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IS Success Model for Evaluating Cloud Computing for Small Business Benefit: A Quantitative Study

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IS SUCCESS MODEL FOR EVALUATING CLOUD COMPUTING FOR SMALL BUSINESS BENEFIT: A QUANTITATIVE STUDY

by

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DEDICATION

With a grateful heart, I dedicate this dissertation to my beloved parents Gladys E. Flack and the late John T. Flack, Jr., whose support and encouragement throughout this process was the wind beneath my wings. It was my hope and prayer that my father could see me walk across the graduation stage. Before I could complete my research God called him home—but to view my graduation ceremony in a better place. I am thankful for my mom who so valued higher education that she supported and encouraged all her children to become lifelong learners. I also dedicate this research to my siblings. To my oldest sister Fredia, who constantly pushed and prodded me to work toward a doctoral degree. To my sister Doris, who encouraged and prayed for me throughout the process, helping me to keep my eyes on the prize. To my brother John, from whom I draw strength being the first male in our immediate and extended family who blazed the path of higher education. Lastly to all my nieces and nephews, who I believe will shoot higher and achieve greater accomplishments in life, the seed has been planted, the path has been blazed, and the bar has been set. I look forward to celebrating all your life accomplishments in the years to come as you all strive toward higher achievements.

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ABSTRACT

IS SUCCESS MODEL FOR EVALUATING CLOUD COMPUTING FOR SMALL BUSINESS BENEFIT: A QUANTITATIVE STUDY

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Information system (IS) success has been extensively researched to frame key attributes of an information system or technology to understand its benefit to business. One definition of IS success is the adoption and extensive use of an information system (Robey & Zeller, 1978). In the present era of cloud computing, as in former IS eras, successful implementation is critical for achieving business success in all enterprise types. IS success is also described as a lagging multifaceted measure of technology effectiveness for a business. Early adopters of a new technology are a rich resource to determine benefits for later adopters, and this is true for those businesses looking to implement cloud computing. This is critically important for small businesses. Cloud computing is characterized as a 21st century model of acquiring computational resources and services through convenient on-demand provisioning mechanisms via a shared network (Mell & Grance, 2010, p. 50). With the resource challenges of small businesses, the selection of a particular cloud computing model can result in business success or calamity. Many small businesses realize they need to make key investments in the latest technologies to advance their business, but many have one opportunity to make the best choice and to do it right. Small businesses typically operate with limited capital resources

to invest in new IS technologies, as well as fund their ongoing upgrades, enhancements, and support. The intent of this research study is to define an IS framework that small businesses can use to determine the benefits of a particular cloud computing solution before adoption, based on the efforts of select small businesses that are early adopters of cloud computing. This research will determine the essential features and attributes that enable cloud computing success for small businesses in their targeted marketplaces. The primary success constructs of this study will focus on the overall cloud quality, experience, and benefit. The results of this research will lead to an enhanced IS success model that will enable small businesses to target specific cloud-based computing services that align with their business requirements to enable them to achieve business success.

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CHAPTER 1: INTRODUCTION

Cloud computing is a growing information technology (IT) model for providing computing resources and services to individual end users and organizations. Cloud computing is characterized by the ability to rapidly provision and release a variety of resources (applications, servers, storage, networks, and services) with minimal customer IT management involvement or service provider involvement (Mell & Grance, 2010, p. 50). Common characteristics of cloud computing are ubiquitous network access, rapid elasticity (bidirectional scalability), measured service, on-demand service, multitenancy, and resource pooling regardless of the cloud deployment model (Subashini & Kavitha, 2011, p. 2). Cloud computing has emerged as a transformational way in which organizations purchase, use, and manage computing resources and services. Cloud computing provides a fundamentally different IT model to procure and deliver IT services. When a business requires a combination of hardware provisioning, software installation, system upgrades, upkeep, data storage, system backups, and comprehensive security, cloud service providers might be responsible for providing any combination (Garrison, Kim, & Wakefield, 2012, p. 62). Cloud services have enabled startups and other businesses to focus on core competencies without worrying as much about infrastructure provisioning and management (Subashini & Kavitha, 2011, p. 3). Key features of cloud computing can provide broad benefits when properly implemented in an enterprise.

Many large corporations are moving rapidly to capitalize on the benefits of cloud-based technologies to provide competitive advantages in their marketplaces. The skepticism and uncertainty executives and business owners felt early on about migrating mission-critical IT systems to the cloud are rapidly diminishing (Columbus, 2013; Kriz, 2015; McKendrick, 2014). This skepticism is being replaced with an increased enthusiasm for and heightened expectation of the financial flexibility and liberty that come from cloud computing services' modularity and pay-per-use approach to accessing the latest computational technologies (Miranda, 2013, p. 65). Since the 2008 recession, organizations must address a dual challenge of maximizing the use of costly IT resources to obtain and maintain their competitive advantage in the marketplace, all while working to diminish the operational and maintenance costs of IT (Dutta, Peng, & Choudhary, 2013, p. 39). Many small businesses are similarly enticed by the attributes of cloud computing, but there are many other factors shaping or inhibiting small businesses' selection of cloud computing to support their business (Krell, 2011, pp. 4–5).

Today's cloud computing services vary in offerings and have differences within the scope of each offering. All cloud computing iterations provide similar enablement capabilities. The usage-based enablement capabilities of cloud computing offer substantial benefit to businesses (Armbrust et al., 2010, pp. 52–53). They provide the ability to reduce or remove upfront expenses, thereby enabling a lower cost-of-entry and the flexibility to adjust capacity as needed to support varying business demand (Grossman, 2009, p. 25). While experts have a difference of opinion on the precise definition of cloud computing, all agree that it provides a subscription-based, pay-for-use model for businesses to affordably access the latest technology at the lowest price

(Carcary, Doherty, & Conway, 2014; Chen & Wu, 2012; Clarke, 2010; Garrison et al., 2012; Grossman, 2009; Han, 2011; Haselmann & Vossen, 2011; Leavitt, 2009; Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011; Ryan & Loeffler, 2010; Subashini & Kavitha, 2011; Sultan, 2011; H. Wang, 2013). This model of computation service is delivered by a third-party service provider that makes computational resources available with the appearance of virtually unlimited capacity (Wittow & Buller, 2010, p. 5). Researchers and industry generally agree on the three major service models of cloud computing (Clarke, 2010; Garrison et al., 2012; Grossman, 2009; Gupta, Seetharaman, & Raj, 2013; Haselmann & Vossen, 2011; Marston et al., 2011; Mell & Grance, 2010; Subashini & Kavitha, 2011), which are Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), and Infrastructure-as-a-Service (IaaS). Based on the cloud model a small business desires to implement, any of these three models (or a combination thereof) can be used to provide competitive leverage in the marketplace (refer to Figure 2 for a comparative illustration of SaaS, PaaS, and IaaS; these terms and definitions will be explained in Chapter 2, “Cloud Computing Fundamentals”).

Large enterprises are working to take advantage of the benefits of cloud computing solutions to achieve information system (IS) success. Enterprises that are assessing their IT operations and framing their business case for migrating to cloud services understand the importance of determining the upfront benefits and risks (Miranda, 2013, p. 65). The top expectation is a reduction in future IS capital expenditures (CapEx) with the ability to redirect those funds to invest in other parts of the business (Armbrust et al., 2010, p. 53; Carcary et al., 2014, p. 9; Creeger, 2009, pp. 4–5; Iye, Krishnan, Sareen, & Panda, 2013, p. 7). In many cases enterprises achieve these benefits soon after implementation, including acceptance, routinization, and infusion that constitute the diffusion of IS (Saeed & Abdinnour, 2013, p. 222). Other benefits provide scalability, operation efficiencies, compliance, and access to leading-edge technologies that are not cost-effective for businesses to buy and build on their own (Miranda, 2013, p. 65). These features also show benefits to small businesses, but there are other factors affecting small businesses. Many small businesses operate with limited capital to invest in new IS technologies, as well as fund their ongoing upgrades, enhancements, and support. Small businesses operate in considerably different contexts than large enterprises, many with the lack of an IT strategy, limited financial resources, and limited IT skills often under the leadership of a single decision maker (i.e., owner; Haselmann & Vossen, 2011, p. 45).

Key constructs of our model will be framed for small businesses to consider to achieve IS success with cloud computing with a focus on operational benefits and business success. A review of select IS success theories used during previous major IS eras (Data Processing Era, 1950s–1960s; Management Reporting and Decision Support Era, 1960s–1980s; Strategy and Personal Computing Era, 1980s–1990s; Enterprise System and Networking Era, 1990s–2000s; and Customer Focus Era, 2000s and beyond; Petter, DeLone, & McLean, 2012) will be considered for applicability in this research area.

The purpose of this research is to determine the essential features and attributes that assure cloud computing success for small businesses in their targeted marketplaces, based on the early adoption experiences of other small businesses. These essential features will be incorporated into an IS success model that will be used to determine the business benefit small businesses have achieved in using particular cloud computing solutions, postadoption.

Small Business IS Challenge

To provide a competitive marketplace advantage, available and appropriate cloud computing technologies must be understood to determine how they can successfully fit within the small business operational model. Many small businesses are looking to take advantage of new technologies and computational services provided by third parties to help address their business issues, but risks must be understood. Small businesses realize they need to make key investments in the latest technologies to advance their business, but many have only one opportunity to do it right and to make the best choice. A major obstacle for many small businesses is limited financial capital. With limited capital funds, small businesses have limited latitude in selecting the right IS solution for their businesses. Recent studies show that 78% of small businesses host IS services in-house whereas 22% outsource (Krell, 2011). This presents an opportunity that cloud computing is uniquely positioned to address, although the risk of realizing “efficiency” will be achieved postadoption (Iye et al., 2013, p. 216). Adopting a cloud computing model that does not best fit a business can result in compromised business effectiveness and efficiency. Many small businesses operate with limited financial resources and produce thin profit margins. Understanding the successes of and challenges for small business early adopters of cloud computing is critical in providing a success model for other small businesses to follow.

Scope and Limitations of Study

Cloud computing includes a plethora of offerings, as noted by Iye et al. (2013), that can be purchased and used independently or in a myriad of combinations. When different cloud computing services are grouped together as “XaaS” offerings, they include the previously stated cloud service offerings. They extend to but are not restricted to Storage-as-a-Service (i.e., STaaS), Application-as-a-Service (AaaS), Network-as-a-Service (NaaS), and Infrastructure-as-a-Service (IaaS; Iye et al., 2013, p. 215). This research will focus on the public SaaS, PaaS, and IaaS cloud computing models, and not private, community, or hybrid cloud computing models.

There are many definitions for small business. We will be limiting our research to those small businesses or small enterprises that are early adopters of cloud computing services with fewer than 100 employees, total annual revenue less than $7 million, and fewer than five physical business locations, regardless of industry segmentation (SBA, 2014). The focus of this study will be on those small businesses located and headquartered in the United States. The metrics used to define the business segment of this study are based on standards set by the United States’ Small Business Administration “Size Standards Methodology” (Size Standards Division Office of Government Contracting & Business Development, 2009). The primary target of our research efforts comprises those small businesses associated with the Kennesaw State University Small Business Development Center (KSU SBDC) in Kennesaw, GA. The KSU SBDC is part of a partnership program between Kennesaw State University, the University of Georgia, and the U.S. Small Business Administration (SBA), working together to benefit small businesses in Georgia (Tonsmeire, 2015). Additional data sources considered are small business corporate contacts provided by IBM's small business client database, and small business and cloud computing social media groups on LinkedIn ("Small Business Network for Startups and Entrepreneurs" to date has 69,788 members; "Cloud Computing" to date has 308,905 members) and Facebook ("Small Business Owners of America" to date has 18,578 members). As a safety net, a Qualtrics© panel was secured to be simultaneously executed with the previously mentioned data sources. Since the dataset usually has only one point of contact per organization—usually the president, chief executive officer (CEO), or chief information officer (CIO)—our research study will be limited to surveying only one knowledgeable point-of-contact per organization.

Importance of the Study

The importance of this study is directly related to the health and vitality of small U.S.-based privately held firms and their vitality to the U.S. economy. Since the 2008 recession, no comprehensive plan of small business development has been produced by the government, leaving it up to small businesses to create their own strategies for growth and success (Cole, 2013, p. 794; Krell, 2011, p. 6). A January 2012 report from the SBA's Office of Advocacy states small businesses will continue to be the incubators for innovation and employment growth after the recovery from the 2008 recession (Kobe, 2012, p. 1). Small businesses are the economic engine that drives the U.S. economy. According to the SBA Office of Advocacy (2014), small firms accounted for 63% of all net new jobs created between 1993 and mid-2013. This equates to 14.3 million of the 22.9 million jobs created since the end of the 2008 recession (Small Business Administration, Office of Advocacy, 2014). Small firms with 20 to 499 employees led all businesses in the creations of jobs in the United States in this same period (Small

Business Administration, Office of Advocacy, 2014). Based on a report from the U.S. Internal Revenue Service, fewer than 10,000 U.S. businesses issue publicly traded securities, yet there were about 30 million small businesses as of 2006 (Cole, 2013, pp. 777). Of all jobs created over the past 15 years in the U.S. private sector, small businesses generated almost 66% of all net new jobs and almost half of nonfarm private national GDP (gross domestic product; Cole, 2013, pp. 777–778).

The importance of this study is to determine how small businesses can quantify and weigh the benefits and risks of applying cloud computing to achieve IS success and business growth. Regardless of the benefits, misaligned business and technical expectations, haphazard adoption by stakeholders, and data security are a few of the risks organizations face in adopting cloud services (Garrison et al., 2012, p. 62).

In practitioner literature, Gartner, Inc. introduced their “hype cycle” in 1995. Gartner’s hype cycle is designed to assist businesses in determining when and where they should invest in a particular technology space (O’Leary, 2008, p. 242). Gartner’s hype cycle simply defines the maturation stages of a technology and the adoption trends. The five stages of the hype cycle (technology trigger, peak of inflated expectations, trough of disillusionment, slope of enlightenment, and plateau of productivity) encapsulate information about the technologies and their state as they move along this curve (O’Leary, 2008, p. 242). In Gartner’s Hype Cycle for Cloud Computing, 2012 (see Reference Illustrations in Appendix A), IaaS, PaaS, and SaaS were specifically projected to enter the “plateau of productivity” in 2 to 5 years (see Table 1). In Gartner’s Hype Cycle for Cloud Computing, 2014 (see Reference Illustrations in Appendix A), SaaS is moving faster to "plateau of productivity" in less than 2 years, much faster than IaaS and PaaS (D. M. Smith, 2014).

Table 1

IaaS, PaaS, and SaaS Trends from 2012 to 2014

Cloud Computing Technology	2012		2014	
	Present Cycle	Timeframe to Plateau of Productivity	Present Cycle	Timeframe to Plateau of Productivity
IaaS	Slope of Enlightenment	2 to 5 years	Slope of Enlightenment	2 to 5 years
PaaS	Peak of Inflated Expectations	2 to 5 years	Peak of Inflated Expectations / Trough of Disillusionment	2 to 5 years
SaaS	Slope of Enlightenment	2 to 5 years	Slope of Enlightenment	Less than 2 years

As stated by Garrison et al. (2012) there might be differences in understanding and expectation between the business and provider about the span, scope, and capabilities of cloud computing services. IT investments by small businesses can be wasted when not implemented properly. When IT investments are not fully realized by organizations, the benefit of their implementation is lost and advantages fall short of expected targets (Garrison et al., 2012, pp. 62–63). For large enterprises, small and medium businesses, governments, nongovernment organizations (i.e., nonprofits), and individuals, cloud-based service reduced initial capital investments and resulted in reduced cost over legacy IT deployments. Investment in cloud computing technology offers benefits that extend beyond cost savings to include flexibility, scalability, accessibility (anytime, anyplace, any device), availability, and virtualization. With the need to have services on demand, cloud-based services provide device independency (virtualization) and limit the loss of key data in the event of systems or human failure (Rawal, 2011, p. 65).

While using cloud computing delivers a number of benefits, enterprises considering the use of the cloud services should make equal effort to quantify its risks to their business (Tamer, Kiley, Ashrafi, & Kuilboer, 2013). Although the potential benefits of cloud services for the enterprise are tremendous, the challenges and complexities of a cloud-based model for the enterprise can be equally risky, compromising IS success. Research conducted by Rawal (2011) found customers wanted a safe path to cloud adoption with benefit assurances, with clear return on investment (ROI) provided. Regardless of the benefits, haphazard implementation by stakeholders, inadequate business acumen, lack of technical capability, and data security are a few of the risks organizations face in adopting cloud computing services (Garrison et al., 2012). Many issues are in the process of being addressed with cloud computing services. Some of the issues with cloud-based computing services are confidentiality, information security, legal and regulatory challenges, and protection from malicious attacks as computational services and data are stored in a geographically dispersed environments, generally outside national borders (Rawal, 2011).

To achieve cloud computing success, potential risks of security, performance, and availability must be addressed. The associated risk and benefits must be taken into consideration in the resultant IS success framework defined for cloud computing. To relate IS success of cloud computing for the enterprise, the fundamental principles of IS success must be understood. IS success for cloud computing is defined as the adoption and extensive use of cloud-based IS systems by an enterprise with desirable net benefits achieved. The goal of this research is to understand the challenges encountered and measure the success achieved by small businesses as a result of implementing cloud computing.

Conceptual Model

The proposed conceptual model for cloud computing IS success for small businesses (Figure 1) is based on quality (cloud computing quality, comprising service and system quality) driving small business experience (organizational satisfaction and use) yielding overall impact (net benefit) as moderated by overall cost.

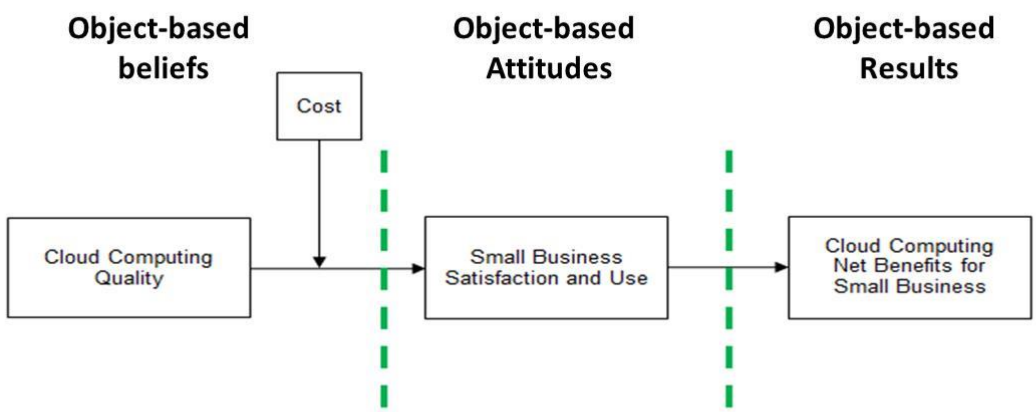


Figure 1. Conceptual model of IS success for cloud computing for small business.

Theoretical Perspective

The intent of this research is to propose and validate a model that can appropriately capture the attributes of small business IS success with cloud computing based on the experiences of early adopters. Cloud-based computing service is still an evolving technological and service paradigm. Its definitions, underlying technologies, use cases, benefits, and risks will be refined by much back and forth between the public and private sectors (Mell & Grance, 2010, p. 50). The wide range of potential risks and challenges associated with the adoption of cloud computing has not been sufficiently studied and explored by previous researchers (Dutta et al., 2013, p. 39). An important area of study in IS research over the past few years has been developing models for achieving the highest degree of IS success in adopting new technologies (Alshamaila, Papagiannidis, & Li, 2013; Gable, Sedera, & Chan, 2008; Venkatesh, Thong, & Xu, 2012; Xu, Benbasat, & Cenfetelli, 2013). It is our intent to explore previously validated IS success models to assess their viability with today's cloud computing model.

From here we will discuss the fundamentals of the IS area of study and the marketplace landscape (see "Cloud Computing Fundamentals" and "Cloud Computing Marketplace"). We will discuss key literature related to small business and the attributes of cloud computing targeted to that business segment (see "Small Business Marketplace" and "Cloud-Centric Model for Small Business"). After establishing the foundation for our research, we establish the theoretical framework for our research model and define the associated hypotheses (see "Theoretical Integration and Hypotheses Development" and "Theoretical Framework"). In the section covering the theoretical framework, supporting research literature related to IS success will be analyzed (see "IS Success Theory"). From here we will build our IS success model for cloud computing specifically focusing on benefits for small business (see "Extending IS Success Model to Cloud Computing"). Key constructs will be discussed as related to independent, dependent, intermediate, and moderating variables associated with the research model (see "Literature Review on Key Constructs"). Hypotheses will be framed and discussed that relate to the constructs of the research model (see "Hypotheses Development"). The methodology of how the quantitative data will be gathered and analyzed to test the hypotheses is discussed in the next chapter (see “Chapter 3: Research Design and Methodology”). The result of the analysis to confirm the hypotheses is discussed in the subsequent chapter (see “Chapter 4: Data Analysis”). All findings and conclusions are presented in the final chapter (see “Chapter 5: Results and Conclusion”).

CHAPTER 2: LITERATURE REVIEW

The literature review for this research project is organized in six topic areas. The first topic area is related to the cloud computing fundamental and attributes, and the second topic area is related to cloud-specific business models for small businesses. The third topic area is related to the cloud computing marketplace, and the fourth topic area addresses specific attributes of cloud computing–centric models for small businesses. The fifth topic area is the theoretical background on the origins of IS success theories up to the present day. The final topic area deals with the research model and the associated constructs for cloud computing IS success for small business.

Cloud Computing Fundamentals

Although experts differ on an exact definition of cloud computing, all generally accept the *National Institute of Standards and Technology (NIST)* definition by Mell and Grance (2010). Based on the cloud model a small business desires to exploit, any of the three models (see Figure 2), IaaS, PaaS, SaaS, or a combination thereof, can be used to provide a competitive advantage in the marketplace.

The illustration in Figure 2 compares the computation stack of a traditional enterprise IS environment versus the three cloud-based models. The components noted in dark gray represent those IS assets that are traditionally housed, owned and managed within the enterprise. The components noted in the lighter color represent those IS assets hosted, owned and managed by an outside party but the services provided are consumed by the enterprise. This model also reflects a comprehensive framework what encompasses the cloud provider side, the client side, and in some cases an intermediary (Clarke, 2010).

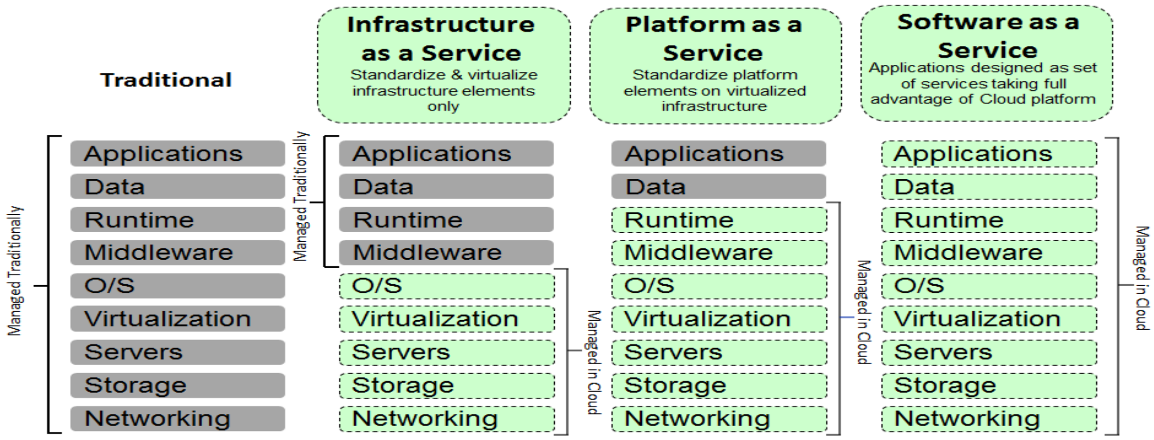


Figure 2. Traditional versus IaaS, PaaS, and SaaS IS models (IBM, 2014).

IaaS provides consumers the ability to deploy, run, and maintain their own software and data, which can include in-house–developed applications, licensed applications, middleware, and a diversity of databases in a cloud environment. IaaS provides the ability for consumers to acquire computational capacity, storage, network, and other fundamental IS resources as required by their organization (Mell & Grance, 2010, p. 50). In the IaaS stack, we see where the applications, data, runtimes (i.e., virtual desktops), and middleware are housed, but are owned and managed by the enterprise, with the operating system (O/S), virtualization, servers, storage, and network provided by a cloud service provider. The cloud computing service called PaaS is defined as resources provided to consumers to enable the provisioning of application services in the cloud. PaaS provides cloud infrastructure for consumer-programed or licensed applications using the programming languages, libraries, services, and tools supported by the provider

(Mell & Grance, 2010, p. 50). In the PaaS stack, we see where the applications and data components are housed, but owned and managed by the enterprise, whereas everything else is provided by an outside party. SaaS provides the complete IS stack for consumers to use. SaaS is simply paying to use software applications running on a cloud infrastructure (Mell & Grance, 2010, p. 50). The entire SaaS stack is hosted, owned, and managed by a cloud service provider for enterprise use. Different variants of the traditional as well as IaaS, PaaS, and SaaS delivery models can interoperate and coexist within an IS environment to provide benefit to the enterprise it serves.

Research conducted by Mell and Grance (2010) theorized that all cloud computing models are composed of five essential characteristics. These five essential characteristics of cloud computing services are as follows: broad network access, resource pooling and sharing, on-demand self-service provisioning, rapid elasticity (i.e., the ability to scale up and down), and metered service. In follow-up research, Gupta et al. (2013) theorized that cloud computing models incorporated the following additional characteristics: cost reduction; sharing and collaboration; reliability; ease of use; convenience; and security and privacy.

Cloud Computing Marketplace

The cloud computing industry is made up of diverse providers delivering a plethora of cloud-based services. These providers used different models for delivering cloud-based services, from general purpose to niche markets. On the surface it appears that cloud computing has evolved to a mature industry space, but associated definitions, attributes, and characteristics for cloud computing will continue to evolve (Mell & Grance, 2010, p. 50).

Industry estimates revenue for cloud services is expected to reach $98 billion for 2015 and $115 billion for 2016 (Anderson et al., 2015). Although Jain & Gupta (2012) estimated the rate of growth rate of 30% since 2011 for all cloud services, Anderson et al.(2015) estimate the average 17% growth rate of all revenue generated by cloud service providers between 2013 ($69.9 billion) to 2019 ($176 billion). Jain et al. (2012) found 2.3 million net new jobs were created in the cloud computing services industry on an aggregate basis from 2010 to 2015, which is five times the rate of growth of jobs created in the IT industry as a whole. Although there are varying projections of revenue forecast in the cloud computing business sector and revenue generated by those that use it, many agree that it ranks as one of the largest IT transformational trends since the dot-com era (Buyya, Yeo, & Venugopal, 2008; Hoon, 2013; Meeker, Joseph, & Thaker, 2008).

Although the prospective benefits of cloud computing for the enterprise are tremendous, the risk for the enterprise can be equally traumatic, compromising IS success. One of the greatest concerns enterprises have in housing their IT services in the cloud primarily centers on data security and availability (Anthes, 2010; Cloud Security Alliance, 2013; Gold, 2012; Kamal & Kaur, 2011; Mangiuc, 2012; Noor, Sheng, Zeadally, & Yu, 2013; Srinivasan, 2013; Whitley, Willcocks, & Venters, 2013; Yeluri, Greene, & Bangalore, 2012). In 2011, a simultaneous cloud security breach affected one of the world’s largest entertainment and electronics companies, all its customers, and one of the world’s largest cloud services firms, with over 100 million customer account files compromised, including debit and credit card information (Gold, 2012, p. 24). Customers across many industries want assurances that include a clear route to enable firms to use the cloud for high performance and availability but do not increase risks in terms of security and privacy. Research by Rawal (2011) found the fear of fears over data security, as well as a number of other issues (e.g., vendor lock-in,, lack of data visibility, and back-up issues) were a cross-industry concern (government, financial, telecom, media, manufacturing, and retail businesses), but they also found that 74% perceived cloud computing as highly relevant within their specific sectors. Research found organizations that experienced major data breaches experienced cost for remediation, cost of implementing increased cybersecurity protection, loss of revenue, litigation, and damage to reputation of the enterprise (Rajendran, 2013). Risk and benefits must be taken into consideration in the resultant IS success framework for using cloud computing in the enterprise. To relate IS success of cloud computing for the enterprise, the fundamental principles of IS success must be understood.

The ongoing marketing message conveyed by cloud computing providers is the comparison of cloud computing to a service utility, where thoughts of the quality and unwillingness to select a utility rarely arise. The typically compared service utilities are electricity, water, gas, and public telephony services. These utility services are taken for granted and are accessed with such regularity consumers expect them to be available at all times (Buyya et al., 2008). Cloud computing has yet to rise to the service level standard of these utilities. The vision of a cloud computing utility is based on a service provisioning model, which anticipates the enormous transformation of the entire 21^{st} century IS industry, where computational services will be broadly available and on-demand (i.e., any time, any place, any device), like other available utility services (Buyya et al., 2008). When one considers lower-order cloud-based services such as email, website hosting, social media, and online procurement of products and services, small businesses are in the game. As for higher-order cloud-based services such as customer relationship management (CRM), ERP, and other business-critical computational services, the masses of small businesses have yet to completely accept running these systems in the cloud. Many believe cloud computing will eventually become the fifth utility, coexisting with the other four utilities, providing a basic level of computation service considered essential for meeting the daily wants and needs of the population at large (Buyya, Yeo, Venugopal, Broberg, & Brandic, 2009). Cloud computing has yet to reach a level of commonality, dependability, and trustworthiness as gas, electricity, water, and telephony, and it is uncertain the level of “commonality, dependability, and trustworthiness it will take to reach this status.

Budriene and Zalieckaité (2012) concluded cloud computing services tend to be used most frequently by specialized IT companies or technology-related companies. Many small businesses are challenged by the many aspects of transforming their IT environment to take advantage of cloud technologies. This is similar to past eras when many were endeavoring to implement enterprise resource planning (ERP) systems, and determined the best course of action was to select specific ERP modules for implementation to improve their existing IS systems and overall IS success (Davenport, 1998). With IaaS, SaaS, and/or PaaS, small businesses are looking to determine which best suit when business model. With the introduction of Internet technologies in the early 1990s, and other technologies such as distributed computing, Web 2.0, high-capacity battery, and pervasive high-speed wireless in the 2000s, small businesses have the ability to take advantage of the latest state-of-the-art computational resources and transact business anywhere in the world. With the use of smart, new, mobile end-user devices (e.g., laptops, tablets, and smartphones) and social media, small businesses can support a larger customer base and broader market. The challenge many small businesses face in this new era is what cloud computing services can help it to achieve IS success based on available technologies and services.

Studies have shown depending on the type of services offered, cloud services cost 20% to 50% less than traditional outsourcing services (Jain & Gupta, 2012, p. 23). One of the principal benefits of cloud services is its on-demand, self-provisioning capabilities, which lets users build, provision, and run applications at a minimal cost (Han, 2011). U.S. Internet users of email services, online data storage, or software applications whose functionality is hosted on the web make up approximately 69% of the consumer base (Wittow & Buller, 2010). With heightened competition for cloud services and the ease of use in enabling cloud-based services, the ability for a small business to move from one provider to another provider is a viable proposition. With today’s cloud computing service models, a company can shift its business from one cloud provider to another if the latter cloud services are better and/or lower in price, and the former cloud service provider does not deliver satisfactory performance (R. Smith, 2009).

Small Business Marketplace

Enterprises of various sizes, especially small businesses, are either wrestling with how to successfully integrate cloud services within their organization or dealing with the aftermath of failed implementations. Twenty-eight percent of small- and medium-sized businesses surveyed indicated their future demand for IT services will increase (Budriene & Zalieckaité, 2012, p. 120). To study this phenomenon with small businesses, we have to define the small business segment space. Although the size of an enterprise can be determined by the number of workers employed, total annual revenue, and the number of physical business locations, they vary from industry to industry. As a starting point, the U.S. businesses are considered small based on the following industry "anchor size standards," first starting with annual revenue of $7.0 million or less per year in receipts based on the employee-based size standards shown in Table 2.

Table 2

Small Business Sizes by Industry (Size Standards Division Office of Government Contracting & Business Development, 2009)

Industry	Number of Employees
Manufacturing, mining and other industries	500 employees or fewer
Wholesale trade industries	100 employees or fewer

A small business is defined as an independent nonfranchise business having fewer than 500 employees (Small Business Administration, Office of Advocacy, 2014). Businesses with fewer than 500 workers accounted for 99.7% of the total number of firms, whereas businesses with fewer than 20 workers accounted for 89.8% (U.S. Census Bureau, 2011). In the United States, the average small business had 1 location and 10 employees, compared to the average large business with 62 locations and 3,313 employees (Gunasekaran, Rai, & Griffin, 2011).

Aside from employment counts, revenues produced by small business are generally recognized as engines of economic growth and social development, and their success is essential for job growth and business competitiveness (Budriene & Zalieckaité, 2012). Research conducted by Mabert et al. (2003) determined enterprises with annual revenues less than $200 million are classified as small, those with annual revenue between $200 million and $1 billion are classified as medium, and those with annual revenue greater than $1 billion are classified as large. For service providers, retail, construction, and other industries with receipts-based size standards, the SBA postulates $7.0 million as an appropriate size standard for annual receipts as a starting point for industries in these sectors (Size Standards Division Office of Government Contracting & Business Development, 2009). Since the economic collapse of 2008, the U.S. government has been hedging its bets that the economic recovery and job creation will be borne on the back of small businesses (Kobe, 2012; Small Business Administration, Office of Advocacy, 2014).

Cloud-Centric Model for Small Businesses

It is evident that cloud computing is the future application platform that many IT services providers are rapidly building (Marston et al., 2011, p. 182; D. M. Smith, 2014, p. 11; S. Srivastava & Kumar, 2011), but its widespread use by small businesses has yet to be determined. Its core purpose and advantage remain unnoticed by a wide segment of small businesses, whereas large companies view cloud computing a tool to provide a marketplace advantage and a vehicle to reduce ongoing IT maintenance costs (Budriene & Zalieckaite, 2012). A large number of cloud computing service providers with diverse capabilities are available, which small businesses can leverage to achieve business benefits. The cloud computing capabilities must be able to fit and align with the select small business operational model. Moreover, for small businesses to be able to exploit the capabilities cloud computing provides, provisioning cost must be aligned with its business needs. The cloud benefits and cost point must ultimately equip a small business with the capability to achieve a competitive advantage in its marketplace.

An effective cloud-centric model for small business will incorporate key attributes. Technical and delivery functionality are the first and critical attributes a cloud computing model must provide to small businesses. Technical and delivery functionality is described as the type of IT services that can be scaled, provisioned, and delivered to the needs of small business. Cloud computing capabilities identified by Iyer and Henderson (2012) include business concentration, recyclable infrastructure, mutual problem resolution, business model investigation, coordinating dependencies, and social media effect (e.g., Facebook™). Other capabilities enabled by cloud computing service include agility, innovation and speed, standardized self-service provisioning, pay per use, minimal IT operation burden on users, strong security, elastic scaling, partitioning, replication/mirroring, and failover capabilities, as well as security, monitoring, and multitenancy (D. M. Smith, 2014, pp. 4, 22). A decision framework developed by Mahesh, Landry, Sridhar, and Walsh (2011) identified six key capabilities for small businesses to consider while selecting a cloud service provider: business IT experience, application performance, cost savings, data archival and audit, interoperability, and security. In their research, Budriene and Zalieckaité (2012) determined that the extent to which IS contributes to the competitive benefit of a small enterprise, to produce and offer its products and services, is directly related to its knowledge and use of those cloud computing services. The Iyer and Henderson (2012) study also determined that cloud computing helped businesses develop a distinctive business model using an infrastructure that can be reused to provide services to both internal users and external customers, as well as allow users to share data and processes owned by a cloud service provider, with all users enjoying the benefits of continuous improvement.

Business fit is the second key attribute a cloud computing model must provide to small businesses. For small businesses that have the need for IT services but do not have the resources to build and support it to fit their business model, cloud computing can offer a solution. The link between IT consumption patterns and changes in benefit is also related to IT proficiency of the small business. The cloud computing application solutions proposed by Budriene and Zalieckaité (2012) would likely result in employee work efficiency and operational cost reduction, which are important beneficial areas for small enterprises. There are many business-related benefits for small businesses, but many still struggle to get digitally connected with suppliers and customers, and run the risk of losing potential business opportunities as well as competitive advantages with other firms (Dai, 2009, p. 53). For those businesses looking to develop applications to improve their business model, Iyer and Henderson (2012) found that cloud computing enabled businesses to accelerate application development and associated business processes, resulting in faster response organization and improved customer satisfaction. For those enterprises that selected SaaS or PaaS and are part of the Small Business Web (an association of cloud service providers that have come together to build a system of interrelated interoperable software), Gray et al. (2011) found a pattern of leveraging the interoperable capabilities of cloud computing, providing capabilities to build the best-of-breed interoperable systems that can operate at a small business price point. Lastly, according to Iyer and Henderson (2012), another pattern of the business value of cloud computing is related to social media and leveraging the convergence of real-time data and social aspects they can generate for the small business.

IS acquisition and expense are the third key attributes a cloud computing model must consider for small businesses. Small businesses could execute strategies that focus on building their own information and communication technology infrastructure, but the resultant solutions would require considerable financial resources, more than what many can afford. Cloud computing makes it more affordable for small businesses to acquire this capability (Marston et al., 2011, p. 178). The manner in which businesses establish their IT environment has advanced from the binary “buy versus build” scenarios. Small businesses have the ability to assemble more complex IT components on the web, which can include building hybrid systems using licensed and/or open-source software, while adopting multiple models of cloud computing (Daneshgar, Low, & Worasinchai, 2013). In the era of cloud computing, small businesses will be required to think and execute differently than in the past. Cost and revenue are the two sides of a business on which technology can have both a positive and negative impact. On the cost side, cloud computing eliminates the requirement to invest up front in expensive technology, thus turning capital expenditure (CapEx) into operational expenses (OpEx) and thereby lowering the barriers of entry into exploiting new markets (Al-Johani & Youssef, 2013, p. 11; Creeger, 2009, p. 53; Sako, 2012; Yoo, 2011, p. 410). Cloud computing is primarily a technical solution and a computational service. Cloud computing enables enterprises (regardless of size) to access such IT resources on-demand, while sharing the provisioning costs and benefits of co-innovating with others (Iyer & Henderson, 2012). Small businesses can now inexpensively procure IT infrastructure as a service, share the provisioning cost and benefits with others, and take advantage of cloud computing solutions that only larger enterprises could afford till recent times (Budriene & Zalieckaité, 2012).

The fourth key attribute for a cloud-centric model for small businesses deals with business competitive advantage. One of the most fascinating aspects of cloud computing is not simply how it helps the provisioning and consumption of information services, but how it enables companies to compete effectively (Iyer & Henderson, 2012; Monroy, Arias, & Guerrero, 2012). For those businesses that were able to make the investments in building e-commerce and interactive web applications, they were able to differentiate their products and services from their competitors. Cloud computing services is the latest digital technology that has created opportunities for leveraging new business models and lowering IS costs to create competitive advantages for small businesses, in some cases leveling the playing field (Sako, 2012).

Theoretical Integration and Hypotheses Development

In this section, we will discuss the background of theories, constructs, and hypothesis development associated with the research topic area. This section is divided into two subsections, the first to establish the foundation for the research topic area and the second to build the hypothetical framework.

Theoretical Framework

In this section, we will discuss the evolution of IS success theory and its applicability to the cloud computing IS paradigm. Building on the foundation of well-established theory of IS success, the intent is to create a framework of theoretical constructs that captures the attributes of IS success theoretical features that reflects its applicability to cloud computing.

IS Success Theory

DeLone and McLean (1992) posited that research in IS lacks a defined dependent variable. Their research suggested that the primary and essential dependent construct for the field of management information systems should be IS success. DeLone and McLean (1992) reviewed 180 articles of both conceptual and empirical studies, and organized them according to the dimensions of the taxonomy. Based on the dimensions of their completed studies, the DeLone and McLean (D&M) taxonomy of IS success identified six interrelated variables or categories of IS success that at the time they believed were essential for measure. These variables included information quality, system quality, use, user satisfaction, individual impact, and organizational impact. This resultant model became the DeLone and McLean IS success model (DeLone and McLean IS SM). The two important contributions provided by the DeLone and McLean IS SM are that it provides a scheme for classifying multiple IS success measures into six categories and it attempts to suggest “temporal and causal” interdependencies among these categories (Seddon, 1997).

IS success is a multifaceted construct that has been the focus of many IS researchers since the earlier DeLone and McLean (1992) study (Goodhue & Thompson, 1995; Karahanna, Straub, & Chervany, 1999; Seddon, 1997; Seddon, Staples, Patnayakuni, & Bowtell, 1999; Taylor & Todd, 1995; Wang & Strong, 1996). Other researchers attempted to go beyond the Delone and McLean IS SM to take into consideration task-technology fit (TTF) and issues related to the impact of IT on performance (Goodhue & Thompson, 1995). Ten years after their initial study, extended research resulted in updates to the original DeLone and McLean IS SM that incorporated features associated with e-commerce and addressed shortcomings (DeLone & McLean, 2004). Within the e-commerce context, they posited that the primary system users are customers or suppliers rather than internal users, from the premise that customers and suppliers also used IS to transact business.

The DeLone and McLean (2003) study found that when IS success attributes (information quality, system quality, use, user satisfaction, individual impact, and organizational impact) are used alone, they could not fully measure IS success. Although they stated that system use is a critical variable in understanding IS success, they found that the simple usage variables being frequently used were insufficient to measure this complex IS success construct.

As DeLone and McLean (2003) stated in their 1992 article, they found that no single variable is inherently better than the other, so the choice of success variables is often a function of the IS being studied based on the organizational context. In later studies of e-commerce systems, researchers cited the requirement for a service quality measure that had been considered in earlier studies (Cronin & Taylor, 1992). As a result of their extended research in 1992, DeLone and McLean (2003) decided to update their model (see Figure 3) to add the third aspect of service quality. In the IS traditional sense, the most widely applied ServQ framework is SERVQUAL. Developed by Parasuraman, Zeithami, and Berry (1988), SERVQUAL represents five essential dimensions of an organization’s relevant perceptions of a provider’s service, reliability, and assurance. SERVQUAL also includes the provider’s empathy and responsiveness that organization needs. This dimension added to the two original systems characteristics of "system quality" and "information quality" to create a three-dimensional view of IS quality. They continued to refine their model by incorporating a new variable, net benefit, which factors in the positive and negative effects of IS. The researcher is required to first define the business context of net benefits to effectively apply the updated DeLone and McLean IS SM to measure the IS success. By intention, the updated DeLone and McLean IS DM does not define this context. It is a matter of detail and fact, not an oversight on their part.

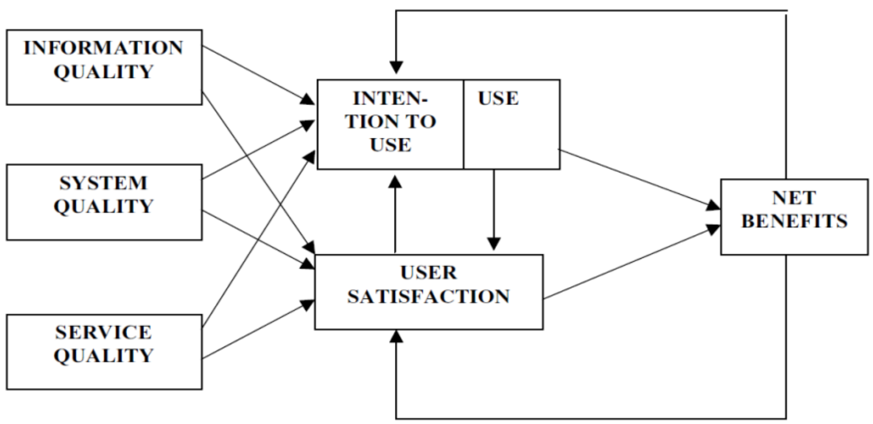


Figure 3. Updated Delone and McLean IS success model (DeLone & McLean, 2004).

DeLone and McLean's 2004 updated model takes into consideration the multirelated aspects of use, "intention to use" and "user satisfaction," as they both relate to each other and net benefits. The resultant model considered feedback relating to the fact that negative or positive net benefits could affect use, intention to use, and user satisfaction. The context or frame of reference in which net benefits are measured and the stakeholders are affected must be carefully defined by the researcher (DeLone & McLean, 2003). This is not an easy task due to the complexities of the IS that is the subject of the study. Although in the 1992 Delone and McLean model this is implied, in the 2004 DeLone and McLean model it is explicitly included, and the feedback loops of IS net benefits provide impact in one iteration. The repeated recursive impact of net benefits on intention to use and user satisfaction (see Figure 3) will consequently influence capabilities and practices of the IS. This will in turn influence the IS quality and therefore satisfaction and use, and so on (Gable et al., 2008). Other researchers chose to study the impact of use, referred to as IT effectiveness, which is not a measure of the use of the IS itself but the impact or success of that use on or within the organization (Bradley, Pratt, Byrd, Outlay, & Wynn, 2012).

Later research by Wixom and Todd (2005) used the updated 2004 DeLone and McLean IS SM as a basis for their research (see Figure 4). In their seminal paper, Wixom and Todd (2005) integrated the technology acceptance and user satisfaction literature to propose a new research model. Their new research model differentiates the views *about* the system (i.e., *object-based*) from those about *using* the system (i.e., *behavioral*; Wixom & Todd, 2005, p. 86). Their model demonstrated its applicability to gauge technology acceptance and user satisfaction, although their research did not include *service quality* (ServQ) as a construct of study. They theorized that the object-based beliefs of *information quality* (IQ) with *system quality* (SysQ) influence the object-based attitudes of satisfaction. Wixom and Todd (2005) incorporated this theory of reasoned action (TRA), the technology acceptance model (TAM), and the unified theory of acceptance and use of technology (UTAUT; Venkatesh, Morris, G. B. Davis, & F. D. Davis, 2003) into their model to assess behavioral attitude. This was found to affect the behavioral beliefs of perceived usefulness and ease of use, which consequently affected behavioral beliefs such as perceived usefulness (PU) and perceived ease of use (PEOU), and, finally, behavioral attitude and usage intention (Xu et al., 2013). The Wixom and Todd e-commerce model did not chiefly measure IS success but adapted the updated DeLone and McLean IS SM to focus on the end-user behavioral aspects of e-business as related to attitude and intention to use e-business applications.

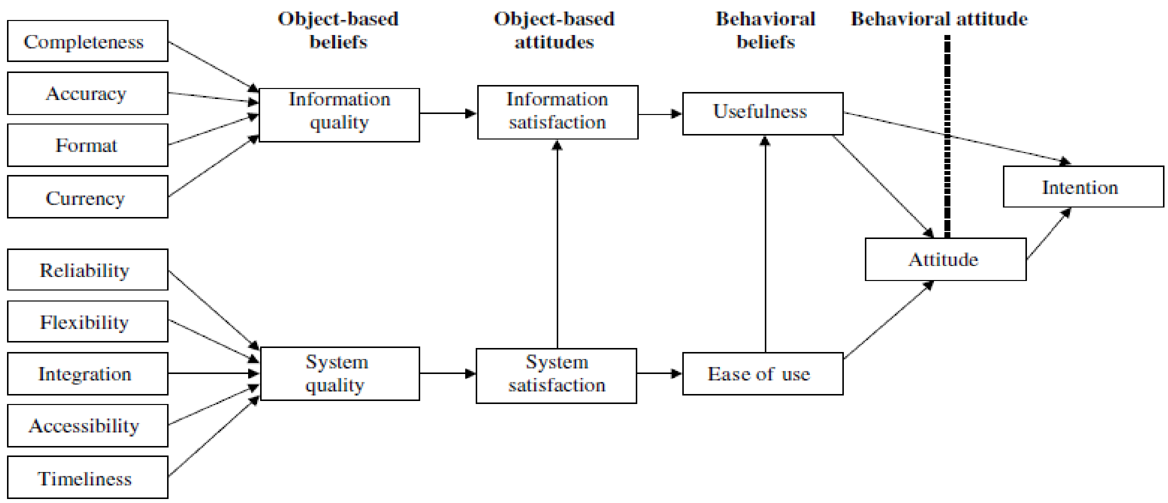


Figure 4. User satisfaction and technology acceptance for e-business (Wixom et al., 2005).

Going much further in applying the 2003 Delone and McLean IS SM to include the website context, Xu et al. (2013) made no clear distinction between content delivered by websites hosted inside or outside the enterprise. Their intent was to deepen and extend the Wixom and Todd (2005) model to the e-service and reintroduce a key dimension—ServQ, which forms the third criterion of IS success along with IQ and SysQ. The three IS quality constructs (ServQ, SysQ, and IQ) are what they henceforth refer to as the three-quality (3Q) model (see Figure 5; DeLone & McLean, 2003; Xu et al., 2013). Their model describes SysQ as the structural characteristic of an e-commerce system and taps into its performance dynamics, such as availability, adaptability, and response time, and further describes IQ as capturing the e-service content, such as the degree to which the content is complete and up-to-date.

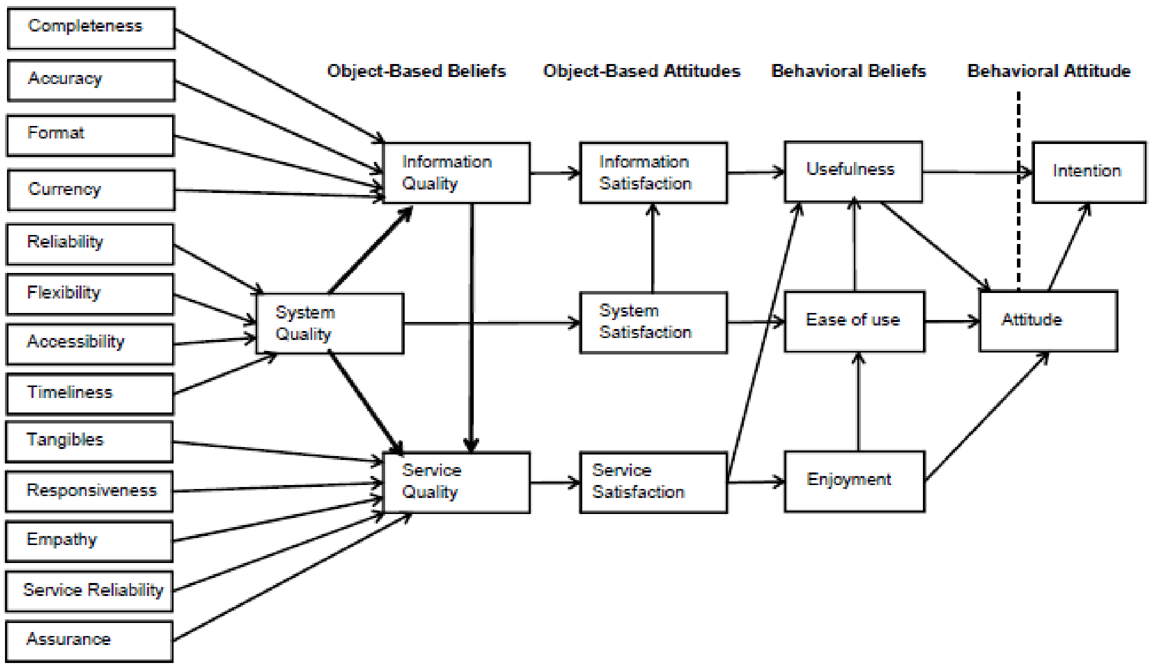


Figure 5. Service quality with system and information quality in website adoption (Xu et al., 2013)

Research by Xu et al. (2013) found that the concept of ServQ was traditionally used to address the IT unity service, but found that its application has evolved to include website content. They also found that ServQ is a customer's overall subjective assessment of the quality of the interaction with an IS service provider, including the degree to which specific service needs have been met. The SERVQUAL construct developed by Parasuraman, Zeithami, and Berry (1988) also includes the tangible facets of a provider's infrastructure and other visual features of a customer's salient perceptions about a vendor's service, reliability, assurance, empathy, and responsiveness (five key dimensions), as well as the tangible aspects of the vendor's infrastructure and/or appearance (Xu et al., 2013, p. 781). A key finding by Xu et al. (2013) determined that when the IS department within an organization increasingly provides a service function to its organizational clients, ServQ was found to be a fundamental criterion for success of online companies, boost online channel usage, and increase loyalty and enhance customer satisfaction with a particular website (Xu et al., 2013).

Another purpose of the Xu et al. (2013) research was to show the relationships among the perceptions of IS, ServQ, and SysQ in the e-service context. Their research posited that beliefs about SysQ will influence one's beliefs about IQ. Users' evaluation of the technical capabilities and usability of a system will influence their perception of SysQ. Users' evaluation of the system's delivery of semantic importance and/or communication of knowledge is perceived IQ (Xu et al., 2013). Likewise, they posited that belief about SysQ will also influence one's belief about ServQ. They found there was a significant relationship between SysQ and IQ, and not a significant relationship between SysQ and ServQ. SysQ, IQ, and ServQ had a significant and positive relationship among their direct corresponding information satisfaction (ISAT), system satisfaction (SysSAT), and service satisfaction (SSAT) constructs.

Our research model posits organizational satisfaction is an antecedent to use for those small businesses that have adopted cloud computing. This is based on the object-based attitudes of the IS affecting behavioral beliefs (Wixom & Todd, 2005; Xu et al., 2013). Research by Sun et al. (2012) determined that the effects of two major dimensions of social capital (cognitive capital and relational capital) not only positively affected user satisfaction but also strengthened the established relationship between service quality and user satisfaction. Other IS studies (Chou & Hong, 2013) combined information quality and system quality into one construct (ISQ) to assess their impact on system use (SU) and user satisfaction (US), and found that ISQ had no significant effect on SU, and SU had no significant effect on US.

Extending IS Success Model to Cloud Computing

For our research, the e-commerce model of Wixom and Todd (2005) and the website model of Xu et al. (2013), both adapted from the updated DeLone and McLean (2003) IS success model, will be used as the basis for the IS success model of cloud computing for small businesses. Basing their research on the DeLone and McLean IS SM, Wixom and Todd (2005) assessed their research model's applicability to gauge user satisfaction and technology acceptance. The e-business–related dependent variables associated with the Wixom and Todd model directly relate to key features that reflect qualities and attributes related to cloud computing.

In our research, "information quality" will not be included in our model based on the premise that the small business adopting a cloud-based model is not looking for the cloud service provider to produce information quality, but the small business will be responsible for assuring its own information quality. Our study will include those small businesses that have adopted cloud computing, moved their existing data, and enabled application services in the cloud. The issue of information quality is presumed because the responsibility of the quality of the information resides with the customer and is not produced by the cloud provider.

Within the context of cloud computing, customers, suppliers, and internal users will all consume computational services delivered inside and outside the enterprise via the Internet. Our research intends to affirm that service quality is the essential and critically important measure of cloud computing IS success, due to the nature of being provided by a third party. The service quality dimension from the DeLone and McLean (2003) original model (see Figure 3) will be reincorporated in our research, although Xu et al. (2013) used the Wixom and Todd (2005) and DeLone and McLean (2003) models to show the relationships among SysQ, IQ, and ServQ. We incorporate the precedence relationship between SysQ and ServQ taken from the Xu et al. (2013) model. Since SaaS, PaaS, and IaaS are "computational services," we will only assess the causal effects of SysQ on ServQ in our research model.

For our research we define net benefits of cloud computing at the organizational level as the chief measure of small business IS success. To achieve an accurate and effective evaluation of cloud computing net benefits, we will consider well-rounded measures of evaluation. Although the net benefits of cloud computing can be related to IS impact, which is defined as a point-in-time measurement of a flow of net benefits from the IS to date and projected, as perceived by all essential user groups (Gable et al., 2008, p. 381), for our research we are assessing the perception of cloud computing net benefits at the organizational level. Through this study our research aims to extend understanding about the consequences and drivers of the causality of net benefits, by service quality, organizational satisfaction, and use. Figure 6 shows the resultant combination of the updated Delone and McLean IS SM with the Wixom and Todd and Xu et al. models as adapted to model IS success for enterprises that have adopted public SaaS, PaaS, and IaaS cloud computing solutions.

It should be noted in Figure 6 that the perception of system quality is related to service quality in our cloud services–based model for small business. Although few studies have taken into account system quality as an antecedent of service quality (Xu et al., 2013), other research based on the Delone and McLean IS SM distinguishes service quality from system quality. With many small businesses lacking a dedicated IT staff, the cloud service provider is chiefly responsible for delivering this unified service. For those small businesses that adopted cloud computing, there is immediate benefit; therefore, we posit service quality as an immediate antecedent to net benefit over a traditional in-house IT environment the small business might have in place or be considering. The combination of ServQ and SysQ comprise the notion of what we call "cloud computing service quality" (CCQual), which is the foundation of this research study (see Figure 1). In our research model, ServQ and SysQ are antecedents to organizational satisfaction and use as supported by the research literature (Cronin & Taylor, 1992; Xu et al., 2013). ServQ, a first stage criterion along with organizational satisfaction and use as second stage criterion, leads to cloud computing net benefit (CCNetBen). With the tendency of small businesses to validate a cloud solution in a limited trial before adoption (which is typically provided by cloud service providers), we posit organizational satisfaction with a cloud service and its associated features will precede use (Wixom & Todd, 2005; Xu, Benbasat, & Cenfetelli, 2011). In our model both perceived organizational satisfaction and use are direct antecedents to net benefits. We posit for small businesses, as organizational satisfaction and use of the cloud service increase, increased net benefit will be achieved.

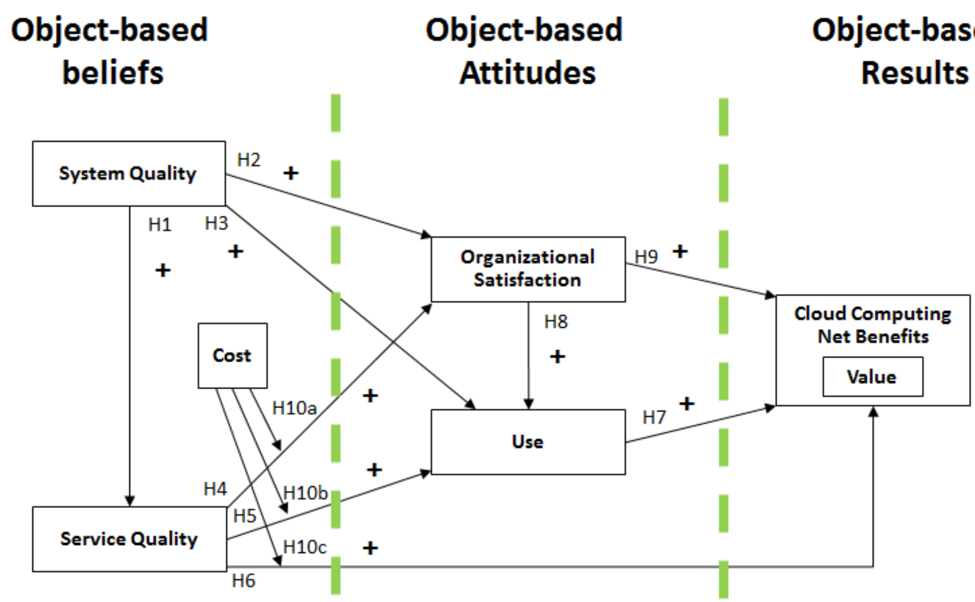


Figure 6. Theoretical model for IS success for cloud computing for small business.

Based on the type of cloud service used by the small business, we posit that SysQ and ServQ drive organizational satisfaction and use in different ways. We posit that higher perceived organizational satisfaction related to ServQ will occur with small businesses that have adopted SaaS and/or PaaS. We posit that higher perceived organizational satisfaction related to SysQ will occur with small businesses that have adopted IaaS. In some cases IaaS might drive perceived use higher due to the fact that IaaS permits small businesses to migrate their existing software stack to the cloud with no changes in software features, but with higher availability, reliability, and accessibility. Cost is the singular moderator to be considered between ServQ and its immediate successors (organizational satisfaction, use, and net benefits). We believe the cost of the cloud service will moderate organizational satisfaction and use as related to SysQ for SaaS and/or PaaS due to the need for more cloud service provider interaction with small businesses.

This research will gather quantitative data to confirm the relevance of extending this IS success model to cloud computing and to confirm that the relationships among the constructs will provide significant indication of cloud computing IS success for small businesses. Table 3 shows the body of peer-approved academic and research literature that was reviewed that encompasses this research study. The literature researched chiefly related to studies on cloud computing and information success as related to small business.

Table 3

Definition of Constructs

Construct	Definition	Supporting Citation
Service Quality	Measures the overall perception of support and service characteristics delivered by the cloud service provider.	DeLone & McLean (2003), Xu et al. (2013)
System Quality	Measures the overall perceptions of the cloud computing system: availability, usability, adaptability, reliability, and response time (e.g., download time).	DeLone & McLean (2003), Wixom & Todd (2005), Xu et al. (2013), Chou & Hong (2013)
Organizational Satisfaction	Measures the perception of the organization's satisfaction and opinions of cloud computing system.	DeLone & McLean (2003)
Use	Measures the organization's perception of use as measured by frequency of use, depth of use, duration of use, appropriateness of use, system dependence, actual use, and self-reported use, among others.	DeLone & McLean (2003), Petter et al. (2013)
Cost	Measures the total cost to initially provision and maintain ongoing operations of the cloud computing service over a determined time period based on the consumption-based model.	Grossman, (2009); Garrison et al., (2012)

Construct	Definition	Supporting Citation
Cloud Computing Net Benefit	Measures the positive and negative impacts of the cloud computing business results based on the context and objectives for each cloud computing investment.	DeLone & McLean (2003)

The intent of Table 3 is to show the relationships of the research literature to the key constructs and variables included in the theoretical model used in this research. Although this table is not exhaustive in scope, it illustrates the comprehensiveness of our study and the intended thoroughness of our efforts. Table 4 shows the body of peer-approved academic and research literature that supports the attributes of the constructs that make the research model.

Table 4

Constructs Linked to Scholarly Peer-Approved Literature

Construct	Attribute	Scholarly Peer-Reviewed Literature
System Quality	Availability and Reliability	Gupta et al. (2013); Han (2011); Haselmann et al. (2011); Maurer, Emeakaroha, Brandic, & Altmann (2012); Armbrust et al. (2010); Mell & Grance (2010);
	Adaptability and Flexibility	Armbrust et al. (2010); Cheng, Yang, Akella, & Tang (2011); Han (2011); Mell & Grance (2010); Teece, Pisano, & Shuen (1997)
	Accessibility	Haselmann et al. (2011); Kalyvas, Overly, & Karlyn (2013); Ko et al. (2011); Mell & Grance (2010); Tamer et al. (2013)
	Security and Privacy	Anthes (2010); Clarke (2010); Gupta et al. (2013); Haselmann et al. (2011); Kalyvas et al. (2013); Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi (2011); Pearson & Benameur (2010); Subashini et al. (2011); Summerill (2012); Wittow & Buller (2010)
Service Quality	Accountability and Auditability	Abbadi (2013); Clarke (2010); Kalyvas et al. (2013); Khan & Malluhi (2010); Ko et al. (2011); Noor et al. (2013)
	Responsiveness	Benlian et al. (2011); Foster, Zhao, Raicu, & Lu (2008); Jain & Gupta (2012); Kalyvas et al. (2013)

Construct	Attribute	Scholarly Peer-Reviewed Literature
	Assurance	Armbrust et al. (2010) ; Buyya et al. (2009); Khan & Malluh (2010); Ko et al. (2011); Wittow & Buller (2010)
	Trust and Empathy	Abbadi (2013); Bayrak (2013); Benlian et al. (2011); Hon, Millard, & Walden (2013); Khan & Malluhi (2010); Ko et al. (2011); Parasuraman et al. (1988); Xu et al. (2011); Haselmann et al. (2011)
Organizational Satisfaction		DeLone & McLean (2003); Petter, DeLone, & McLean (2008); Robey & Zeller (1978); Robey (1979); Robey, Smith, & Vijayasarathy (1993)
Use		DeLone & McLean (2003); Petter et al. (2013); Ward (2014)
Cloud Computing Net Benefits		DeLone & McLean (2003); Gable et al. (2008); Petter et al. (2008)
Cost		Dutta et al. (2013); Grossman (2009); Han (2011); Kudtarkar, DeLuca, Fusaro, Tonellato, & Wall (2010); Marston et al. (2011); Nanath & Pillai (2013); O'Sullivan (2009)

Literature Review on Key Constructs

In this section, we will discuss the individual variables that make up the constructs of our proposed IS success for cloud computing for small business theoretical model. Five variables will be defined and framed, starting with the dependent variables and working backward through the model to the independent variables.

Dependent Variable

Cloud Computing Net Benefit

For our research, net benefits capture the balance of positive and negative impacts of cloud computing on the small business enterprise. The net benefits of cloud computing are the extent that it contributes to the success of the small business. Net benefits share similarities with and differences from the net impact of other classic computational models used in enterprises. The context and objectives of net benefit measures must be determined for the cloud computing investment. There are a multitude of cloud computing attributes of net benefits to be considered, and many could be similar to the ones that have been established and verified for IS investments in general. Although DeLone and McLean (2003) postulated that success measures of net benefits are most important, they argued that net benefit cannot be successfully evaluated without system quality and information quality measurements included. Examples of net benefits are improved decision-making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, creation of jobs, and economic development (S. Petter et al., 2008, p. 239).

Independent Variables

System Quality

In this context, system quality is attributed to the cloud service provider and measures the overall perception of the characteristics of a cloud service. Availability, accessibility, adaptability, reliability, usability, flexibility, scalability, security, and privacy are attributes of system qualities valued by enterprise adopters of cloud computing systems. In cloud computing IS research conducted by Samson and McDowall (2013), they found there are many service providers and hosting companies available that have good quality facilities and provide high service availability, but few are suitable for a regulated environment that complies to industry-accepted best practices. A research study of mobile data services (MDSs) found perceived system quality is likely to be dependent on the total integrity of the technical architectures of MDSs in sustaining user experiences (S. Lee et al., 2009).

Availability and reliability. New technologies now allow for establishing or migrating computational and data storage services to cloud operators at the lowest cost of delivery. Cloud computing has become more pervasive and market driven, and is rapidly moving to a utility-based model. The intent is to provide for up to 99.999% (5 nines) uptime per year (or 5.15 h of planned outages per year maximum) for all system components (Islam, Morshed, & Goswami, 2013, p. 160; Marston et al., 2011, p. 181; Srinivasan, 2013, p. 62). Haselmann et al. (2011, p. 45) found that as important as the aspects of security and privacy are, issues concerning availability and performance rated just as high for small and medium businesses in their study sample. Cloud computing providers design and implement their services to provide availability and diversity to all clients regardless of a localized or regional service outage due to human or natural causes (Gupta et al., 2013). A critical design principal in building a highly available computing system is to remove all “single points of failure.” In spite of this very well-known design principle, if a cloud computing service provided by a single company does not provide for functional, operational, facilities, and geographical diversity, they in fact become a “single point of failure” (Armbrust et al., 2010). Cloud computing providers design and implement their systems and infrastructure with the intent to be continuously available, with limited or no downtime. This is enabled at n + 1 redundancy in key systems such as application, computational, data storage, network, power, and cooling, all distributed across multiple cloud computing hosting sites. To the small business, the cloud computing capabilities available for provisioning often appear to be unlimited (Mell & Grance, 2010, p. 50).

There are many factors that contribute to issues of IS downtime. These factors include software and hardware failure, network failure, natural disasters, malicious human actions, and unintentional human errors (Han, 2011). Cloud computing providers have huge advantages in offering highly available and extremely reliable IS services over locally provisioned services, which require more investment in resources to reduce the same, associated risks. The technology itself, if deployed correctly, affords the ability to minimize the effects of downtime. Nonfunctional requirements for the allocation of cloud resources are just as critical as the functional requirements (Maurer et al., 2012, p. 39). Nonfunctional requirements consist of application execution time, latency, response time, availability, and reliability. These nonfunctional requirements are termed "quality of service" (QoS) requirements and are articulated by means of "service level agreements" (SLAs; Maurer et al., 2012).

Adaptability and flexibility. A critical attribute of cloud computing is in its ability for rapid elasticity. This is a characteristic of cloud computing where it can be rapidly and elastically provisioned. This capability allows it to quickly scale out, be rapidly released, and quickly scale in, in some cases automatically. Unbeknownst to the consumer, the available provisioning capabilities often appear to be unlimited, with the ability to be purchased at any time in any quantity (Mell & Grance, 2010). In a traditional IT environment, storage and computational upgrades can be costly. Planning for downtime can be problematic, and is a certainty during an upgrade or system maintenance process. In comparison, the cloud computing model itself provides an effortless way to seamlessly upgrade computational capability and storage capacity with zero downtime, if handled appropriately (Han, 2011). When requirements vary by customer, cloud service providers must ensure they can adapt and flex their service delivery capability while isolating customers from the underlying complexities of the infrastructure and maintaining service levels (Cheng et al., 2011). This is a critical application of a dynamic capabilities framework, which is a critical attribute for a cloud computing service provider. As they relate to the ability of a service provider to integrate, build, and reconfigure internal and external competencies, dynamic capabilities are essential for a cloud service provider to have to address rapidly changing IT service needs for clients (Teece et al., 1997, p. 516). Flexibility has correlations to dynamic capabilities frameworks. Related to the applicability of dynamic capabilities theory to cloud computing, much research has been invested in this space. In a dynamic capabilities framework for cloud computing, all applications require distinct and separate models of computation, storage, and communication to provide an adaptable and flexible service (Ambrose & Chiravuri, 2010).

Accessibility. In the previous IS era that preceded cloud computing, e-business, one of the major inhibitors to adoption in many regions and countries was accessibility. One of the major reasons small businesses are attracted to cloud computing is the flexibility of being able to access services from anywhere at any time via the Internet (Kalyvas et al., 2013, p. 9). One of the key features of SaaS is the capability to provide consumers the use of a third party's applications through a widely accessible network running in a cloud environment (Mell & Grance, 2010). The SaaS model is claimed to be an attractive cloud computing service model for small businesses that are trying to simultaneously cut cost while at the same time endeavoring to increase flexibility of the IT service they need (Haselmann & Vossen, 2011). One of the major characteristics of a cloud computing environment is that applications are accessible from a diversity of client device types (i.e., smartphone, tablet computers, think clients, laptops, standard desktop PCs) through a thin app, thin client interface (i.e., web browser), or program interface (Mell & Grance, 2010; Tamer et al., 2013). The virtual environment that cloud computing provides gives users the ability to access IS resources that they might not otherwise have access to due to financial or organizational limitations (Tamer et al., 2013). Research by Tamer et al. (2013) noted that computational and communication services provided to users as they move from place to place, called nomadic computing, are highly dependent on broad network access. Companies might find it difficult or impossible to deploy the same on-premises solution inside their companies across countries, and it becomes an additional challenge to move this capability to a cloud service provider if they lack this capability. The right cloud service provider makes it possible for a company to deploy a uniform IS solution around the world (Tamer et al., 2013). With this level of access come issues with security and vulnerability, which small businesses must know and address before adoption. To assure accessibility protects small businesses from risk, cloud service providers must provide capabilities to permit access based on roles with different access privileges (Ko et al., 2011, p. 5). Typical cloud computing offerings provide broad network access characteristics that are beneficial to small businesses. Cloud services available over a public network and accessed through standard means encourage usage by a diverse set of platforms (Mell & Grance, 2010).

Security and privacy. One of the most debated issues with cloud computing centers around security and privacy. Security deals specifically with the aspects of protection mechanisms. These mechanisms include authentication, access controls, encryption, confidentiality, integrity, retention, storage, backup, incident response, and recovery (Pearson & Benameur, 2010). Privacy deals specifically with the aspects of personal and organization information handling (fairness of use, notice, choice, access, accountability; Pearson & Benameur, 2010). Cloud computing offers incredible benefits and wide potential to satisfy the needs of businesses and users like no other technology before, but privacy and security concerns abound (Summerill, 2012). Haselmann et al. (2011, p. 45) found that security was the number one concern for small and medium businesses in their study sample. To provide robust security for their customers, cloud service providers must provision security at multiple layers and in multiple dimensions (e.g., data storage, data locality, data segregation, network/data transmission, data access, authentication/authorization, application), as well as security related to third-party resources (Subashini & Kavitha, 2011). Just as the capabilities of SaaS are built on PaaS, and PaaS built on IaaS (see Figure 2), so are their information security issues and risks (Subashini & Kavitha, 2011, p. 3). As a small business implements the higher order of cloud-based services, additional levels of security services need to be considered. With SaaS, the small business is totally dependent on the cloud service provider to provision the right security for the entire stack regardless of where that cloud stack resides (Subashini & Kavitha, 2011, p. 4). There are considerable challenges in abandoning traditional infrastructures for third-party cloud computing hosted services when security and privacy concerns and legal uncertainties have yet to be completely addressed (Wittow & Buller, 2010). Cloud service providers and businesses are now subject to a broader range of state, federal, and international data security and privacy laws (Kalyvas et al., 2013, p. 7). Cloud service providers that deliver services to the U.S. federal government must comply with the Federal Information Security Management Act (FISMA). FISMA, which is a regulation governing the use of cloud computing services for U.S. federal government agencies, requires both applications and data of government agencies to be stored in a completely segregated environment, both logically and physically (Marston et al., 2011, p. 180).

With all the benefits of cloud computing come the thorny issues of security and privacy (Anthes, 2010). Cloud computing providers are constantly aware of clients' concerns of security and privacy, as they pertain to their data assets hosted in their environments. Storing and securing personal information (i.e., credit card or health records) are extremely sensitive and highly technical aspects of cloud computing (Wittow & Buller, 2010) and come with substantial risks. Cloud service providers have implemented services for their clients such as multilevel authentication with strong password requirements, network and data encryption, proactive security monitoring, tracking, auditing, and compliance. In the area of compliance assurance, cloud service providers must include features in their services that enable their customers to maintain multiple dimensions of compliance (e.g., data transmission security, data storage security, data use, data disclosure), which also include privacy policy enforcement (Clarke, 2010, p. 629). Many small businesses have found that the level of security that cloud service companies provide is stronger than what they can provide in-house, due to the shared economy of scale (Gupta et al., 2013).

Mediating Variables

Service Quality

Service quality is defined is the primary determiner of satisfaction (user or organizational) with IT service delivery (Gable et al., 2008, p. 390; S. Petter et al., 2012, p. 349; Sun et al., 2012, p. 1195; Xu et al., 2011, pp. 744–745). For our research, service quality is defined as the overall and comprehensive services delivered by the cloud computing service provider. Its importance is greater since the consumer of services is the entire enterprise and its customers. Service provider tangibles, plus the capabilities to deliver reliable and responsive service while providing assurance and empathy, are five dimensions of service quality required by organizations (Benlian et al., 2011, p. 88). With previous generation IT systems, service quality was advanced to be a chief antecedent to user satisfaction with IT service (Sun et al., 2012). Poor user support will translate into poor service quality, and will result in not only lost customers and lost sales, but lower operational efficiency by users. QoS of cloud-based service is equally important or ranks higher when compared to price, and if QoS assurances are uncertain, customers are less likely to migrate to the lowest-cost service (Armbrust et al., 2010). Some organizations are wary of cloud computing and question whether utility computing services will have adequate accessibility and availability (system quality) to provide for the overall service quality needed (Armbrust et al., 2010). Some cloud applications do not yet have the availability or QoS guarantees that some organizations demand (perhaps sometimes unreasonably) from their IT vendors (Marston et al., 2011). Benlian et al. (2011) developed a more in-depth conceptualization of SaaS service quality, which yielded more insights into the strengths and weaknesses of SaaS services, which could possibly explain dissatisfaction and possible discontinuance of SaaS by their users. Given a growing service orientation in the IS industry and that SaaS-based cloud solutions are quickly gaining broad market reach, it has become essential for companies to continually assess the service quality attributes of their procured SaaS services and confirm continual IS usage (Benlian et al., 2011). Service quality can also be correlated to service level. Service level is the cloud provider's ability to provide a stable operational environment where services are available to support the customer's business during the customer's normal business operational hours, and as needed at during other times (Kalyvas et al., 2013).

Accountability and auditability. Cloud computing, as with other third-party–provided services, is not without substantial risks. The discovery of shortcomings with a cloud service provider's delivered performance depends on the audibility of the services, including timely and effective audit performance (Clarke, 2010). This is especially true at a time when businesses are finding themselves subject to an expanding plethora of state and federal data security requirements, privacy laws, data retention requirements, and other standards of accountability (Kalyvas et al., 2013, p. 7). Industry groups, such as the CloudAudit Working Group, have come together to establish a common framework for cloud computing providers that includes audit, assertion, assessment, authorized access (for customers to their information), and assurance of their cloud computing environments (Kalyvas et al., 2013, p. 8). Many trust management research prototypes on cloud computing have been studied by various researchers (Noor et al., 2013). A broadly studied proposed framework called "TrustCloud" focused on the consumer's perspective of cloud services for cloud accountability and auditability enforcement (Ko et al., 2011).

The core design principal behind TrustCloud is to provide a framework that exploits a centralized architecture with detective controls and monitoring techniques for achieving and maintaining trust with cloud services (Noor et al., 2013). Many methods to increase the accountability and auditability of cloud service providers have been proposed, which includes receiving access logs and audit trails of all the cloud provider users and employees who have access to the system (Khan & Malluhi, 2010). Research by Ko et al. (2011) proposed tracking of file access histories, and so forth, and will enable service providers and users to reduce a number threats. These threats include the following: data breaches, denial of service, account or service traffic hijacking, data loss, and insecure interfaces and application program interfaces (APIs). Cloud service providers that make extensive logging, auditing, and historical data available go the extra distance in establishing accountability with their users (Abbadi, 2013). These data have different uses and intentions, as in proactive response services (through tools that provide for incident and security monitoring), billing, and error and forensic investigations (Abbadi, 2013). Research conducted by Ko et al. (2011) identified trust via the addressing of auditability and accountability as a critical area of research in cloud computing.

Responsiveness. The dimension of responsiveness deals with client perceptions about the inclination of the cloud computing service provider to help them when needed and satisfactorily address requests for assistance (Benlian et al., 2011). Responsiveness is one of the most critical aspects in contracting for cloud computing services (Kalyvas et al., 2013, p. 14). Cloud computing service offers the benefit of improving IT responsiveness to business needs (Jain & Gupta, 2012, p. 26). One of the chief reasons for cloud computing’s improved responsiveness over other IT services is based on the use of virtualization technologies that provide ease of resource provisioning, automation of monitoring and maintenance, and reuse of common resources (Foster et al., 2008, p. 6). Research conducted by Benlian et al. (2011) on SaaS determined the chief focus should be on the vendor's operations management competencies, especially in the areas of service responsiveness and security. IT managers should negotiate and require contractual uptime guarantees at least for the most critical cloud-hosted services, viz., IT helpdesk capability, application response time, escalation clauses, and indemnification if the performance criteria are not achieved (Kalyvas et al., 2013).

Assurance. An absence of transparency, unclear security guarantees, and loss of control over data assets have led to a dearth of customer assurance in third-party–hosted cloud services (Khan & Malluhi, 2010). An ongoing challenge for cloud providers is how to provide assurance that computational processing capabilities will be guarded and performance optimized based on client needs. Many cloud service providers have deployed technologies for the virtualization of server and storage resources to assure clients of the availability of resources with autonomic capabilities incorporated to adapt to demand (Ko et al., 2011). This functionality is incorporated into today's cloud computing models and is designed to afford cloud providers (agents) the ability to mitigate risk for the individual users and enterprise (principals), thereby providing assurances, even if not explicitly specified. This necessitates that cloud providers incorporate redundancy, reliability, and failover capabilities into their systems to make sure site and system failures do not interrupt customer operations or violate SLAs (Armbrust et al., 2010). This also requires cloud providers to include mechanisms to assure client data are protected and uncompromised. However, since cloud computing is becoming essential to support the core business operations of a small business, it is critical that guarantees on service delivery are in place and become a required component of the selection process. To adequately meet user expectations, clear and consistent communication of policies, capabilities, and practices is necessary (Wittow & Buller, 2010). SLAs are brokered between the providers and consumers, and are one means of providing the assurance small businesses would need (Buyya et al., 2009). Software license agreement terms should contractually protect the interest of the subscriber and not be exclusively worded to limit the liability of the licensor or cloud provider (Wittow & Buller, 2010). Service level agreement terms should include clear guidelines for contracts and include realistic migration plans that assure business continuity and secure availability of the data upon relationship termination.

Trust and empathy. With many of the benefits being clearly understood, one of the major barriers for cloud service providers to overcome is in the area of trust. The chief barrier to broad reception (acceptance) of cloud services is the lack of trust by prospective customers (Ko et al., 2011). Trust implies an act of reliance and faith (Khan & Malluhi, 2010, p. 20). Trust is confidence in expected behavior or something to be delivered in a prescribed way (Khan & Malluhi, 2010). In cloud computing, this is the belief that the competency and expertise of the cloud service provider can protect the most critical and valuable IS assets of the subscriber. Large enterprises have the legal resources, in-house technical expertise, large business dependencies, and revenue to leverage to get the cloud service providers to bend to their needs, assuring trustworthiness of the provider. Haselmann et al. (2011) found that small and medium enterprises did not trust cloud service providers although they expected very high levels of security from them, and this was specifically related to their data in the area of control. For a small business, trusting cloud service providers is a strong barrier to overcome, and they have fewer tools at their disposal to assure trust than the larger enterprises. Cloud computing has uncovered a new set of challenges by presenting different types of trust scenarios (Khan & Malluhi, 2010). Companies and individuals are required to transfer some or all control of computing resources and services to cloud service providers (Ko et al., 2011). As with many leading-edge technologies, the adoption of those technologies precedes the incorporation of features that address the issues of trust, and this is true for cloud computing (Khan & Malluhi, 2010, p. 20). Key attributes of trust posited by Khan and Malluhi (2010) are as follows: (1) insufficient information about a system or its capability results in less trust; (2) unsure control over assets results in less system trust; (3) trust will vary, depending on the control and ownership of data assets; (4) trust can be established through contractual relationships; and (5) trust can be cultivated through the central role of security in preventing service failure.

All perceived or real threats to cloud computing drive ongoing concerns of trust with all businesses. Research has found that two mutually dependent elements are required to establish trust in cloud systems and to mitigate threats. One element is trustworthy mechanisms and tools built into the support infrastructure to help cloud providers automate the process of managing, maintaining, and securing their systems (referred to as self-managed services; Abbadi, 2013). The second element is methods developed for the operational management of the cloud infrastructure to help cloud users and allow providers to establish and maintain trust (Abbadi, 2013).

Caring for a client's needs and providing specific individualized services is defined as service empathy (Parasuraman et al., 1988, p. 6). As it pertains to initial research on the attribute by Parasuraman et al. (1988), empathy contains items representing seven attributes: communication, security, credibility, competence, understanding/knowing customers, courtesy, and access. Some cloud users expressed frustration at providers' lack of empathy with their compliance obligations (Hon et al., 2013). Empathy reflects the customer's perceptions of the service provider (Xu et al., 2011, p. 748). If a service provider is empathic to the needs of the customers, it will provide individualized attention and have their best interests at heart (Benlian et al., 2011). Outsourced application services providers (ASPs) are expected to meet these criteria, as well as other dimensions of service quality (Bayrak, 2013).

Organizational Satisfaction

In their early research, Robey and Zeller (1978) found that the difference between successful and failed implementations of ISs is related to user satisfaction and involvement. Their research illustrates the relevance of some nontechnical variables in system implementation (Robey & Zeller, 1978). Their research studied the deployment of an identical information management system in two separate divisions of the same company. They found the difference between the success and failure of the two separate implementations centered on the attitudes of those involved in their use, which directly related to their satisfaction and dissatisfaction, respectively. The satisfaction of the users of the successful information management system implementation was significantly related to individual performance and performance visibility, and the perceived urgency and importance of the IS being implemented (Robey & Zeller, 1978). Relationships between user satisfaction and success factors have been well studied (DeLone & McLean, 2003). As posited earlier by DeLone and McLean (2003), greater system quality is expected to lead to greater user satisfaction. A research scan performed by Petter et al. (2008) found gaps in the IS success research literature in the area of the relationship between net benefits and organizational satisfaction. For this study the focus will be on measuring the opinions related to satisfaction of the enterprise leaders who have enterprise services hosted in the cloud.

Use

Regardless of the enterprise type, O'Sullivan (2009) determined one of the key benefits of cloud computing is in its ease of provisioning, administration, and use through a web browser and that it is intuitive for users. For this research, we define use as in "system use" as noted in Petter et al. (2013). System use is the extent to and manner in which users and customers use the capabilities of an IS (S. Petter et al., 2013). This is more correlated to the "amount of use" as espoused by Iivari (2005, p. 9). There are many attributes of system use that have been measured (i.e., frequency, depth, duration, appropriateness, dependence, actual, self-reported, etc.; Petter et al., 2013). As posited by DeLone and McLean (2003), a high-quality IS is characterized by increased use, higher user satisfaction, and positive net benefits. Based on the cloud solution selected by a small business, we believe this to be true. Extrinsic motivation, organizational competence, and IT infrastructure are the strongest determinants for use (S. Petter et al., 2013). In the area of cloud computing, use will be defined as a construct that measures enterprise services hosted in the cloud computing environment for enterprise use, as well as customer-facing services hosted in the cloud.

Moderating Variable: Cost

Using the cloud to run applications provides many technical advantages and results in significant cost savings when compared to running them on local managed servers (Han, 2011). The “cost of entry” with on-premises software presence is very high, whereas with cloud computing, it is comparably lower (O’Sullivan, 2009). Cloud computing offers the ability to rapidly scale up and down the IT services needed for an organization on a pay-per-use pricing model, while reducing overall IT management costs and driving the utilization to 100% of the contracted services (Grossman, 2009, p. 24; Kudtarkar et al., 2010, p. 198). Substantial cost savings and reduced implementation barriers make the benefits of using a cloud service significant when the attributes of easy start-up, low barriers to launch, technical scalability, and service flexibility are taken into consideration (Han, 2011, p. 202). However, the value of a cloud service is vastly compromised if its “elastic” nature (autonomic or easy ability to scale up or down based on demand) is not fully utilized (Kudtarkar et al., 2010). PaaS eliminates upfront IT investment costs, reduces time and minimizes work for setting up a running environment, and removes upgrade and maintenance tasks (except for a customer’s own customized applications) when compared to the traditional IT approaches (Han, 2011). Included with its other technical advantages, IaaS eliminates upfront costs in hardware investment (Han, 2011).

Usage-based pricing offered by public or third-party cloud companies provides several advantages. These advantages include a low barrier to entry, reduced capital expense, lower ongoing operational costs, and the ability to scale up (or down) as demand dictates to support brief surges in capacity (Grossman, 2009). For small businesses cloud computing becomes an additional available resource to achieve a competitive advantage in their marketplace. Organizations are facing the requirement of driving high usage of applications to sustain competitiveness while substantially reducing IT operation and maintenance costs (Dutta et al., 2013). O'Sullivan (2009) posits the "capital expenditure" with on-premises software represents substantial investments in software license and hardware, whereas with cloud computing there is none. Classic ROI studies are not as effective in determining the cost benefit of cloud computing because there is typically little or nothing for the customer to invest based on the cloud model selected. The objective of ROI papers is to mathematically derive the return a firm would receive based on the investment required in cloud computing (Nanath & Pillai, 2013). Detailed breakdown of the component costs in ROI calculations must be factored into a cloud ROI study, including amortization cost.

With cloud computing, small businesses have access to competitive computational tools—the same ones used by large enterprises that were not available to small businesses in the past. Investment in licenses, infrastructure maintenance, and upgrades lies with the cloud application service provider, not the user (O'Sullivan, 2009). The service is usually paid for from the operations budget (OpEx)—because there is no capital expenditure (CapEx; Marston et al., 2011; O'Sullivan, 2009). Cloud computing requires no upfront investment, which will allow cash-strapped small businesses more flexibility with the use of their financial resources (Marston et al., 2011, p. 184). The basic premise of cloud computing is small businesses can lease the required computing, storage, and communication resources at a lower cost to support their business needs from a large service provider that possesses these assets and is connected to the Internet.

Hypothesis Development

In this section, we will discuss hypotheses that reflect the relationship among the constructs that was derived from the literature review on IS success theory and cloud computing as related to the small business subject area. Ten hypotheses will be framed that will be tested by our resultant research instrument.

System Quality as Related to Service Quality

The schema that Xu et al. (2013) posited on website content proposes a relationship between SysQ and ServQ. The basis for this research is that SysQ will influence one's belief about ServQ as it relates to IS success with cloud computing. Although research conducted by Xu et al. (2013) determined the relationship between SysQ and ServQ was not significant in an e-service context, we believe SysQ will have a significant and positive relationship on ServQ as related to cloud computing. A cloud computing service with a self-service on-demand characteristic provides a small business the ability to provision computing capabilities (i.e., server time, network storage, either manually or automatically) as needed without requiring human interaction by the service provider (Mell & Grance, 2011). Sharing characteristics with both computing clusters and grids, cloud computing possesses unique attributes and capabilities, with promise to provide services to users without reference to the hosted infrastructure (virtualization; Buyya et al., 2009). With this one attribute, the perception of cloud computing service quality simplifies the complexities, as well as enhances and extends the benefit of the cloud computing system. In a sense, cloud computing provides for the simplification of security issues for users in small businesses by outsourcing security management, monitoring, and compliance to a third party with a highly skilled staff to deal with them (Anthes, 2010). For the benefit of small businesses, there is a causal relationship between system quality and service quality, hence we hypothesize the following:

> H1: The perception of system quality positively affects the perceived service quality of cloud computing services for small businesses.

System Quality as Related to Organizational Satisfaction

As discussed in the their e-services study, Xu et al. (2013) found that SysQ and ServQ had a significant and positive relationship with their direct corresponding system satisfaction (SysSAT) and service satisfaction (SSAT). For our model, system and service satisfaction are integrated into a singular satisfaction construct we call “organizational satisfaction.” When users participate in selection and development activities of an IS system, organizational satisfaction and system quality are higher (Robey & Zeller, 1978; Spears & Barki, 2010). Research confirms the importance of system quality in furthering system usage and user satisfaction, and subsequently personal and organizational performance (i.e., operational cost reduction; S. Lee, Shin, & H. G. Lee, 2009); therefore we posit it is also related to organizational satisfaction. In research conducted by S. Lee et al. (2009) on cloud-based mobile data systems (MDS), system quality reflects the instrumental aspect of MDS, and its performance below the threshold expectation level could lead to dissatisfaction with MDS. Although system quality and information quality were two of five independent constructs used to determine the effect of satisfaction and use of a web-based e-learning environment, Alshare et al. (2011) managed to increase overall student satisfaction regardless of their category, noting that increasing system quality and information quality is essential. Small business’s organizational satisfaction with cloud computing system quality is an essential component of overall success and provides the core basis for cloud computing technology adoption. The relationship between system quality and organizational satisfaction is hypothesized as follows:

> H2: The perception of system quality positively affects organizational satisfaction in cloud computing services for small businesses.

System Quality as Related to Use

System quality influences and results in increased system usage (Seddon, 1997). In a postadoption usage study of a cloud-based MDSs, S. Lee et al. (2009) determined the elements to increase usage include variables related to system environment or system quality (e.g., access speed and reliability, interface design), cost-related perceptions (e.g., pricing and uncertainty in usage cost), and user attributes (e.g., usage skill or self-efficacy). When a system is able to provide users with the ability to do more, work better, work better in the same amount of time, or take less time to achieve the same amount of work and at a higher quality is deemed a successful system (Seddon, 1997, p. 242). System quality is a requirement that, once its performance is up to the expectation level, clients might take for granted in using a service, and, therefore, the effect of system quality on usage increase might be insignificant (S. Lee et al., 2009). A large number of studies concur that the level of system quality is correlated with system usage when usage is studied at the organizational level (Caldeira & Ward, 2002; Fitzgerald & Russo, 2005; Premkumar, Ramamurthy, & Nilakanta, 1994). Again, it is important to remember that these studies are mostly conducted in the organizational context in which IS usage is significantly affected by group oriented, collective forces (i.e., organizational cultures, goals and objectives, management support; Seddon, 1997). Petter et al. (2008) found mixed results of system quality as related to use, based on context of the IS being studied and the attributes of the associated constructs. Given the context of small business, we believe that the system quality of a cloud computing system will be significantly related to use. Small businesses' organizational use of cloud computing services will increase as business results increase even if system quality remains the same; the relationship between system quality and organization use is noted in the following hypothesis:

> H3: The perception of system quality positively affects the degree of use of cloud computing services for small businesses.

Service Quality as Related to Organizational Satisfaction

As discussed in their e-services study, Xu et al. (2013) found that ServQ had a significant and positive relationship with their direct corresponding service satisfaction (SSAT) construct. For our model, system and service satisfaction are integrated into a singular satisfaction construct we call "organizational satisfaction." Research by Krishnan et al. (1999) found that improved financial services and the quality of those services resulted in improved customer satisfaction. The Benlian et al. (2011) study of SaaS satisfaction as related to service quality provided a more in-depth conceptualization of SaaS quality. Instead of validating already established dimensions of service quality (i.e., rapport, reliability, responsiveness, and features), Benlian et al. (2011) identified two new factors that were essential for the evaluation of service quality of SaaS providers (i.e., security and flexibility). The Benlian et al. (2011) study offered more insights into the strengths and weaknesses of SaaS, which explained dissatisfaction and possible discontinuance. In their study in cloud-supported MDSs, S. Lee et al. (2009) found users reduced MDS usage when they perceived weakness in its system quality dimensions.

When a decision is made to deploy a new application with a typical in-house IT service delivery model, it usually takes months to establish a budget, select the vendors for new hardware and software, negotiate prices, launch the orders, and install and test the new systems (Monroy et al., 2012). With cloud computing in the area of responsiveness, the service is provided almost instantaneously when it is contracted with a cloud service provider; which improves organizational satisfaction. With limited IS staff and technical acumen, small businesses are highly reliant on the service quality delivered by their cloud computing service provider. On this premise we base the following hypothesis:

> H4: The perception of service quality positively affects the degree of organizational satisfaction with cloud computing services for small businesses.

Service Quality as Related to Use

Use of an IS is, arguably, the most critical variable in the entire repertoire of empirical and behavioral studies (Straub & del Giudice, 2012). Previous studies on continued IS usage have examined the influence of software service quality on satisfaction and the intentions of continued IS usage (Benlian et al., 2011). In their update to their model, DeLone and McLean (2004) defined use based on nature and amount of the usage as important indicators of IS success. For cloud services to be continuously used by small businesses, cloud vendors need to shift their attention to all relevant aspects of service quality management (e.g., cues and events that happen before, during and after delivery of cloud services; Benlian et al., 2011). Benlian et al. (2011) found that cloud service providers who understand how small businesses perceive service quality, know the areas to allocate investments to improve service quality to continue and increase client use. This would also reflect the responsiveness and technical competence a cloud computing service provides, which supports extension of use as well as the amount and volume of ongoing usage. In their research on mobile banking, Kim et al. (2009) determined perceived service quality of a bank based on the firm's reputation affected usage intentions of the services. Such is the case for using cloud computing services that incorporate these unique services technologies to improve overall small business organizational use. Productive and continual organizational use of a cloud computing service by a small business is essentially dependent on service quality. On this basis we establish the following hypothesis:

> H5: The perception of service quality positively affects the degree of use of cloud computing services for small businesses.

Service Quality as Related to Net Benefits

Wilkins (2009) found small businesses that focused on improving services to their clients and leveraged technology to do so improved their customer loyalty, retention and resultant profitability. Although those small businesses had a less strategic view than large business, and limited budgets, they were more reactive to near-term business needs than long-term goals (Wilkins, 2009). This reflected their IT purchase decisions and effected their ability to extract the functionality needed to innovatively use IT, moreover it impacted IS success. The services that small businesses receive from cloud service providers enable them to receive benefits far beyond that which they can provide on their own. The characteristics or "impacts" that the Delone and McLean IS SM argues for are beyond the immediate user and include a diverse set of impacts (work group, interorganizational, industry, consumer, and/or societal; DeLone & McLean, 2003). In a review of studies by Petter et al. (2008) on the relationship between service quality and net benefits found that higher level of vendor support and effectiveness were related to lower operational cost. Seddon et al. (1999) looked at the IS effectiveness measures for evaluating net benefits of some aspect of the system (e.g., increased speed to complete tasks, increased decision quality, increased productivity, ROI). As it pertained to net benefits, Gable et al. (2008) posited that net benefits could be determined by or are closely associated with "IS-impact" as we earlier noted. Although defined as a holistic index representing the stream of net benefits by the ratio of quality to impact, the IS impact model determined the quality half as being the best proxy measure of probable future impacts (Gable et al., 2008). In the Gable et al. (2008) study, the IS, being a long-term investment, is expected to produce a continuing flow of benefits with continual use. With cloud computing in the area of responsiveness, the service is provided almost instantaneously when it is contracted with a cloud service provider; this enhances enterprise agility (Monroy et al., 2012). Beyond traditional IS technology, cloud computing service provides a foundational net benefit for small businesses. On this basis we establish the following hypothesis:

H6: The perception of service quality positively affects the perceived net benefits of cloud computing services for small businesses.

Use as Related to Net Benefits

Literature suggests that cloud computing use is driven by usage-based pricing; on-demand (self-provisioning), ubiquitous access; convenience; ease of provisioning; feature and functionality; and the ability to provide a competitive advantage. Cloud services allow small business users access capacity exactly when they need it (Grossman, 2009), and they only pay for the consumption of those resources required. In their research study in applying 2003 Delone and McLean IS SM to ERP systems, Chou and Hong (2013) measured corporate benefit (CB) in place of net benefit as the chief measure of ERP deployment success in manufacturing. Thus, the indicators for measuring CBs in their investigation are cost savings, reduced search costs, and time savings (Chou & Hong, 2013) as related to use. Research by Chou and Hong (2013) found that as the use of an ERP increased, CB increased, and the two were positively correlated. Regardless of the measure of use, as small businesses consume cloud computing services, the net benefits are realized soon after adoption. On this understanding we base the following hypothesis:

> H7: The degree of use of a cloud solution positively affects overall net benefits of cloud computing for small businesses.

Organizational Satisfaction as Related to Use

Fundamental attributes of cloud computing that have been heavily researched are ease of use and speed of provisioning (Ward & Gopal, 2014). DeLone and McLean (2003) postulated higher expected system quality leads to higher user satisfaction and use. Higher user satisfaction and use in turn cause positive impact on individual and organizational productivity improvements. From their research, they determined that use is an interrelated variable with “intention to use” and “user satisfaction.” Although use presents difficulties in interpreting its multidimensional aspects (i.e., mandatory or voluntary, effective or ineffective, informed or uninformed, etc.), DeLone and McLean (2003) proposed intention to use might be an appropriate alternative measure in select contexts. They concluded that intention to use is related to attitude to the IS, whereas use is a behavior with the IS. Attitude and links with behavior are particularly difficult to assess. Researchers might choose to stay with “use,” but expectantly with an added but informed understanding (DeLone & McLean, 2003). As found with their originally formulated results of the DeLone and McLean model, use and user satisfaction are closely interrelated (DeLone & McLean, 2003). In a process sense, use must precede organizational satisfaction, but positive experience with use will lead to greater organizational satisfaction in a *causal* sense (DeLone & McLean, 2003). Similarly, increased user satisfaction will lead to increased intention to use and thus use (DeLone & McLean, 2003).

DeLone and McLean (2003) posit that intention to use and combined use are reciprocally interdependent with user satisfaction, based on the context of the IS as tested over time (Iivari, 2005, p. 11). Research has suggested that users' intention for continuance of an IS is determined by their satisfaction with the use of the IS and perceived usefulness of continued IS use (Bhattacherjee, 2001). Satisfaction is regarded as the major feature in establishing and maintaining a loyal base of long-term consumers (users; Bhattacherjee, 2001). Research by O'Sullivan (2009) on "ease of use" found that on premise software presents difficulty for users and administrators to learn new interfaces and customize, whereas cloud computing, with its browser-based user interface, is intuitive for users to learn. A majority of users in one study confirmed that ease and convenience of use are the major reasons why they use the cloud for handling IS functions (Wittow & Buller, 2010). Small business's trepidation is overcome after the adoption of cloud computing services when business results begin to be realized and satisfaction increases, which results in increased use. From this, we base the following hypothesis:

H8: The organizational satisfaction of a cloud solution positively affects overall cloud computing use for small businesses.

Organizational Satisfaction as Related to Net Benefit

The organizational satisfaction with cloud computing is multidimensional like cloud computing itself and results in net benefits. The benefits realized by a large academic medical center in Atlanta are as follows: 50% decrease in Internet service provider costs; 30% reduction in annual hardware costs; 60% decrease in archive storage costs; reduced risk through encryption, firewalls, and intrusion detection; improved HIPAA privacy and security compliance; and IT staffing burdens eliminated (Rajendran, 2013). Research by Benlian et al. (2011) found previous models on continued IS usage examined the effect of software service quality with confirmation on satisfaction and on continued IS usage intentions. They found some models used rather abstract notions of service quality—although highly desirable for theory-building purposes, deemed not applicable for practical purposes. In their study of SaaS and in order to offer more analytical and prescriptive advice, as small business satisfaction increases with the system and service quality of cloud computing services after adoption, business benefits begin to be realized. To provide small business ongoing organizational satisfaction, net benefits should be continually realized, as noted in the following hypothesis:

> H9: The organizational satisfaction with a cloud solution positively affects the overall net benefits of cloud computing for small businesses.

Cost as Related to Organizational Satisfaction

In IS research, satisfaction with a service can be related to loyalty (Aydin, Özer, & Arasil, 2005; de Ruyter, Wetzels, & Bloemer, 1998; M. Srivastava & Rai, 2014) and relationship commitment (Sharma, 2003). Other research investigated the relationship between service quality and loyalty (de Ruyter et al., 1998; Ranaweera & Neely, 2003). These studies include cost as a moderator, denoted by switching cost or the cost of changing from one service provider to another (Porter, 1980). The latter can also be related to the cost of moving from an in-house delivered IS to a cloud-based IS. De Ruyter et al. (1998) found that there is a moderating relationship between the levels of switching costs and customer loyalty or satisfaction with a service. According to

Ranaweera et al. (2003) in the qualitative portion of their study identified the moderating effect of price and determined that those who were unhappy with price despite positive service quality perceptions are bound to be dissatisfied and will look to move to another IS platform or service. In the quantitative portion of the Ranaweera et al. (2003) study found that service quality was not the primary concern of customers because with high service quality at the expense of reasonable price also appeared to be unacceptable for price sensitive customers. Ranaweera et al. (2003) determined when price perceptions are poor and there is potential for improved service quality, service quality enhancements can lead to a significant rise in the retention and satisfaction (Ranaweera et al., 2003). The Ranaweera et al. (2003) study confirmed when negative price perceptions are associated with high service quality perceptions, service quality alone will be insufficient to retain or satisfy customers.

Of the four related risk vectors for cloud computing service adoption studied by Iye et al. (2013), the lack of significant cost reduction was found to be a major dissatisfier among various businesses. Iye et al. (2013) found that the gains cloud computing services, advertised in terms of reduction in capital and operative costs, might not be sufficient enough to move from existing systems to cloud platform, or completely satisfy them when they get there. Businesses operating in a traditional noncloud mode, many of their costs do not “naturally” fall in step with cloud model and the operating cost reduction is something that has to be systematically achieved (Iye et al., 2013).

Cloud-based systems, due to their shared infrastructure and resource model, provide positive cost savings (e.g., reduced cost) to small businesses, simultaneously reducing the entry point (switching cost) for small businesses to adopt it as well as normalize IT cost expenditures over time, therefore resulting in positive (e.g., increased) organizational satisfaction. Reduced cost of entry allows startups and small businesses to afford feature rich enterprise resource planning (ERP), customer relationship management (CRM), sales force automation (SFA), and supply change management (SCM) systems immediately and economically based on subscription fees (Gupta et al., 2013). The satisfaction small businesses receive with cloud-based services is positively related to the paying only for the volume and type of services they consume. Small businesses can quickly add or subtract resources from their order. The satisfaction they receive is that they do not own the facility, hardware and technical support headaches associated them (R. Smith, 2009). Lower cost extends to the total costs of provisioning and ongoing operation. Cost (i.e., lower) strengthens the relationship between service quality and organizational satisfaction when the cloud services are rightly aligned with the needs of the small business, especially when financial resources are limited. We assume that the degree of cost will have a moderating effect on the relationship between perceived service quality and organizational satisfaction, and a negative moderating effect on the relationship between perceived service quality and organization dissatisfaction response. The moderating relationship of cost associated with the relationship between service quality and organizational satisfaction provides the basis for the following hypothesis:

> H10a: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and organizational satisfaction with small businesses than with cloud computing services with relatively higher costs.

Cost as Related to Use

Cloud computing pricing models are positively related (e.g., cost aligned) to usage-based pricing where computing resources are paid for based on the rate of consumption. Cloud computing pricing models are similar to usage-based pricing where computing resources are paid for based on the rate of consumption or cost is discounted based on negotiated volume. This happens through use of customized SLAs, thereby focusing on the service provided and hiding the complexities of the underlying technological infrastructure. The concept of pay-as-you-go in cloud computing differs from traditional hosted computing models that involve negotiated payment of costs to have resources reserved (i.e., stood up) for a specific period of time regardless of the actual usage (Nanath & Pillai, 2013). If a company's software and systems are not proprietary to their business, there is little reason they should not be exploring the option for using data and services in the cloud since cloud computing service providers have made their services so inexpensive to use and easy to access (R. Smith, 2009).

To overcome internal resistance to cloud-based technologies, initiating a pilot or proof-of-concept study with a cloud-based service can provide the internal IT department first-hand experience with the ease of use, cost-effectiveness, and available functionality of clouds without compromising the company's core business operations (R. Smith, 2009). For a small business, many cloud providers make available free 30-day or limited-time trials where they can validate the cloud service's usability for their business without incurring any costs (Christauskas & Miseviciene, 2012, p. 15). In their literature review, Gupta et al. (2013) found the use of cloud computing by large-scale enterprises is primarily based on their perceptions of cost reduction first and ease of use and convenience second, followed by reliability, sharing, collaboration, and last but not least, security and privacy. Gupta et al. (2013) determined that reliability on cloud usage improves ease of use and is highly convenient for small businesses. Small business use is intensified when the consumption of the cloud computing service is moderated by lower cost. The moderating relationship of cost associated with the relationship between service quality and use provides the basis for the following hypothesis:

> H10b: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and use for small businesses than with cloud computing services with relatively higher costs.

Cost as Related to Net Benefit

Gupta et al. (2013) identified that the low entry cost for small firms using cloud computing resulted in a positive effect on small business convenience and economic benefits (e.g., net benefit). Research conducted by Nanath and Pillai (2013) resulted in a comprehensive model that incorporates organization input from different perspectives and provides recommendations on adopting/shifting to cloud computing. Three layers were considered for determining the cost benefit of cloud computing that Nanath and Pillai (2013) determined were essential for achieving business benefit. General base cost estimation, base cost estimation related to data patterns, and cost estimation related to project specifications are the three layers to determine the cost benefits of cloud computing (Nanath & Pillai, 2013, p. 94). The intent of the research performed by Nanath and Pillai (2013) is to aid managers at different responsibility and decision levels in an organization in understanding the financial prospects of adopting cloud computing. The result of the study by Nanath and Pillai (2013) finds that it is profitable for small businesses and start-ups to adopt cloud computing. Due to its flexibility, cloud computing offers more granular and scalable cloud computing solutions when compared to traditional IS models and at a lower cost (entry and ongoing operation; Han, 2011) with added features and increased value. There is also the risk of cost blow-outs within contractual agreements if the cloud service provider mechanisms for their control is missing (Clarke, 2010). Cloud computing net benefit is intensified (positive) for small businesses over a traditional IT service delivery model is less in overall cost (positive), both postadoption and over the life of the cloud computing service. The moderating relationship of cost associated with the relationship between service quality and net benefits provide the basis for the following hypothesis:

H10c: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and perceived net benefits for small businesses than with cloud computing services with relatively higher costs.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

In this chapter we will discuss the research method and methodology used in this study. This chapter is divided into five sections. The first section provides an overview of the research design. The second section presents details of the statistical analysis that was used to test the proposed hypotheses. The third section details the pilot test and final survey including the sample and procedures used for data collection. The fourth section describes the preliminary measures used in the study. The final section discusses common method variance and the steps that were taken to minimize the effect.

Research Design

This research used retrospective experience methodology to explore the experiences of small businesses that were using some form of cloud computing. The decision to collect data from respondents from small businesses was based on the high prevalence of business challenges (Krell, 2011) and perceptions of benefit (Gupta et al., 2013). This methodology was determined appropriate for the current study, as it involved asking respondents to complete scaled responses (see Figure 7) related to questions involving their experiences and challenges that took place during and after cloud computing implementation.

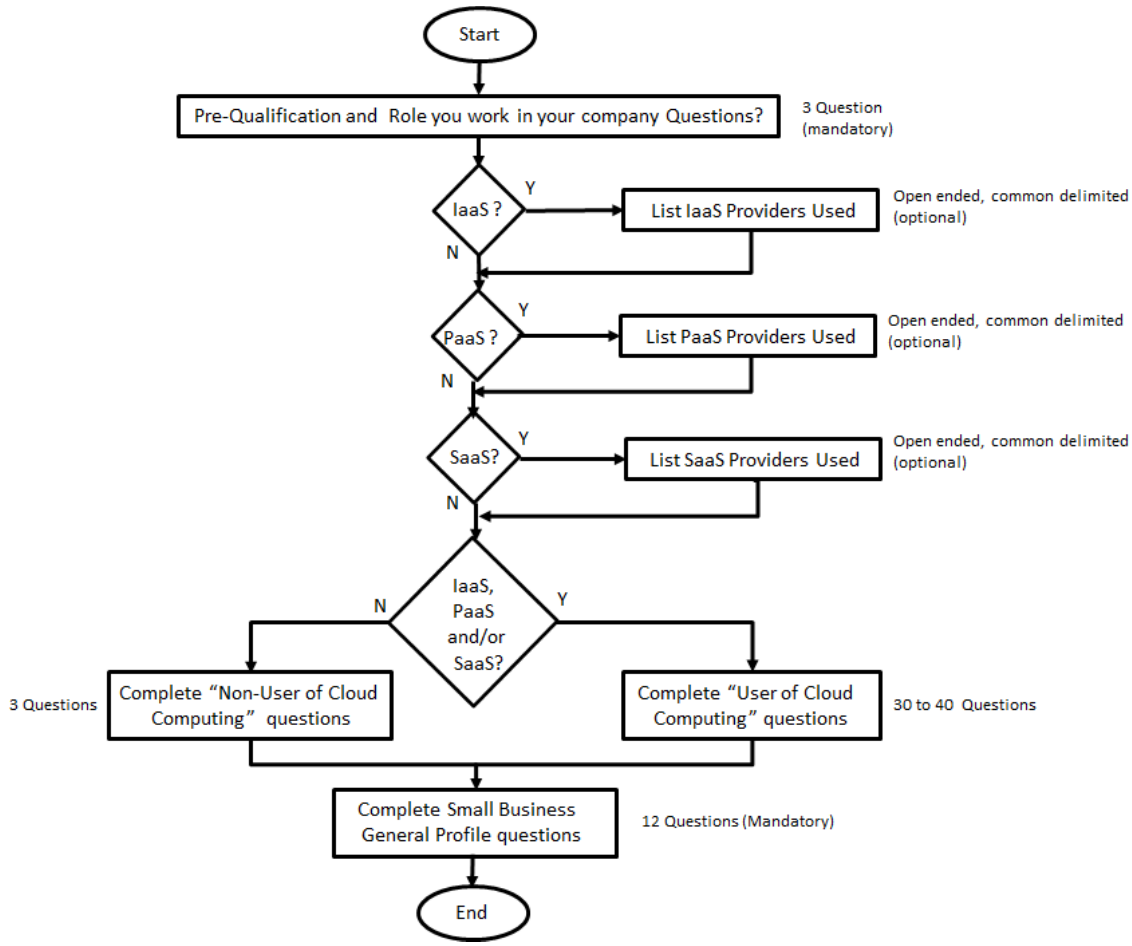


Figure 7. Research survey flow chart.

Using the Wixom and Todd (2005) and Xu et al. (2013) validated survey instruments as a base to work from, the intended survey questions were mapped to the associated constructs, and their associated hypotheses were tested. Our methodological approach was to simultaneously gather data from select small businesses associated with the KSU SBDC and other small business sources. This also included data sources provided by IBM's small business client database and small business and cloud computing social media groups on LinkedIn© ("Small Business Network for Startups and Entrepreneurs" to date has 69,788 members; "Cloud Computing" to date has 308,905 members) and Facebook ("Small Business Owners of America" to date has 18,578 members). A Qualtrics© small business panel was also secured to gather our final research data with our previously mentioned data sources. Only one primary individual was targeted in each of the small businesses surveyed. This select individual was the owner, operator, CIO, president, or founder of the targeted small business, as validated by the survey instrument, who was most knowledgeable of the cloud computing services implemented in their enterprise.

Measurements

The preliminary questionnaire for our study employed established scales that were already available. Modifications were made to suit the context of this study. The questionnaire was reviewed by an expert panel of IaaS, PaaS, and SaaS cloud service sales sellers within IBM Global Services in Atlanta, GA; select small business cloud computing service users; and DBA IS students in the KSU Coles College of Business. Each individual scale is described below.

System Quality

System quality measured the desired characteristics of a cloud computing system. Availability, adaptability and flexibility, reliability, accessibility, and security and privacy were the system qualities that were valued by small businesses that use cloud computing. Multiple items were used to measure each characteristic. The items were rated on a 7-point Likert-type scale with 1 = *Strongly Disagree* and 7 = *Strongly Agree*.

Service Quality

Service quality measured the overall support delivered by the service provider. Accountability and auditability, responsiveness, assurance, trust, and empathy were the service qualities that were valued by small businesses that used cloud computing.

Multiple items were used to measure each characteristic. The items were rated on a 7-point Likert-type scale with 1 = *Strongly Disagree* and 7 = *Strongly Agree*.

Organizational Satisfaction

Organizational satisfaction measured organization opinions of the IS and used a 7-point Likert-type scale with 1 = *Strongly Disagree* and 7 = *Strongly Agree*.

Use

Use as related to system use was measured by considering the actual use, frequency of use, depth of use, and system dependence. The items were rated on a 7-point Likert-type scale with 1 = *Strongly Disagree* and 7 = *Strongly Agree*.

Cloud Computing Net Benefit

Cloud computing net benefit was the most important success measure of our study as it captured the balance of positive and negative impacts of cloud computing on the organization, including the market and customers that the small business engaged and served. Measures were determined by context and objectives achieved by cloud computing investment. Thus, there was a variety of cloud computing net benefit measures, but many were similar to the ones that were developed and tested for IS investments in general. The items were rated on an 11-point Likert-type scale with –5 = *Strongly Negative* and +5 = *Strongly Positive*.

Cost

This attribute was defined as the total cost to initially provision and maintain ongoing operations of the cloud computing service over a determined time period based on the consumption-based model. The items were rated on an 8-point Likert-type scale with 1 = *0%* and 8 = *Greater than 25%*.

Data Collection

The study tested the IS success model to evaluate cloud computing for small businesses by gathering structured data in an attempt to increase the understanding of cloud computing's net benefit. This research used a quantitative method design (quantitative questions asked via an online survey using Qualtrics©). This survey also included open-ended questions to gather data from those small businesses that opted out of the survey because they had not implemented cloud computing. The intention of this optional survey path was to gather data to be used to provide direction for future research, but in using the services of Qualtrics© to gather the final data, only small businesses that were cloud business users were targeted.

Few challenges emerged from this type of study. To address the typical challenges associated with limiting the number of survey questions each participating company must complete to ensure that the associated quantitative data were gathered in accordance with the defined research model, Q-sorting methodology was implemented to address this challenge. This was performed to optimize the selection of measurement attributes for the research model that used formative constructs, thereby reducing the total number of questions associated to the constructs. The survey was sent to one person in each small business organization to complete but it was not requested of that individual to send it to one other person in the organization to complete. In only surveying one person per organization, we did not need to include unique identifier in the survey response to differentiate participants (i.e., name, company email address, etc.).

Data Modeling

Research hypotheses were tested using structured equation modeling via partial-least squares structured equation modeling (PLS-SEM) software to analyze survey data and confirm the theoretical construct. PLS-SEM maximized the explained variance while also evaluating the data quality based on measurement model characteristics (Hair, Ringle, & Sarstedt, 2011). The use of PLS-SEM has increased considerably in the last 20 years primarily because of its ability to deal with nonnormal data, small sample sizes, formative measures, and research that focuses on prediction (Hair, Sarstedt, Pieper, & Ringle, 2012).

Q-Sort, Pretest, Pilot Test, and Final Survey

The scale items were validated by dual Q-sort tests, which was a means of verifying discriminant validity and evaluated if the measures could be categorized as per the theoretical predictions. The dual Q-sort tests of the scale items were conducted using Qualtrics©.

The survey instrument was validated in a pretest for face validity with a small set of 17 owners, operators, technology directors, or CIOs of small businesses that were using cloud computing services. The pretest of the questionnaire was conducted using Qualtrics©.

The survey was pilot tested to validate the measurement model. The pilot test targeted a set of small businesses sufficient to validate our measurement model. The pilot test of the questionnaire was conducted using Qualtrics©. Pilot test participants were prequalified and selected from small business and cloud computing social media groups on LinkedIn© and through personal business connections. Individuals in those organizations who cleared the prequalification questions to determine if they were using cloud computing in their small business were asked to complete the survey (see Figure 7). Small businesses that did not pass the prequalification questions (do not use IaaS, PaaS, or SaaS) were asked to respond to a list of reversed and open-ended survey questions to gather qualitative data to understand why they do not use cloud computing in their business. For the pilot test, additional open-ended questions were added to the end of the survey asking for specific feedback regarding any misunderstanding of the questions on the survey, and to gather information and general feedback regarding the subject matter. The results of the pilot test were used to revise and refine the initial survey instrument as needed.

The formal survey participants were selected from a group of small businesses prequalified by Qualtrics©. To collect the final data for this study, Qualtrics© was used to distribute the final survey. The minimum sample size for PLS-SEM was determined to be the larger of either: (1) ten times the largest number of formative indicators measuring one construct, or (2) ten times the largest number of structural paths heading for a particular latent construct in the structural model (Hair et al., 2011). It was our hope that a substantial number of small businesses in our candidate pool was using IaaS, PaaS, and/or SaaS so that the associated data could be analyzed separately in a future study.

Limitations

Due to the different combinations of cloud computing deployment and service models, this research primarily focused on small businesses that have implemented IaaS, SaaS, or PaaS as control variable. This research was a postadoption study. The targeted small businesses using IaaS, SaaS, or PaaS would be those using public cloud computing service providers (not private cloud or hybrid cloud computing solutions). Only select small businesses located in the United States from various industry groups (e.g., manufacturing, distribution, retail, IT services, etc.) were targeted.

CHAPTER 4: RESULTS

Q-Sort Tests

Forty-one (41) scale items were uploaded to Qualtrics© to conduct a Q-sort survey. A Q-sort is a means of verifying discriminant validity. Its purpose is to evaluate if the measures (i.e., scales) can be categorized as per the theoretical predictions (Petter, Straub, & Rai, 2007). It combines the validation of content and construct through experts and/or key informants who group the items according to their similarity (Straub, Boudreau, & Gefen, 2004, p. 390). This process also removes or differentiates among items that do not match postulated constructs (Straub et al., 2004). A Q-sort survey was created to determine if 9 scale items associated with System Quality (SysQ), 8 with Service Quality (SysQ), 5 with Organizational Satisfaction (OrgSat), 10 with Use (Use), 8 with Cloud Computing Net Benefits (NetBen), and 1 with Cost (Cost) could be associated to each construct. In this survey, a single open-ended free-form text field was provided for participants to provide unstructured feedback. Another open-ended free-form text field was provided for participants to provide their email address so they could participate in future research on the subject matter. Finally, a last open-ended free-form text field was provided for participants to provide their U.S. mailing address so that a participation gift could be sent to them.

The Q-sort study was conducted to determine if a group of cloud computing experts and DBA IS students could relate the 41 statements and questions that make up the core of our survey instrument to the six constructs of our research model. The Q-sort survey period was conducted over a 15-day period. The Q-sort study was targeted to a group of 48 IaaS, PaaS, and SaaS cloud service sellers within IBM Global Services and 6 DBA IS students in the KSU Coles College of Business. Of this pool of 54 requested survey participants, 16 initiated the survey and 10 completed the survey, which resulted in an 18.5% completion rate. Two out of 10 participants provided feedback on select areas of the survey. One participant noted, “Some system, service, satisfaction questions seem close to net benefit.” Another survey participant noted, “…there were a few which came across a little odd in wording.” The issues associated with each of these two comments have been addressed in the change table (see Table 7). Four out of 10 participants provided their email addresses to participate in future research on the subject matter. Seven of 10 participants provided their U.S. mailing address to receive their participation gift.

Although the research literature does not establish a consistent standard for ranking of Q-sorted items, but various methods are accepted as long as they are practical and systematic (Dziopa & Ahern, 2011). For our Q-sort study we have set a simple standard of agreement starting at the 70% level (7 out of 10 majority agreement). Based on the results of the Q-sort, 17 of the 41 statements or questions were correctly associated with their corresponding construct at a rate of 0.70 and higher (see Table 5).

Table 5

Q-Sort Association with Rate of 0.70 and Higher

Index	Scale Item	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase I Correct Association
OrgSat5	Overall, my interaction with the cloud service for my small business is very satisfying.	0	3	7	0	0	0	70%
Use2	Duration of use of cloud services in my small business.	1	0	0	7	2	0	70%
OrgSat3	The cloud service was very satisfying for me to select for my small business.	1	0	8	0	1	0	80%
OrgSat4	All things considered, I am very satisfied with the cloud service selected for my small business.	0	1	8	1	0	0	80%
ServQ2	My cloud service provider maintains flawless records.	1	8	0	0	1	0	80%
ServQ7	Overall, the level of service quality I received from the cloud service provider for my small business's select use was good.	0	8	2	0	0	0	80%
NetBen4	My cloud service has resulted in overall productivity improvement.	0	0	0	0	9	1	90%
NetBen7	My cloud service has resulted in improved business processes.	0	0	1	0	9	0	90%
Use6	I use cloud services whenever appropriate to do my work in my small business.	0	0	0	9	1	0	90%
NetBen5	My cloud service has resulted in improved outcomes or outputs.	0	0	0	0	10	0	100%
NetBen8	My cloud service has resulted in better positioning for business.	0	0	0	0	10	0	100%
OrgSat2	The cloud service has met our small business expectations.	0	0	10	0	0	0	100%

Index	Scale Item	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase I Correct Association
ServQ1	My cloud service provider publishes a policy on the protection of transactional data and from accidents.	0	10	0	0	0	0	100%
Use1	Frequency of use of cloud services in my small business.	0	0	0	10	0	0	100%
Use3	I use cloud services a lot to do my work.	0	0	0	10	0	0	100%
Use4	I use cloud services whenever possible to do my work in my small business.	0	0	0	10	0	0	100%
Use5	I use cloud services frequently to do my work in my small business.	0	0	0	10	0	0	100%

Of the 41 statements or questions, 14 were marginally associated and 10 were completely unassociated or largely not associated with their corresponding construct (see Table 6) at a rate of 0.69 and lower. This would require: (1) removing the associated scale item, (2) adjusting the wording of the scale item, or (3) selecting another scale item to replace the invalidated scale item. Table 6 contains the 24 statements or questions that were marginally associated or completely unassociated with their corresponding construct.

Table 6

Q-Sort Association with Rate of 0.69 and Lower

Index	Scale Item	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase I Correct Association
OrgSat1	The cloud service is of high quality.	3	6	0	1	0	0	0%
ServQ4	I felt confident about the selection decision of the cloud service.	0	0	9	0	1	0	0%
SysQ8	Overall, I would give the quality of the cloud service a high rating for my small business's selected use.	0	4	6	0	0	0	0%
SysQ9	Overall, my interaction with the cloud service for my small business was very satisfying.	0	1	8	0	1	0	0%
NetBen1	My cloud service is cost-effective.	0	0	0	0	1	9	10%
ServQ8	The decision to select the service provider in terms of delivering satisfactory service was very satisfying.	2	2	5	1	0	0	20%
Use7	Generally, cloud services support my work procedures in my small business.	3	2	0	2	3	0	20%

Index	Scale Item	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase I Correct Association
Use9	Implementation of cloud services has meant that I have handed over information technology services tasks to others.	0	0	0	2	6	2	20%
Use10	Generally, the cloud service has made my work easier.	0	1	2	3	4	0	30%
SysQ4	The cloud service was able to flexibly adjust to new demands or conditions during my small business's selected use.	4	1	2	0	3	0	40%
SysQ6	My cloud service provides the data encryption needs for my small business.	4	1	1	0	4	0	40%
Use8	Implementation of cloud services entails new tasks for my small business.	0	1	0	4	3	2	40%
NetBen2	My cloud service has resulted in reduced staff costs.	0	0	0	0	5	5	50%
NetBen3	My cloud service has resulted in cost reductions (e.g., inventory holding costs, administration expenses, etc.).	0	1	0	0	5	4	50%

Index	Scale Item	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase I Correct Association
ServQ3	I believe the cloud service is responsive to my needs during my small business's selected use.	1	5	3	0	1	0	50%
SysQ3	The cloud service was able to adapt to meet a variety of needs during my small business's selected use.	5	1	3	1	0	0	50%
SysQ7	My cloud service provides the access control measures for my small business.	5	3	0	1	1	0	50%
Cost	How much has your IT cost been reduced since you have adopted cloud?	0	0	0	0	4	6	60%
NetBen6	My cloud service has resulted in an increased capacity to manage a growing volume of activity (e.g., transactions, population growth, etc.).	1	1	0	1	6	1	60%
ServQ5	My cloud service provider guarantees the protection of my company's business information.	3	6	0	0	1	0	60%

Index	Scale Item	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase I Correct Association
ServQ6	My cloud service provider had my best interests in mind for my small business's subscribed set of services.	1	6	2	0	1	0	60%
SysQ1	The cloud service availability supported the needs of my small business's selected use.	6	1	2	0	1	0	60%
SysQ2	The cloud service performed reliably for my small business's selected use.	6	3	1	0	0	0	60%
SysQ5	The cloud service was readily accessible for my small business's selected use.	6	1	1	1	1	0	60%

After a review of the Q-sort results, a second Q-sort was recommended to tune my survey instrument before pretest to reduce potential cross-loading onto specific constructs by specific scale items. To correct the issues noted with the 24 scale items, the actions presented in Table 7 were implemented and tested in a second Q-sort before the execution of the pretest.

Table 7

Scale Adjustments Based on Q-Sort Results

Index	Scale Item	Scale Item Adjustment
OrgSat1	The cloud service is of high quality.	The cloud service *for my small business* is of high quality.
ServQ4	I felt confident about the selection decision of the cloud service.	*(SWAPPED QUESTION) I felt safe in my interaction with the cloud service during the use by my small business.*
SysQ8	Overall, I would give the quality of the cloud service a high rating for my small business's selected use.	Overall, I would give the *system* quality of the cloud service a high rating for my small business's selected use.
SysQ9	Overall, my interaction with the cloud service for my small business was very satisfying.	Overall, my *system experience* with the cloud service *used by* my small business *is* very satisfying.
NetBen1	My cloud service is cost-effective.	My cloud service *provides* cost-effective *benefits.*
ServQ8	The decision to select the service provider in terms of delivering satisfactory service was very satisfying.	*(SWAPPED QUESTION) I am very satisfied with the cloud service my small business receives from the cloud service provide.*
Use7	Generally, the cloud service supports my work procedures in my small business.	Generally, the *use of cloud services supports* my work procedures in my small business.
Use9	Implementation of cloud services has meant that I have handed over information technology services tasks to others.	*(QUESTION REMOVED)*
Use10	Generally, the cloud service has made my work easier.	Generally, the *use of* cloud services *has* made my work easier.
SysQ4	The cloud service was able to flexibly adjust to new demands or conditions during my small business's selected use.	The cloud service was able to *systematically and* flexibly adjust to new demands or conditions during my small business's selected use.
SysQ6	My cloud service provides the data encryption needs for my small business.	My cloud service provides the data encryption *system service* needs for my small business.
Use8	Implementation of the cloud service entails new tasks for my small business.	Implementation of the cloud service entails *the use* of new tasks for my small business.
NetBen2	My cloud service has resulted in reduced staff costs.	*The benefit of* my cloud service has resulted in reduced staff costs.
NetBen3	My cloud service has resulted in cost reductions (e.g., inventory holding costs, administration expenses, etc.).	*The benefit of* my cloud service has resulted in cost reductions (e.g., inventory holding costs, administration expenses, etc.).

Index	Scale Item	Scale Item Adjustment
ServQ3	I believe the cloud service is responsive to my needs during my small business's selected use.	I believe the *services of* my cloud *provider* *are* responsive to my needs during my small business's selected use.
SysQ3	The cloud service was able to adapt to meet a variety of needs during my small business's selected use.	The cloud service was able to *systematically* adapt to meet a variety of needs during my small business's selected use.
SysQ7	My cloud service provides the access control measures for my small business.	My cloud service *system* provides the access control measures for my small business.
Cost	How much has your IT cost been reduced since you have adopted cloud?	How much has your *small business's* IT cost been reduced since you have adopted cloud *(by % of overall annual revenue)*?
NetBen6	My cloud service has resulted in an increased capacity to manage a growing volume of activity (e.g., transactions, population growth, etc.).	*The benefit of* my cloud service has resulted in an increased capacity to manage a growing volume of activity (e.g., transactions, population growth, etc.).
ServQ5	My cloud service provider guarantees the protection of my company's business information.	My cloud service provide*s a service which guarantees* the protection of my company's business information.
ServQ6	My cloud service provider had my best interests in mind for my small business's subscribed set of cloud services.	My cloud service provider had my best interests in mind for my small business's subscribed set of ~~*cloud*~~ services.
SysQ1	The cloud service availability supported the needs of my small business selected use.	The cloud service's *systems were available to support* the needs of my small business selected use.
SysQ2	The cloud service performed reliably for my small business's selected use.	The cloud service'*s system* performed reliably for my small business's selected use.
SysQ5	The cloud service was readily accessible for my small business's selected use.	The cloud service*'s system* was readily accessible for my small business's selected use.

All 23 scale items were uploaded to Qualtrics© to conduct a second Q-sort survey with the 10 individuals who participated in the first Q-sort survey. The purpose of the second Q-sort was to ensure that the potential of cross-loading in the pilot tests was removed, and to make sure each scale properly mapped to and measured the attribute associated with the construct. The second Q-sort study was completed over a 14-day period, with all 10 individuals completing the survey. The results of the second Q-sort determined that 5 of the 23 statements or questions were completely associated with their corresponding construct at 0.70 or higher (see Table 8).

Table 8

Phase II Q-Sort Association with Rate of 0.70 and Higher

Index	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase II Correct Association	Phase I Correct Association	Difference
NetBen3	0	0	2	0	7	1	70%	50%	20%
NetBen6	1	0	1	1	7	0	70%	60%	10%
SysQ8	7	0	2	0	1	0	70%	0%	70%
Use8	0	1	1	7	1	0	70%	40%	30%
NetBen2	0	0	1	0	8	1	80%	50%	30%

Of the 23 statements or questions, 7 were marginally associated with their corresponding construct at 0.50 to 0.69 (see Table 9). In addition, 11 were higher than marginal with their corresponding construct at 0.49 to 0.10.

Table 9

Phase II Q-Sort Association with Rate of 0.69 and Lower

Index	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase II Correct Association	Phase I Correct Association	Difference
ServQ6	1	1	8	0	0	0	10%	60%	–50%

Index	System Quality	Service Quality	Organizational Satisfaction	Use	Net Benefit	Cost	Phase II Correct Association	Phase I Correct Association	Difference
SysQ9	1	1	6	1	1	0	10%	0%	10%
OrgSat1	2	5	2	0	1	0	20%	0%	20%
ServQ5	2	2	2	1	3	0	20%	60%	–40%
Use10	1	0	1	2	6	0	20%	30%	–10%
Cost	0	0	1	0	6	3	30%	60%	–30%
NetBen1	0	0	2	0	3	5	30%	10%	20%
SysQ3	**3**	2	2	3	0	0	30%	50%	–20%
ServQ4	2	4	2	2	0	0	40%	0%	40%
SysQ6	4	2	1	2	1	0	40%	40%	0%
Use7	0	0	1	4	5	0	40%	20%	20%
ServQ8	0	5	5	0	0	0	50%	20%	30%
SysQ1	5	2	1	1	1	0	50%	60%	–10%
SysQ2	5	0	2	1	2	0	50%	60%	–10%
SysQ5	5	0	3	2	0	0	50%	60%	–10%
SysQ7	5	0	1	1	3	0	50%	50%	0%
ServQ3	0	6	3	0	1	0	60%	50%	10%
SysQ4	6	0	1	2	1	0	60%	40%	20%

The second Q-sort produced weaker results for select scale items that were adjusted based on the earlier results in the first Q-sort. This implied that the first scale items were much better received in the first Q-sort than for the second Q-sort for 10 of the 23 items. This presented a slight dilemma with our second Q-sort effort. Research literature shows that the distribution map in Q-Sorting is arbitrary, has no effect on statistical analysis, can be adjusted dependent on our study's requirements to be more applicable to capture the opinions of our participants as generally accepted by the literature (Dziopa & Ahern, 2011). We adjusted the bar for the standard of agreement the Q-sorted items to 60% bar or more (i.e., 6 out of 10 participants agree on the categorization of an associated scale items to a construct). As a result, two of the items in the Phase II Q-sort effort became acceptable. Going back to the Phase I Q-sort, 6 of the 23 scale items that were at the 60% level then became acceptable, but the modified scales associated with each was now less than 60% on the Phase II test. With a 60% bar, this would result in 13 of 23 Q-sort validated scale items at 60% or higher. As for the remaining 10 items, the scales with results from the Phase I and Phase II tests, with the closest potential cross-correlating scale item(s) from Phase I to Phase II Q-sort in parentheses and "➔" which directs the action, are as follows:

- SysQ9: 0% → 10% (OrgSat @ 80% → 60%) ➔ Delete scale item.
- OrgSat1: 0% → 20% (ServQ @ 60% → 50%) ➔ Delete scale item.
- Use10: 30% → 20% (NetBen @ 40% → 60%) ➔ Move Use10 to NetBen.
- NetBen1: 10% → 30% (Cost @ 90% → 50%) ➔ Keep Phase II scale item.
- SysQ3: 50% → 30% (OrgSat @ 30%; Use → 30%) ➔ Keep Phase I scale item.
- ServQ4: 0% → 40% (OrgSat @ 90%; SysQ, OrgSat, and Use each @ 20%) ➔ Keep Phase II scale item.
- Use7: 20% → 40% (SysQ @ 30%; NetBen @ 50%) ➔ Keep Phase II scale item.

- SysQ6: 40% → 40% (NetBen @ 40%; ServQ and Use @ 20%) ➔ Keep Phase II scale item.
- ServQ8: 20% → 50% (OrgSat @ 50%) ➔ Keep Phase II scale item.
- SysQ7: 50% → 50% (ServQ @ 30%; NetBen @ 30%) ➔ Keep Phase II scale item.

For the OrgSat construct, OrgSat1 (“The cloud service for my small business is of high quality”) was dropped. For the NetBen construct, NetBen1 (“My cloud service provides cost-effective benefits”) was dropped. For the Use construct, 2 scale items were identified; Use10 (“Generally, the use of cloud services has made my work easier”) was the weaker of the two and was selected to be dropped. For the ServQ construct, 2 scale items were identified; ServQ4 (“I felt safe in my interaction with the cloud service during the use by my small business”) was the weaker of the two and was selected to be dropped. For the SysQ construct, the challenge was having weak results on 4 scale items. Based on the results of the second Q-sort, SysQ9 (“Overall, my system experience with the cloud service used by my small business is very satisfying“) and SysQ3 (“The cloud service was able to systematically adapt to meet a variety of needs during my small business’s selected use”) was dropped. Based on feedback by select Q-sort participants, the term “cloud service” was not as specific, definitive, and connective as the term “cloud service provider”, and was recommended to be the chief term used in this research effort. Select scale items were adjusted to support this requirement.

The final scale items selected to be in the survey instrument as a result of the Q-sort study are presented in Table 10.

Table 10

Phase I and II Q-Sort Scale Rating Comparisons

Construct	Scale Item	Scale	Selection % (Q-Sort #)
System Quality	SysQ1	The availability of the cloud service supports the needs of my small business's selected use.	60% (1)
	SysQ2	The cloud service performs reliably for my small business's selected use.	60% (1)
	SysQ5	The cloud service is readily accessible for my small business's selected use.	60% (1)
	SysQ4	The cloud service is able to systematically and flexibly adjust to new demands or conditions for my small business's selected use.	60% (2)
	SysQ8	Overall, I would give the quality of the cloud service a high rating for my small business's selected use.	70% (2)
	SysQ3	The cloud service is able to adapt to meet a variety of needs for my small business's selected use. ~~The cloud service was able to systematically adapt to meet a variety of needs during my small business's selected use.~~	50% (1) 30% (1)
	SysQ6	~~My cloud service provides the data encryption needs for my small business.~~ My cloud service provides the data encryption system service needs for my small business.	40% (1) 40% (2)
	SysQ7	~~My cloud service provides the access control measures for my small business.~~ My cloud service system provides the access control measures for my small business.	50% (1) 50% (2)
	SysQ9	~~Overall, my interaction with the cloud service for my small business was very satisfying.~~ ~~Overall, my system experience with the cloud service used by my small business is very satisfying.~~	0% (1) 10% (2)
Service Quality	ServQ1	My cloud service provider publishes a policy on the protection of transactional data protection and from accidents.	100% (1)
	ServQ2	My cloud service provider maintains flawless records.	80% (1)

Construct	Scale Item	Scale	Selection % (Q-Sort #)
	ServQ5	My cloud service provider guarantees the protection of my company's business information.	60% (1)
	ServQ6	My cloud service provider has my best interests in mind for my small business's subscribed set of cloud services.	60% (1)
	ServQ7	Overall, the level of service quality I receive from the cloud service provider for my small business's selected use was good.	80% (1)
	ServQ3	I believe the services offered by my cloud provider are responsive to my needs for my small business's selected use.	60% (2)
	ServQ4	~~I felt confident about the selection decision of the cloud service.~~ I feel safe in my interaction with the cloud service.	0% (1) 40% (2)
	ServQ8	~~The decision to select the service provider in terms of delivering satisfactory service was very satisfying.~~ I am very satisfied with the cloud service my small business receives from our cloud service provider.	20% (1) 50% (2)
Organizational Satisfaction	OrgSat2	The cloud service has met our small business expectations.	100% (1)
	OrgSat3	The cloud service was very satisfying for me to select for my small business.	80% (1)
	OrgSat4	All things considered, I am very satisfied with the cloud service selected for my small business.	80% (1)
	OrgSat5	Overall, my interaction with the cloud service for my small business is very satisfying.	70% (1)
	~~OrgSat1~~	~~The cloud service is of high quality.~~ ~~The cloud service for my small business is of high quality.~~	0% (1) 20% (2)
Use	Use1	The frequency of use of cloud services in my small business is...	100% (1)
	Use2	The duration of use of cloud services in my small business is...	70% (1)
	Use3	I use cloud services a lot to do my work.	100% (1)
	Use4	I use cloud services whenever possible to do my work in my small business.	100% (1)
	Use5	I use cloud services frequently to do my work in my small business.	100% (1)

Construct	Scale Item	Scale	Selection % (Q-Sort #)
	Use6	I use cloud services whenever appropriate to do my work in my small business.	90% (1)
	Use8	Implementation of cloud services entails the use of new tasks for my small business.	70% (2)
	Use7	~~Generally, the cloud service supports my work procedures in my small business.~~ Generally, the use of cloud services supports my work procedures in my small business.	20% (1) 40% (2)
	~~Use10~~ NetBen9	Generally, cloud services *have* made my work easier. ~~Generally, the use of cloud services has made my work easier.~~	30% (1) 20% (2)
Net Benefits	NetBen4	My cloud service has resulted in overall productivity improvement.	90% (1)
	NetBen5	My cloud service has resulted in improved outcomes or outputs.	100% (1)
	NetBen7	My cloud service has resulted in improved business processes.	90% (1)
	NetBen8	My cloud service has resulted in better positioning for business.	100% (1)
	NetBen2	The benefits of my cloud service have resulted in reduced staff costs.	80% (2)
	NetBen3	The benefits of my cloud service have resulted in cost reductions (e.g., inventory holding costs, administration expenses, etc.).	70% (2)
	NetBen6	~~My cloud service has resulted in an increased capacity to manage a growing volume of activity (e.g., transactions, population growth, etc.).~~ The benefits of my cloud service have resulted in an increased capacity to manage a growing volume of activity (e.g., transactions, population growth, etc.).	60% (1) 70% (2)
	~~NetBen1~~	~~My cloud service is cost effective.~~ ~~My cloud service provides cost effective benefits.~~	10% (1) 30% (2)
Cost	Cost	How much has your IT cost been reduced since you have adopted cloud *services*?	60% (1)

The final number of scale items in the body of the research survey was further reduced from 41 to 37 (see Table 11) as a result of the 2-phase Q-sort effort (i.e., one removed as a result of Phase I and three removed as a result of Phase II). A total of 37 scale items Q-sorted was effectively mapped to their construct with sufficient strength, and the effort to pretest the survey instrument was sufficiently established. The final requested scale items are listed with their scales in Table 11.

Table 11

Final Q-Sorted Survey Scale Items

Construct	Scale Item	Scale
System Quality	SysQ1	The availability of the cloud service supports the needs of my small business's selected use.
	SysQ2	The cloud service performs reliably for my small business's selected use.
	SysQ3	The cloud service is able to adapt to meet a variety of needs for my small business's selected use.
	SysQ4	The cloud service is able to systematically and flexibly adjust to new demands or conditions for my small business's selected use.
	SysQ5	The cloud service is readily accessible for my small business's selected use.
	SysQ6	My cloud service provides the data encryption system service needs for my small business.
	SysQ7	My cloud service system provides the access control measures for my small business.
	SysQ8	Overall, I would give the quality of the cloud service a high rating for my small business's selected use.
Service Quality	ServQ1	My cloud service provider publishes a policy on the protection of transactional data protection and from accidents.
	ServQ2	My cloud service provider maintains flawless records.
	ServQ3	I believe the services offered by my cloud provider are responsive to my needs for my small business's selected use.
	ServQ4	I feel safe in my interaction with the cloud service.
	ServQ5	My cloud service provider guarantees the protection of my company's business information.
	ServQ6	My cloud service provider has my best interests in mind for my small business's subscribed set of cloud services.
	ServQ7	Overall, the level of service quality I receive from the cloud service provider for my small business's selected use

Construct	Scale Item	Scale
		was good.
	ServQ8	I am very satisfied with the cloud service my small business receives from our cloud service provider.
Organizational Satisfaction	OrgSat1	The cloud service has met our small business expectations.
	OrgSat2	The cloud service was very satisfying for me to select for my small business.
	OrgSat3	All things considered, I am very satisfied with the cloud service selected for my small business.
	OrgSat4	Overall, my interaction with the cloud service for my small business is very satisfying.
Use	Use1	The frequency of use of cloud services in my small business is...
	Use2	The duration of use of cloud services in my small business is...
	Use3	I use cloud services a lot to do my work.
	Use4	I use cloud services whenever possible to do my work in my small business.
	Use5	I use cloud services frequently to do my work in my small business.
	Use6	I use cloud services whenever appropriate to do my work in my small business.
	Use7	Generally, the use of cloud services supports my work procedures in my small business.
	Use8	Implementation of cloud services entails the use of new tasks for my small business.
Net Benefits	NetBen1	The benefits of my cloud service have resulted in reduced staff costs.
	NetBen2	The benefits of my cloud service have resulted in cost reductions (e.g., inventory holding costs, administration expenses, etc.).
	NetBen3	My cloud service has resulted in overall productivity improvement.
	NetBen4	My cloud service has resulted in improved outcomes or outputs.
	NetBen5	The benefits of my cloud service have resulted in an increased capacity to manage a growing volume of activity (e.g., transactions, population growth, etc.).
	NetBen6	My cloud service has resulted in improved business processes.
	NetBen7	My cloud service has resulted in better positioning for business.
	NetBen8	Generally, cloud services have made my work easier.
Cost	Cost	How much has your IT cost been reduced since you have adopted cloud services?

Pretest

To conceptually validate the instrument, a pretest was initiated to test the face validity. Face validity is the insight provided by expert individuals concerning the quality of the measures (Thong, Yap, & Raman, 1996). Face validity is defined as the extent to which expert participants' assessment of the scale items in the survey reflects the intent of the scale (McKenny, Short, & Payne, 2013). The manner in which this can be performed is to have the experts familiar with the subject matter repeatedly evaluate the instrument in a review process with the researcher until consensus is reached, resulting in an optimized measurement instrument. Having participants complete a controlled research activity as moderated by the researcher is an effective effort toward exposing validity concerns (Howison, Wiggins, & Crowston, 2011). Face validation of the survey instrument assesses sensibility of the scales to determine if they are explainable, realistic, sensible, and without anomalies as well as that the values that measure them are not problematic (Gaskin, Berente, Lyytinen, & Yoo, 2014).

The research survey instrument with the Q-sorted scale items were uploaded to Qualtrics© in preparation for the pretest phase. The presurvey questions loaded as lead-in questions for the survey instrument are presented in Table 12. The postsurvey questions loaded to gather demographic questions on all survey participants are presented in Table 13.

Table 12

Survey Prequestions

Survey Question	Measurement
Is the country in which the business is	Y/N

Survey Question	Measurement
registered in the United States of America (USA)? (USCompanyYN)	
Is your business a franchise or are you a franchise business owner? (FranchiseYN)	Y/N
Your role in your organization (select the higher role that applies) (Role)	Founder, Owner, CEO, CIO, IT Director, IT Staff, Other
Does your company use software services that are hosted outside your company's IT organization, such as email, ERP, CRM, etc.? (UseSaaSYN)	Y/N
Which software services (such as email, ERP, CRM, etc.) are you using that are hosted outside your company's IT organization (please list all, separated by commas)? (SaaStype)	<free form>
Does your company use business platform services that are hosted outside your company's IT organization, such as order processing, travel reservations, etc.? (UsePaaSYN)	Y/N
Which individual business process services (such as order processing, travel reservations, etc.) are you using that are hosted outside your company's IT organization (please list all, separated by commas)? (PaaStype)	<free form>
Does your company use infrastructure services hosted outside your company's IT organization, such as server and data storage services? (UseIaaSYN)	Y/N
Which individual infrastructure services (such as server and data storage services) are you using that are hosted outside your company's IT organization (please list all, separated by commas)? (IaaStype)	<free form>

Table 13

Survey Postquestions

Survey Question	Measurement
Are there any successes, issues, or concerns that your small business has encountered with your cloud service provider(s) that you want to share? (CloudFB)	<free form>
Are there any other cloud computing system and service quality features you deem necessary and critical that were not covered in this survey? (CloudQual)	<free form>
Would you recommend a small business utilize multiple cloud service providers? (CloudRecYN)	Y/N
Are there any other cloud service net benefits you have experienced that have not been covered in this survey? (CloudBen)	<free form>
What is the gender of the owner of your small business? (Gender)	Male, Female
What is the age of the owner of your small business (please select one)? (Age)	less than 20, 21 to 30, 31 to 40, 41 to 50, greater than 50
What are the number of years your small business has been in operation (please select one)? (YrInBiz)	Less than 1, 1 to 2, 3 to 5, 6 to 10, greater than 10
What is the primary industry your small business operates (please select one)? (Ind)	Retail, Manufacturing, Service, Transportation, Travel, Other
Please provide the name of the primary industry your small business is classified.	<free form>
What is the total annual gross revenue before taxes of your small business (most recent year)? (AnnTotRev)	Less than $50K, $51K to $500K, $501K to $5M, $6M to $10M, greater than $10M

Survey Question	Measurement
Total annual amount spent by your small business on information technology (IT) spend (i.e., hardware, software, services, utilities, etc.), as a part of total pretax revenue (most recent year)? (AnnITSpend)	Less than $50K, $50K to $500K, $501K to $5M, $5M to $10M, Greater than $10M
What is the number of full-time employees on your small business payroll (please select one)? (NumEmply)	1 to 5, 6 to 10, 11 to 20, 21 to 35, 36 to 50, 51 to 100, 101 to 200, greater than 200
What is the number of your fixed small business locations (please select one)? (NumLoc)	1 to 2, 3 to 5, 6 to 10, 11 to 20, greater than 20
Please provide the Web site address for your small business. (CompWebAddr)	<free form>

Decision logic was included to guide the participants' survey workflow as they progressed through the survey. To make the best use of computing screen space and to optimize the number of core survey questions presented to the survey taker, the matrix-table method was used. The matrix-tables of the survey were oriented with the scale measurement on the top row, the survey questions in the left-most column, and the selection of multiple radio buttons to the right of each survey question. The benefit of using this type of survey data gathering method is that it was an efficient way to gather participant input. However, it can be problematic when a participant "straightlines" multiple survey responses, thus disregarding the intent of the question. The latter can result in many surveys being rejected. The resultant pretest survey included 6 prestage survey questions, 37 core survey questions, and 14 poststage survey questions, for a total of 57 survey questions.

A variety of 21 small businesses spanning multiple industries were invited to participate in the pretest. In each invitation, a predefined time and date were provided for each participant to select; a resultant email calendar invitation was sent to all those who agreed to participate, with a toll-free conference call bridge number for them to use and a sample set of 6 pretest follow-up questions that would be asked of all participants. The Qualtrics© survey link was sent to each participant 1 hr before each individual pretest call. Instructions specified that participants should not activate the survey until the pretest call began. The small businesses selected reflected a variety of industry segments (see Table 14).

Table 14

Industry Areas of Pretest Participants

Small Business Type	Number of Participants
Technology Services	4
Construction	3
Healthcare Services	1
Business Services	1
Funeral Home	1
Manufacturing	1
Healthcare Services	1
Event Management	1
Waste Management	1
Retail	1
Home Services	1
Financial	1

The small businesses' pretest participants were selected based on a prior relationship due to the researcher's corporate relationships and due to their known use of some form of cloud computing. Over a 21-day period, 17 of 21 invited small businesses participated in the pretest with all interviews digitally recorded and transcribed. Specific data gathered from each participant before they launched the survey included their type of computing device (e.g., PC, Apple PC, Apple iPad, etc.), operating system (e.g., Windows OS, Mac OS, iPad iOS, Droid OS, etc.), and web browser (e.g., Firefox, Internet Explorer, Safari, Chrome, etc.). All pretest participants were requested to honestly and truthfully take the survey as they would if they were anonymous survey participants. As each pretest session was being recorded, participants were requested to verbally inform the researcher of each stage of progression as they worked through the survey so the researcher could follow along on an identical copy. Survey participants were allowed to read questions aloud if it was helpful to them, except when they were filling in the poststage profile information.

All pretest participants raised concerns about not being able to clearly see the survey progress completion status bar. The survey completion status bar was just a narrow line at the top border of the survey screen, and did not clearly inform the study participant of their completion status of the survey. We worked directly with Qualtrics© and the KSU IRB committee to redesign the general KSU survey template to include a distinct and visible survey progress status bar with related completion percentages. The survey progress status bar was made to be in clear view at the bottom of every survey page. During the pretest, survey participants were free to ask the researcher for clarification on any questions and to make known any errors or inconsistencies found in the survey, thus providing direct constructive feedback to improve the survey.

Pilot Test

At the completion of the pretest, changes were incorporated into the survey, and the pilot test was immediately launched to select small businesses associated with large small business and cloud computing LinkedIn social media groups. The pilot test was completed over a 29-day period. The number of small business representatives invited to participate in the pilot totaled 155. Of the 155 invited participants, 64 launched the survey. The pilot test survey data were exported from Qualtrics© and uploaded to Microsoft Excel©. In MS Excel©, the pilot test dataset was cleaned and validated before analysis was performed. All records were removed by participants who represented franchise-based small businesses (FranYN = 1). Specific records were removed if small businesses determined they were not using at least one form of cloud computing (UseSaaSYN = 2, UsePaaSYN = 2, or UseIaaSYN = 2). All records were checked to determine if each pilot test participant completed the survey to the end. All responses where the responses from question to question were straightlined were discarded from the pilot test. As a result, 6 participants were eliminated because they were franchise based, 8 participants were determined to be non–cloud users, 8 participants aborted the survey at the midway point, and 6 surveys were discarded due to straightlining. All nonrelevant columns and content were also removed from pilot data (i.e., Qualtrics©-added content, columns associated with nonessential information, and other text fields). The total number of small businesses to complete the pilot test survey was 36. This resulted in a survey completion rate of 32/155 = 23.23%. The demographics of the study participants are included in Tables 15, 16, and 17.

Table 15

Pilot Test—Field Demographics—Screening Data

Role in small business	
Founder (1)	22
Owner (2)	11
President (3)	1
CEO (4)	0
CIO (5)	2
Director (6)	0
IT Staff (7)	0
Other (8)	0
Highest level of education attained	
High school diploma or its equivalent (1)	0
High school diploma with some college education (2)	2
Bachelor’s degree (3)	18
Postgraduate degree (4)	16
Cloud types used by the small business research participants	
SaaS	7
PaaS	0
IaaS	2
SaaS & PaaS	8
SaaS & IaaS	4
PaaS & IaaS	1
SaaS, PaaS & IaaS	14
Recommend small businesses use multiple cloud service providers	
Yes (1)	25
No (2)	11

Table 16

Pilot Test—Field Demographics—Summary Data (1 of 2)

Gender of the owner of the small business	
Male (1)	17
Female (2)	19
Age of the owner of the small business	
Less than 20 (1)	0

21 to 30 (2)	1
31 to 40 (3)	3
41 to 50 (4)	19
Greater than 50 (5)	13
Number of years the small business has been in operation	
Less than 1 year (1)	1
1 year to 2 years (2)	3
3 years to 5 years (3)	11
6 years to 10 years (4)	6
Greater than 10 years (5)	15
Primary industry in which the small business operates	
Construction (1)	1
Finance (2)	0
Insurance (3)	0
Professional Services (4)	17
Scientific Services (5)	0
Technical Services (6)	5
Retail and Wholesale Trade (7)	1
Real estate, Rental and Leasing (8)	1
Health Care and Social Assistance (9)	5
Administrative, Waste Management, and Remediation (10)	0
Transportation and Warehousing (11)	0
Arts, entertainment and Recreation (12)	1
Manufacturing, Agriculture, Mining (13)	0
Food Services (14)	1
Other (15)	4

Table 17

Pilot Test—Field Demographics—Summary Data (2 of 2)

Total annual gross revenue before taxes of your small business (most recent year)	
Less than $50K (1)	13
$50K to $500K (2)	15
$501K to $5M (3)	7
$5M to $10M (4)	1
$10M to $50M (5)	0
$50M to $100M (6)	0

Total annual amount spent by the small business on IT	
Less than $50K (1)	36
$50K to $500K (2)	0
$501K to $5M (3)	0
$5M to $10M (4)	0
Greater than $10M (5)	0
Number of full-time employees on the small business's payroll	
1 to 5 (1)	28
6 to 10 (2)	1
11 to 20 (3)	3
21 to 35 (4)	3
36 to 50 (5)	0
51 to 100 (6)	0
101 to 200 (7)	0
More than 200 (8)	1
Number of fixed small business locations	
1 to 2 (1)	33
3 to 5 (2)	2
6 to 10 (3)	0
11 to 20 (4)	1
More than 20 (5)	0

The cleansed and validated pilot test dataset was uploaded to SPSS© and statistical analysis was initiated. To assess a measurement model with all reflective constructs three steps should typically be performed: (1) reliability of the individual items, (2) internal consistency, and (3) discriminant validity (Barclay, Higgins, & Thompson, 1995). Traditional forms of validity for reflective constructs as confirmed by methods prescribed by Barclay et al. (1995) are not the same for formatively measured constructs because the constructs are theoretically different. Since our research model consists of all formative constructs, reliability of the individual items did not necessarily matter because they were not measuring the same thing. As for measures of internal consistency, the expectation of a formative construct to be internally consistent is not assumed as the items are not unidimensional because they are forming the construct. Petter, Straub, and Rai (2007) argue that content validity is more important than convergent or discriminant validity or reliability. For our study, we first performed principal component analysis (PCA) with SPSS© to analyze the descriptive statistics (to determine the mean and standard deviation of each scale item), correlation matrix (to determine the linear strength of each scale item), communalities (to determine the lowest extraction value associated with scale items), cumulative percentage of variance explained, weights, and variance inflation factor (VIF) to arrive at optimum model fit.

In a model with reflective measures on their constructs, a researcher would evaluate the measurement model by examining its discriminant validity using confirmatory factor analysis via SmartPLS©. When the loadings of the items on their individual constructs are higher than the loadings on the other constructs in the model, discriminant validity is confirmed (Xu et al., 2013). Discriminant validity is the degree to which a construct is truly distinct from other constructs in a model (Hair, Black, Babin, & Anderson, 2010). Discriminant validity is used to determine the correlation between any two constructs in the model and to determine if the items making up the two constructs could be better served as one construct. If the measures of the fit of the two constructs are significantly different from the one-construct model, then discriminant validity is supported (Hair et al., 2010). In a model that includes formative items, there are no loadings for the scale items associated with the constructs but weights are associated with scale items to their corresponding constructs. In a model like ours with formative constructs, the discriminant validity test is not as strong or reliable of a test to confirm the validity of the model as with PCA. For a model with scale items with formative relationship to their constructs, we examine the standard deviation, communalities of the extractions, R^2 (for each of the endogenous variable in the structural model; removes the direction of a correlation measure), VIFs, and weights of the associated scale items associated with each construct using PCA with SPSS© to determine model validity (Cenfetelli & Bassellier, 2009; S. Petter et al., 2007) . The average mean per each construct was calculated and is included in Table 18.

Table 18

Pilot Test—PCA Mean Average Deviation on Individual Items per Construct

Construct Average Deviation	
	Avg Mean
SysQ	5.542
ServQ	5.340
OrgSat	5.639
Use	5.201
NetBen	8.073

Based on the descriptive statistics shown in Table 19, acceptable deviation was determined for 27 of the 28 items in the pilot test. Concerns with the standard deviation of Use1 (2.166) was noted and observed in the final study.

Table 19

Pilot Test—PCA Descriptive Statistics on Individual Items

Descriptive Statistics							
	M	*SD*	Analysis *N*		*M*	*SD*	Analysis *N*
SysQ1	5.50	1.134	36	OrgSat1	5.64	1.496	36
SysQ2	5.83	1.254	36	OrgSat2	5.72	1.279	36
SysQ3	5.08	1.442	36	OrgSat3	5.56	1.182	36
SysQ4	5.36	1.355	36	OrgSat4	5.64	1.246	36

SysQ5	5.94	1.264	36	Use1	5.22	2.166	36
SysQ6	5.44	1.482	36	Use2	3.47	1.920	36
SysQ7	5.50	1.342	36	Use3	5.42	1.592	36
SysQ8	5.67	1.331	36	Use4	5.61	1.609	36
ServQ1	5.61	1.460	36	Use5	5.69	1.470	36
ServQ2	4.81	1.451	36	Use6	5.69	1.261	36
ServQ3	5.42	1.402	36	Use7	5.42	1.105	36
ServQ4	5.33	1.512	36	Use8	5.08	1.273	36
ServQ5	5.17	1.813	36	NetBen1	7.28	2.263	36
ServQ6	5.03	1.404	36	NetBen2	8.17	1.920	36
ServQ7	5.56	1.182	36	NetBen3	8.56	1.992	36
ServQ8	5.81	1.091	36	NetBen4	7.92	2.062	36
				NetBen5	7.58	1.826	36
				NetBen6	8.22	1.973	36
				NetBen7	8.11	1.924	36
				NetBen8	8.75	1.713	36

The next step of the validation test was to assess the correlation matrix for the strength of linear relationships between scale items. The correlation matrix values in Table 20 show ±0.6 = strong, ±0.4 = moderate, and ±0.2 = weak correlations for the scale items. Those values for Use1, Use2, NetBen1 and NetBen2 in Table 20 show weak correlations or weak strength of linear relations.

Table 20

Pilot Test—Correlation of Individual Items

Correlation Matrix[a]

		SysQ1	SysQ2	SysQ3	SysQ4	SysQ5	SysQ6	SysQ7	SysQ8	ServQ1	ServQ2	ServQ3	ServQ4	ServQ5	ServQ6	ServQ7	ServQ8
Correlation	SysQ1	1.000															
	SysQ2	0.663	1.000														
	SysQ3	0.725	0.624	1.000													
	SysQ4	0.679	0.743	0.701	1.000												
	SysQ5	0.618	0.607	0.630	0.512	1.000											
	SysQ6	0.680	0.748	0.758	0.643	0.486	1.000										
	SysQ7	0.563	0.544	0.657	0.605	0.455	0.718	1.000									
	SysQ8	0.663	0.839	0.610	0.655	0.600	0.743	0.464	1.000								
	ServQ1	0.518	0.307	0.437	0.333	0.344	0.571	0.686	0.299	1.000							
	ServQ2	0.599	0.484	0.527	0.516	0.368	0.600	0.521	0.572	0.476	1.000						
	ServQ3	0.764	0.707	0.845	0.716	0.481	0.747	0.539	0.720	0.389	0.659	1.000					
	ServQ4	0.683	0.754	0.695	0.790	0.608	0.723	0.606	0.639	0.345	0.656	0.715	1.000				
	ServQ5	0.473	0.201	0.323	0.266	0.254	0.397	0.540	0.178	0.673	0.567	0.343	0.459	1.000			
	ServQ6	0.655	0.425	0.634	0.550	0.323	0.626	0.508	0.525	0.466	0.494	0.618	0.507	0.279	1.000		
	ServQ7	0.618	0.662	0.660	0.513	0.442	0.687	0.685	0.630	0.493	0.565	0.632	0.629	0.462	0.610	1.000	
	ServQ8	0.728	0.686	0.647	0.706	0.469	0.727	0.439	0.800	0.328	0.680	0.765	0.699	0.306	0.563	0.529	1.000
	OrgSat1	0.598	0.775	0.624	0.616	0.533	0.603	0.491	0.785	0.248	0.520	0.728	0.661	0.202	0.508	0.650	0.639
	OrgSat2	0.690	0.808	0.602	0.686	0.468	0.745	0.500	0.767	0.247	0.648	0.816	0.803	0.316	0.514	0.597	0.759
	OrgSat3	0.853	0.816	0.743	0.781	0.519	0.752	0.541	0.757	0.427	0.648	0.805	0.757	0.422	0.645	0.714	0.795
	OrgSat4	0.839	0.839	0.670	0.739	0.586	0.832	0.539	0.770	0.471	0.624	0.760	0.809	0.432	0.610	0.645	0.809
	Use1	0.198	0.067	-0.061	0.244	0.193	-0.005	0.138	0.017	0.091	0.060	-0.116	0.247	0.114	0.054	-0.005	-0.042
	Use2	0.085	0.057	-0.004	0.086	0.058	0.115	0.150	0.097	0.220	0.280	-0.022	0.171	0.108	0.027	0.120	-0.037
	Use3	0.498	0.437	0.221	0.458	0.395	0.343	0.288	0.377	0.268	0.283	0.227	0.451	0.223	0.110	0.116	0.245
	Use4	0.611	0.732	0.569	0.656	0.467	0.554	0.450	0.712	0.189	0.591	0.670	0.736	0.238	0.524	0.568	0.542
	Use5	0.540	0.561	0.268	0.573	0.452	0.353	0.282	0.560	0.169	0.320	0.327	0.510	0.148	0.267	0.248	0.390
	Use6	0.610	0.672	0.533	0.585	0.312	0.702	0.617	0.653	0.461	0.654	0.624	0.610	0.360	0.505	0.654	0.496
	Use7	0.764	0.670	0.605	0.736	0.549	0.634	0.568	0.583	0.458	0.533	0.641	0.787	0.492	0.508	0.540	0.591
	Use8	0.327	0.098	0.214	0.263	0.109	0.207	0.109	0.169	0.187	0.504	0.252	0.297	0.217	0.478	0.120	0.423
	NetBen1	0.056	0.027	-0.104	0.171	-0.154	-0.208	-0.254	0.013	-0.174	-0.088	0.062	-0.036	-0.235	0.060	-0.155	0.046
	NetBen2	0.105	0.202	0.057	0.229	0.039	-0.047	-0.011	0.201	0.136	-0.009	0.165	0.059	0.000	-0.012	0.034	0.152
	NetBen3	0.291	0.473	0.043	0.357	0.285	0.166	0.171	0.384	0.126	0.226	0.181	0.468	0.211	-0.057	0.229	0.275
	NetBen4	0.373	0.459	0.195	0.297	0.239	0.340	0.222	0.448	0.217	0.367	0.349	0.449	0.279	0.070	0.371	0.272
	NetBen5	0.490	0.406	0.307	0.340	0.287	0.471	0.356	0.306	0.516	0.346	0.371	0.424	0.272	0.205	0.296	0.245
	NetBen6	0.588	0.443	0.355	0.375	0.326	0.425	0.410	0.388	0.448	0.445	0.451	0.463	0.389	0.214	0.350	0.326
	NetBen7	0.498	0.375	0.244	0.379	0.296	0.433	0.288	0.372	0.321	0.499	0.374	0.557	0.347	0.136	0.186	0.405
	NetBen8	0.463	0.539	0.333	0.335	0.337	0.653	0.305	0.514	0.371	0.405	0.449	0.540	0.207	0.252	0.325	0.432

		OrgSat1	OrgSat2	OrgSat3	OrgSat4	Use1	Use2	Use3	Use4	Use5	Use6	Use7	Use8	NetBen1	NetBen2	NetBen3	NetBen4	NetBen5	NetBen6	NetBen7	NetBen8
Correlation	OrgSat1	1.000																			
	OrgSat2	0.813	1.000																		
	OrgSat3	0.715	0.805	1.000																	
	OrgSat4	0.710	0.850	0.858	1.000																
	Use1	0.052	0.105	0.174	0.126	1.000															
	Use2	-0.038	0.043	0.083	0.049	0.620	1.000														
	Use3	0.209	0.311	0.481	0.366	0.594	0.401	1.000													
	Use4	0.842	0.738	0.703	0.669	0.231	0.126	0.433	1.000												
	Use5	0.377	0.425	0.544	0.453	0.605	0.356	0.861	0.589	1.000											
	Use6	0.667	0.672	0.712	0.637	0.162	0.203	0.506	0.743	0.472	1.000										
	Use7	0.560	0.711	0.824	0.735	0.426	0.134	0.694	0.640	0.661	0.689	1.000									
	Use8	0.031	0.173	0.272	0.290	-0.090	-0.028	0.081	0.184	0.167	0.123	0.259	1.000								
	NetBen1	0.005	0.077	0.015	0.087	0.045	0.022	-0.073	-0.001	0.018	-0.160	0.067	0.210	1.000							
	NetBen2	0.181	0.124	0.147	0.121	0.128	0.319	0.061	0.105	0.170	-0.014	0.114	0.041	0.574	1.000						
	NetBen3	0.319	0.399	0.290	0.394	0.322	0.393	0.348	0.337	0.479	0.229	0.385	0.105	0.294	0.476	1.000					
	NetBen4	0.259	0.479	0.407	0.444	0.222	0.494	0.333	0.369	0.350	0.386	0.404	0.003	0.226	0.495	0.645	1.000				
	NetBen5	0.330	0.487	0.441	0.547	0.385	0.433	0.415	0.303	0.270	0.514	0.527	-0.107	0.215	0.338	0.387	0.605	1.000			
	NetBen6	0.367	0.546	0.546	0.475	0.423	0.386	0.579	0.469	0.477	0.579	0.690	0.061	0.127	0.322	0.360	0.616	0.732	1.000		
	NetBen7	0.302	0.512	0.399	0.482	0.412	0.442	0.600	0.476	0.548	0.509	0.582	0.241	0.039	0.188	0.535	0.507	0.615	0.784	1.000	
	NetBen8	0.354	0.593	0.480	0.572	0.231	0.280	0.542	0.441	0.479	0.612	0.600	0.154	-0.092	0.109	0.318	0.479	0.651	0.718	0.797	1.000

a. Determinant = .000

b. This matrix is not a positive definite.

In Table 21, the extractions associated with the communalities of each scale item shows extraction values lower than .500 for only SysQ5 (0.406), ServQ5 (0.498), Use8 (0.114), and NetBen2 (0.481). These items were noted for observation in the latter stages for possible extraction in the pilot test.

Table 21

Pilot Test—PCA Communalities on Individual Items

Communalities					
	Initial	Extraction		Initial	Extraction
SysQ1	1.000	0.752	OrgSat1	1.000	0.719
SysQ2	1.000	0.799	OrgSat2	1.000	0.810
SysQ3	1.000	0.732	OrgSat3	1.000	0.851
SysQ4	1.000	0.700	OrgSat4	1.000	0.846
SysQ5	1.000	0.406	Use1	1.000	0.548
SysQ6	1.000	0.801	Use2	1.000	0.530
SysQ7	1.000	0.666	Use3	1.000	0.616
SysQ8	1.000	0.772	Use4	1.000	0.657
ServQ1	1.000	0.583	Use5	1.000	0.561
ServQ2	1.000	0.582	Use6	1.000	0.672
ServQ3	1.000	0.812	Use7	1.000	0.768
ServQ4	1.000	0.765	Use8	1.000	0.114
ServQ5	1.000	0.498	NetBen1	1.000	0.545
ServQ6	1.000	0.559	NetBen2	1.000	0.481
ServQ7	1.000	0.635	NetBen3	1.000	0.587
ServQ8	1.000	0.745	NetBen4	1.000	0.566
			NetBen5	1.000	0.582
			NetBen6	1.000	0.719
			NetBen7	1.000	0.700
			NetBen8	1.000	0.573
			Extraction Method: Principal Component Analysis.		

For the pilot test, the total variance explained by the extracted sum of squared loadings as expressed by cumulative percentage was 64.588% (see Table 22). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was not able to be generated with the items associated with NetBen included. With NetBen removed from the PCA, the calculated KMO from the pilot test was 66.7%.

Table 22

Pilot Test—KMO for All Items, with NetBen Excluded

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.667
Bartlett's Test of Sphericity	Approx. Chi-Square	1125.805
	Df	378
	Sig.	0.000

To analyze the formative constructs of the pilot model via component-based structured equation modeling (SEM), the pilot data were loaded (with scale items sorted) into SmartPLS 3©. With the model created and the data loaded, the "PLS Algorithm" was run with all default options set. Without Cost as a moderator, the R^2 for each of the endogenous variable provided significant predictive power of each of the associated phenomena of the study (i.e., ServQ = 88.3%, OrgSat = 89.8%, Use = 82.7%) with the overall model predicting 63.9% of the variance of NetBen. With Cost as a moderator, the R^2 for each endogenous variable provided significant predictive power for each of the associated phenomena of study (i.e., ServQ = 87.9%, OrgSat = 91.6%, Use = 83.6%) with the overall model predicting 65.3% of the variance of NetBen. Support for eight of nine hypotheses was initially confirmed, with only one hypothesis showing a negative value (H6). Inspection of the pilot data initially identified issues with the outer weights.

The 5-stage analysis that was performed on the model with the pilot data to systematically extract the lowest outer weights with the highest VIF (Cenfetelli & Bassellier, 2009) produced nominal changes in the R^2 for each of the associated constructs. With NetBen7 (Weight = –0.396) and Use5 (VIF = 6.277); Use1 (Weight = –0.387) and OrgSat2 (VIF = 5.393); Use3 (Weight = –0.197) and SysQ6 (VIF = 5.096); NetBen4 (Weight = –0.087) and SysQ2 (VIF = 4.552); and ServQ5 (Weight = –0.067) and OrgSat3 (VIF = 4.149) removed the model fit improved. All issues of multicollinearity were addressed as noted by Cenfetelli et al. (2009). Inspection of the pilot data after the analysis resulted in the VIFs as noted in Table 23.

Table 23

Pilot Test—Assessment of Outer VIFs for All Scale Items (VIF < 3.3)

	VIF	Possible Multicollinearity Issue?		VIF	Possible Multicollinearity Issue?
NetBen1	1.625	No	SysQ8	2.263	No
NetBen2	1.865	No	Use2	1.047	No
NetBen3	1.448	No	Use4	2.417	No
NetBen5	2.533	No	Use6	2.783	No
NetBen6	2.896	No	Use7	2.145	No
NetBen8	2.574	No	Use8	1.088	No
OrgSat1	2.017	No			
OrgSat4	2.017	No			
ServQ1	2.078	No			
ServQ2	2.739	No			
ServQ3	3.253	No			
ServQ4	2.863	No			
ServQ5	2.377	No			
ServQ7	2.115	No			
ServQ8	3.053	No			
SysQ1	2.771	No			
SysQ3	3.116	No			
SysQ4	2.603	No			
SysQ5	1.966	No			
SysQ7	1.913	No			

Inspection of the pilot data after the analysis resulted in the outer weights as noted in Table 24.

Table 24

Pilot Test—Assessment of Outer Weights for All Scale Items (Smallest to Largest)

Outer Weights					
	NetBen	OrgSat	ServQ	SysQ	Use
NetBen1	0.013				
NetBen2	–0.015				
NetBen3	0.274				
NetBen5	0.156				
NetBen6	0.537				
NetBen8	0.254				
OrgSat1		0.236			
OrgSat4		0.818			
ServQ1			0.266		
ServQ2			0.009		
ServQ3			0.183		
ServQ4			0.589		
ServQ5			**–0.097**		
ServQ7			0.074		
ServQ8			0.160		
SysQ1				0.410	
SysQ3				0.003	
SysQ4				0.307	
SysQ5				0.016	
SysQ7				0.149	
SysQ8				0.290	
Use2					0.269
Use4					0.216
Use6					0.109
Use7					0.682
Use8					0.008

The R^2 for each of the endogenous variables was optimized and provided significant predictive power of each of the associated phenomena of study (i.e., ServQ = 83.5%, OrgSat = 87.6%, Use = 75.5%) with the overall model predicting 67.2% of the variance of NetBen with moderate improvement. With the five largest negative weights removed, support for seven of nine hypotheses was confirmed in the pilot test. Five stages of analysis performed on the model with the pilot data to systematically extract the lowest outer weights with the highest VIF produced nominal changes in the R^2 for each of the associated constructs. This analysis resulted in a 1.9% improvement of the R^2 for NetBen, and support for seven of nine hypotheses was confirmed with only two hypotheses showing negative values (H6 and H8). It was noted that the support for the nine main hypotheses decreased from eight of nine to seven of nine after the second analysis test phase in the pilot test. The results of the pilot study sufficiently confirmed the model with the associated pilot data, and enabled us to proceed to the final and formal data gathering stage.

Based on the results of the pilot test, minor modifications were made to the survey instrument design. To ensure all participants know that this survey was specifically intended for small business cloud computing users, the qualifying questions were adjusted for clarity. To ensure survey participants would not straightline answers for similar Likert scale grouped or matrixed questions, 4 confirmation or "read check" questions were imbedded in each "odd" matrix to make sure participants were reading and interpreting each set of questions appropriately (i.e., "If you are reading this select *Agree* [or some other specific option in the select Likert scale]."). The questions associated with Use1 and Use2 were inserted between matrices 3 and 4, and matrices 6 and 7, respectively. A small error was found with the SysQ8 scale where it was determined that the scale item was not distinctive in its measure of system quality, and "system quality" was explicitly added to the item. The scale SysQ8 was changed from "Overall, I would give the quality of the cloud service a high rating for my small business's selected use" to "Overall, I would give the system quality of the cloud service a high rating for my small business's selected use." The scale ServQ2 was changed from "My cloud service provider maintains flawless records" to "My cloud service provider maintains accurate records." The scale SysQ2 was changed from "The cloud service performs reliably for my small business's selected use" to "The cloud service performs reliably and dependably for my small business's selected use." The scale NetBen4 was changed from "My cloud service has resulted in improved outcomes or outputs" to "My cloud service has resulted in improved business outcomes or outputs." The scale NetBen7 was changed from "My cloud service has resulted in better positioning for business" to "My cloud service has resulted in better positioning for my small business's success."

The core or main body of the final survey included 45 questions, with a total of 60 questions when the pre- (7) and post-survey (8) questions were included. Based on the length of time for the pilot test participants to complete the survey, we did not believe the addition of the check questions would greatly extend the survey completion time.

Quantitative Results

Data Collection

Based on the challenges in getting small businesses associated with large LinkedIn groups to complete the pilot study, we decided not to use large LinkedIn and Facebook social media groups to solicit small businesses to participate in the final study.

Due to the factors beyond this researcher's control, the KSU SBDC would not support this research effort after numerous attempts, and the targeted sponsor within IBM was not able to get corporate approval to solicit IBM small business clients to participate in this study within the timeframe required. The final survey was exclusively launched via Qualtrics© to a targeted small business panel and was conducted over a 12-day period. The total number of small business representatives invited to participate in the final survey was 49,019. Of the 49,019 respondents, 2,048 were qualified and entered the survey. Of the 2,048 qualified respondents, 1,503 responded and accessed the survey (73.39%). The survey screening questions dismissed 692 (non–U.S.-based, franchise-based small business, medium or large business, cloud computing nonusers) or 46.04% of the qualified respondents. Based on imbedded survey quality checks (4 read check tests included in survey), 178 respondents (11.84%) failed and were immediately exited out of the final survey. Those respondents who exceeded the Qualtrics© quota (spending too little or too much time to complete the survey) totaled 138 (9.18%).

Following the same methodology developed in the pilot study, the Qualtrics© data were loaded into Microsoft Excel© and additional data quality analysis was performed. In MS Excel©, the final dataset was cleaned and validated before analysis was performed. After analysis of the final survey data provided by Qualtrics©, 145 participants (9.65%) were disqualified due to data quality issues. These outliers were removed because they did not pass face validity tests due to exorbitant straightlining of survey responses (i.e., same value selected 96% to 100% of the time across all survey scale items and across all categories with little or no variability). Of the 1,503 respondents, 350 successfully completed the survey (23.29%) as U.S.-based nonfranchise small businesses using as least one form of cloud computing—or 17.09% of all invited and qualified participants who entered the survey.

Of the 350 small businesses that participated in the final study, 27% of the owners of those small businesses completed the survey, followed by 17% of other individuals who worked with or in the organization. For the education profile of the participants, 46% completed a 4-year bachelor's degree, and 23% completed high school and some college courses. Although the breakdown of the cloud computing types was not the focus of this study, we found that 34% have a combination of SaaS, PaaS, and IaaS cloud types being used by their small business, with SaaS-only small business users totaling 23%. Of the small businesses that participated in this study, 73% would recommend that other small businesses implement a model of using multiple cloud service providers to support their business versus depending on one or a limited few.

As for the specific demographics of the small businesses that participated in this study (see Table 25), we found that 67% of the owners were male, and 33% of the owners were between 31 and 40 years of age. We found that 30% of the small business owners who were the primary survey participants of this study were older than 50 years of age. Of the small businesses that participated in the final study, 37% had been in business longer than 10 years, with 29% being in business from 3 to 5 years. The percentage of small businesses in operation for more than 3 years made up 90% of the total survey participants.

Of the 14 small business industry segments that were the scope of this study (see Tables 26 and 27), 23% of the small business participants were in the professional services sector, with the next largest segment being technical services at 14%. Together, professional and technical service–based small businesses made up 37% of the small business participants in this study, with an evenly distributed mix across the 12 remaining categories. For the total annual gross revenue before taxes, 32% earned from $501K to $5M per year, with the second next highest category being 30% at $50K to $500K per year. This study also showed that although 76% of the small businesses annually earned between $50K and $10M per year, 60% spent less than $50K per year on IT. As for the number of full-time employees, 24% of the small businesses in this study had one to five employees on their full-time payroll. Sixty-three percent (63%) had fewer than 35 full-time employees, and 75% had only one to two fixed business locations.

The typical profile of the small businesses that participated in this study consisted of the owner completing this study, with that individual being a male, older than 31 years of age, and possessing at least a college degree. The typical small business that participated in this study used multiple forms of cloud services in various combinations, has been in business more than 3 years, and being in the professional or technical services industries. Although a large segment of the small businesses that participated in this final study annually produced gross revenue between $50K and $10M, 90% of them spent less than $500K per year on IT and employed fewer than 100 employees across fewer than five locations.

Table 25

Final Study—Field Demographics—Screening Data

Role in small business	
Founder (1)	53
Owner (2)	94
President (3)	20
CEO (4)	18

CIO (5)	7
Director (6)	54
IT Staff (7)	44
Other (8)	60
Highest level of education attainment	
High school diploma or its equivalent (1)	35
High school diploma with some college education (2)	82
Bachelor's degree (3)	160
Postgraduate degree (4)	73
Cloud types used by small business research participants	
SaaS	82
PaaS	20
IaaS	13
SaaS & PaaS	60
SaaS & IaaS	44
PaaS & IaaS	11
SaaS, PaaS & IaaS	120
Recommend small businesses use multiple cloud service providers	
Yes (1)	255
No (2)	95

Table 26

Final Study—Field Demographics—Summary Data (1 of 2)

Gender of the owner of the small business	
Male (1)	233
Female (2)	117
Age of the owner of the small business	
Less than 20 (1)	11
21 to 30 (2)	30
31 to 40 (3)	117
41 to 50 (4)	86
Greater than 50 (5)	106
Number of years the small business has been in operation	
Less than 1 year (1)	5
1 year to 2 years (2)	30
3 years to 5 years (3)	101
6 years to 10 years (4)	83
Greater than 10 years (5)	131

Primary industry the small business operates in	
Construction (1)	33
Finance (2)	7
Insurance (3)	8
Professional Services (4)	79
Scientific Services (5)	6
Technical Services (6)	48
Retail and Wholesale Trade (7)	29
Real estate, Rental and Leasing (8)	9
Health Care and Social Assistance (9)	26
Administrative, Waste Management, and Remediation (10)	3
Transportation and Warehousing (11)	13
Arts, entertainment and Recreation (12)	23
Manufacturing, Agriculture, Mining (13)	25
Food Services (14)	13
Other (15)	28

Table 27

Final Study—Field Demographics—Summary Data (2 of 2)

Total annual gross revenue before taxes of your small business (most recent year)	
Less than $50K (1)	44
$50K to $500K (2)	106
$501K to $5M (3)	111
$5M to $10M (4)	48
$10M to $50M (5)	34
$50M to $100M (6)	7
Total annual amount spent by small business on IT	
Less than $50K (1)	209
$50K to $500K (2)	105
$501K to $5M (3)	26
$5M to $10M (4)	7
Greater than $10M (5)	3
Number of full-time employees on small business payroll	
1 to 5 (1)	83
6 to 10 (2)	46
11 to 20 (3)	46
21 to 35 (4)	46
36 to 50 (5)	36

51 to 100 (6)	54
101 to 200 (7)	18
More than 200 (8)	21
Number of fixed small business locations	
1 to 2 (1)	262
3 to 5 (2)	63
6 to 10 (3)	13
11 to 20 (4)	7
More than 20 (5)	5

The final cleansed and validated 350-record dataset was uploaded to SPSS© and statistical analysis was initiated.

Analysis of the Measurement Model

Principal Component Analysis

Performing PCA against our model with the final data, we examined the standard deviation, communalities of the extractions, MSA, VIF, and weights associated with the scale items associated with each construct to determine model validity. The fixed number of factors to extract was 4 with a maximum of 25 iterations based on the initial PCA calculation. In Table 28, shows the Mean Average Deviation for each construct and the values are acceptable.

Table 28

Final Study—PCA Mean Average Deviation on Individual Items per Construct

Construct Average Deviation	
	Avg Mean
SysQ	5.474
ServQ	5.477
OrgSat	5.500
Use	5.012
NetBen	7.954

Based on the descriptive statistics shown in Table 29, acceptable deviation was determined for all 28 items in the final study. Concerns with the standard deviation of NetBen1 (2.236), NetBen2 (2.191), NetBen4 (2.020), and NetBen8 (2.158) was noted for later extraction in the latter stages of the final study.

Table 29

Final Study—PCA Descriptive Statistics on Individual Items

Descriptive Statistics							
	Mean	Std. Deviation	Analysis *N*		Mean	Std. Deviation	Analysis *N*
SysQ1	5.56	1.153	350	OrgSat1	5.44	1.267	350
SysQ2	5.61	1.144	350	OrgSat2	5.55	1.188	350
SysQ3	5.31	1.233	350	OrgSat3	5.49	1.160	350
SysQ4	5.28	1.200	350	OrgSat4	5.51	1.236	350
SysQ5	5.80	1.056	350	Use1	4.98	1.837	350
SysQ6	5.33	1.341	350	Use2	3.63	1.653	350
SysQ7	5.41	1.207	350	Use3	5.19	1.556	350
SysQ8	5.49	1.167	350	Use4	5.06	1.413	350
ServQ1	5.32	1.373	350	Use5	5.19	1.409	350
ServQ2	5.77	1.103	350	Use6	5.47	1.266	350
ServQ3	5.46	1.137	350	Use7	5.42	1.191	350
ServQ4	5.43	1.358	350	Use8	5.17	1.228	350
ServQ5	5.46	1.332	350	NetBen1	7.15	2.236	350
ServQ6	5.20	1.232	350	NetBen2	7.54	2.191	350
ServQ7	5.66	1.109	350	NetBen3	8.06	1.992	350
ServQ8	5.53	1.224	350	NetBen4	8.06	2.020	350
				NetBen5	8.19	1.900	350
				NetBen6	8.11	1.931	350
				NetBen7	8.10	1.925	350
				NetBen8	8.42	2.158	350

Assessing the correlation matrix for the strength of linear relationships between scale items of our final data was our next step. The correlation matrix in Table 30 shows weak correlations for Use1 and Use2 (±0.20). The values in Table 30 show moderate to strong correlations, which reflect the strength of the linear relationships.

Table 30

Final Study—Correlation of Individual Items

Correlation Matrix[a]

		SysQ1	SysQ2	SysQ3	SysQ4	SysQ5	SysQ6	SysQ7	SysQ8	ServQ1	ServQ2	ServQ3	ServQ4	ServQ5	ServQ6	ServQ7	ServQ8
Correlation	SysQ1	1.000															
	SysQ2	0.568	1.000														
	SysQ3	0.613	0.537	1.000													
	SysQ4	0.601	0.492	0.593	1.000												
	SysQ5	0.552	0.527	0.520	0.536	1.000											
	SysQ6	0.492	0.389	0.466	0.539	0.473	1.000										
	SysQ7	0.606	0.484	0.518	0.581	0.470	0.562	1.000									
	SysQ8	0.602	0.653	0.508	0.547	0.552	0.376	0.476	1.000								
	ServQ1	0.469	0.402	0.358	0.363	0.320	0.489	0.619	0.339	1.000							
	ServQ2	0.465	0.613	0.442	0.454	0.559	0.435	0.431	0.504	0.378	1.000						
	ServQ3	0.659	0.614	0.622	0.568	0.579	0.484	0.479	0.675	0.385	0.515	1.000					
	ServQ4	0.496	0.581	0.459	0.397	0.455	0.384	0.506	0.530	0.373	0.430	0.532	1.000				
	ServQ5	0.426	0.381	0.377	0.431	0.362	0.521	0.481	0.354	0.498	0.445	0.359	0.402	1.000			
	ServQ6	0.539	0.424	0.504	0.521	0.451	0.613	0.506	0.455	0.408	0.451	0.558	0.498	0.466	1.000		
	ServQ7	0.635	0.616	0.566	0.598	0.586	0.541	0.562	0.647	0.430	0.547	0.661	0.545	0.483	0.555	1.000	
	ServQ8	0.573	0.577	0.504	0.552	0.537	0.442	0.453	0.804	0.351	0.447	0.600	0.549	0.393	0.470	0.651	1.000
	OrgSat1	0.624	0.620	0.507	0.521	0.526	0.415	0.486	0.670	0.412	0.500	0.675	0.517	0.394	0.425	0.618	0.671
	OrgSat2	0.641	0.594	0.532	0.616	0.533	0.477	0.592	0.665	0.425	0.472	0.699	0.545	0.415	0.569	0.795	0.639
	OrgSat3	0.659	0.651	0.584	0.591	0.575	0.469	0.522	0.706	0.417	0.499	0.722	0.583	0.426	0.568	0.713	0.648
	OrgSat4	0.669	0.656	0.617	0.556	0.597	0.507	0.506	0.699	0.413	0.505	0.700	0.581	0.418	0.519	0.720	0.731
	Use1	0.224	0.161	0.211	0.137	0.206	0.209	0.247	0.174	0.109	0.101	0.236	0.197	0.109	0.167	0.186	0.166
	Use2	0.172	0.146	0.139	0.183	0.084	0.168	0.234	0.138	0.141	0.083	0.128	0.162	0.173	0.198	0.188	0.172
	Use3	0.442	0.348	0.429	0.432	0.409	0.388	0.458	0.439	0.240	0.277	0.425	0.430	0.271	0.382	0.486	0.457
	Use4	0.393	0.407	0.405	0.378	0.392	0.366	0.346	0.414	0.238	0.337	0.482	0.443	0.283	0.431	0.444	0.428
	Use5	0.489	0.450	0.507	0.406	0.492	0.432	0.465	0.462	0.310	0.351	0.518	0.436	0.246	0.428	0.476	0.381
	Use6	0.539	0.476	0.445	0.475	0.475	0.364	0.527	0.527	0.360	0.419	0.531	0.459	0.336	0.425	0.575	0.493
	Use7	0.595	0.515	0.548	0.634	0.558	0.508	0.596	0.579	0.365	0.459	0.583	0.529	0.365	0.525	0.613	0.585
	Use8	0.513	0.415	0.493	0.515	0.394	0.496	0.561	0.367	0.412	0.386	0.405	0.428	0.437	0.473	0.467	0.420
	NetBen1	0.309	0.228	0.312	0.371	0.285	0.415	0.361	0.257	0.234	0.200	0.304	0.240	0.327	0.361	0.370	0.386
	NetBen2	0.302	0.261	0.270	0.297	0.292	0.327	0.329	0.294	0.211	0.244	0.289	0.234	0.303	0.297	0.367	0.304
	NetBen3	0.446	0.385	0.394	0.428	0.395	0.404	0.391	0.412	0.235	0.239	0.423	0.317	0.287	0.375	0.537	0.440
	NetBen4	0.475	0.446	0.416	0.406	0.414	0.397	0.383	0.449	0.297	0.316	0.461	0.336	0.315	0.367	0.525	0.456
	NetBen5	0.432	0.369	0.387	0.449	0.444	0.441	0.409	0.373	0.320	0.341	0.408	0.286	0.341	0.394	0.507	0.451
	NetBen6	0.422	0.426	0.360	0.387	0.378	0.417	0.403	0.402	0.278	0.261	0.385	0.309	0.295	0.339	0.480	0.402
	NetBen7	0.385	0.375	0.409	0.450	0.417	0.441	0.427	0.344	0.300	0.250	0.400	0.268	0.327	0.363	0.492	0.428
	NetBen8	0.479	0.455	0.496	0.470	0.433	0.387	0.382	0.462	0.257	0.334	0.489	0.396	0.285	0.402	0.531	0.475

	OrgSat1	OrgSat2	OrgSat3	OrgSat4	Use1	Use2	Use3	Use4	Use5	Use6	Use7	Use8
OrgSat1	1.000											
OrgSat2	0.623	1.000										
OrgSat3	0.666	0.711	1.000									
OrgSat4	0.687	0.692	0.735	1.000								
Use1	0.242	0.170	0.223	0.254	1.000							
Use2	0.167	0.208	0.195	0.199	0.551	1.000						
Use3	0.365	0.468	0.451	0.476	0.499	0.428	1.000					
Use4	0.500	0.420	0.478	0.438	0.298	0.248	0.579	1.000				
Use5	0.445	0.471	0.533	0.514	0.441	0.332	0.719	0.653	1.000			
Use6	0.493	0.584	0.587	0.538	0.302	0.271	0.584	0.530	0.587	1.000		
Use7	0.523	0.646	0.629	0.598	0.298	0.229	0.631	0.531	0.649	0.624	1.000	
Use8	0.413	0.469	0.470	0.454	0.105	0.155	0.344	0.366	0.370	0.399	0.502	1.000
NetBen1	0.271	0.362	0.265	0.336	0.257	0.296	0.418	0.303	0.374	0.315	0.387	0.380
NetBen2	0.316	0.340	0.314	0.344	0.315	0.292	0.377	0.327	0.442	0.304	0.360	0.381
NetBen3	0.444	0.495	0.436	0.512	0.249	0.209	0.446	0.348	0.494	0.423	0.446	0.394
NetBen4	0.467	0.500	0.491	0.555	0.218	0.162	0.403	0.299	0.436	0.444	0.426	0.426
NetBen5	0.398	0.411	0.440	0.441	0.267	0.263	0.459	0.364	0.410	0.400	0.440	0.443
NetBen6	0.398	0.450	0.425	0.469	0.216	0.150	0.412	0.314	0.445	0.372	0.440	0.453
NetBen7	0.396	0.476	0.424	0.482	0.173	0.188	0.401	0.336	0.429	0.356	0.441	0.400
NetBen8	0.478	0.534	0.503	0.585	0.180	0.146	0.499	0.455	0.524	0.497	0.515	0.363

	NetBen1	NetBen2	NetBen3	NetBen4	NetBen5	NetBen6	NetBen7	NetBen8
NetBen1	1.000							
NetBen2	0.704	1.000						
NetBen3	0.539	0.565	1.000					
NetBen4	0.517	0.549	0.820	1.000				
NetBen5	0.524	0.513	0.620	0.664	1.000			
NetBen6	0.420	0.480	0.685	0.706	0.670	1.000		
NetBen7	0.494	0.480	0.652	0.665	0.715	0.728	1.000	
NetBen8	0.431	0.469	0.679	0.680	0.612	0.711	0.646	1.000

a. Determinant = 4.166E-13

In Table 31, illustrate the extractions associated with the communalities of each scale items. The extraction value for ServQ2 (0.490) was the only item lower than 0.500. Although considered for extraction in latter stages, it might not be required because it was borderline acceptable.

Table 31

Final Study—PCA Communalities on Individual Items

Communalities					
	Initial	Extraction		Initial	Extraction
SysQ1	1.000	0.637	OrgSat1	1.000	0.640
SysQ2	1.000	0.625	OrgSat2	1.000	0.688
SysQ3	1.000	0.529	OrgSat3	1.000	0.736
SysQ4	1.000	0.568	OrgSat4	1.000	0.743
SysQ5	1.000	0.523	Use1	1.000	0.617
SysQ6	1.000	0.628	Use2	1.000	0.549
SysQ7	1.000	0.667	Use3	1.000	0.725
SysQ8	1.000	0.728	Use4	1.000	0.524
ServQ1	1.000	0.557	Use5	1.000	0.696
ServQ2	1.000	0.490	Use6	1.000	0.571
ServQ3	1.000	0.698	Use7	1.000	0.655
ServQ4	1.000	0.514	Use8	1.000	0.537
ServQ5	1.000	0.577	NetBen1	1.000	0.587
ServQ6	1.000	0.553	NetBen2	1.000	0.579
ServQ7	1.000	0.710	NetBen3	1.000	0.763
ServQ8	1.000	0.648	NetBen4	1.000	0.779
			NetBen5	1.000	0.679
			NetBen6	1.000	0.724
			NetBen7	1.000	0.715
			NetBen8	1.000	0.711

Note. Extraction method: PCA.

For the final study, the total variance explained by the extracted sum of squared loadings as expressed by cumulative percentage was 63.53% (see Table 32). With all the items included in the PCA, the calculated KMO from the pilot was 95.6%.

Table 32

Final Study—KMO for All Items, with NetBen Included

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.956
Bartlett's Test of Sphericity	Approx. Chi-Square	9582.968
	Df	630
	Sig.	0.000

To analyze the formative constructs of the final model via component-based SEM, we loaded the final data (with scale items sorted) into SmartPLS 3©. With the Cost moderator excluded in the model, the initial R^2 for each of the endogenous variables provided significant predictive power of each of the associated phenomena of study (i.e., ServQ = 83.1%, OrgSat = 85.6%, Use = 64.9%) with the overall model predicting 48.5% of the variance of NetBen. Support for all nine main hypotheses was confirmed in the nonmoderated model. With the Cost moderator included in the model, the R^2 for each of the endogenous variables provided significant predictive power of each of the associated phenomena of the study (i.e., ServQ = 83.1%, OrgSat = 85.7%, Use = 65.6%) with the overall model predicting 52.9% of the variance of NetBen. Support for all nine main hypotheses was confirmed with the Cost moderator included. Inspection of the final study data initially identified issues with the VIFs and weights.

A multiple-stage analysis was performed on the final study data to systematically extract the lowest outer weights with the highest VIF (R. T. Cenfetelli & Bassellier, 2009) to determine the best model fit. With NetBen6 (Weight = –0.015) and NetBen4 (VIF = 3.771) as well as Use1 (Weight = –0.009) and OrgSat3 (VIF = 2.843) removed, all nine hypotheses were confirmed, with no hypotheses showing negative values.

The R^2 for each of the endogenous variables provides significant predictive power of each of the associated phenomena of study (i.e., ServQ = 83.1%, OrgSat = 83.7%, Use = 65.5%) with the overall model predicting 53.3% of the variance of NetBen. The results of the multistage analysis sufficiently confirmed the model with the final data.

Variance inflation factor. In the examination of collinearity of our research model, SmartPLS 3© was used to compute the VIF values. For formative constructs, a maximum acceptable VIF was set to 3.3 (R. Cenfetelli & Bassellier, 2009), and anything higher suggested an issue with multicollinearity. Initially, there was an issue with the VIFs for two items—NetBen4 (3.771) and NetBen3 (3.626) —but other scale items were extracted based on the 2-steps executed following the process defined Cenfetelli & Bassellier, (2009). The VIFs associated with the final optimized model are noted in Table 33. Inspection of the final data initially identified issues with the outer weights and this issue was resolved as noted in Table 34.

Table 33

Final Study—Assessment of Outer VIFs for All Scale Items (VIF < 3.3)

VIFs					
	VIF	Possible Multicollinearity Issue?		VIF	Possible Multicollinearity Issue?
NetBen1	2.191	No	SysQ4	2.164	No
NetBen2	2.232	No	SysQ5	1.841	No
NetBen3	2.485	No	SysQ6	1.712	No
NetBen5	2.421	No	SysQ7	2.006	No
NetBen7	2.558	No	SysQ8	2.193	No
NetBen8	2.221	No	Use2	1.238	No
OrgSat1	2.056	No	Use3	2.633	No
OrgSat2	2.084	No	Use4	1.922	No
OrgSat4	2.417	No	Use5	2.780	No
ServQ1	1.476	No	Use6	1.943	No

ServQ2	1.641	No	Use7	2.401	No
ServQ3	2.231	No	Use8	1.376	No
ServQ4	1.740	No			
ServQ5	1.646	No			
ServQ6	1.795	No			
ServQ7	2.545	No			
ServQ8	2.037	No			
SysQ1	2.376	No			
SysQ2	2.061	No			
SysQ3	1.998	No			

Table 34

Final Study—Assessment of Outer Weights for All Scale Items (Smallest to Largest)

	Outer Weights				
	NetBen	OrgSat	ServQ	SysQ	Use
NetBen1	0.167				
NetBen2	0.107				
NetBen3	0.182				
NetBen5	0.192				
NetBen7	0.062				
NetBen8	0.504				
OrgSat1		0.218			
OrgSat2		0.465			
OrgSat4		0.441			
ServQ1			0.089		
ServQ2			0.054		
ServQ3			0.265		
ServQ4			0.092		
ServQ5			0.034		
ServQ6			0.119		
ServQ7			0.331		
ServQ8			0.280		
SysQ1				0.188	
SysQ2				0.155	
SysQ3				0.117	
SysQ4				0.100	

SysQ5	0.112	
SysQ6	0.157	
SysQ7	0.138	
SysQ8	0.325	
Use2		0.016
Use3		0.100
Use4		0.066
Use5		0.193
Use6		0.224
Use7		0.349
Use8		0.329

Structural Model Analysis

Figure 8 includes the final refined SmartPLS© model with the results of analysis as tested on the input provided by 350 independent U.S. small businesses who were cloud users. The numbers on the path lines between constructs point to indicators representing the effects or path coefficients between constructs.

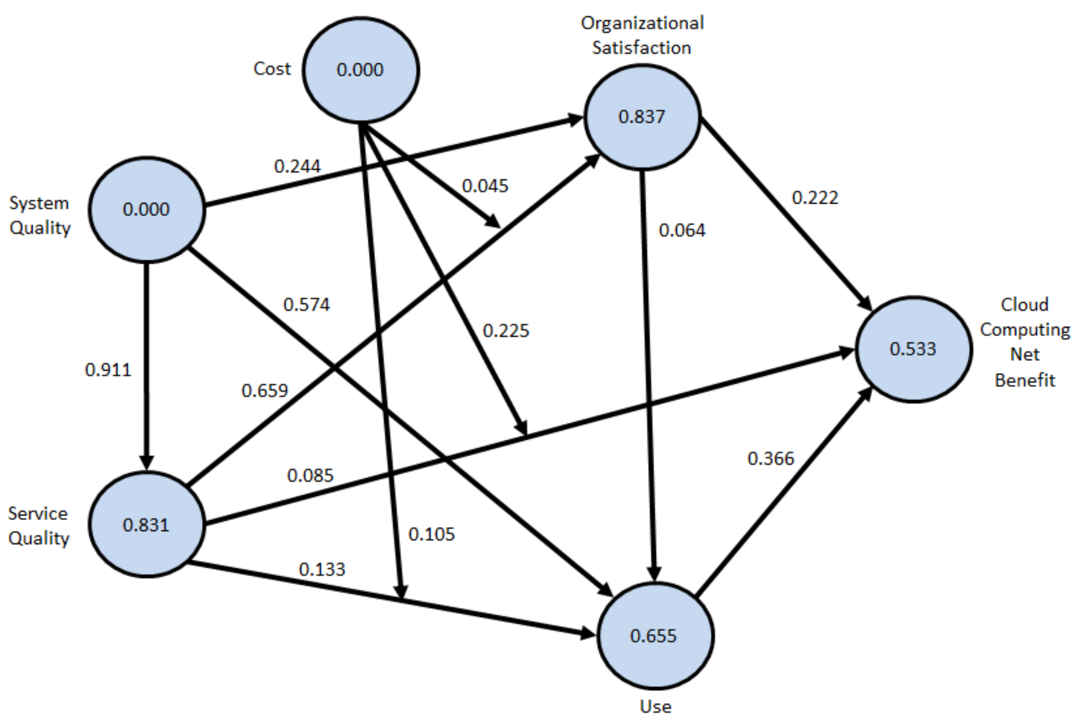


Figure 8. Results summary—Results of SmartPLS© algorithm run

Hypothesized Linkages

With our PLS structural model in SmartPLS 3©, the process of bootstrapping was performed to examine the level of significance of individual path coefficients or *t*-statistics (Hair, Jr., Hult, Ringle, & Sarstedt, 2014). The process of bootstrapping extracts a set of samples from the original sample. With bootstrapping, a sample can be taken more than once in random order. The default set by SmartPLS© for bootstrapping was increased from 300 to 5,000 subsamples for final analysis. SmartPLS© included both the *p*-values and *t*-values in the calculated results. Figure 9 includes the summary of the model of the results of analysis and refinement in SmartPLS© of our study of 350 independent small business cloud users. The numbers on the path lines between constructs point to indicators representing the *t*-values, which relate to the hypotheses supported and not supported. Table 35 shows the hypothesis testing results for the set of small businesses that participated in this research.

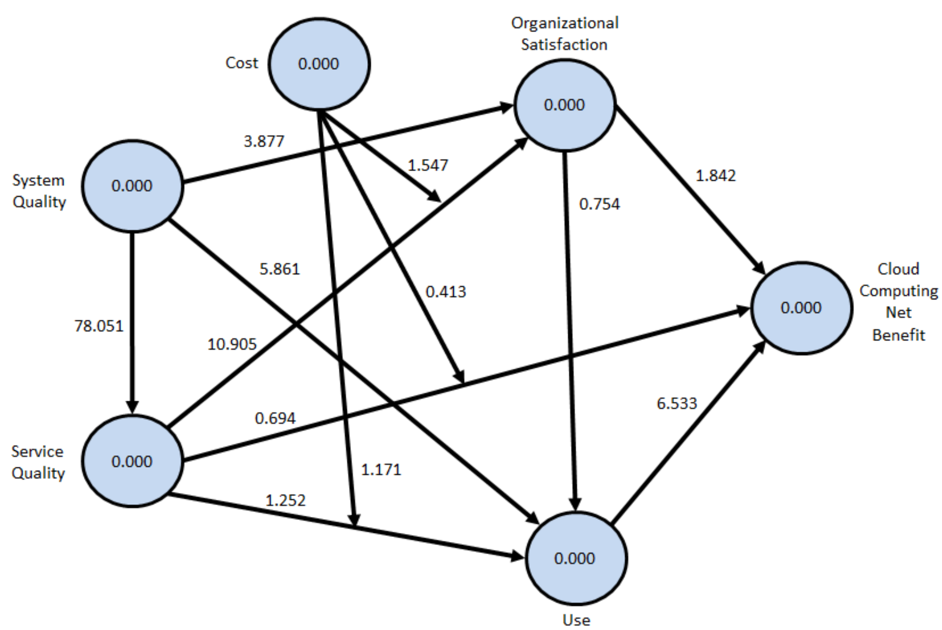


Figure 9. Results summary—Results of SmartPLS© bootstrapping run

Table 35

Hypotheses Testing Results—Independent Small Business Users of Cloud Computing

Hypothesis	Path Coefficent	*t*-Value	*p*-Value	Result
H1: The perception of system quality positively affects the perceived service quality of cloud computing services for small businesses.	0.911	78.051***	0.000 ***	Supported
H2: The perception of system quality positively affects organizational satisfaction in cloud computing services for small businesses.	0.244	3.877 ***	0.000 ***	Supported
H3: The perception of system quality positively affects the degree of use of cloud computing services for small businesses.	0.574	5.861 ***	0.000 ***	Supported
H4: The perception of service quality positively affects the degree of organizational satisfaction with cloud computing services for small businesses.	0.659	10.905 ***	0.000 ***	Supported
H5: The perception of service quality positively affects the degree of use of cloud computing services for small businesses.	0.133	1.252	0.211	Not Supported
H6: The perception of service quality positively affects the perceived net benefits of cloud computing services for small businesses.	0.085	0.694	0.487	Not Supported
H7: The degree of use of a cloud solution positively affects overall net benefits of cloud computing for small businesses.	0.366	6.533 ***	0.000 ***	Supported
H8: The organizational satisfaction of a cloud solution positively affects overall cloud computing use for small businesses.	0.064	0.754	0.163	Not Supported

Hypothesis	Path Coefficent	*t*-Value	*p*-Value	Result
H9: The organizational satisfaction with a cloud solution positively affects the overall net benefits of cloud computing for small businesses.	0.222	1.842 *	0.066 *	Partially Supported
H10a: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and organizational satisfaction with small businesses than with cloud computing services with relatively higher costs.	-0.033	1.547	0.122	Not Supported
H10b: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and use for small businesses than with cloud computing services with relatively higher costs.	-0.041	1.171	0.242	Not Supported
H10c: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and perceived net benefits for small businesses than with cloud computing services with relatively higher costs.	0.016	0.413	0.680	Not Supported

Note. *t*-values for the 2-tailed test are 1.65 (.10*), 1.96 (.05**), and 2.57 (.01***).
*p < .10. **p < .05. ***p < .01.

Hypotheses 5, 6, 8, 10a, 10b, and 10c were not statistically supported in this final research study, although the research literature suggests otherwise. For Hypothesis 5, we believe this is the case because the participants in this study, being owners and founders (total 42%), did not perceive a differential effect of cloud computing service quality on use, based on the use attributes being measured in this study. Although the Benlian et al. (2011) study found that cloud service providers who understand and know the areas allocate investments to improve service quality to small businesses for their continued and increased use, our study could not confirm these results. It is our belief that since this study investigated general cloud computing experiences by small businesses, with a more focused study of small businesses' service quality experiences with a specific SaaS, IaaS, or PaaS solution and its effects on use, this hypothesis would be confirmed. Of the small businesses that participated in this study, 64% are using a combination of the three primary cloud computing service models. Therefore, this specific study could not determine the perceptions of the effects of system quality on use.

Research literature shows that small businesses with limited IT budgets received near-term business benefits from the implementation of a new IT. As such, we hypothesized a direct effect of service quality on net benefit for small businesses adopting cloud computing services. For Hypothesis 6, with the path coefficient (0.085) and *p*-value (0.487), we believe this can be explained because of the demographics of the small business participants. With 90% (315) of the study participants representing small businesses that have been in operation longer than 3 years (3 to 5 years = 29%, 6 to 10 years = 24%, greater than 10 years = 37%), we posit that the realization of the immediate or near-term benefits of system quality on cloud computing net benefits was not in the forethoughts of the participants of this study. It is possible the participants in this survey have forgotten the direct effects of cloud computing service quality on net benefits, or that their cloud service is no longer providing the direct ongoing stream of net benefits from service quality that we initially hypothesized. One data point not included in this study is the date of the last significant cloud service adopted by the small business. This would have helped to measure this phenomenon and enabled the comparison of the path coefficients and *p*-values of the effects of service quality on the cloud computing net benefits, based on the period of adoption. With the inclusion of this additional attribute the significance of this hypothesis could be tested.

Research shows that the multidimensional aspects of use make assessing an IS a great challenge. Our research endeavored to assess use as a behavior related to organizational satisfaction with use pertaining to cloud computing. Delone and McLean (2003) hold that intention to use and combined use are reciprocally interdependent with user satisfaction, based on the context of the IS being studied over time (Iivari, 2005, p. 11). Other studies using Delone and McLean show that increased user satisfaction will lead to increased intention to use and thus use. Although the path coefficient and *p*-value do not support Hypothesis 8, we believe that directionally (positive) the relationship between organizational satisfaction and use has been appropriately determined in this study. Further refinement of the scale items associated with these constructs, adjusted for the technological phenomena being studied, would possibly confirm this hypothesis.

Although IS research determined that there is a moderating relationship between cost (i.e., levels of switching costs, operating costs) and customer loyalty or satisfaction with a service, our research found that the moderating effects of cost was not significant between cloud computing service quality and organizational satisfaction. The quantitative study by Ranaweera et al. (2003) determined that when price perceptions are poor and there is potential for improved service quality and service quality enhancements, this can lead to a significant rise in retention and satisfaction. The Ranaweera et al. study confirmed when negative (high) price perceptions are associated with high service quality perceptions, service quality alone will be insufficient to retain or satisfy customers. This was the basis of our research on the moderating effect of Cost on Service Quality as related its three subsequent constructs (Organizational Satisfaction, Use, and Cloud Computing Net Benefit). The service adoption study by Iye et al. (2013) confirmed that the lack of significant cost reduction was found to be a major dissatisfier among various businesses; this was not found to be the case as a result of our research. The Iye et al. study indicated that the gains cloud computing services, advertised in terms of reduction in capital and operative costs, might not completely satisfy them when they get there. Our study did not attempt to validate the realities of the switching cost of small businesses moving to the cloud and only investigated the postadoption perceptions of cost as it pertained to strengthening the effect of Service Quality on its direct succeeding constructs in our research model. Our research did not confirm the belief that cloud-based systems, due to their shared infrastructure and service delivery model, enhanced IT cost expenditures over time, therefore resulting in positive (e.g., increased) Organizational Satisfaction, Use, or Net Benefit.

The Gupta et al. (2013) study determined that the reduced cost of entry allows startups and small businesses to afford feature rich enterprise resource planning (ERP), customer relationship management (CRM), sales force automation (SFA), and supply change management (SCM) systems immediately and economically based on subscription fees, but our research did not capture this aspect. The perception of Cost (i.e., lower) strengthening the relationship between service quality and organizational satisfaction when the cloud services are rightly aligned with the needs of the small business, especially when financial resources are limited, was not confirmed by our research.

In comparison to the numerous benefits, there are few reasons why small businesses should not be exploring the option for using cloud computing services since the providers have made their services so inexpensive to use (R. Smith, 2009). There is extensive research literature that reports cloud computing pricing models being positively related (e.g., cost aligned) to usage-based pricing where computing resources are paid for based on the rate of consumption, which supports extended use. In their literature review, Gupta et al. (2013) found the use of cloud computing by large-scale enterprises is primarily based on their perceptions of cost reduction first, but the results of our study did not support the premise that lower cost intensifies the use or consumption of cloud computing services for small businesses.

Researchers have studied the benefits and attributes of the low entry and operational costs of small firms using cloud computing, resulting in positive effects on net benefits (Gupta et al., 2013; Nanath & Pillai, 2013). This research provides the basis for small businesses adopting/shifting to cloud computing resulting in immediate and ongoing net benefits. The study by Nanath and Pillai (2013) determined that it is profitable for small businesses and start-ups to adopt cloud computing, and this profitability was based on the flexible, granular, and scalable cloud computing solutions at a lower cost when compared to traditional IS models. Our research did not confirm that cloud computing net benefit is intensified (positive) for small businesses, either postadoption or over the life of the cloud computing service.

CHAPTER 5: DISCUSSION AND CONCLUSION

This chapter focuses on the discussion of the results obtained exclusively from the main study—the survey. Second, will be a discussion of the contributions of the study results. Third, will be an evaluation of the limitations and future research opportunities based on the limitations presented. Finally, to complete the work concluding remarks will be offered.

Discussion of Results

Primary Study—Survey

This study was designed to adapt and refine the DeLone and McLean 2004 IS success model into a framework, one more aligned to measure the IS phenomena called cloud computing. Small businesses have an interest in best leveraging IT services to support and drive their business, while limiting overall IT costs and maximizing overall benefit. Small business acceptance of this new model of acquiring and using IT services is new and emerging to be a broadly accepted trend for new small businesses. Based on the attributes of public cloud services, it allows small businesses minimize their IT spend, rapidly acquire and use the latest technologies, and maximize the spending of limited capital resources on the core components of their business. Initially testing found that it was necessary to educate, inform and question the user about their experiences with different cloud computing types to qualify if they are truly cloud computing small business users. Although our study does not test the survey participant's various cloud computing experiences, it was beneficial to confirm their binary responses to the cloud computing types they stated they were using. The participants did not always correctly associate the cloud computing type they were using to the specific cloud category, but there are varying degrees of how some cloud types blend into others. For example, some participants stated they were using SaaS and listed DropBox as the particular cloud service although Dropbox could be categorized as IaaS. Others still could not properly determine PaaS cloud services they were using, and miscategorized SaaS and IaaS as PaaS cloud services. In all, the participants did qualify as cloud computing users. The study confirms that the small business owners are well aware of the use of cloud services by their small business due to the large number of small business owners and founders participating in the study.

The DeLone and McLean 2004 model for IS success is a multidimensional construct model for analyzing net benefits which when essential features and attributes are defined, helps to measure cloud computing success. Those researchers who are interested in the specific small business experiences with specific public cloud computing offerings can drive beyond the collective indicator of cloud service users. A comparative analysis of the different experiences of cloud computing use by small businesses could highlight different aspect is the IS success.

The following section will discuss the research results, being mindful of both the academic and practitioner perspectives. After the discussion of System Quality and Service Quality, the paper will move forward with a discussion on the results associated with the other relationships found within the model. These results will be particularly interesting to those desiring to learn more about the direct effects of System Quality the potential effects of one quality attribute on another. Current research on the predecessors of Organizational Satisfaction and Use has demonstrated varying results. The discussion that follows is reinforced with the intent to motivate the reader to believe that there is a positive opportunity to study more of the interactive effects of the components of the 2004 D&M IS model. This will produce a positive opportunity for extending research in IS success particularly as it pertains to the introduction of new technology.

System Quality, a key construct within the IS literature is indicative of the perceived system quality and is likely to be dependent on the total integrity of the technical architectures in sustaining user experiences. As in research by Xu et al. (2013) determined that when the IS department within an organization increasingly provides a service function to its organizational clients, ServQ was found to be a fundamental criterion for success boosting usage, increased loyalty and enhance customer satisfaction. This we confirmed with third-party hosted cloud computing services as a result of our research which showed the significant effect of system quality on service quality, organizational satisfaction, and use. Just as the Xu et al. (2013) research confirmed the relationships among the perceptions of SysQ and ServQ in the e-service context, we also confirmed this perception SysQ and ServQ in the cloud computing context. Their research confirmed the beliefs about SysQ will influence one's beliefs about ServQ, which we also confirmed with our research. Although Xu et al. (2013) did not confirm a significant relationship between SysQ and ServQ, this relationship was confirmed in our research and was found to be highly significant. Xu et al., (2013) found SysQ, IQ, and ServQ had a significant and positive relationship among their direct related corresponding satisfaction constructs (ISAT, SysSAT, SSAT). We found SysQ and ServQ had a significant and positive relationships with our single satisfaction construct

(OrgSat). Hypothesis 1 that states the perception of system quality positively affects the perceived service quality of cloud computing services for small businesses is supported and highly significant (*p* = .000). System quality had the second highest effect on Service Quality, more than any other construct. As posited, system quality influences one's believe about service quality. Although found not significant in research conducted by Xu et al. (2013), we found this relationship to be significant. A cloud computing services with effective self-service and on-demand characteristics simplifies complexities as well as enhances benefits. This hypothesis is related to the simplification and provisioning of security services without the need for a highly skilled staff to deal with them (Anthes, 2010). This is also reflected in the scale item with the largest weight on the construct and reflects the study participant's view of their cloud service's overall quality (ServQ7 = 0.331 "Overall the level of service quality I receive from the cloud service provider for my small businesses selected user was good"). Hypothesis 2 states the perception of system quality positively affects organizational satisfaction in cloud computing services for small businesses is supported and highly significant (*p* = .000). As postulated, the system quality of a cloud services would have a positive relationship on satisfaction, as related to system security (SysQ6 = 0.157 "My cloud service provides for the data encryption system needs of my small business."). As in the Lee et al., (2009) study on the performance aspects of a cloud-based MDSs, we also found that a system operating below a certain performance or organization expectation level would lead to overall organization dissatisfaction with a system. Hypothesis 3 assures that the perception of system quality positively affects the degree of use of cloud computing services for small businesses is supported and highly significant (*p* = .000). System quality had the second highest effect on Use. As claimed, the system quality of a cloud services would have a positive relationship on satisfaction, and we believe this is related to system availability (SysQ1 = 0.188 “The availability of the cloud service supports the needs of my small business’s selected use.”) which is highly noted in the literature (Caldeira & Ward, 2002; Fitzgerald & Russo, 2005; Premkumar et al., 1994; Seddon, 1997).

Service Quality, the primary determiner of satisfaction with IT service delivery and for our research, service quality is defined as the overall and comprehensive services delivered by the cloud computing service provider. As in research by Xu et al., (2013) in the concept of ServQ as a IT unity service found that ServQ evolved into the customer’s overall subjective assessment of the quality of the interaction with an IS service provider. In research conducted by Xu et al. (2013) confirmed beliefs about SysQ will also influence one’s belief about ServQ, which we also confirmed through our research. Hypothesis 4 determined that the perception of service quality positively affects the degree of organizational satisfaction with cloud computing services for small businesses is supported and highly significant (p = .000). The research confirms the five dimensions of service quality required by organizations which Benlian et al. (2011) provided insights that measure satisfaction and dissatisfaction with cloud-based services. Our research confirms that service quality as a chief antecedent to satisfaction, in our case, organizational satisfaction. Based on the bootstrap results, second to the effects of system quality on service quality was the effect of service quality on organizational satisfaction. We believe this is related to study participants perceptions of service satisfaction (ServQ8 = 0.280 “I am very satisfied with the cloud service my small business receives from my cloud service provider.”) and responsiveness (ServQ3 = 0.265 “I believe the services offered by my cloud provider are responsive to my needs for my small business's selected use."). We determined that Hypothesis 5 which is the perception of service quality positively affects the degree of use of cloud computing services for small businesses is significant but not supported (p = .211). Of all the relationships between the constructs in this study and based on the literature, we believed this relationship would show more significant results based on the literature and prior research. The one scale item which we believed would show significant contribution, Use1 ("The frequency of use of cloud services in my small business is...) had the lowest weight (–0.009) of all associated scale items and was the first to be extracted in our analysis. Use2 ("The duration of use of cloud services in my small business is ") had the second lowest weight (0.016) and it did not contribute to the R^2 in a significant way. The research literature affirmed that the quality of the service provided by the cloud provider is correlated to the amount of and ongoing use of the cloud service, but was not affirmed in this study. Hypothesis 6 which states that the perception of service quality positively affects the perceived net benefits of cloud computing services for small businesses is not supported (p = 0.487). Although this new relational phenomenon was being tested in our study, we believed this relationship would show significant results based on the literature. Since our research is primarily focused on those small businesses that started their business with a 'cloud first' strategy or early adopter of cloud services with no former deployed IT solution to compare or contrast their cloud experience, we have come to believe this result is appropriate for our study. With the addition of few more control variables to determine if the survey participants had migrated from existing internal IT systems to a cloud based-service, we believe the relationship between service quality and net benefit would provide significant results.

Use, a key construct in IS literature, is indicative of the extent to and manner in which users and customers use the capabilities of an IS. Xu et al.'s (2013) research confirmed users' evaluation of the technical capabilities and usability of a system will influence their perception of SysQ; we also found the same to be true. Likewise, they posited that belief about SysQ will also influence one's belief about ServQ. Hypothesis 7, which states that the degree of use of a cloud solution positively affects overall net benefits of cloud computing for small businesses, is supported and highly significant (p = .000). Our research found that Use had the highest effect on Cloud Computing Net Benefits, over all other constructs in our research. Our research confirmed that the degree of use affects overall cloud computing net benefits as suggested in the research literature. Just as Chou and Hong (2013) determined that as the use of an ERP system increased as driven by chief attributes, corporate benefit (CB) increased, we also determined that as cloud service use increased, cloud computing net benefit increased. This was determined due to the unique features cloud computing services offers (i.e., usage-based pricing, on-demand capacity, ubiquitous access, convenience, rich features). Of all three constructs in our research model related to Cloud Computing Net Benefit, our research confirmed that Use had the largest effect on Cloud Computing Net Benefit.

Organizational Satisfaction, the measure of the opinions related to satisfaction of the enterprise leaders who have enterprise services hosted in the cloud. Hypothesis 8—the organizational satisfaction of a cloud solution positively affects overall cloud computing use for small businesses—was not supported (p = .163). Our research did not confirm this hypothesis to be significant, although the research literature supported the premise that increased user satisfaction will lead to increased intention to use and resultant use of an IS (DeLone & McLean, 2003). The research literature confirms the difficulties in measuring and interpreting the multidimensional aspects of use. For our research we chose to test use as a behavior related to cloud computing, in the case of this specific hypothesis, as related to organizational satisfaction. Hypothesis 9 asserts that the organizational satisfaction with a cloud solution positively affects the overall net benefits of cloud computing for small businesses, and this is supported with some significance at $p = .066$. The result of this finding was promising, although it was not completely affirmed by our research.

We found that Organizational Satisfaction had the second highest effect on Cloud Computing Net Benefit in our research study. Research by Benlian et al. (2011) determined that as small business satisfaction increased with the system and service quality of cloud computing services after adoption, business benefits began to be realized. With the addition of a few scale items to determine the successful level of adoption of cloud-based services, we believe the relationship between organizational satisfaction and net benefit would provide significant results. The results of organizational satisfaction warrant further study.

Cost represents the financial resources used to procure cloud computing services that are characterized by usage-based pricing as demand dictates and other special advantages (i.e., low barrier to entry, reduced capital expense, lower ongoing operational costs, and ability to scale up or down). Hypothesis 10a, which states that for cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and organizational satisfaction with small businesses than with cloud computing services with relatively higher costs, is not supported and is not significant at $p = .122$. Research on this moderating effect of lower cost (or lower price) identified it as having a substantial effect on business satisfaction as related to service quality and its associated features. With the ability of providing higher quality computational services at a lower cost than what could be provisioned in-house by a small business, our research did not confirm our belief that this moderator would have an effect on organizational satisfaction, especially with little or no upfront investment (CapEx) required with a scalable pay-as-you-go pricing structure.

Hypothesis 10b—that with cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and use for small businesses than with cloud computing services with relatively higher costs—is neither supported nor significant at $p = .242$. Gupta et al. (2013) found the use of cloud computing by large-scale enterprises is primarily based on their perceptions of cost reduction, but our research did not support this finding for small businesses. Gupta et al. found that the lower the barrier of entry to cloud services is (at low or no cost), the higher the effect on the relationship between the cloud service quality and use is.

Hypothesis 10c—that with cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and perceived net benefits for small businesses than with cloud computing services with relatively higher costs—is not supported or significant ($p = .680$). Our research did not affirm this hypothesis with Cost although the path value was directionally correct (positive). This hypothesis had no moderating effect on the relationship between these two constructs, although the effect of Service Quality on Cloud Computing Net Benefit was not supported by our study. Research by Nanath and Pillai (2013) found that with the rich features cloud computing provided, three layers of cost benefit were essential for achieving business benefit. Based on the results of our study, the effect of Service Quality on Cloud Computing Net Benefit was too weak to be strengthened regardless of if there was a moderating effect of Cost. It is interesting that the moderating effect of Cost is not significant on the relationship between Service Quality and Use and Service Quality and Cloud Computing Net Benefit based on the research literature in this subject area. These results warrant further study.

Cloud Computing Net Benefits (CCNB), the balance of positive and negative impacts of cloud computing and the extent that it contributes to the success of the small business, was found to provide significant insight as a result of our study. With NetBen4 and NetBen6 removed in the analysis steps, NetBen8 ("Generally, the cloud services have made my work easier.") provided the most significant weight on CCNB. NetBen5 ("The benefits of my cloud service have resulted in an increased capacity to manage a growing volume of activity (e.g., transactions, population growth, etc.).") had the second highest weight. NetBen3 ("My cloud service has resulted in overall productivity improvement.") had the third highest weight. NetBen8, NetBen5, and NetBen3 confirmed that small businesses found cloud services simplified the tasks required to run their small business while enabling them to increase their capacity to drive more business, resulting in more overall productivity improvement. Although the direct effects of Service Quality on CCNB were determined to not be significant, our research determined the indirect effects of System Quality through Use provided the most significant effects on CCNB.

Our research determined that the indirect effects of System Quality through Organizational Satisfaction provided the second most significant effects on CCNB. The finding that System Quality had a higher effect on Use, and Service Quality had a higher effect on Organizational Satisfaction, confirms the premise of our study that small business satisfaction and use result in the direct effect on cloud computing net benefit.

The relationships between the constructs were analyzed using structural equation modeling techniques; the results are summarized in Table 36.

Table 36

Summary of Hypotheses Supported and Not Supported

Hypothesis	Result
H1: The perception of system quality positively affects the perceived service quality of cloud computing services for small businesses.	Supported
H2: The perception of system quality positively affects organizational satisfaction in cloud computing services for small businesses.	Supported
H3: The perception of system quality positively affects the degree of use of cloud computing services for small businesses.	Supported
H4: The perception of service quality positively affects the degree of organizational satisfaction with cloud computing services for small businesses.	Supported
H5: The perception of service quality positively affects the degree of use of cloud computing services for small businesses.	Not Supported
H6: The perception of service quality positively affects the perceived net benefits of cloud computing services for small businesses.	Not Supported
H7: The degree of use of a cloud solution positively affects overall net benefits of cloud computing for small businesses.	Supported
H8: The organizational satisfaction of a cloud solution positively affects overall cloud computing use for small businesses.	Not Supported
H9: The organizational satisfaction with a cloud solution positively affects the overall net benefits of cloud computing for small businesses.	Partially Supported
H10a: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and organizational satisfaction with small businesses than with cloud computing services with relatively higher costs.	Not Supported

Hypothesis	Result
H10b: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and use for small businesses than with cloud computing services with relatively higher costs.	Not Supported
H10c: With cloud computing services with relatively lower costs, there will be a stronger relationship between perceived service quality and perceived net benefits for small businesses than with cloud computing services with relatively higher costs.	Not Supported

It is not surprising that System Quality strongly influences Service Quality as per the technology phenomena of study called cloud computing. All business types are depending more and more on cloud delivered services, especially with the advent of mobile technology being used by these enterprises as well as their customers. The moderating effect of Cost is not confirmed by our research that lower cost will strengthen the relationship between Service Quality and Organizational Satisfaction, Use and Cloud Computing Net Benefit. Further research in this area will possibly confirm this moderating relationship and extend our research in the study of other cloud computing types with other business scenarios.

Overall, the results of this study show that Use of a cloud computing system by a small business has a stronger effect on Cloud Computing Net Benefit than the direct effects of Service Quality and Organizational Satisfaction. This study also shows that System Quality has a stronger in-direct effect on Cloud Computing Net Benefit through Use, than through Service Quality and Organizational Satisfaction.

Contributions

This study represents quantitative research which focuses on the net benefit of cloud computing on small businesses while extending the D&M IS model to create a more parsimonious model to examine the unique relationships between select constructs as it pertains to cloud computing. Although this study is specifically directed toward the benefit of cloud computing to small businesses, it can be adapted for use in other scenarios. One of the goals of this unique study is to study the effects of System Quality on Service Quality, and to determine if Organizational Satisfaction has an effect on Use. This research also intended to confirm the direct effects of Service Quality on Cloud Computing Net Benefits. The research literature indicates Cost has a strong effect on the adoption, use and extended use of cloud computing as well as converting IT expensed from typical fixed CapEx expenses to flexible OpEx expenses, although not confirmed by this research study. The intent of our research is to show immediate and direct benefit of System Quality on Cloud Computing Net Benefit.

It is clear by the results of this study that small businesses are achieving the positive intended results in adoption and use of cloud computing. Given that this research is focused on small business, if would suggest that cloud service providers keep this in mind when trying to apply the results and designing solutions to other target audiences.

Implications for Academic Researchers

The primary contribution of this research is to demonstrate the extended relevance of the DeLone and McLean IS success model to the latest IS phenomena called public cloud computing. The DeLone and McLean 2004 model for IS success is a multidimensional construct model for analyzing net benefits that, when essential features and attributes are defined, helps to measure cloud computing success. This research project surveyed the cloud computing success for select small businesses in their targeted marketplaces. This project leveraged the D&M IS success theoretical model to develop hypotheses about the potential relationships within the IS success research work stream. For researchers who are interested in studying cloud computing services, these results draw attend to the blended relationship between system quality and service quality as it related to cloud computing, as well as a small business's organizational satisfaction and use of those third-party cloud services results in measurable net benefits. This blended relationship between system and service quality is due to the outsourcing, out tasking or being reliant on a third party to delivery these services for the small business. From a researcher perspective, this offers new insights into using this model for examining other ISs for which this IS success model would be appropriate.

Comparison of the hypotheses results. System Quality had a strong effect on Service Quality, yet Service Quality had a stronger effect on Organizational Satisfaction and System Quality had a stronger effect on Use. The findings for Use having a stronger effect on Cloud Computing Net Benefit, yet one who have expected Organizational Satisfaction to have had a stronger effect on Cloud Computing Net Benefit. As a result, this is an interesting finding and potential for comparative analysis for future research.

Implications for Practitioners and Industry

The results of this study contribute to the practitioners as there is much to be learned with the application of the D&M IS model to cloud computing, which is a low-cost broadly available service to small businesses. In the case of the cloud service providers being the practitioner, this research and its future iterations will help them to align their services to better understand the perceptions and experiences of its targeted business market. For those small businesses that are early users of a specific cloud provider's services, gaining an early understanding of their perceptions of the product will be useful for its improvement as well as gaining critical data to market to other small businesses.

When small businesses surveyed indicated their future demand for IT services will increase (Budriene & Zalieckaite, 2012, p. 120) and those small businesses with fewer than 20 workers accounted for 89.8% all U.S. small businesses (U.S. Census Bureau, 2011), this represented a large market for cloud computing service providers to exploit. As a result of this study, it is clear that small businesses are achieving the benefits that cloud computing services offer. To exploit this market segment it is important to know small businesses' perceptions and benefits of the use of cloud computing. Understanding how those small businesses perceive and benefit from their cloud services helps them to improve their products and services. One day many of these small businesses will became medium-sized businesses, and possibly many of those medium-sized businesses will become large enterprises. Those cloud computing service providers that are attuned to the needs of those small business customers will have a critical imbedded advantage to grow their business as their clients grow.

Limitations and Future Research Opportunities

One limitation of this study is that is focuses on those small businesses that use cloud computing. This study's focus is to present the survey participants with the definition of the three primary cloud types that are widely accepted by the academy and practitioners, and for participants to select which cloud type they use in their small business. Although researchers and industry generally agree on SaaS, PaaS, and IaaS as the three major service models of cloud computing (Clarke, 2010; Garrison et al., 2012; Grossman, 2009; Gupta, Seetharaman, & Raj, 2013; Haselmann & Vossen, 2011; Marston et al., 2011; Mell & Grance, 2010; Subashini & Kavitha, 2011), there exist many variations provided by cloud providers and multiple combinations of cloud types implemented by various small businesses. To address this in future studies, the researcher should provide each survey participant with an extensive list of cloud vendors and services to choose from and systematically determine the cloud type within the survey instrument. For the purposes of our research we relied on the knowledge of the survey participant to determine which cloud computing type they were using in their small business—which represents another limitation of this study. This is not magnified in great degree with small business, but if this study is applied to a medium or large business, and then the degree of accuracy might be brought into question.

If a cloud computing service provider executed this study in a specific controlled group (i.e., user group), then the level of awareness between differing cloud types and perception of experiences would be strengthened. The final limitation of this study is based on the demographic data gathered on the small businesses and their associated study participants. It would be interesting to study the perceptions of those small businesses that adopted a “cloud first” strategy when they started their small business versus those that moved from a legacy IT infrastructure to a cloud-based IT model. Although the majority of the small businesses that participated in this study operated one to two sites, the comparison of the cloud experience of those small businesses that operated from more than two sites might offer different insights.

Another opportunity where this work can be extended and further explored is to compare the various small business perceptions of and the net benefits achieved through one cloud computing service type versus another. This comparative study could help small businesses understand the benefits of subscribing to a SaaS versus running their own software stack in an IaaS environment. This type of study with our research model would be able to compare different effects of one construct on the other and the resultant net benefits based on the comparative cloud models. For a cloud computing service provider, these data could be used to best market their products and make the best value proposition for their target market.

Presently, this study and the model it uses offer knowledge about small businesses' experiences with cloud computing. However for any user group of cloud computing this study is worth employing to examine their perceptions. Although U.S. businesses are the foci of this study, it would be easy to study the same group in another country taking into consideration other moderating attributes (i.e., laws, taxes, government structure, etc.). Further, there are additional opportunities to conduct this study comparing the cloud computing experiences of U.S. versus non-U.S. small business, small versus medium businesses, private versus public universities, family- versus stockholder-owned businesses, or minority- versus majority-owned businesses. What can be learned by this extended research is that there are additional experiences, different perspectives, and varying net benefits achieved by the various organizations that have adopted cloud computing.

From a research perspective it would be interesting to see the results of this model tested against another business model that is using cloud computing or some other new

IS. Likewise it would be interesting to conduct this study while focusing purely on one cloud computing type used by small businesses. Another interesting study would be to compare the same services delivered by one cloud service provider to those of another as used by a set of small businesses. This could possibly reveal a better understanding of the same cloud service type within a set of small businesses, or comparable cloud experiences of one set of small businesses to that of another using another similar cloud computing services. It could be that the system quality of both systems would be similar but vary in the service quality delivered by those cloud providers.

Concluding Remarks

The purpose of this research study was to define an IS framework that small businesses could use to determine the benefits of a particular cloud computing solution before adoption, based on the efforts of select small businesses that were early adopters of cloud computing. This research determined the essential features and attributes that enable cloud computing success for small businesses in their targeted marketplaces. Focused on the primary success constructs associated with overall cloud quality, experience, and benefit, this research has yielded an enhanced IS success model calibrated to small businesses and targets specific cloud computing services attributes that align with their business requirements and success criteria.

In summary, this research sought to better comprehend the IS success and net benefits achieved by small businesses that use cloud computing. Although this research endeavored to evaluate the aggregated cloud computing experiences of small businesses it yielded to the need to study small businesses’ experiences with each of the major three different cloud computing types. New or existing small businesses can use this research to determine the success and net benefits they should expect to achieve based on the experiences of the small businesses that participated in this study. Through this study, cloud computing service providers can gain insight on small businesses' cloud computing experiences to tune their business model to better exploit this market segment and to grow their business. To gain additional knowledge in this space, future researchers can use this research model to investigate the varying dimensions of different cloud computing types with small businesses, as well as new cloud computing types when they are introduced. With cloud computing being at the epicenter of this era in delivering IS services across a spectrum of business segments, this model will be useful in determining the IS success and net benefits to cloud computing users for years to come. Extending our research from the initial target population of U.S.-based small businesses, there is expected to be a different experiences encountered by other non–U.S.-based small businesses, or those specific to an industry segment. This present research study will serve as the basis for future research in IS success and cloud computing, and become the catalyst to expand the knowledge base for both practitioners and academics in future years.

REFERENCES

Abbadi, I. M. (2013). A framework for establishing trust in cloud provenance. *International Journal of Information Security*, *12*(2), 111–128. http://doi.org/10.1007/s10207-012-0179-0

Al-Johani, A. A., & Youssef, A. E. (2013). A framework for ERP systems in SME based on cloud computing technology. *International Journal on Cloud Computing: Services and Architecture*, *3*(3), 1–14. http://doi.org/10.5121/ijccsa.2013.3301

Alshamaila, Y., Papagiannidis, S., & Li, F. (2013). Cloud computing adoption by SMEs in the north east of England: A multi-perspective framework. *Journal of Enterprise Information Management*, *26*(3), 250–275. http://doi.org/10.1108/17410391311325225

Alshare, K. A., Freeze, R. D., Lane, P. L., & Wen, H. J. (2011). The impacts of system and human factors on online learning systems use and learner satisfaction. *Decision Sciences Journal of Innovative Education*, *9*(3), 437–461.

Ambrose, P. J., & Chiravuri, A. (2010). A socio-cognitive interpretation of the potential effects of downsizing on software quality performance. *Information Systems Journal*, *20*(3), 239–265. http://doi.org/10.1111/j.1365-2575.2009.00332.x

Anderson, E., Nag, S., Singh, T. J., Sood, B., Hare, J., Eid, T., … Yeates, M. (2015). *Forecast analysis: Public cloud services, worldwide, 1Q15 update* (No. G00277763) (pp. 1–22). Gartner.

Anthes, G. (2010). Security in the cloud. *Communications of the ACM*, *53*(11), 16–18. http://doi.org/10.1145/1839676.1839683

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., … Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM*, *53*(4), 50–58.

Aydin, S., Özer, G., & Arasil, O. (2005). Customer loyalty and the effect of switching costs as a moderator variable: A case in the Turkish mobile phone market. *Marketing Intelligence & Planning*, *23*(1), 89–103. http://doi.org/10.1108/02634500510577492

Barclay, D., Higgins, C., & Thompson, R. (1995). The partial least squares (PLS) approach to causal modeling: Personal computer adoption and use as an illustration. *Technology Studies*, *2*(2), 285–309.

Bayrak, T. (2013). A decision framework for SME information technology (IT) managers: Factors for evaluating whether to outsource internal applications to application service providers. *Technology in Society*, *35*(1), 14–21. http://doi.org/10.1016/j.techsoc.2012.11.001

Benlian, A., Koufaris, M., & Hess, T. (2011). Service quality in software-as-a-service: Developing the SaaS-Qual measure and examining its role in usage continuance. *Journal of Management Information Systems*, *28*(3), 85–126.

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, *25*(3), 351–370.

Bradley, R. V., Pratt, R. M. E., Byrd, T. A., Outlay, C. N., & Wynn, D. E. (2012). Enterprise architecture, IT effectiveness and the mediating role of IT alignment in US hospitals. *Information Systems Journal*, *22*(2), 97–127. http://doi.org/10.1111/j.1365-2575.2011.00379.x

Budriene, D., & Zalieckaite, L. (2012). Cloud computing application in small and medium-sized enterprises. *Issues of Business and Law, 4*, 119–130.

Buyya, R., Yeo, C. S., & Venugopal, S. (2008). Market-oriented cloud computing: Vision, hype, and reality for delivering IT services as computing utilities. In *High Performance Computing and Communications, 2008. HPCC'08. 10th IEEE International Conference on* (pp. 5–13). IEEE. Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4637675

Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. (2009). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. *Future Generation Computer Systems*, *25*(6), 599–616. http://doi.org/10.1016/j.future.2008.12.001

Caldeira, M. M., & Ward, J. M. (2002). Understanding the successful adoption and use of IS/IT in SMEs: An explanation from Portuguese manufacturing industries. *Information Systems Journal*, *12*(2), 121–152.

Carcary, M., Doherty, E., & Conway, G. (2014). The adoption of cloud computing by Irish SMEs—An exploratory study. *Electronic Journal of Information Systems Evaluation*, *17*(1), 1–13.

Cenfetelli, R., & Bassellier, G. (2009). Interpretation of formative measurement in information systems research. *MIS Quarterly*, *33*(4), 689–707.

Cheng, F., Yang, S. L., Akella, R., & Tang, X. T. (2011). A meta-modelling service paradigm for cloud computing and its implementation. *South African Journal of Industrial Engineering*, *22*(2), 151–160.

Chen, P.-Y., & Wu, S.-Y. (2012). The impact and implications of on-demand services on market structure. *Information Systems Research*, *24*(3), 750–767. http://doi.org/10.1287/isre.1120.0451

Chou, J.-S., & Hong, J.-H. (2013). Assessing the impact of quality determinants and user characteristics on successful enterprise resource planning project implementation. *Journal of Manufacturing Systems*, *32*(4), 792–800. http://doi.org/10.1016/j.jmsy.2013.04.014

Christauskas, C., & Miseviciene, R. (2012). Cloud-computing based accounting for small to medium sized business. *Engineering Economics*, *23*(1), 14–21.

Clarke, R. (2010). User requirements for cloud computing architecture. In *2010 10th IEEE/ACM International Conference on Cluster, Cloud and Grid Computing (CCGrid)* (pp. 625–630). IEEE. http://doi.org/10.1109/CCGRID.2010.20

Cloud Security Alliance. (2013). The notorious nine cloud computing top threats in 2013. Retrieved from https://downloads.cloudsecurityalliance.org/ initiatives/top_threats /The_Notorious_Nine_Cloud_Computing_Top_Threats_in_2013.pdf

Cole, R. A. (2013). What do we know about the capital structure of privately held US firms? Evidence from the surveys of small business finance. *Financial Management*, *42*(4), 777–813. http://doi.org/10.1111/%28ISSN%291755-053X/issues

Columbus, L. (2013, July). CIOs on cloud computing adoption: Conquer complexity and help us grow. *Forbes*. Retrieved from http://www.forbes.com/sites/louiscolumbus/2013/07/01/cios-on-cloud-adoption-conquer-complexity-and-help-us-grow/

Creeger, M. (2009). CTO roundtable: Cloud computing. *Communications of the ACM*, *52*(8), 50–56.

Cronin, J. J., & Taylor, S. A. (1992). Measuring service quality: A reexamination and extension. *Journal of Marketing*, *56*(3), 55–68.

Dai, W. (2009). The impact of emerging technologies on small and medium enterprises (SMEs). *Journal of Business Systems, Governance and Ethics*, *4*(4), 53–60.

Daneshgar, F., Low, G. C., & Worasinchai, L. (2013). An investigation of "build vs. buy" decision for software acquisition by small to medium enterprises. *Information and Software Technology*, *55*(10), 1741–1750. http://doi.org/10.1016/j.infsof.2013.03.009

Davenport, T. H. (1998). Putting the enterprise into the enterprise system. *Harvard Business Review*, *76*(4), 121–131.

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60–95.

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean Model of information systems success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9–30.

DeLone, W. H., & McLean, E. R. (2004). Measuring e-Commerce success: Applying the DeLone & McLean information systems success model. *International Journal of Electronic Commerce*, *9*(1), 31–47.

de Ruyter, K., Wetzels, M., & Bloemer, J. (1998). On the relationship between perceived service quality, service loyalty and switching costs. *International Journal of Service Industry Management*, *9*(5), 436–453. http://doi.org/10.1108/09564239810238848

Dutta, A., Peng, G. C. A., & Choudhary, A. (2013). Risks in enterprise cloud computing: The perspective of IT experts. *Journal of Computer Information Systems*, *53*(4), 39–48.

Dziopa, F., & Ahern, K. (2011). A systematic literature review of the applications of Q-technique and its methodology. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, *7*(2), 39–55. http://doi.org/10.1027/1614-2241/a000021

Fenn, J., & Linden, A. (2005). Understanding Gartner's hype cycle. *Stamford: Gartner Group*. Retrieved from http://lib-resources.unimelb.edu.au/gartner/research/128100/128180/128180.pdf

Fitzgerald, G., & Russo, N. L. (2005). The turnaround of the London ambulance service computer-aided despatch system (LASCAD). *European Journal of Information Systems*, *14*(3), 244–257. http://doi.org/10.1057/palgrave.ejis.3000541

Foster, I., Zhao, Y., Raicu, L., & Lu, S. (2008). Cloud computing and grid computing 360-degree compared. In *Grid Computing Environments Workshop, 2008. GCE'08* (pp. 1–10). IEEE. Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4738445

Gable, G. G., Sedera, D., & Chan, T. (2008). Re-conceptualizing information system success: The IS-impact measurement model. *Journal of the Association for Information Systems*, *9*(7), 1–32.

Garrison, G., Kim, S., & Wakefield, R. L. (2012). Success factors for deploying cloud computing. *Communications of the ACM*, *55*(9), 62–68. http://doi.org/10.1145/2330667.2330685

Gaskin, J., Berente, N., Lyytinen, K., & Yoo, Y. (2014). Toward generalizable sociomaterial inquiry: A computational approach for zooming in and out of sociomaterial routines. *Management Information Systems Quarterly*, *38*(3), 849–871.

Gold, J. (2012). Protection in the cloud: Risk management and insurance for cloud computing. *Journal of Internet Law*, *15*(12), 1–28.

Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly*, (2), 213. http://doi.org/10.2307/249689

Gray, P. H., Parise, S., & Iyer, B. (2011). Innovation impacts of using social bookmarking systems. *MIS Quarterly*, *35*(3), 629–643.

Grossman, R. L. (2009). The case for cloud computing. *IT Professional*, *11*(2), 23–27.

Gunasekaran, A., Rai, B. K., & Griffin, M. (2011). Resilience and competitiveness of small and medium size enterprises: An empirical research. *International Journal of Production Research*, *49*(18), 5489–5509. http://doi.org/10.1080/00207543.2011.563831

Gupta, P., Seetharaman, A., & Raj, J. R. (2013). The usage and adoption of cloud computing by small and medium businesses. *International Journal of Information Management*, *33*(5), 861–874. http://doi.org/10.1016/j.ijinfomgt.2013.07.001

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis*. Pearson Higher Education.

Hair, Jr., J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (pls-sem)*. Thousand Oaks, CA: SAGE.

Han, Y. (2011). Cloud computing: Case studies and total costs of ownership. *Information Technology & Libraries*, *30*(4), 198–206.

Haselmann, T., & Vossen, G. (2011). Software-as-a-service in small and medium enterprises: An empirical attitude assessment. In *Web Information System Engineering–WISE 2011* (pp. 43–56). Berlin, Germany: Springer. Retrieved from http://link.springer.com/chapter/10.1007/978-3-642-24434-6_4

Hon, W. K., Millard, C., & Walden, I. (2013). Negotiating cloud contracts: Looking at clouds from both sides now. *Stanford Technology Law Review*, 79–129.

Hoon, P. M. (2013). How the cloud is changing the IT outsourcing market. *NetworkWorld Asia*, *10*(3), 27.

Howison, J., Wiggins, A., & Crowston, K. (2011). Validity issues in the use of social network analysis with digital trace data. *Journal of the Association for Information Systems*, *12*(12), 767–797.

Iivari, J. (2005). An empirical test of the DeLone-McLean model of information system success. *ACM Sigmis Database*, *36*(2), 8–27.

Islam, M. M., Morshed, S., & Goswami, P. (2013). Cloud computing: A survey on its limitations and potential solutions. *International Journal of Computer Science Issues (IJCSI)*, *10*(4). Retrieved from http://ijcsi.org/papers/IJCSI-10-4-2-159-163.pdf

Iye, E. K., Krishnan, A., Sareen, G., & Panda, T. (2013). Sectorial adoption analysis of cloud computing by examining the dissatisfier landscape. *Electronic Journal of Information Systems Evaluation*, *16*(3), 211–219.

Iyer, B., & Henderson, J. C. (2012). Business value from clouds: Learning from users. *MIS Quarterly Executive*, *11*(1), 51–60.

Jain, V., & Gupta, A. (2012). Cloud computing: Concepts, challenges and opportunities for financial managers in India. *Amity Global Business Review*, *7*, 22–29.

Kalyvas, J. R., Overly, M. R., & Karlyn, M. A. (2013). Cloud computing: A practical framework for managing cloud computing risk—Part I. *Intellectual Property & Technology Law Journal*, *25*(3), 7–18.

Kamal, S., & Kaur, R. (2011). Cloud computing security issue: Survey. *AIP Conference Proceedings*, *1414*(1), 149–153. http://doi.org/10.1063/1.3669947

Karahanna, E., Straub, D. W., & Chervany, N. L. (1999). Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Quarterly*, *23*(2), 183–213.

Khan, K. M., & Malluhi, Q. (2010). Establishing trust in cloud computing. *IT Professional*, *12*(5), 20–27.

Kim, G., Shin, B., & Lee, H. G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, *19*(3), 283–311. http://doi.org/10.1111/j.1365-2575.2007.00269.x

Kobe, K. (2012). *Small Business GDP: Update 2002–2010* (No. SBAHQ-10-M-0258). Washington, DC: Economic Consulting Services. Retrieved from http://www.sba.gov/sites/default/files/rs390tot_0.pdf

Ko, R. K., Jagadpramana, P., Mowbray, M., Pearson, S., Kirchberg, M., Liang, Q., & Lee, B. S. (2011). Trustcloud: A framework for accountability and trust in cloud computing. In *2011 IEEE World Congress on Services (SERVICES)* (pp. 584–

588). IEEE. Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6012795

Krell, E. (2011). The state of small business. *Baylor Business Review*, *30*(1), 4–9.

Krishnan, M. S., Ramaswamy, V., Meyer, M. C., & Damien, P. (1999). Customer satisfaction for financial services: The role of products, services and information technology. *Management Science*, *45*(9), 1194–1209.

Kriz, S. (2015, January 29). How CIOs can win in the cloud. *InformationWeek*. Retrieved from http://www.informationweek.com/cloud/software-as-a-service/how-cios-can-win-in-the-cloud/a/d-id/1318739

Kudtarkar, P., DeLuca, T. F., Fusaro, V. A., Tonellato, P. J., & Wall, D. P. (2010). Cost-effective cloud computing: A case study using the comparative genomics tool, roundup. *Evolutionary Bioinformatics*, (6), 197–203. http://doi.org/10.4137/EBO.S6259

Leavitt, N. (2009). Is cloud computing really ready for prime time? *Growth*, *27*(5). Retrieved from http://www.hh.se/download/18.70cf2e49129168da0158000123279/1341267677241/8+Is+Cloud+Computing+Ready.pdf

Lee, S., Shin, B., & Lee, H. G. (2009). Understanding post-adoption usage of mobile data services: The role of supplier-side variables. *Journal of the Association for Information Systems*, *10*(12), 860–888.

Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2003). The impact of organization size on enterprise resource planning (ERP) implementations in the US manufacturing sector. *Omega*, *31*(3), 235–246. http://doi.org/10.1016/S0305-0483(03)00022-7

Mahesh, S., Landry, B. J. L., Sridhar, T., & Walsh, K. R. (2011). A decision table for the cloud computing decision in small business. *Information Resources Management Journal*, *24*(3), 9–25. http://doi.org/10.4018/irmj.2011070102

Mangiuc, D.-M. (2012). Security issues of cloud based services—A guide for managers. *Review of International Comparative Management / Revista de Management Comparat International*, *13*(3), 468–477.

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing—The business perspective. *Decision Support Systems*, *51*(1), 176–189. http://doi.org/10.1016/j.dss.2010.12.006

Maurer, M., Emeakaroha, V. C., Brandic, I., & Altmann, J. (2012). Cost–benefit analysis of an SLA mapping approach for defining standardized cloud computing goods. *Future Generation Computer Systems*, *28*(1), 39–47. http://doi.org/10.1016/j.future.2011.05.023

McKendrick, J. (2014, January 17). Cloud computing's paradox: More IT, but less IT management. *Forbes*. Retrieved from http://www.forbes.com/sites/joemckendrick/2014/01/17/cloud-computings-paradox-more-it-but-less-it-management/

McKenny, A. F., Short, J. C., & Payne, G. T. (2013). Using computer-aided text analysis to elevate constructs an illustration using psychological capital. *Organizational Research Methods*, *16*(1), 152–184. http://doi.org/10.1177/ 1094428112459910

Meeker, M., Joseph, D., & Thaker, A. (2008). *Morgan Stanley technology trends* (pp. 1–93). Morgan Stanley. Retrieved from http://www.mobileread.com/forums/attachment.php?s=2b145158ecd7444fbef01983e885ad52&attachmentid=14582&d=1216717541

Mell, P., & Grance, T. (2010). The NIST definition of cloud computing. *Communications of the ACM*, *53*(6), 50.

Mell, P., & Grance, T. (2011). *The NIST definition of cloud computing: recommendations of the National Institute of Standards and Technology*. Retrieved from http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

Miranda, S. (2013). ERP in the cloud: CFOs see the value of running enterprise applications as a service. *Financial Executive*, *29*(1), 65–66.

Monroy, C. R., Arias, C. A., & Guerrero, Y. N. (2012). The new cloud computing paradigm: The way to IT seen as a utility. *Latin American & Caribbean Journal of Engineering Education*, *6*(2), 24–31.

Nanath, K., & Pillai, R. (2013). A model for cost-benefit analysis of cloud computing. *Journal of International Technology & Information Management*, *22*(3), 93–117.

Noor, T. H., Sheng, Q. Z., Zeadally, S., & Yu, J. (2013). Trust management of services in cloud environments: Obstacles and solutions. *ACM Computing Surveys*, *46*(1). http://doi.org/10.1145/2522968.2522980

O'Leary, D. E. (2008). Gartner's hype cycle and information system research issues. *International Journal of Accounting Information Systems*, *9*(4), 240–252. http://doi.org/10.1016/j.accinf.2008.09.001

O'Sullivan, D. (2009). The Internet cloud with a silver lining. *Manager: British Journal of Administrative Management*, (66), 20–21.

Parasuraman, A., Zeithami, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perception of service quality. *Journal of Retailing, 64*(1), 5–6.

Pearson, S., & Benameur, A. (2010). Privacy, security and trust issues arising from cloud computing. In *Cloud Computing Technology and Science (CloudCom), 2010*

IEEE Second International Conference on (pp. 693–702). IEEE. Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5708519

Petter, S., DeLone, W. H., & McLean, E. R. (2008). Measuring information systems success: Models, dimensions, measures, and interrelationships. *European Journal of Information Systems*, *17*(3), 236–263. http://doi.org/10.1057/ejis.2008.15

Petter, S., DeLone, W. H., & McLean, E. R. (2012). The past, present, and future of "IS success." *Journal of the Association for Information Systems*, *13*(5), 341–362.

Petter, S., DeLone, W. H., & McLean, E. R. (2013). Information systems success: The quest for the independent variables. *Journal of Management Information Systems*, *29*(4), 7–62. http://doi.org/10.2753/MIS0742-1222290401

Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. *MIS Quarterly*, *31*(4), 623–656.

Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competition*. New York, NY: Free Press.

Premkumar, G., Ramamurthy, K., & Nilakanta, S. (1994). Implementation of electronic data interchange: An innovation diffusion perspective. *Journal of Management Information Systems*, *11*(2), 157–186.

Rajendran, J. (2013). What CFOs should know before venturing into the cloud. *HFM (Healthcare Financial Management)*, *67*(5), 40–43.

Ranaweera, C., & Neely, A. (2003). Some moderating effects on the service quality-customer retention link. *International Journal of Operations & Production Management*, *23*(2), 230–248. http://doi.org/10.1108/01443570310458474

Rawal, A. (2011). Adoption of cloud computing in India. *Journal of Technology Management for Growing Economies*, *2*(2), 65–78.

Robey, D. (1979). User attitudes and management information system use. *Academy of Management Journal*, *22*(3), 527–538. http://doi.org/10.2307/255742

Robey, D., Smith, L. A., & Vijayasarathy, L. R. (1993). Perceptions of conflict and success in information systems development projects. *Journal of Management Information Systems*, *10*(1), 123–139.

Robey, D., & Zeller, R. L. (1978). Factors affecting the success and failure of an information system for product quality. *Interfaces*, *8*(2), 70–75.

Ryan, W. M., & Loeffler, C. M. (2010). Insights into cloud computing. *Intellectual Property & Technology Law Journal*, *22*(11), 22–28.

Saeed, K. A., & Abdinnour, S. (2013). Understanding post-adoption IS usage stages: An empirical assessment of self-service information systems. *Information Systems Journal*, *23*(3), 219–244. http://doi.org/10.1111/j.1365-2575.2011.00389.x

Sako, M. (2012). Business models for strategy and innovation. *Communications of the ACM*, *55*(7), 22–24. http://doi.org/10.1145/2209249.2209259

Samson, Y., & McDowall, R. D. (2013). Cloud computing: How to choose the right cloud supplier. *Spectroscopy*, *28*(12), 15.

Seddon, P. B. (1997). A respecification and extension of the DeLone and McLean model of IS success. *Information Systems Research*, *8*(3), 240–253.

Seddon, P. B., Staples, S., Patnayakuni, R., & Bowtell, M. (1999). Dimensions of information systems success. *Communications of the AIS*, *2*(3es), 5.

Sharma, N. (2003). The role of pure and quasi-moderators in services: An empirical investigation of ongoing customer–service-provider relationships. *Journal of Retailing and Consumer Services*, *10*(4), 253–262.

Size Standards Division Office of Government Contracting & Business Development. (2009). *SBA size standards methodology*. Washington, DC. Retrieved from http://www.sba.gov/sites/default/files/size_standards_methodology.pdf

Small Business Administration, Office of Advocacy. (2014). *Frequently asked questions about small business*. Retrieved from http://www.sba.gov/sites/default/files/FAQ_March_2014_0.pdf

Smith, D. M. (2014). *Hype cycle for cloud computing, 2014* (pp. 1–104). Gartner. Retrieved from https://www.gartner.com/doc/2807621/hype-cycle-cloud-computing-

Smith, R. (2009). Computing in the cloud. *Research Technology Management*, *52*(5), 65–68.

Spears, J. L., & Barki, H. (2010). User participation in information systems security risk management. *MIS Quarterly*, *34*(3), 503–A5.

Srinivasan, S. (2013). Is security realistic in cloud computing? *Journal of International Technology & Information Management*, *22*(4), 47–66.

Srivastava, M., & Rai, A. K. (2014). An investigation into service quality–customer loyalty relationship: The moderating influences. *DECISION*, *41*(1), 11–31. http://doi.org/10.1007/s40622-014-0025-5

Srivastava, S., & Kumar, A. (2011). A new approach of CLOUD: Computing infrastructure on demand. *Trends in Information Management*, *7*(2), 145–153.

Straub, D., Boudreau, M., & Gefen, D. (2004). Validation guidelines for IS positivist research. *The Communications of the Association for Information Systems*, *13*(1), 63.

Straub, D., & del Giudice, M. (2012). Use. *MIS Quarterly*, *36*(4), iii–vii.

Subashini, S., & Kavitha, V. (2011). A survey on security issues in service delivery models of cloud computing. *Journal of Network and Computer Applications*, *34*(1), 1–11. http://doi.org/10.1016/j.jnca.2010.07.006

Sultan, N. A. (2011). Reaching for the "cloud": How SMEs can manage. *International Journal of Information Management*, *31*(3), 272–278. http://doi.org/10.1016/j.ijinfomgt.2010.08.001

Summerill, P. W. (2012). Cloud computing: Silver lining or rainy day? *Utah Bar Journal*, *25*(6), 22–25.

Sun, Y., Fang, Y., Lim, K. H., & Straub, D. (2012). User satisfaction with information technology service delivery: A social capital perspective. *Information Systems Research*, *23*(4), 1195–1211. http://doi.org/10.1287/isre.1120.0421

Tamer, C., Kiley, M., Ashrafi, N., & Kuilboer, J.-P. (2013). Risks and benefits of business intelligence in the cloud. *Proceedings for the Northeast Region Decision Sciences Institute (NEDSI)*, 86–95.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, *6*(2), 144–176.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509–533. doi:10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Thong, J. Y., Yap, C., & Raman, K. S. (1996). Top management support, external expertise and information systems implementation in small businesses. *Information Systems Research*, *7*(2), 248–267.

Tonsmeire, D. (2015). Kennesaw State University Small Business Development Center (SBDC). Retrieved from http://coles.kennesaw.edu/centers/small-business-development/

U.S. Census Bureau. (2011). *Statistics of U.S. businesses*. Retrieved from http://www.census.gov/econ/susb/

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 425–478.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, *36*(1), 157–178.

Wang, H. (2013). Information services paradigm for small and medium enterprises based on cloud computing. *Journal of Computers*, *8*(5), 1240–1246.

Wang, R. Y., & Strong, D. M. (1996). Beyond accuracy: What data quality means to data consumers. *Journal of Management Information Systems*, *12*(4), 5–33.

Ward, T., & Gopal, C. (2014). How they did it: Moving IBM's smarter supply chain to the cloud. *Supply Chain Management Review*, *18*(2), 26–31.

Whitley, E. A., Willcocks, L. P., & Venters, W. (2013). Privacy and security in the cloud: A review of guidance and responses. *Journal of International Technology & Information Management*, *22*(3), 75–92.

Wilkins, C. (2009). The influence of net benefits on collective, innovation, configural system use: A case study of small-to-medium enterprises. *The Electronic Journal of Information Systems Evaluation*, *12*(2), 187–198.

Wittow, M. H., & Buller, D. J. (2010). Cloud computing: Emerging legal issues for access to data, anywhere, anytime. *Journal of Internet Law*, *14*(1), 1–10.

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, *16*(1), 85–102. http://doi.org/10.1287/isre.1050.0042

Xu, J., Benbasat, I., & Cenfetelli, R. (2011). The effects of service and consumer product knowledge on online customer loyalty. *Journal of the Association for Information Systems*, *12*(11), 741–766.

Xu, J., Benbasat, I., & Cenfetelli, R. (2013). Integrating service quality with system and information quality: An empirical test in the e-Service context. *MIS Quarterly*, *37*(3), 777–794.

Yeluri, R., Greene, J., & Bangalore, S. (2012). Service security and compliance in the cloud. *Intel Technology Journal*, *16*(4), 34–56.

Yoo, C. (2011). Cloud computing: Architectural and policy implications. *Review of Industrial Organization*, *38*(4), 405–421. http://doi.org/10.1007/s11151-011-9295-7

APPENDICES

APPENDIX A: REFERENCE ILLUSTRATIONS

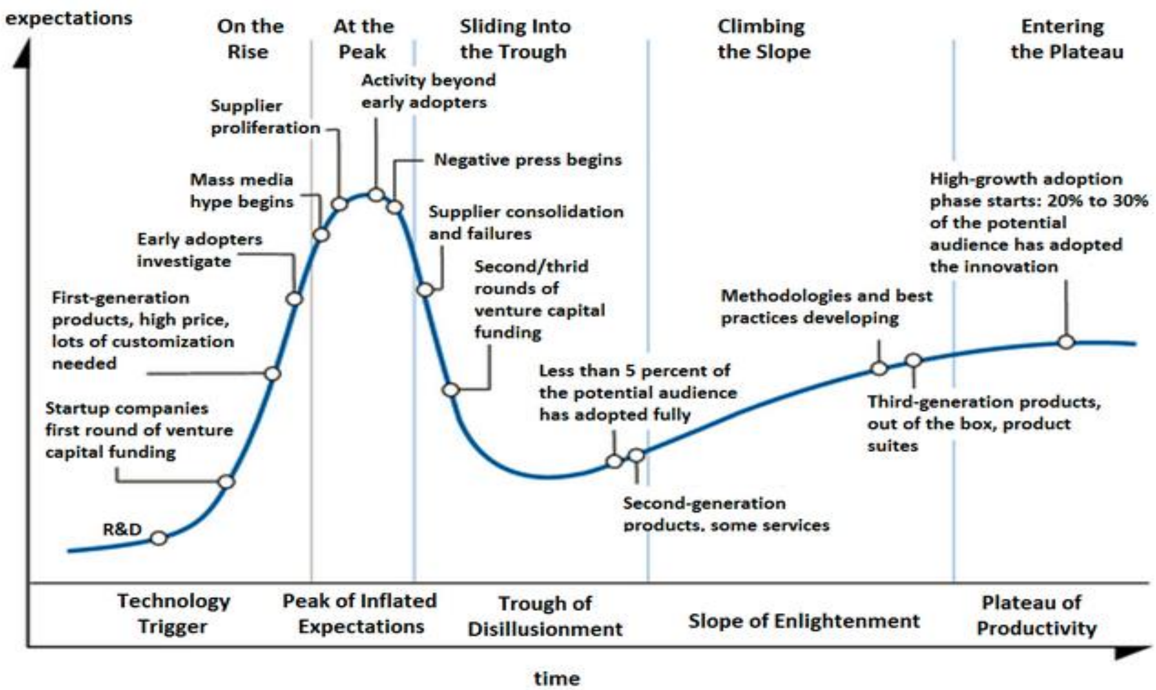


Figure 10. Legend for Gartner's hype cycle (Fenn & Linden, 2005)

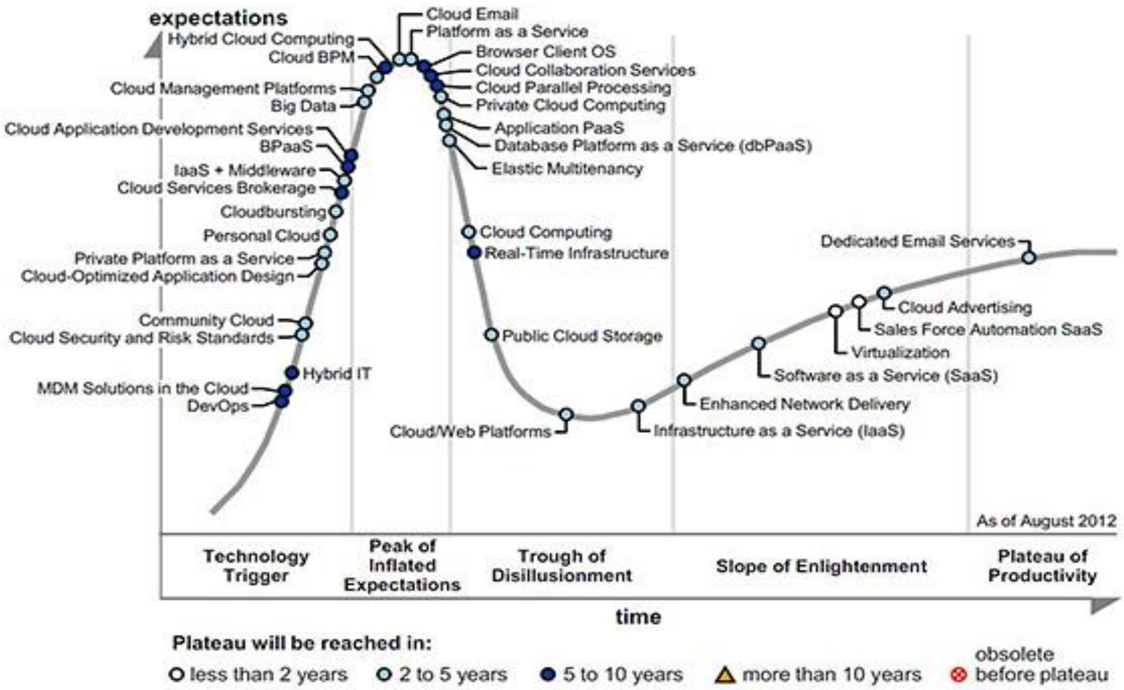


Figure 11. Hype cycle for cloud computing, 2013 (Gartner, 2012).

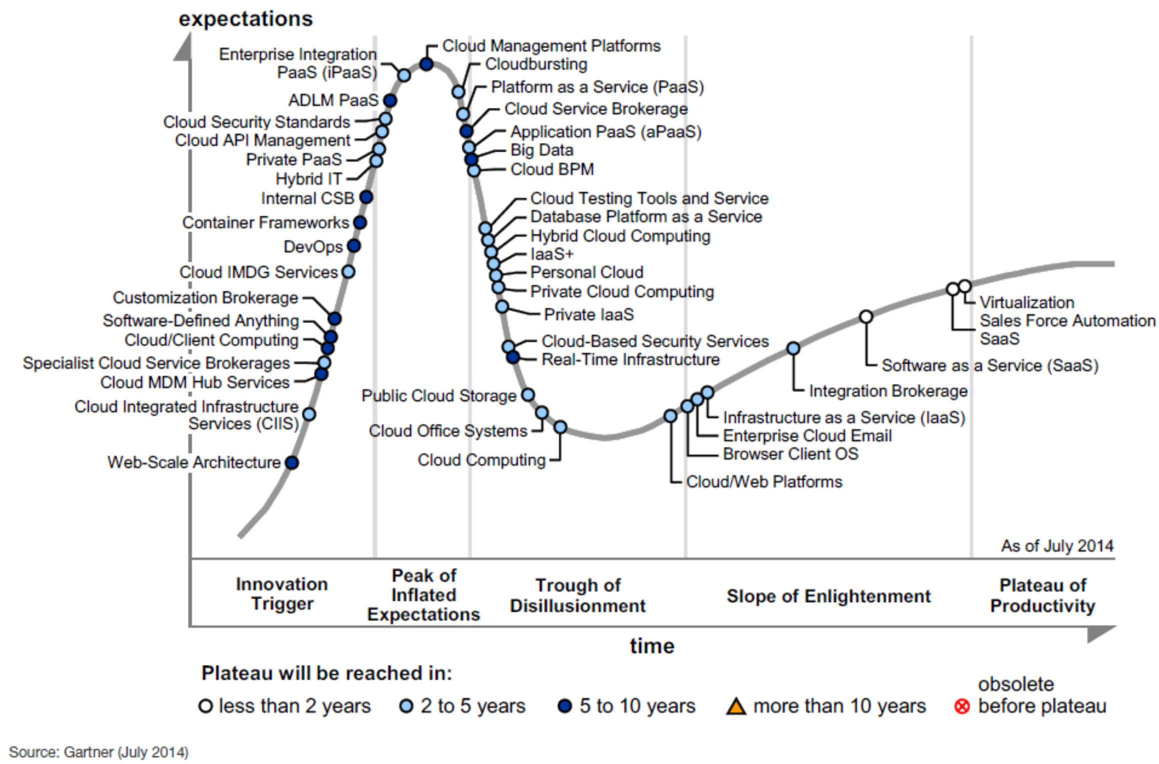


Figure 12. Hype cycle for cloud computing, 2014 (Gartner, 2014).

APPENDIX B: SURVEY INSTRUMENT

INFORMATION LETTER

For a Research Study entitled:
"Information Systems (IS) Success Model for Evaluating Cloud Computing for Small
Business Benefit: A Quantitative Study"

You are invited to participate in a research study and to learn more about the IS success as it pertains to cloud computing and small business. The study is being conducted by Charles K. Flack, a doctoral student, under the direction of Pamila Dembla, Ph.D., Associate Professor of Information Systems, Coles College of Business, Kennesaw State University. You are invited to participate because you work for or own a small business, and you are age 18 or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to complete a survey. Your total time commitment will be approximately 10 to 20 minutes.

Are there any benefits to yourself or others? If you participate in this study, you can expect to provide meaningful data and information to IS researchers, small businesses, and cloud service providers. We cannot promise you that you will receive any or all of the benefits described.

Will you receive compensation for participating? To thank you for your time you will be offered the opportunity to receive the study results once completed. Contact Charles K. Flack by phone at (770) 868-6874 or by email at cflack@students.kennesaw.edu.

Are there any costs? If you decide to participate, you will incur no monetary expenditure.

Any data obtained in connection with this study will remain confidential. We will protect your privacy and the data you provide by ensuring that the Web server does not collect email addresses or names. Qualtrics© collects IP addresses to manage surveys. Qualtrics© uses SSL for secure collection and transmission of data and responses are transmitted over a secure, encrypted connection. Information collected through your participation may be used to fulfill an educational requirement, published in scholarly journals, or presented at professional meetings.

If you have questions about this study, please contact Charles K. Flack by phone at (770) 868-6874, by email at cflack@students.kennesaw.edu, or by regular mail – Pamila

Dembla, Ph.D., Associate Professor of Information Systems, Coles College of Business, Kennesaw State University, 1000 Chastain Road, Kennesaw, GA 30144.

If you have questions about your rights as a research participants, you may contact the Kennesaw State University Institutional Review Board by phone (470) 578-2268 or email at IRB@kennesaw.edu.

This survey is best executed and viewed from a Windows or Mac PC or laptop.

HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

Charles K. Flack	**August 31, 2015**
Investigator	**Date**

The Kennesaw State University Institutional Review Board has approved this document for the use from August 31, 2015 to August 31, 2016. Study #16-065.

PAGE BREAK

Thank you for agreeing to participate in this very important research study that is designed to investigate the information system success of small businesses that are early adopters of cloud computing services.

> Cloud computing is characterized as a 21st century model of acquiring and using computational resources and services through a convenient on-demand provisioning mechanisms via a shared network or the Internet via a Web browser. Cloud computing is characterized by the ability to rapidly acquire and release a variety of resources (applications, servers, storage, networks, and services) automatically or with minimal customer information technology (IT) management or service provider involvement.

This study is designed to understand your small business experiences with cloud computing.

If your small business is using one or more cloud based services, we want you to take this survey in consideration of the **TOTAL PORTFOLIO** or **COLLECTIVE VIEW of CLOUD SERVICES** utilized by your small business, regardless if delivered by one or more providers.

You will be asked a series of **37** key questions, with an additional set of small business profile questions.

The survey should take no more than **10 to 20 minutes** to complete by one (1) person who is knowledgeable in both the technology and operations of your business.

NOTE: The **BLUE** highlighted text denotes **HELP TEXT**. Hover your **CURSOR** over text to see associated and extended content.

Example of Additional Text

PAGE BREAK

USCompany Is your small business based, licensed and registered to operate in the United States of America (USA)?

- ❍ Yes (1)
- ❍ No (2)

If **No** Is Selected, Then Skip To **End of Survey**

FranYN Is your small business a franchise or are you a franchise business owner?

- ❍ Yes (1)
- ❍ No (Select "No" if you are an independent, nonfranchisee small business) (2)

If **Yes** Is Selected, Then Skip To **End of Survey**

Role Your role in your small business (select the highest role that applies)

- ❍ Founder (1)
- ❍ Owner (2)
- ❍ President (3)
- ❍ CEO (4)
- ❍ CIO (5)
- ❍ Director (6)
- ❍ IT Staff (7)
- ❍ Other (8)

If **Other** Is Not Selected, Then Skip To **Your highest level of education attainment (select the highest level that applies):**

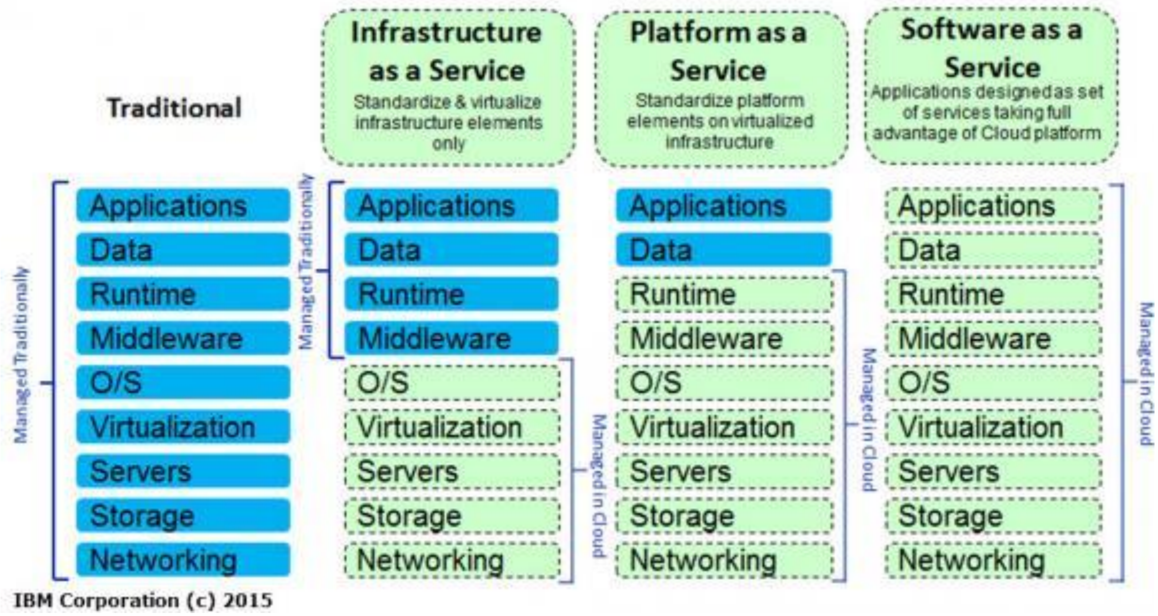
OtherRole Since you selected “Other,” please enter your role in your organization below.

EdLvl Your highest level of education attainment (select the highest level that applies):

- ❍ High school diploma or its equivalent (1)
- ❍ High school diploma with some college education (2)
- ❍ Bachelor’s degree (3)
- ❍ Postgraduate degree (4)

PAGE BREAK

Traditional IT Model vs Three Industry-Standard Cloud Computing IT Service Models (After you have completely reviewed this illustration, select "Save & Continue" to move to next page).



PAGE BREAK

SaaSdef Software as a Service (SaaS) provides the complete end-to-end information system(s) (IS) for consumers to use. This includes software, hardware, network services and support. SaaS is simply paying for the use of a complete software system running on 3rd-party's infrastructure. The entire SaaS solution is hosted, owned, and managed by a cloud service provider. Example of SaaS Providers <<==float cursor over text

UseSaaSYN Does your small business use software services that are hosted outside your company, from those as simple as email to more complex solutions like project collaboration, accounting, payroll, Enterprise resource planning (ERP), Customer Resource Management (CRM), etc.?

- ❍ Yes (1)
- ❍ No (2)

If **No** Is Selected, Then Skip To **Platform as a Service (PaaS) is defin...**

SaaStype Which software services (such as email, ERP, CRM, etc.) are you using that are hosted outside your small business's information technology (IT) organization (please list by COMPANY names, all separated by commas)?

PaaSdef Platform as a Service (PaaS) is defined as resources provided to consumers to enable the provisioning of application services in the cloud. PaaS provides cloud infrastructure for consumer-programmed or licensed applications using the programming languages, application program interfaces (APIs), libraries, services, and tools supported by the provider. Example of PaaS Providers <<==float cursor over text

UsePaaSYN Does your small business use business platform services that are hosted outside your small business's information technology (IT) organization, that interfaces with order processing, payment and other virtual services, etc.?

❍ Yes (1)
❍ No (2)

If **No** Is Selected, Then Skip To **Infrastructure as a Service (IaaS) pr...**

PaaSType Which individual business process services (such as order processing, database, web services, etc.) are you using that are hosted outside your company's information technology (IT) organization (please list by COMPANY names, all separated by commas)?

IaaSdef Infrastructure as a Service (IaaS) provides consumers the ability to deploy, run, and maintain their own software and data. This can include in-house–developed applications, licensed applications, middleware, and a diversity of databases in a cloud or 3rd party shared environment. (<<==float cursor over text) Example of IaaS Providers <<==float cursor over text

UseIaaSYN Does your small business use infrastructure services hosted outside your small business's information technology (IT) organization, such as server and data storage services?

❍ Yes (1)
❍ No (2)

If **No** Is Selected, Then Skip To **End of Block**

IaaStype Which individual infrastructure services (such as server and data storage services) are you using that are hosted outside your company's information technology (IT) organization (please list by COMPANY names, all separated by commas)?

Matrix_1 Please review the scale on the top row before entering your responses.

	Strongly Disagree 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Strongly Agree 7 (7)
(ServQ8) I am very satisfied with the cloud service my small business receives from my cloud service provider. (1)	❍	❍	❍	❍	❍	❍	❍
(SysQ8) Overall, I would give the system quality of the cloud service a high rating for my small business's selected use. (2)	❍	❍	❍	❍	❍	❍	❍
If you are reading this line, select "Strongly Disagree" (3)	❍	❍	❍	❍	❍	❍	❍
(Use4) I use the cloud services whenever possible to do my work in my small business. (4)	❍	❍	❍	❍	❍	❍	❍
(OrgSat1) The cloud service has met our small business's expectations. (5)	❍	❍	❍	❍	❍	❍	❍

Matrix_2 Please review the scale on the top row before entering your responses.

	Strongly Disagree 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Strongly Agree 7 (7)
(SysQ5) The cloud service is readily accessible for my small business's selected use. (1)	❍	❍	❍	❍	❍	❍	❍
(ServQ2) My cloud service provider maintains accurate records. (2)	❍	❍	❍	❍	❍	❍	❍
(SysQ2) The cloud service performs reliably and dependably for my small business's selected use. (3)	❍	❍	❍	❍	❍	❍	❍
(ServQ4) I feel safe in my interaction with the cloud service. (4)	❍	❍	❍	❍	❍	❍	❍

Matrix_3 Please review the scale on the top row before entering your responses.

	Strongly Disagree 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Strongly Agree 7 (7)
(OrgSat4) Overall, my interaction with the cloud service for my small business is very satisfying. (1)	❍	❍	❍	❍	❍	❍	❍
(ServQ3) I believe the services offered by my cloud provider are responsive to my needs for my small business's selected use. (2)	❍	❍	❍	❍	❍	❍	❍
If you are reading this line, select "2" (3)	❍	❍	❍	❍	❍	❍	❍
(Use5) I use cloud services frequently to do my work in my small business. (4)	❍	❍	❍	❍	❍	❍	❍
(SysQ3) The cloud service is able to adapt to meet a variety of needs for my small business's selected use. (5)	❍	❍	❍	❍	❍	❍	❍

Use1 The frequency of use of cloud services in my small business is... (Select One)
- ❍ At least once per month (1)
- ❍ Several weeks per month (2)
- ❍ Every week per month (3)
- ❍ Several times per week (4)
- ❍ At least 2 to 3 days per week (5)
- ❍ Every day per week (6)
- ❍ Several time per day (7)

Matrix_4 Please review the scale on the top row before entering your responses.

	Strongly Disagree 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Strongly Agree 7 (7)
(SysQ6) My cloud service provides for the data encryption system needs of my small business. (1)	❍	❍	❍	❍	❍	❍	❍
(ServQ6) My cloud service provider has my best interests in mind for my small business's subscribed set of cloud services. (2)	❍	❍	❍	❍	❍	❍	❍
(Use8) Implementation of the cloud services entails the use of new tasks for my small business. (3)	❍	❍	❍	❍	❍	❍	❍
(SysQ1) The availability of the cloud service supports the needs of my small business's selected use. (4)	❍	❍	❍	❍	❍	❍	❍

Matrix_5 Please review the scale on the top row before entering your responses.

	Strongly Disagree 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Strongly Agree 7 (7)
(Use3) I use the cloud services a lot to do my work. (1)	❍	❍	❍	❍	❍	❍	❍
(OrgSat3) All things considered, I am very satisfied with the cloud service selected for my small business. (2)	❍	❍	❍	❍	❍	❍	❍
If you are reading this line, select "3" (3)	❍	❍	❍	❍	❍	❍	❍
(Use7) Generally, the use of cloud services supports my work procedures in my small business. (4)	❍	❍	❍	❍	❍	❍	❍
(SysQ4) The cloud service is able to systematically and flexibly adjust to new demands or conditions for my small business's selected use. (5)	❍	❍	❍	❍	❍	❍	❍

Matrix_6 Please review the scale on the top row before entering your responses.

	Strongly Disagree 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Strongly Agree 7 (7)
(ServQ5) My cloud service provider guarantees the protections of my company's business information. (1)	❍	❍	❍	❍	❍	❍	❍
(Use6) I use cloud services whenever appropriate to do work in my small business. (2)	❍	❍	❍	❍	❍	❍	❍
(ServQ1) My cloud service provider publishes a policy on the protection of transactional data and protection from accidents. (3)	❍	❍	❍	❍	❍	❍	❍
(SysQ7) My cloud service system provides the access control measures for my small business. (4)	❍	❍	❍	❍	❍	❍	❍

Use2 The duration of use of cloud services in my small business is... (Select One)

- ❍ Less than 30 minutes per day (1)
- ❍ 30 minutes to 1 hr per day (2)
- ❍ 1 to 2 hours per day (3)
- ❍ 2 to 4 hours per day (4)
- ❍ 4 to 6 hours per day (5)
- ❍ 6 to 8 hours per day (6)
- ❍ More than 8 hrs per day (7)

Matrix_7 Please review the scale on the top row before entering your responses.

	Strongly Disagree 1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	Strongly Agree 7 (7)
(ServQ7) Overall, the level of service quality I receive from the cloud service provider for my small business's selected use was good. (1)	❍	❍	❍	❍	❍	❍	❍
(OrgSat2) The cloud service was very satisfying for me to select for my small business. (2)	❍	❍	❍	❍	❍	❍	❍

Matrix_8 IMPORTANT. Please review the scale on the top row before entering your responses.

	Strongly Negative -5 (1)	-4 (2)	-3 (3)	-2 (4)	-1 (5)	Neither Positive nor Negative 0 (6)	+1 (7)	+2 (8)	+3 (9)	+4 (10)	Strongly Positive +5 (11)
(NetBen1) The benefits of my cloud service have resulted in reduced staff costs. (1)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
(NetBen2) The benefits of my cloud service have resulted in operational cost reductions (e.g., inventory holding costs, administration expenses, etc.). (2)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
If you are reading this line, select "-4" (3)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
(NetBen3) My cloud service has resulted in overall productivity improvement. (4)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
(NetBen4) My cloud service has resulted in improved business outcomes or outputs. (5)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

Matrix_9 IMPORTANT. Please review the scale on the top row before entering your responses.

	Strongly Negative -5 (1)	-4 (2)	-3 (3)	-2 (4)	-1 (5)	Neither Positive nor Negative 0 (6)	+1 (7)	+2 (8)	+3 (9)	+4 (10)	Strongly Positive +5 (11)
(NetBen5) The benefits of my cloud service have resulted in an increased capacity to manage a growing volume of activity (e.g., transactions, population growth, etc.). (1)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
(NetBen6) My cloud service has resulted in improved business processes. (2)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
(NetBen7) My cloud service has resulted in better positioning for my small business's success. (3)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
(NetBen8) Generally, the cloud services have made my work easier. (4)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

Cost How much has your IT cost been reduced since you have adopted cloud services? (Select One)
- 0% (1)
- 0 to 2% (2)
- 2 to 5% (3)
- 5 to 10% (4)
- 10 to 15% (5)
- 15 to 20% (6)
- 20 to 25% (7)
- greater than 25% (8)

CloudFB Are there any successes, issues, or concerns that your small business has encountered with your cloud service provider(s) that you want to share?

CloudQual Are there any other cloud computing system and service quality features you deem necessary and critical that were not covered in this survey?

CloudRecYN Would you recommend a small business utilize multiple cloud service providers?
- Yes (1)
- No (2)

CloudBen Are there any other cloud service net benefits you have experienced that have not been covered in this survey?

Gender What is the gender of the owner of your small business?
- Male (1)
- Female (2)

Age What is the age of the owner of your small business (please select one)?
- Less than 20 (1)
- 21 to 30 (2)
- 31 to 40 (3)
- 41 to 50 (4)
- Greater than 50 (5)

YrInBus What are the number of years your small business has been in operation (please select one)?

- ❍ Less than 1 year (1)
- ❍ 1 year to 2 years (2)
- ❍ 3 years to 5 years (3)
- ❍ 6 years to 10 years (4)
- ❍ Greater than 10 years (5)

Ind What is the primary industry your small business operates (please select one via down arrow)?

- ❍ Construction (1)
- ❍ Finance (2)
- ❍ Insurance (3)
- ❍ Professional Services (4)
- ❍ Scientific Services (5)
- ❍ Technical Services (6)
- ❍ Retail and Wholesale Trade (7)
- ❍ Real estate, Rental and Leasing (8)
- ❍ Health Care and Social Assistance (9)
- ❍ Administrative, Waste Management, and Remediation (10)
- ❍ Transportation and Warehousing (11)
- ❍ Arts, entertainment and Recreation (12)
- ❍ Manufacturing, Agriculture, Mining (13)
- ❍ Food Services (14)
- ❍ Other (15)

If **Other** Is Not Selected, Then Skip To **What is the total annual gross revenue before taxes of your small business (most recent year)?**

OthInd Please provide the name of the primary industry your small business is classified.

AnnTotRev What is the total annual gross revenue before taxes of your small business (most recent year)?

- ❍ Less than $50K (1)
- ❍ $50K to $500K (2)
- ❍ $501K to $5M (3)
- ❍ $5M to $10M (4)
- ❍ $10M to $50M (5)
- ❍ $50M to $100M (6)

ITspend Total annual amount spent by your small business on information technology (IT) spend (i.e., hardware, software, services, utilities, etc.), as a part of total pretax revenue (most recent year)?

- ❍ Less than $50K (1)
- ❍ $50K to $500K (2)
- ❍ $501K to $5M (3)
- ❍ $5M to $10M (4)
- ❍ Greater than $10M (5)

Empl What is the number of full-time employees on your small business payroll (please select one)?

- ❍ 1 to 5 (1)
- ❍ 6 to 10 (2)
- ❍ 11 to 20 (3)
- ❍ 21 to 35 (4)
- ❍ 36 to 50 (5)
- ❍ 51 to 100 (6)
- ❍ 101 to 200 (7)
- ❍ More than 200 (8)

Locations What is the number of your fixed small business locations (please select one)?

- ❍ 1 to 2 (1)
- ❍ 3 to 5 (2)
- ❍ 6 to 10 (3)
- ❍ 11 to 20 (4)
- ❍ More than 20 (5)

WebAddr Please provide the Web site address for your small business.

CallYN Would you like to be contacted by Charles K. Flack (cflack@students.kennesaw.edu) to arrange a follow-up interview to further discuss your small business and its cloud computing plans or needs? Your contact information will be stored in a separate dataset.

- ❍ Yes (1)
- ❍ No (2)

If **No** Is Selected, Then Skip To **End of Survey**

Name Please provide your name below.

Email Please enter your email address below.

Other If you have any other questions or comments to the investigator, please write them below.

End of Survey