

Factors Influencing Organization Adoption Decision On Cloud Computing

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ABSTRACT

Cloud computing is a developing field, using by organization that require to computing resource to provide the organizational computing needs. The goal of this research is evaluate the factors that influence on organization decision to adopt the cloud computing in Malaysia. Factors that relate to cloud computing adoption that include: need for cloud computing, cost effectiveness, security effectiveness of cloud computing and reliability. This paper evaluated the factors that influence on adoption decision from view point of management decision making. The variables that evaluate in this study include: Cost effectiveness, Need for cloud computing, Security effectiveness, and reliability on cloud computing as independent variable and Adoption decision as dependent variable. The scope of this research is IT companies in Malaysia, and target population is member of organization that want to make decision to adopt the cloud computing. The Correlation and Multi Regression analysis show that all factors have a positive and significant effect on organization adoption decision to cloud computing.

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1. INTRODUCTION

In the recent times, most popular new technology is a cloud computing. Cloud computing is one of new technology that users and organizations don't have enough information about it so they can't adopt and use this technology more simple define of cloud computing technology : cloud computing is a model that in it data and different application store and keep in the network storage and user via the internet can access to the servers that are locate in the remote place. In the other hand the use of web application that provided by a servers named cloud computing.

Cloud computing is a way that it delivered the information technology service and capabilities to an organization and end users over the internet via a centralized provider, sometimes for a fee [2]. Cloud computing has a number of different characteristics, cloud provider that control and hold the computing resource, cloud user access the computing resource over the internet by personal computer, smart phone, laptops, and personal digital assistants. They can access to programs, storages, applications, processing and software development that provide by cloud computing. After the agreement between the cloud provider and cloud user , access granted to cloud user and can use the services , cloud user can access to cloud and fee base on usage .Some items include their capabilities, application, costs, the need for cloud computing, and security are reasons for adoption and growth the trends. Here the focus on the factors those influence the adoption of cloud computing as a way to doing computing and information management function for organizations.

In literature, one common theme is the advantages to organization of having large scale resource of computation available according to demand that are connect to the internet [2]. Another matter that is the

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need to provide and control security for software, data, information, both versus unauthorized outsiders and versus the other cloud computing system users that are not allow to access to particular files[2]. While the unauthorized distribution of files industry someone's wedding pictures may be considered less important than disturbing the sensitive profile design for an electronic system or distributing private medical information, security must be addressed for all files.

Reliability must be returned, with a minimum of unplanned failure, for the cloud computing system to be good business option [2]. Availability of computing abilities for remote computing to user all over the world is modifying the world balance of power in the computing [8],[4]. Researcher willing to agree on the benefits of the economy of scale fetch by cloud computing, the global availability of cloud computing resources and need to maintain appropriate system, file, and security of information [6],[2]. Cloud computing has a potential to develop the usage of good performance, availability, and computing of data intensive and also management of information and application to development market segment. This development availability also comes with improve and facilitates compared to the cost for equipment, utilities, manpower, and maintenance of system [2].

To evaluate the reasons that affect on organizations to adopt this technology, adoption theory is expressed. the field of adoption theory puts on to the method reason that information technology decision making organizations use to help them in the adoption of cloud computing as a way for meeting all or some of their computing needs. The adoption theory reason for selecting to adopt a new way or method for performing something [5] [11]. All over, today many researcher are working in this area cloud computing, but one area that need more investigation is the evaluation the factors that influence on the organizations decision to adopt cloud computing. Studying the factor that influence on organization's decision to adopt cloud computing is the topic of this research.

1.1 Problem statement

Determining the cloud computing is suitable for organization or no, for who want to make decision about adopt the cloud computing is not easy work and frequently they are guessing about this technology is used for future or no, because if they don't consider to main and important factors to adoption decision, then lead to make mistake decision and cause to costly mistake. so, in this research, the factor that very important an main to adoption decision determine and evaluate which one is more important than others. The result of this research help to who want to make decision to adoption the cloud computing for organization, and also make better decision without any mistake and also result lead to reduce to costly mistake.

This is true that Cloud Computing is a new technology which can help adopters in many ways but the rate of Cloud Computing adoption is not growing as researchers expected [5] [6]. Academy research on factors that effect on adoption decision to cloud computing is minimal. some work has been done on the security in cloud computing or cost of financial benefit of cloud computing. There is a little work and literature on factors influencing organization adoption decision on cloud computing.

This paper tries to provide suitable information for organizations which want to make decision to adopt the cloud computing and also for cloud provider who must know which factors are important to organization to adopt the cloud computing and try to provide them. It is important to note that, there has been very few studies done on identify and evaluate the factors that influence on organization decision to adopting cloud computing by organization in Malaysia.

1.2 Research question

The goal of this research is to give organizations further insight into how such complex decision are made, to help them in making the suitable decisions. These decisions are depend of various variable, such as: cost – effectiveness, the needs, the reliability, and the security effectiveness of cloud computing, so survey covers all of these items, the particular research question follow:

Q 1 : What is the impact of cost effectiveness of cloud computing on organization decision to adopt the cloud computing ?

Q 2 : What is the impact of need for cloud computing on organization decision to adopt the cloud computing?

Q 3 : What is the impact of reliability of cloud computing on organization decision to adopt the cloud computing?

Q 4 : What is the impact of security effectiveness of cloud computing on organization decision to adopt the cloud computing?

1.3 Research objective

The purpose of this study, evaluate the reasons for adopting cloud computing by organizations to satisfy and provide all computation needs of organization . The goal of this research is to supply decision makes, both cloud users and cloud provider , with this information , can help to organizations to make decision of adopting it, and help to cloud provider to providing users and also organization needs and also meeting the current and future user and organization computational resource needs.

1.4 Significance of research

The result of this research can help and foundation of further research of cloud computing and other method of cloud computing such as : providing large scale of computing resource to meet the needs of large number of users and groups .the help to increase knowledge understanding of the factor of more concerns for making decision to adopt cloud computing for cloud provider, and help to pay more attention to this factor until can attractive more users and organizations. This research can help to organization that want to find a way to provide organizational computing needs.

2. LITERATURE OF REVIEW

2.1 Cloud computing adoption

Rogers's distribution of innovation theory, that has under the various update during the year, the basic form for many of current adoption theory research [13]. In 1962 , Rogers noted three main factors for adopting the innovation by a individual : perception of innovation , process of it, and finding result of it : either rejection or adoption . in next refinement of innovation theory of roger , four primary factors were noticed by roger for adopting the technology . these factors consist : time frame for adopting ,innovation and social structure that develop technology innovation adoption. Brown (1981) more described that learning process or communication can develop the innovation adoption .for some innovation , such as a cloud computing , to be considered for adoption , it must offer the advantages to users and be suitable with current technology [13].sufficient communication is required to educate and encourage the users of technology 's value. Victor in an organization and modify agents from outside the organization can prompt the adoption of new technology [13] [7] [8].

Adoption of the new technology happen in stages. Each new technology need the timeframe for adoption as a cloud computing , some users early adopt the new technology and embracing it before many users start to using it. Adoption decision has many social influence inside and outside organizations [15] [16].

Cloud computing has advantages for some applications of low cost and quickly, and availability , with no needed for customer to buy computing hardware or pay for programming and maintaining the computing infrastructure. Some youngest and potential user more quickly adopt the new technology such as cloud computing than the other, when faced with ability to do a job more quick, easily, and with lower cost and faster , can find cloud computing attractive

2.2 Cost effectiveness of Cloud Computing

Cost effectiveness is a relationship among the monetary input and favourable outcome. In the cloud computing, computing as a utility, and providing computing as a service for customers [2] .One of the attractive and important cost issue in the cloud computing is the capability to pay for service, base on needs , avoiding the large expenses for computer systems buys [2] . another attractive features of cloud computing is the saving the space, utilities and maintenance of staff that can be discovered by outsourcing computing applications to the cloud provider . this function can also to attractive to user and organization interested in issues, providing effective use of utilities and power by sharing use of resource of computing. According to Armbrust et al. (2009), the capabilities key for cloud computing, is supplying large scale commodity computing resource at the low cost location. Armbrust claims that this the reduction of produce cost of a factor of five to seven items in various area such as : network expenses, electricity, network ,software and hardware expenses , operations that lead to economy of scale. Insomuch, the cloud computing providers mix higher system utilization and cost saving contrasted to individual organizations. This items let the users can save money while the cloud provider understands a appropriate return on investment [2] [9].

As well as, the convenience of doing large computation quickly on demand can save user and organization times and money because of the more quick response time feasible with my processors on the cloud computer. For instance . cloud computer can have many nodes , but the most private computer are smaller. Because of difference, the large number of parallel calculations can be enforced more faster in cloud computer than on private computing systems. These can mean a difference among hours or minutes running a job on the cloud computing system contrasted day or even many year on desktop of system . as a outcome ,

previously ,calculations were impractical to solve and now can be solved in suitable time , and also applications often can completed more quickly , presuming that transferring data to and from the cloud with finite latency.

2.3 Need for cloud computing

Need for cloud computing means some companies require this technology,cloud computing. Cloud computing provide diversity of needs of computing resource for users and organizations. This consists large amount of the computing resource available against demand to meet needs of users, enabling user to pay fee for service on demand, minimizing up-front resource commitment for users [1]. The cloud computing provider is responsible for managing system for customer data. One attractive area in cloud computing is for availability, affordable, and high efficiency computing for demanding applications . cloud computing could be appropriate for big organization such as : use in government, health care industries , or financial service. According to Biddick (2008), the more likely application to transfer to cloud computing are business application and storage , while specialized information technology applications , for example : management, security, or compliance , are very less likely to transfer to cloud computing. This represent a willing to use cloud computing for data intensive application but less for proprietary and sensitive applications[3].

2.4 Reliability of Cloud Computing

Reliability means is the quality of being dependable or reliable . High reliability is predicted, with the minimum downtime. This can be attractive to users and organizations that depend on quick responses and reliable computing and secure and also information and data storage for computer – based application. With theses software malware , precautions, and draw backs can affect cloud reliability [19]. For these reason , software reliability is very important to cloud computing success. A quality of service way benefits internet – based computing application [20] . Whenever , there are some risk associated in sending a job to central computer, cloud computing is very reliable, with suitable safeguards.

2.5 Security effectiveness of Cloud Computing

Security effectiveness is doing more with less risk ,about process, technology. Thurman (2008) said many security concerns about cloud computing namely : virtualization, control and associated data integrity and shuffling of data ; with data integrity concerns at remote places . risks that related to computer are still considered by the Thurman to be high with the gap among R&D and real practice requiring to be bridged more efficiently . reliable system that are human serviceability , encouraging the trained people to take responsibility , rather than to Blindly trust technology , are required [4] [14].

For success as a cloud computing provider, it is mandatory that the provider effective security protection for user's file and data. Using the multi core system with multiple processing cores help and facilitate privacy and data separation [10]. The security must protect information from un authorized access to other users and to outside parties, while information is in the cloud provider and also information is in the passing in internet among the user and provider. Providing security can be complex. Not only the cloud provider must establish a secure system but also the provider must also consist protection again employee and user carelessness . when using the remote logins, a secure login approach is required [4].

In the area of security, prevention security or innovations methods require to be adopted to ensure about system of enhanced and security of information. Adopting preventive innovations to avoid unwanted outcomes includes persuasive people that adopting a specific behaviour or innovation is useful to them [18]. In term of system security , this includes having strong security proceeding and also convincing users to adopt and retain suitable security protection , often with hard result for carelessness . these precaution should consist forbiddance versus sharing or publishing information required for account access or system.

The purpose of this research is to evaluate the factors that influence on organization adoption decision to cloud computing. Cloud computing can provide organization computing resource and satisfy them. the goal of this study is evaluate factors such as : need, reliability, security, and perceived cost effectiveness of cloud computing and find how these factors will influence organization's decision to adopt cloud computing.

H1 : Cost effectiveness has a positive and significant effect on organization decision to adopt cloud computing.

H2: Need for cloud computing has a positive and significant effect on organization decision to adopt cloud computing.

H3 : Reliability has a positive and significant effect on organization decision to adopt cloud computing

H4 : Security effectiveness has a positive and significant effect on organization decision to adopt cloud computing.

3. METHODOLOGY

For this research used quantitative research design . A survey questionnaire used for achieving the objective of this study. This sample of this study base on probabilities techniques, this research has select and to use a simple random sampling in this type of sampling each of elements has equal chance of choice in population . the number of organization member that want to make decision about adopting of cloud computing or using this technology now as the population in this study. Sampling size is 100 respondents in this study , the member of the organization that want to decision to adopt the cloud computing technology in various company in Malaysia organization, such as : information technology (IT) manager and information systems (IS) managers, chief Information officers and other managers and members .100 member response the survey.

Data was collected from a survey and survey instrument is organized into the several section [11] . in the first part of questionnaire that related to demographic data of respondents that include (Age, Gender, Education, and Experience), and second part include : first section include 4 items that mention security issues related to cloud computing, Second section include 3 items that cover perception of need of cloud computing, Third section include 3 items that cover the organizations perception of cloud computing reliability and four section include 3 items , cover the attitude of participants about cost effective of cloud computing, last section include 3 items that cover for decision recommend. These 5 section all use a five-point Likert-type scale , with value range from one for strongly disagree to 5 for strong agree. Appendix A includes the survey instrument, changed from the instrument administered by Lease (2005) [11][12]. Data analysis used to help to investigator for summarizing the conclusion . the data is analyzed by using the ‘ statistic package for social science ‘ (SPSS) . in research , the data analysis was done by using Descriptive ,Pearson Correlation , Test of Normality, Test of Reliability and Multiple Regression for analysis the independent and dependent variable . the dependent variable is adoption decision of cloud computing and independent variable are cost effectiveness, need , reliability and security effectiveness. The relationship between the each independent and dependent variable was analyzed

4. FINDINGS AND CONCLUSIONS

In the past year, there has been growth in the customer utilization on different business , government , and also education purposes. Also, at this time, the global nature of internet has opened the global market and competition has brought with maximum use of resource and minimum costs. One area to meet the needs is using the cloud computing to concentrate the computing and also information management function for large organizations and also individual people (users) .

Cloud computing is one approach to deliver the information technology service and capabilities to organizations and individual in the internet by provider, often for fee [17] . cloud computing include number of characteristics , computing resource that are held by cloud provider , and also can access in the internet by personal computers , phone, laptop .

Users can access to program, processing , storage, application, and software . this access according to agreement between the cloud provider and cloud user and also the fee of access , based on usage. Now, there are many research available that main focus of them is cloud computing such as : application, cost, capability, need, security, reliability . the main focus of this research on the factors that influence on adoption decision to cloud computing for organizations .

The main purpose of this research , evaluate reason that affect on organization members who make decision to adopt the cloud computing for small and large company. In this research , select four variable (cost, security, reliability, and need to cloud computing) as independent variable, and adoption decision to cloud computing as dependent variable. In addition , they are many research conducted in this area but no one them evaluate four factors together and no one of them in Malaysia organizations, so in this research , choose four important factor that effect to adoption decision and evaluate them in Malaysia organizations. According to above discussion , four hypothesis are defined as follow :

H1 : the cost effectiveness has positive and significant effect on organization decision to adopt the cloud computing.

H2 : the need for cloud computing has positive and significant effect on organization decision to adopt the cloud computing

H3 : the reliability has positive and significant effect on organization decision to adopt the cloud computing

H4 : the security effectiveness has positive and significant effect on organization decision to adopt the cloud computing

These hypothesis examined by Pearson Correlation and Multi Regression Analysis. this result of Pearson Correlation , show that the significant and positive relationship between the independent variables and dependent variable, so , all of the four hypothesis (H1,H2,H3,H4) are accepted and after taking Pearson Correlation , Multi Regression Analysis was implied to effect of each of factors on adoption decision to cloud computing and result indicated that S(security), C (cost), N(need), R(reliability), and AD (adoption decision) do have significant and also positive effects . therefore, it is possible to show the regression equation like this :

$$AD = -0.932 + 0.446 (C) + 0.177 (S) + 0.438 (N) + 0.237(R)$$

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.923	.126		-7.311	.000		
	cost	.446	.062	.404	7.205	.000	.212	4.721
	security	.177	.029	.199	6.054	.000	.616	1.622
	need	.438	.061	.330	7.158	.000	.313	3.197
	reliability	.237	.030	.275	7.978	.000	.562	1.781

a. Dependent Variable: adoptionn

Table 1. multi regression result

5. RECOMMENDATION OF FUTURE RESEARCH

The recommendation for future research are multiple, developing the scope of this survey to consist the other geographic area can evaluate the factors that influence on cloud computing adopting in other countries or other religions. With surveying larger sample can enable a more and better analysis to be done. Research can be done considering international cloud computing problems with global of computing. As well as, evaluate the cloud computing adoption for particular delivery ways, such as, organizational, private the cloud computing, commercial, can be performed .

My geographic areas, have different organizational situations, for example, have different financial , reliability , security and cost concerns , so other researchers can developed this research to other geographic areas. Some country growing economies rapidly with the limited computing resource and infrastructures cloud have various approach to adoption the cloud computing that expended nation with large available computing assets. This study can be done in the other countries that with limited computing access but growing in computational needs .

Surveying with larger sample size can yield more accurate result .the more result can be find if use larger sample size then can be find the relation among the different input variable and also adoption decision the cloud computing to be evaluated . since with increase the sample size can increase the number of variable and also target of sample size can support complex analysis.

The other area that can effect on adoption decision is the effect of demographic data on cloud computing adoption . data such as : the organization size, types (such as : government, business, academic, industry) . for instance , the view of the small firms about cloud computing different from the large firms.

Studies could be done to compare the specific cloud computing delivery ways. These study could consist the adoption of organizational cloud, private cloud and commercial clouds. In this study , the factors that influence the cloud computing adoption in the various environments could be defined. In this research , the R square is 0.93 in multi regression analysis , so to increase the R square , can be consider to the variable that related to literature . following that, as a suggestion to future study , finding the new variables that have affect to adoption decision to cloud computing for organization. Many variables are available that can influence on adoption decision to cloud computing but some of them are more important than other, so in this study , evaluated the four important factors but in future study can develop this study framework with other variables such as : trust, accountability and evaluate them on adoption decision to cloud computing for organization.

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