INTERNATIONAL JOURNAL OF ADVNACED STUDIES
IN COMPUTER SCIENCE AND ENGINEERING
IJASCSE VOLUME 6 ISSUE 5, 2017
05/31/2017

Perceived Risk and Trust in the Adoption of Cloud Computing Services and Their Effects on Organizational Performance

Lisa Y. Chen
Department of Information Management
I-Shou University
Kaohsiung, Taiwan
lisachen@isu.edu.tw

***Abstract*—The emergence of cloud computing services has driven fundamental changes in IT services, and such services are exploding in popularity throughout the world. Cloud computing services enable user access to a range of technologies and applications by increasing business agility and reducing the cost and complexity of providing IT, which in turn improves business efficiency. However, the use of cloud computing services remains limited and has also raised security risks. Thus, this study intends to explore the determinants of user intention and organizational performance in cloud computing services. This study used the technology acceptance model (TAM) to examine the effects of perceived risk and perceived trust on intention to use and organizational performance through perceived usefulness and perceived ease of use. A self-administered questionnaire was employed to collect data for statistical analysis. The data analysis for this study included descriptive statistical analysis, reliability and validity analysis, Pearson correlation analysis and regression analysis. The empirical results supported all hypotheses and findings. Suggestions for future research are discussed, and recommendations and limitations are also addressed in this study.**

Keywords-cloud computing services; perceived risk; perceived trust; technology acceptance model

I. INTRODUCTION

The availability of smartphones and the expectation of immediate and simple access to both private and company-specific information on a global basis are driving demand for the centralization of IT services and the related competence required to effectively support it [1]. However, cloud computing intends to offer hardware and software resources that promise massive cost savings combined with increased IT agility, and enterprise are growing and embracing the advent of cloud computing.

Cloud computing can generate important economic benefits and promises opportunities for enterprises, because on-demand resources can be configured, expanded and accessed on the Internet. The efficiency of delivering cloud computing resources is also credited for facilitating faster networking and Internet connectivity at a relatively low price [2]. The foundation of cloud computing services is based on the cloud technology stack as defined by the foundational elements of Infrastructure-as-a-Service (IaaS), which is used for supporting the Platform-as-a-Service (PaaS) layer of the cloud platform. The most visible area of the cloud computing stack is the Software-as-a-Service (SaaS) layer, which is where applications that users interact with are located [3] [4].

Although cloud computing services create new demand and seek added value through the Internet, the adoption of cloud computing services remains very low in Taiwan. About half of the enterprises do not understand cloud computing services, and as a result, only about 8% of enterprises have adopted cloud computing services or applications among 1,357 enterprise respondents in Taiwan, according to a 2011 survey report conducted by [5]. The results also determined that about 38% of the respondents stated that they have not yet adopted cloud computing services but plan to use cloud services or applications in the foreseeable future, and about 53% of enterprises do not plan to adopt. However, about 32.1% of the respondents indicated that cloud computing services can actually reduce operating costs, and 37.6% of enterprises surveyed reported that they will consider adopting cloud computing services only if the nature of the services corresponds with their business requirements and needs.

Considerable prior research has endeavored to examine the effectiveness of the technology acceptance model (TAM) in terms of evaluation and acceptance. Many researchers have sought to explore various relationships that have focused on integrating TAM, as well as

extensions and tests of their model [6]. TAM provides a much-needed theoretical basis for exploring those factors that explain cloud computing services and their link to user intention and organizational performance.

II. THEORETICAL BACKGROUND

A. *Cloud Computing Services*

The structure of cloud computing is designed to deliver information technology services with access to the web, from which resources can be retrieved through web-based tools and applications rather than a direct connection to a server, where data and software packages are stored. Cloud computing providers deliver applications through the Internet, and these are accessed from web browsers and desktop and mobile applications, while business software and data are stored on servers at a remote location [7].

Cloud computing offers businesses the opportunity to immediately address technology requirements in order to meet new demands. It has the potential to produce a series of disruptions that will emanate from the technological industry and ultimately transform industries around the world. Cloud computing can also collect and deliver massive amounts of data without spending large amounts of money and time of data transmission [8]. By adopting cloud computing, managers or users in the same company around the world can use this same platform to cooperate with each other in a more timely and effective manner. It might also be more accurate, as cloud computing consists of a set of technologies and service models that focus on the Internet-based use and delivery of IT applications, processing capability, storage and memory space [9].

Gartner [10], an information technology research and advisory company, defined cloud computing as “a style of computing in which massively scalable IT-related capabilities are provided ‘as a service’ using Internet technologies to multiple external customers.” It divided the various definitions of cloud computing into two main categories. The first are cloud computing services that focus on cloud access to services and computing resources, which can refer to a range of services extending from system infrastructure, such as computer and storage services, to applications, such as customer relationship management (CRM) and business processes, including payroll services provided over the Internet. The second are cloud computing technologies that focus on the use of technologies, including virtualization and automation, which allow for the creation and delivery of service-based capabilities. Cloud computing technologies are an extension of traditional data center approaches and can be applied to entirely internal enterprise systems, without the use of external off-premises capabilities provided by a third party [11].

However, cloud computing services use web applications or server services that customers pay to access rather than software or hardware they buy and install. Cloud computing services can be broadly divided into three previously mentioned categories: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). IaaS provides users with virtual infrastructure that delivers operating systems and virtualization technology as security, compute, storage, and network to collections of virtualized computer hardware resources. As such, IaaS is a highly practical solution for enterprises with various IT resource challenges [12] [13]. With IaaS, the consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage and deployed applications, and may also have limited control of select networking components.

PaaS is a form of infrastructure as a service in which customers rent virtualized servers and associated services used to run applications with a graphical user interface or through an application-programming interface [14]. It facilitates the deployment of applications without the cost and complexity of buying and managing the underlying hardware and software layers. Its offerings are typically built on a scalable infrastructure, where memory and processing power can scale up or down as needed. With PaaS, the delivery of a computing platform and solution stack as a service allows users to create and deploy their applications [15]. Consumers do not manage or control the underlying cloud infrastructure, including network, servers, operating systems or storage, but have control over the deployed applications and possibly the configuration settings for the application-hosting environment.

In the present study, the cloud represents the new operating system, and services represent new applications for enterprises. Based on the TAM, this study seeks to measure the adoption success of cloud computing services. The following offers a brief discussion of the importance of the TAM, as well as how it measures the success and the effectiveness of cloud computing operating systems and services.

B. *Technology Acceptance Model*

Davis [16] introduced the technology acceptance model (TAM), which was based on the theory of reasoned action (TRA) [17] to measure technology acceptance and intent to use the system. This model pertains to how consumers decide to use and accept a new or different type of technology. While the theory of reasoned action had many measures of attitude, the TAM replaces these

with measures of technology acceptance [18]. Namely, these are usefulness and ease of use. It has been suggested that a significant number of factors are employed when consumers decide if they want to adopt and use a new type of technology. However, the two most significant factors are whether the technology is easy to use and whether it will be useful [19] [20]. Both of these are understandably important considerations that must be carefully addressed.

Figure 1. The orginal echnology acceptance model (Davis, 1989)

Taylor and Todd [21] indicated that users' perceived usefulness of the information system will affect bot user satisfaction and continued use of the information system. Therefore, when user perception of a system is high, attitudes toward using the system will be positive, and consequently, their future intention to continue using the system will be high. Additionally, when a user's perception that using an information system is easy, the user's attitude toward using the system will be positive. Venkatesh and Davis [6] extended the original TAM; their empirical research demonstrates that in addition to perceived usefulness, perceived ease of use (belief variables) and external variables, other factors can affect the attitudes and behaviors of a user in deciding when to use a technology. Their extended model, referred to as TAM2 (see Figure 2). Therefore, to improve the model used to predict user behavior, previous scholars have researched the characteristics of external variables added to enhance the ability to explain the technology acceptance model. Previous literature that has summarized the technology acceptance model in information-systems-related fields has been widely used to explain and predict user acceptance of new information systems. Therefore, this research applies the technology acceptance model as a theoretical basis to investigate user acceptance of cloud computing services.

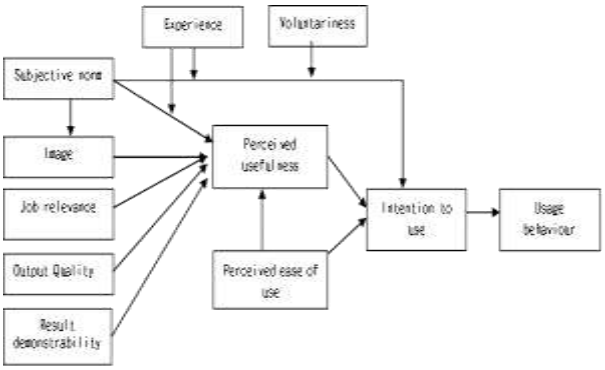

Figure 2. The technology acceptance model 2 (Venkatesh and Davis, 2000)

C. *Research Model and Hypotheses*

The study's objectives will be achieved through the development of a comprehensive research framework used to explore those factors that have been identified as affecting the adoption of cloud computing services. The conceptual framework is presented in Figure 2. As shown in Figure 2, this study validates the link based on the model by providing empirical evidence supporting the unproven link between cloud computing service quality and a set of factors. The research model includes six constructs. These constructs were hypothesized to predict user intention and organizational performance through moderators of perceived usefulness and perceived ease of use. Thus, this study provides an effective framework for understanding the determinants of user intention to use cloud computing services, as well as how the adoption of cloud computing services affects organizational performance.

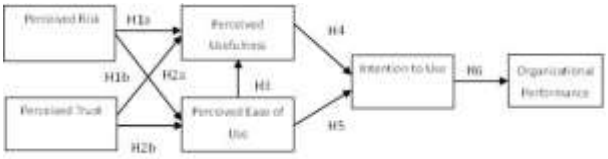

Figure 3. The research model

1. *Perceived risk, perceived usefulness, and perceived ease of use*

Although cloud computing services enable users to remotely store data and on-demand, high-quality cloud applications without the burden of local hardware and software management, cloud computing services encompass a wide range of potential risks and safety issues. If companies release that information to a cloud-based application through SaaS, they are giving up some

control and some understanding of how their information is being protected. For a number of companies, that simply might be too much risk. Once a company witnesses other companies successfully using SaaS for a period of time, that company may then be more likely to also start using SaaS [20]. Hamid and Cheng [22] defined perceived risk as the measurement of uncertainties or lack of knowledge about the distribution of potential outcomes and the uncontrollability of outcome achievement. Azmi and Bee [23] defined perceived risk as the perception of the amount of loss or uncertainty a user will encounter while pursuing a desired outcome. Dowling and Staelin [24] defined perceived risk as users' perceptions of the uncertainty and potential adverse consequences of engaging in an activity. Thus, perceived risk is defined as the potential for loss in pursuing a desired outcome while engaged in the use of online services. However, Suki [25] defined perceived risk as a user's subjective expectation of suffering a loss in pursuit of a desired outcome. In Suki's study, users reported that the perceived risks of innovation were inversely related to adoption of services. Therefore, this study's hypotheses can be generated as follows:

H1a: Perceived risk negatively affects the perceived usefulness of cloud computing services.

H1b: Perceived risk negatively affects the perceived ease of use of cloud computing services.

2. Perceived trust, perceived usefulness, and perceived ease of use

Many argued that trust increases the intention to use a technology and plays an important role in accepting technology. Trust is the dimension of a business relationship that is employed to determine the extent to which users feel they can trust the integrity of the promise offered by providers. Patrick [26] defined trust as "users' thoughts, feelings, emotions, or behaviors that occur when they feel that an agent can be relied upon to act in their best interest when they give up direct control." Quan et al. [27] indicated that trust increases a user's intention to use a service and is strongly associated with attitudes toward products and services. Morgan and Hunt [28] considered trust as a belief that allows a party to rely on an exchange partner's reliability and integrity. Tsai [29] indicated that the use of new technology will directly affect a user's attitude toward intention to use the technology or service. When a user perceives that trust in the service is high, the user's attitude toward using the technology or service is more positive. Wiedmann et al. [30] indicated that perceived trust in the reliability of technical elements and structures, as well as the fairness of an Internet user, is a major determinant of sustainable Internet usage among individuals. Grandison and Sloman [31] defined trust as "the firm belief in the competence of an entity to act dependably, securely, and reliably within a specified context." Thus, this study hypothesizes as follows:

H2a: Perceived trust positively affects the perceived usefulness of cloud computing services.

H2b: Perceived trust positively affects the perceived ease of use of cloud computing services.

3. Perceived usefulness, perceived ease of use, intention to use and organizational performance

Many companies were happy with the lower cost and decided that cloud computing services were the best choice, but other risks and benefits were also considered. When examining those benefits and risks, significant differences were noted among companies that had adopted cloud computing services and those that chose not to do so. The main differences were not in the areas of security risk or cost, but, rather, in the performance of the software and the economic risks the company was taking [32]. Mazzuccoa and Dyachuk [14] argued that cloud providers can benefit from significant economies of scale if they operate large infrastructures shared by users with very different workloads. Thus, cloud providers must meet customer requirements in terms of both availability and performance. Therefore, Shaukat and Zafarullah [33] argued that organizational performance is the accumulated end result of the entirety of an organization's work processes and activities. It is necessary for the management of an organization to measure and assess the organization's performance to better understand how to use the organization's resources in a better way and to earn a strong organizational reputation. In addition, perceived usefulness is a key factor of usage behavior and intention to use technology. The experiences of using new technology to conduct various tasks can invoke a deeper understanding of its characteristics, which can in turn support the user in creating an understanding of the technology's overall usefulness [34] [35]. Perceived ease of use is defined as the perception of the degree of effort required of the user to use the system or service [23]. Intention to use is the crucial ingredient needed to achieve success in business, and it is also considered an important determinant of cloud computing service use behavior, with significant impacts on firm profitability. Venkatraman and Ramanujam [36] argued that organizational performance is a subset of the overall concept of organizational effectiveness. They view organizational performance as an indicator that can measure how well an organization achieves its objectives. Organizational performance can be measured in accordance with three dimensions: financial performance; operational performance; and organizational effectiveness.

Renko et al. [37] found that investments in expanding a firm's technological capability can be beneficial for both exploration and exploitation. Organizations can benefit from introducing new technology into existing products and systems to improve performance. Thus, the following hypotheses for this study are proposed:

H3: Perceived ease of use positively affects perceived usefulness.

H4: Perceived usefulness positively affects intention to use.

H5: Perceived ease of use positively affects intention to use.

H6: Intention to use positively affects organizational performance.

III. METHODALOGY

A. *Measures*

The research methodology is developed and presented based on the above research motives and purposes. A self-administered questionnaire survey was used to collect the data for statistical analysis, which was used to investigate those factors that influence the use of cloud computing services and to better understand user satisfaction. In this study, each variable is measured by multiple items on a five-point Likert scale that is divided into the following categories, "Strongly Disagree," "Disagree," "Neutral," "Agree," and "Strongly Agree," each of which is designated a score of 1, 2, 3, 4, and 5, respectively. For the purposes of this study, the survey was developed and distributed to enterprise managers who have used cloud computing services to measure their perceptions regarding the use of cloud computing services, with an understanding of their expectations and how cloud computing services affects organizational performance.

In this study, perceived risk (PR) is defined as the potential for loss in pursuing a desired outcome while engaged in cloud computing services [24]. Perceived trust (PT) can be defined as users' belief in the competence of cloud computing services to act dependably and reliably when users are not directly in control [28] [31] [26]. Perceived ease of use (PEOU) is defined as the degree to which users believe that cloud computing services will be free of effort. Perceived usefulness (PU) is defined as the degree to which users believe that the perceived value of cloud computing services can increase their usefulness in meeting the specific needs of individuals [16]. Intention to use (IU) is the degree to which users are inclined to use applications or services offered as part of SaaS computing services. Organizational performance (OP) is defined as the degree to which firms achieve their business objectives through SaaS cloud computing service usage [33] [36].

B. *Sample and Data Collection*

M In this study, 45 pre-test samples were issued to verify the reliability and validity of a self-administered questionnaire. The final questionnaire was employed to collect data from enterprise managers in Taiwan. Random samples of 127 questionnaires were collected with six having incomplete data and thus considered invalid questionnaires. A total of 122 valid questionnaires are appropriated for this study. According to generally accepted rules, the sampling is to have a total of at least 10 cases per variable if more than one variable is being studied at the same time [38]. However, the characteristics of the samples demonstrated that 54.1% of respondents are male and 45.9% of respondents are female. Most of the respondents (59.8%) have undergraduate degrees and more than five years of work experience. The majority of respondents (45.1%) were between 35-45 years of age.

C. *Result of Analysis*

This study used SmartPLS and SPSS for Windows as the statistical package for the statistical analysis of questionnaire data. The analysis included descriptive statistics, reliability analysis, validity analysis, factor analysis, Pearson correlation analysis, and regression analysis. The results of this study demonstrated that the Cronbach's α value for each construct was greater than 0.7, which means the questionnaire had high reliability. In addition, composite reliability is greater than 0.9, and average variance extracted (AVE) exceeds 0.7. The results of the Cronbach's alpha, composite reliability and AVE are shown in Table I.

TABLE I. CRONBACH'S ALPHA, COMPOSITE RELIABILITY AND AVE

Constructs	Cronbach's alpha	Composite Reliability	AVE
Intention to use	0.926	0.945	0.773
Organizational Performance	0.925	0.943	0.769
Perceived ease of use	0.938	0.953	0.801
Perceived usefulness	0.929	0.946	0.780
Perceived risk	0.937	0.952	0.799
Perceived trust	0.929	0.946	0.779

The squared root of the AVE value of each construct is greater than the correlation between that construct and all other constructs as shown in table II.

TABLE II. THE SQUARE ROOT OF AVE AND CORRELATIONS OF ALL CONSTRUCTS

Factor	IT	OP	PEOU	PU	PR	PT
Intention to use (IT)	0.879[a]					
Organizational performance (OP)	0.391	0.877[a]				
Perceived ease of use (PEOU)	0.502	0.404	0.895[a]			
Perceived usefulness (PU)	0.495	0.443	0.655	0.883[a]		
Perceived risk (PR)	-0.394	-0.972	-0.424	-0.445	0.894[a]	
Perceived trust (PT)	0.403	0.566	0.569	0.746	-0.595	0.883[a]

The results of the regression analysis for the hypotheses, which are listed in Table III, revealed that all of the hypotheses were supported. As shown in Table 2, the results for H1a and H1b demonstrated that D-W=1.848 and 2.040 and VIF was 1.000, indicating that there is no autocorrelation and collinearity was not serious. The multiple regression showed a coefficient of H1a, R2 =0.196, Adj-R2 =0.189, F=29,276, and β=-0.443 (P=0.00<0.001) reached a significance level. For H1b, R2 =0.177, Adj-R2 =0.170, F=25.571, and β=-0.421 (P=0.00<0.001) reached a significance level. For H2a and H2b, the results demonstrated that D-W=1.835 and 2.301 and VIF was 1.000, indicating that there is no autocorrelation and collinearity was not serious. The multiple regression showed a coefficient of H2a, R2 =0.549, Adj-R2 =0.545, F=146.192, and β=0.741 (P=0.00<0.001) reached a significance level. For H2b, R2 =0.316, Adj-R2 =0.310, F=55.033, and β=0.562 (P=0.00<0.001) reached a significance level.

For H3, the results revealed that D-W=2.036 and VIF was 1.000, indicating that there was no autocorrelation and collinearity was not serious. However, the multiple determination coefficient of H5 R2 =0.426, Adj- R2 =0.421, F=88.369, and β=0.653 (P=0.001) reached a significance level. For H4 and H5, the results showed that D-W=1.889 and 2.236 were close to 2 and VIF was 1.000, indicating that there was no autocorrelation and collinearity was not serious. The multiple regression showed a coefficient of H4, R2 =0.240, Adj-R2 =0.243, F=37.925, and β=0.490 (P=0.00<0.001) reached a significance level. For H5, R2 =0.249, Adj-R2 =0.242, F=39.415, and β=0.499 (P=0.00<0.001) reached a significance level. For H6, the results showed that D-W=1.756 was close to 2, suggesting no autocorrelation; VIF was 1.000, indicating that collinearity was not serious. However, the multiple determination coefficient of H6 R2 =0.146, Adj- R2 =0.139, F=20.535 and β=0.382 (P=0.001) reached a significance level.

TABLE III. THE REGRESSION ANALYSIS

	Variable		F	β	t	VIF
H1a	Perceived risk	Perceived usefulness	29.276	-0.443	-5.411***	1.000
	R^2=0.196 , Adj-R^2=0.189, , P=0.000, D-W=1.848					
H1b	Perceived risk	Perceived ease of use	25.571	-0.421	-5.057***	1.000
	R^2=0.177 , Adj-R^2=0.170 , P=0.000, D-W=2.040					
H2a	Perceived trust	Perceived usefulness	146.192	0.741	12.091***	1.000
	R^2=0549 , Adj-R^2=0.545, P=0.000, D-W=1.835					
H2b	Perceived trust	perceived ease of use	55.033	0.562	7.418***	1.000
	R^2=0.316 , Adj-R^2=0.310, P=0.000, D-W=2.301					
H3	Perceived ease of use	Perceived usefulness	88.369	0.653	9.400***	1.000
	R^2=0.426 , Adj-R^2=0.421, P=0.000, D-W=2.036					
H4	Perceived usefulness	Intention to use	37.925	0.490	6.158***	1.000
	R^2=0.240 , Adj-R^2=0.243, P=0.000, D-W=1.889					
H5	Perceived ease of use	Intention to use	39.415	0.499	6.278***	1.000
	R^2=0.249, Adj-R^2=0.242, P=0.000, D-W=2.236					
H6	Intention to use	Organizational Performance	20.535	0.382	4.532***	1.000
	R^2=0.146 , Adj-R^2=0.139, P=0.000, D-W=1.756					

IV. CONCLUSION

The study summarized the critical, relevant literature to provide preliminary findings with valuable information and relevant results that serve as useful reference data sources for readers. The results indicate that perceived risk had a negative influence on perceived usefulness and perceived ease of use. Perceived trust had a positive influence on perceived usefulness and perceived ease of use. Perceived ease of use had a positive influence on perceived usefulness. Perceive usefulness and perceived ease of use had a positive influence on intention to use. In addition, intention to use had a positive influence on organizational performance. This study identified those factors encompassing cloud computing services that influence user intention and organizational performance. The results of this study provide a nascent understanding of how effectively and efficiently cloud computing services deliver ubiquitous value to firms. Additionally, the results of this study provide dependable and practical guidelines for firms' decision makers to benefit their long-term business model development.

1. Implications of Research

The study is intended to explore the service experienced by the customers of businesses. The results of the study are expected to suggest that the relative importance of cloud computing services is affordable and attractive for businesses in response to IT customers' requirements and technology investors. The relevant results also contain useful reference data sources to offer assistance to firms and researchers in understanding the benefits of using cloud services, which will in turn help businesses improve operations and advance business goals. In conclusion, the study is expected to lead to the effective implementation of cloud computing services and planning, which requires an effective design and development strategy to further transform the manner in which organizations leverage IT.

2. *Limitations and Future Directions*

The results of the study also facilitate sensible and effective planning of future cloud computing service development and further study of both researchers and practitioners. However, some possible solutions are needed to overcome limitations encountered in this study. Since the survey is based on self-reporting, which may cause subjective judgment bias, a request to participants for their help in replying to the survey may increase response rates. The strategy is to explain how their participation will contribute toward specific goals and improve the quality of the research. Additionally, the use of personalized, e-mailed survey invitations may further improve response rates. Moreover, collecting data is a tremendously time-consuming, labor-intensive and often costly process. Easy-to-answer formats and shorter surveys are generally more attractive and may decrease response times, which may in turn result in higher response rates. Survey follow-ups allow potential non-respondents to know that many others have already provided answers, which may motivate them to participate in the survey.

ACKNOWLEDGMENT

The authors would also like to thank the editors and anonymous reviewers for their generous comments and suggestions.

REFERENCES

[1] M. McNickle, 2013, 5 issues affecting cloud service quality and performance, Healthcare IT News, [Online] Available: http://www.healthcareitnews.com/news/5-issues-affecting-cloud-service-quality-and-performance (March, 10, 2017)

[2] S. Lynn, 2012, 20 Top Cloud Services for Small Businesses, PC Magazine, [Online] Available: http://www.pcmag.com/article2/0,2817,2361500,00.asp (March. 13. 2017)

[3] M. Armbrust, A. Fox, R. Griffith, A. D. Joseph, R. Katz, A. Konwinski, G. Lee, D. Patterson, A. Rabkin, L. Stoica, I., and M. Zaharia, 2010, "A view of cloud computing," Communications of the ACM, vol. 53, no. 4, pp. 50-58, 2010.

[4] L. Zhang, W. Tan, Y. Xu, and G. Tan, "Dimensions of Consumers' Perceived Risk and Their Influences on Online Consumers' Purchasing Behaviour," Communications in Information Science and Management Engineering, vol. 2, no. 7, pp. 8-14, 2012.

[5] Foreseeing Innovative New Digiservices, "2011, 2012 Taiwan's cloud computing industry is still showing an upward trend" [Online] Available: https://mic.iii.org.tw/IndustryObservations_PressRelease02.aspx?sqno=284 (March, 10, 2017).

[6] V. Venkatesh, and F. Davis, "A theoretical extension of the technology acceptance model: four longitudinal field studies," Management Science, vol. 46, no. 2, pp. 186-204, 2000.

[7] K. A. Rababah, and M. Khasawneh, "Factors Affecting University Students' Intention to Use Cloud Computing in Jordan," Journal International Journal of Web-Based Learning and Teaching Technologies, vol. 12, no. 1, pp. 51-65, 2017.

[8] L. Columbus, 2012, Hype Cycle for Cloud Computing Shows Enterprises Finding Value in Big Data, Virtualization, Forbes. [Online] Available: http://www.forbes.com/sites/louiscolumbus/2012/08/04/hype-cycle-for-cloud-computing-shows-enterprises-finding-value-in-big-data-virtualization/ (March, 20, 2017)

[9] O. Harfoushi, A. H. Akhorshaideh, N. Aqqad, M. A. Janini, and R. Obiedat, "Factors Affecting the Intention of Adopting Cloud Computing in Jordanian Hospitals Osama," Communications and Network, vol. 8, no. 2, pp. 88-101, 2016.

[10] Gartner, 2008, Gartner Says Contrasting Views on Cloud Computing Are Creating Confusion. [Online] Available: http://www.gartner.com/it/page.jsp?id=766215 (Feburary, 2, 2017)

[11] S. Mahdavi-Hezavehi, M. Galster, and P. Avgeriou, "Variability in quality attributes of service-based software systems: A systematic literature review," Information and Software Technology, vol. 55, no. 2, pp. 320-343, 2013

[12] L. Sriram, and A. Khajeh-Hosseini, "Research Agenda in Cloud Technologies," In 1st ACM Symposium on Cloud Computing, SOCC, 2010.

[13] W. L. Shiau, and P. Y. K. Chau, "Understanding behavioral intention to use a cloud computing classroom: A multiple model comparison approach," Information & Management, vol. 53, no. 3, pp. 355-365, 2016.

[14] M. Mazzuccoa, and D. Dyachuk, "Optimizing Cloud providers revenues via energy efficient server allocation, Sustainable Computing, " Informatics and Systems, vol. 2, no. 1, pp. 1-12, 2012.

[15] R. Aoun, C. E. Abosi, E. A. Doumith, R. Nejabati, M. Gagnaire, and D. Simeonidou, "Towards an optimized abstracted topology design in cloud environment," Future Generation Computer Systems, vol. 29, no. 1, pp. 46-60, 2013.

[16] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," MIS Quarterly, vol. 13, no. 3, pp. 319-340, 1989.

[17] I. Ajzen, and M. Fishbein, "Understanding attitudes and predicting social behavior," Englewood Cliffs, NJ: Prentice-Hall, 1980.

[18] V. Venkatesh, "Determinants of Perceived Ease of Use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model," Information systems research, vol. 11, no. 4, pp. 342-365, 2000.

[19] M. Y. Chuttur, "Overview of the Technology Acceptance Model: Origins, developments and future directions," Working Papers on Information Systems, vol. 9, no. 37, pp. 1-21, 2009.

[20] W. R. King, and J. He, "A Meta-Analysis of the Technology Acceptance Model," Information & Management, vol. 43, no. 60, pp. 740-755, 2006.

[21] S. Taylor, and P. Todd, "Assessing IT usage: the role of prior experience," MIS Quarterly, vol. 19, no. 4, pp. 561-570, 1995.

[22] N. R. B. Hamid, and A. Y. Cheng, "A Risk Perception Analysis on the use of Electronic Payment Systems by Young Adult," WSEAS Transactions on Information Science and Applications, vol. 1, no. 10, pp. 26-35, 2013.

[23] A. C. Azmi, and N. G. & Bee, "The Acceptance of the e-Filing System by Malaysian Taxpayers: A Simplified Model," Journal of e-Government, vol. 8, no. 1, pp. 13-22, 2010.

[24] G. R. Dowling, R. Staelin, "A Model Of Perceived Risk And Intended Risk-Handling Activity," Journal of Consumer Research, vol. 21, no. 1, pp. 119-134, 1994.

[25] N. M. Suki, "An Empirical Study of Factors Affecting the Internet Banking Adoption among Malaysian Consumers," Journal of Internet Banking and Commerce, vol. 15, no. 2, pp. 1-11, 2010.

[26] A. Patrick, "Privacy, Trust, Agents, And Users: A review of human factors issues associated with building trustworthy software agents," Human Factors of Trustworthy Agents, vol.1, no. 6, pp. 1-12, 2002.

[27] S. Quan, C. Hao, and Y. Jianxin, "Factors Influencing the Adoption of Mobile Service in China: An Integration of TAM," Journal of Computers, vol. 5 no. 5, pp. 799-806, 2010.

[28] R. M. Morgan, and S. D. Hunt, "The Commitment-Trust Theory of Relationship Marketing," Journal of Marketing, vol. 58 no. 3, pp. 20-38, 1994.

[29] W. C. Tsai, "A Study of Consumer Behavioral Intention to Use E-Books: the technology acceptance model perspective," Innovative Marketing, vol. 8, no. 4, pp. 55-66, 2012.

[30] K. P. Wiedmann, N. Hennigs, L. Pankalla, M. Kassubek, B. Seegebarth, and M. O. Reeh, "Online Distribution of Pharmaceuticals: Investigating relations of consumers' value perception, online shopping attitudes and behaviour in an e-pharmacy context," Journal of Customer Behaviour, vol. 9, no. 2, pp. 175-199, 2010.

[31] T. Grandison, and M. Sloman, 2000, A Survey of Trust in Internet Applications, IEEE Communications and Surveys, [Online] Available: http://www.comsoc.org/pubs/surveys (Feburary, 10, 2017).

[32] A Benlian, and T. Hess, "Opportunities and risks of software-as-a-service: Findings from a survey of IT executives," Decision Support Systems, vol. 52, no. 1, pp. 232-246, 2011.

[33] M. Shaukat, and M. Zafarullah, "Impact of Information Technology on Organizational Performance: An analysis of Quantitative Performance Indicators of Pakistan's Banking and Manufacturing Companies," European Journal of Economics, Finance and Administrative Sciences, no.16, pp. 39-49, 2009.

[34] N. M. Suki, "Exploring the Relationship getween Perceived Usefulness, Perceived Ease of Use, Perceived Enjoyment, Attitude and Subscribers' Intention Towards Using 3G Mobile Services," Journal of Information Technology Management, vol. XXII, no. 1, pp. 1-7, 2011.

[35] H. Gangwar, andH. Date, "Critical Factors of Cloud Computing Adoption in Organizations: An Empirical Study," Global Business Review, vol. 17, no. 4, pp. 886-904, 2016.

[36] N. Venkatraman, and V. Ramanujam, "Measurement of business performance in strategy research: A comparison of approaches," Academy of Management Review, vol. 11 no. 4, pp. 801-814, 1986.

[37] M. Renko, A. Carsrud, and M. Brännback, "The effect of a market orientation, entrepreneurial orientation, and technological capability on innovativeness: a study of young biotechnology ventures in the United States and in Scandinavia," Journal of Small Business Management, vol. 47, no. 3, pp. 331-369, 2009.

[38] J. C. Nunnally, Psychometric theory, New York: McGraw-Hill, 1978.