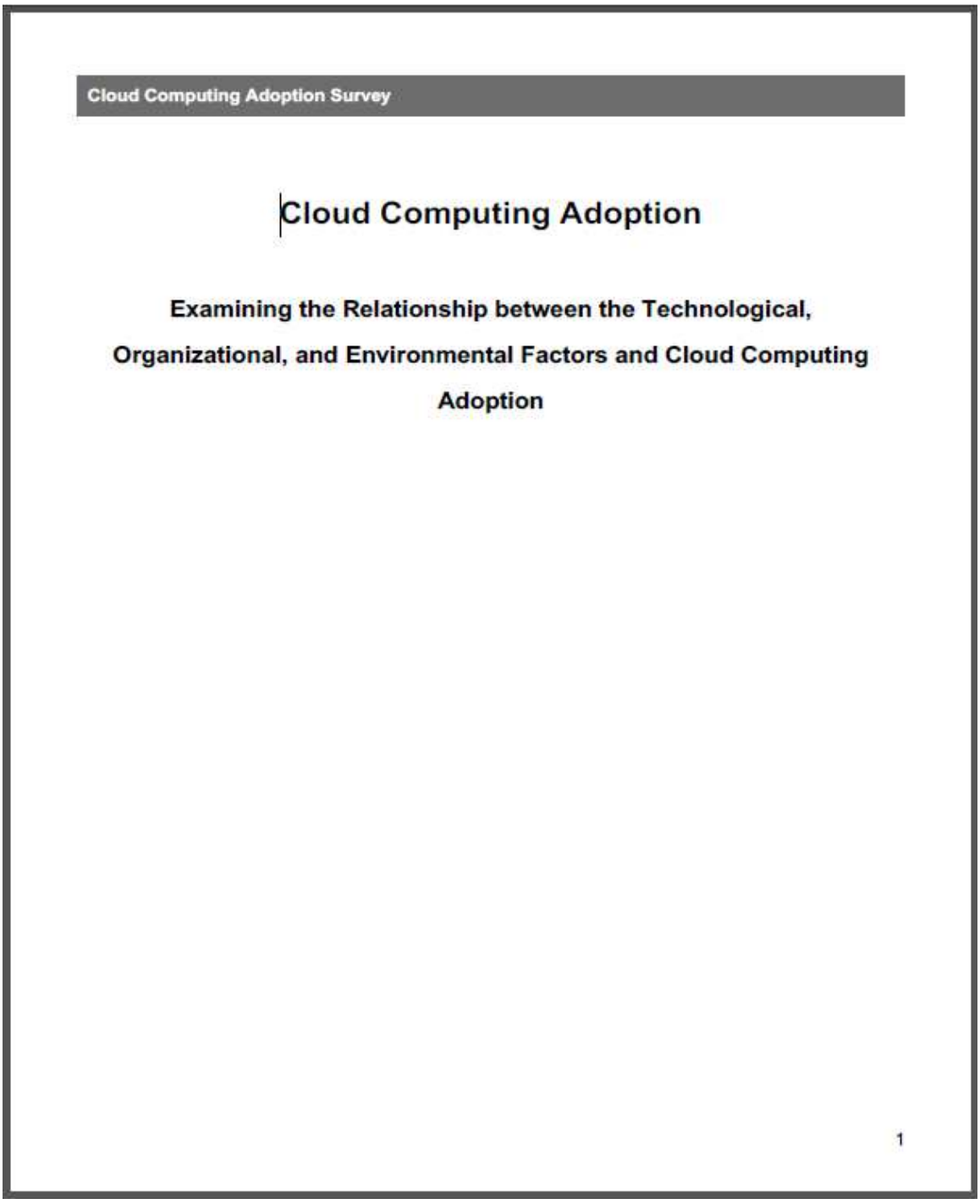
Appendix A: Cloud Computing Adoption Survey



Cloud Computing Adoption Survey

Purpose: You are invited to participate in a research study being conducted for a Doctoral Study at Walden University. The purpose of this study is to examine the relationship between the technological, organizational, and environmental factors and IT managers' interest in adopting cloud computing.
There is no deception in this study. We are interested in your opinions about cloud computing adoption.

Participation Requirements: Participants for this study are expected to (a) have some expertise pertaining to the IT activities and operations within IT organization and (b) play a role in influencing the adoption decision process.

Potential Risk/Discomfort: There are no known or anticipated risks in this study; however, you can choose not to answer any question that makes you uncomfortable. The survey has 10 questions with multiple sub questions and will take about 10-12 minutes to finish.

Potential Benefits: If desired, you could receive a summary of the investigation's findings upon completion of the research by sending an email request to joe.malak@waldenu.edu. The results will have scientific interest that may eventually have benefits for people who contemplating adopting cloud computing. No incentives for participation are offered by the researcher. However, Survey Monkey Audience is offering some incentives, per the terms of their email invitation, "Complete it to generate $0.50 for your charity, and a chance to win a $100 Amazon.com Gift Card".

Anonymity/Confidentiality: The data collected in this study are confidential. To ensure the anonymity of the respondents, this survey tool is utilized to provide anonymous response collection. All data is collected and coded such that your name and your email are not associated with them. In addition, the coded data are made available only to the researcher associated with this project.

Research Personnel: The following people are involved In this research project and may be contacted at any time:
Joe Malak (Researcher-Primary contact) - joe.malak@waldenu.edu - (203) 430-4127
Dr. Alex Lazo (Doctoral Study Chair) - alexandre.lazo@waldenu.edu - (949) 500-8759

Walden Research Participant Advocate - irb@waldenu.edu - (800) 925-3368 ext. 3121210

Withdrawal: Participation in this study is voluntary. You can withdraw and may skip questions on the questionnaire if you do not want to answer them. We would be happy to answer any question that may arise about the study.
Please submit your questions or comments to: Joe Malak, via email at joe.malak@waldenu.edu or via phone at (203) 430-4127

Signatures: I have read and I understand the conditions of my participation in this study. Taking the survey indicates that I agree to participate in the survey. Please feel free to print a copy of this form for your own record.

Cloud Computing Adoption Survey

1. For the purpose of this survey, the participant is expected to have IT knowledge, and play a critical role in influencing technology adoption decisions. Please indicate whether you meet this profile:

Yes	NO
○	○

2. Position Level:

VP / Sr.VP	Director / Sr. Director	Manager / Sr. Manager	Other
○	○	○	○

3. U.S. Region where your organization is located:

Midwest	Northeast	Southeast	Southwest	West
○	○	○	○	○

4. Please specify below the primary industry to which your organization belongs. Primary industry is defined as the sector that accounts for most of your organization's activities:

Education	Financial	Government	Healthcare	Manufacturing	Services (e.g. Financial, Insurance, Retail)	Transportation	Other
○	○	○	○	○	○	○	○

5. In what year was your organization founded?

6. About how many employees work at your organization?

1-50	51-100	101-500	501-1000	1001-5000	5001-10000	>10000
○	○	○	○	○	○	○

7. Please rate the attitude of your top management (e.g. CEO, CFO, and other senior executives) toward the deployment of information technology in your organization.

Very Negative			Neutral			Very Positive
○	○	○	○	○	○	○

Cloud Computing Adoption Survey

8. Information technology can be used for a number of objectives. To what extent is information technology important for the fulfillment of the following objectives in your organization?

	Not at all Important			Neutral			Extremely Important
Personnel Reduction	○	○	○	○	○	○	○
Reduction of Operational Costs	○	○	○	○	○	○	○
Productivity Improvement	○	○	○	○	○	○	○
Improved Access to Information	○	○	○	○	○	○	○
Improved Quality of Decision Making	○	○	○	○	○	○	○
Improved Competitiveness	○	○	○	○	○	○	○
Improved Service to Customers	○	○	○	○	○	○	○

Cloud Computing Adoption Survey

9. Please indicate how much you agree or disagree with each of the following statements based on a scale ranging from Strongly Disagree to Strongly Agree.

	Strongly Agree						Strongly Disagree
Adopting cloud computing will increase the profitability of our organization.	○	○	○	○	○	○	○
Adopting cloud computing will allow for reduced operational costs.	○	○	○	○	○	○	○
Adopting cloud computing will allow us to enter new businesses or markets.	○	○	○	○	○	○	○
Adopting cloud computing will allow better communication with our customers.	○	○	○	○	○	○	○
Adopting cloud computing will require no up-front capital investment.	○	○	○	○	○	○	○
Adopting cloud computing will provide dynamic and high service availability.	○	○	○	○	○	○	○
Cloud computing adoption is consistent with my organization's belief and values.	○	○	○	○	○	○	○
The attitude towards cloud computing adoption in my organization is favorable.	○	○	○	○	○	○	○
Cloud computing adoption is compatible with my organization's information technology (IT) infrastructure.	○	○	○	○	○	○	○
Cloud computing adoption is consistent with my organization's business strategy.	○	○	○	○	○	○	○
Top management in my organization is interested in adopting cloud computing.	○	○	○	○	○	○	○
Top management in my organization considers cloud computing adoption important.	○	○	○	○	○	○	○
Top management in my organization has shown support for cloud computing adoption.	○	○	○	○	○	○	○
Many of our competitors are currently adopting cloud computing.	○	○	○	○	○	○	○
Many of our competitors will be adopting cloud computing in the near future.	○	○	○	○	○	○	○
Our key competitors are currently adopting cloud computing.	○	○	○	○	○	○	○
Our competitors that have adopted cloud computing are benefiting greatly.	○	○	○	○	○	○	○
Our competitors that have adopted cloud computing are perceived favorably by others in our industry.	○	○	○	○	○	○	○
Customers that matter to us expect us to use cloud computing.	○	○	○	○	○	○	○

5

	Strongly Agree						Strongly Disagree
We may not retain our important customers without adopting cloud computing.	○	○	○	○	○	○	○
Customers that are crucial to us encourage us to use cloud computing.	○	○	○	○	○	○	○
Many of our customers are currently adopting cloud computing.	○	○	○	○	○	○	○
Many of our customers will be adopting cloud computing.	○	○	○	○	○	○	○
Many of our suppliers are currently adopting cloud computing.	○	○	○	○	○	○	○
Many of our suppliers will be adopting cloud computing.	○	○	○	○	○	○	○
Industry sources (e.g., industry or trade associations) are pressuring our organization to adopt cloud computing.	○	○	○	○	○	○	○
We participate actively in industry, trade, or professional associations that promote cloud world adoption.	○	○	○	○	○	○	○
We often receive information regarding cloud computing from sources outside our organization (such as industry and professional associations, or trade newsletters).	○	○	○	○	○	○	○

Cloud Computing Adoption Survey

10. Please indicate how much you agree or disagree with each of the following statements based on a scale ranging from Strongly Disagree to Strongly Agree.

	Strongly Disagree			Neutral			Strongly Agree
My organization intends to adopt cloud computing.	○	○	○	○	○	○	○
It is likely that my organization will take steps to adopt cloud computing in the future.	○	○	○	○	○	○	○
It is likely that my organization will adopt cloud computing within the next 12 months.	○	○	○	○	○	○	○

Appendix B: Descriptive Statistics

[Missing column label]	*n*	Minimum	Maximum	*M*	*SD*
ORRD1	136	1	7	5.76	1.312
ORRD2	136	1	7	4.86	1.756
ORRD3	136	1	7	5.93	1.263
ORRD4	136	2	7	6.14	1.069
ORRD5	136	2	7	6.07	1.106
ORRD6	136	1	7	5.92	1.224
ORRD7	136	1	7	5.98	1.232
ORRD8	136	2	7	6.02	1.112
RLAD2	136	1	7	5.57	1.438
RLAD6	136	1	7	5.70	1.267
RLAD4	136	1	7	5.68	1.321
RLAD1	136	1	7	5.69	1.336
RLAD3	136	1	7	5.11	1.707
RLAD5	136	1	7	5.74	1.212
CMPT1	136	1	7	5.67	1.345
CMPT2	136	1	7	5.65	1.279
CMPT3	136	1	7	5.73	1.177
CMPT4	136	1	7	5.74	1.272
TPMS1	136	1	7	5.59	1.498
TPMS2	136	1	7	5.72	1.304
TPMS3	136	1	7	5.68	1.298
MMPR1	136	1	7	5.55	1.191
MMPR2	136	1	7	5.70	1.207
MMPR3	136	1	7	5.61	1.323
MMPR4	136	1	7	5.76	1.272
MMPR5	136	1	7	5.61	1.323
CRPR1	136	1	7	5.44	1.490
CRPR2	136	1	7	5.18	1.569
CRPR3	136	1	7	5.25	1.581
NRPR4	136	1	7	5.50	1.425
NRPR5	136	1	7	5.42	1.396
NRPR6	136	1	7	5.59	1.291
NRPR7	136	1	7	5.68	1.263

NRPR1	136	1	7	5.35	1.458
NRPR2	136	1	7	5.49	1.481
NRPR3	136	1	7	5.76	1.231
ADPT1	136	1	7	5.88	1.256
ADPT2	136	1	7	5.90	1.252
ADPT3	136	1	7	5.76	1.346
Valid N (listwise)	136				

Appendix C: Authorization to Use Survey Instrument

From : dr Tweel [drtweel@gmail.com]
Date : 02/13/2014 08:17 PM
To : Joe Malak [joe.malak@waldenu.edu]
Subject : Re: Permission to use your survey instrument

Hello Joe,
Sure you have my permission and good luck in your graduate work.

Dr. Tweel

On Feb 13, 2014 9:00 PM, "Joe Malak" <joe.malak@waldenu.edu> wrote:
Dear Dr. Tweel;

My name is Joe Malak, and I am a DBA student at the Walden University. I am currently working on the proposal for my DBA Doctoral study. My study is concerned with the analysis of the factors Influencing cloud adoption by IT decision makers . I would like to request your permission to use the survey instrument you have developed for your PhD dissertation titled as "Examining the Relationship between Technological, Organizational, and Environmental Factors and Cloud Computing Adoption". With your permission, I plan to use the survey instrument to examine the key factors influencing cloud adoption by IT decision makers. If you are the copyright owner of the survey questionnaire, I would like to request your permission to use the survey in my study.

Your response will be greatly appreciated.

Best regards,

Joe Malak

joe.malak@waldenu.edu