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Research paper



An investigation of influential factors in adopting the cloud computing in Saudi Arabia: an application of technology acceptance model

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Abstract

Cloud computing is an emerging concept in the technological sphere. Its development enables many applications to avail information online and on demand. It is becoming an essential element for businesses due to its ability to dimin-ish the costs of IT infrastructure and is being adopted in Saudi Arabia. However, there exist many factors that affect its adoption. Several researchers in the field have ignored the study of the TAM model for identifying the relevant fac-tors and their impact for adopting of cloud computing.

Keywords: *Acceptability; Adoption; Cloud Computing; Determinants.*

1. Introduction

Cloud computing is one of the emerging technology which can be utilized to enable a pervasive and on-order network computing resources. It encompasses a common pool of computing resource settings such as storage, applications, networks, services and servers that can be utilized on demand. Furthermore, these resources can be quickly accessed and released with minimal management endeavor or coordination with cloud service providers [1-2]. This empowers customers of cloud service providers to avail of IT frameworks, stages and programming administrations using cloud based computing resources as and when required [3-5]. Customers of cloud service providers can manage their corporate applica- tions, store databases, run different applications and reports using the Internet over the cloud resources [6]. It leads to a user friendly and cost effective cloud computing system that ensures on demand availability of computing resources [7].

Due to the un-common and special attributes of cloud technology, it has transformed the customary IT espousal issue. Costly IT advancements are mostly adopted by the firms which are large in size and can afford to procure such latest technology. However, in the case of cloud computing, the benefits of the latest technology are most greatly experienced by small and medium sized enterprizes. This is due to the fact that they have the ability to greatly reduce their initial startup costs and capital expenditure in the latest technology. This advantage of cloud computing is availed by eliminating the initial resource utilization, and empowering organizations to only bear the cost for the actual utilization of services, which reduces the fixed cost of managing technology assets. This approach has greatly changed the todays' business models [7]. Some of the researchers have all stated the manifold benefits of cloud based technologies and their ability to reduce upfront costs [7-8].

In spite of the numerous benefits of adopting cloud computing, there are still doubts on its benefits for business efficiency. Some of the assortment of issues involves security, execution precariousness, inertness, and system bottlenecks in the context of cloud technology. These issues have been addressed by different researchers [9-10]. Keeping pros and cons into consideration, it can be deduced that cloud technology bears a double-edged blade and it is not easy for business managers to take a decision for migrating their unique IT frameworks to the cloud.

A careful examination of the espousal issue has been advised by numerous researchers and experts [10]. Discovery, illustrative, or case-study based research has been carried out in several research projects. These developments have shown that cloud computing can be viewed as another design of vogue and also as a pattern that uncovers the cutting edge application structure [11-14]. Most of the previous researches in this field have concentrated on the general conceptualization, meaning of cloud computing, quantitative discourse on the cloud's advantages and their concerns, or theoretical advantage counts in view of cloud merchants' estimating records. While the different researches and theory aspects have given a crucial comprehension of cloud based computing, it still needs experimental reviews with wide datasets that thoroughly analyze the components that may influence the acceptance of cloud computing, especially in the context of business in Saudi Arabia [15].

Moreover, recent cloud selection researches have been re- garded as cloud computing as only another IT appropriation issue. There are numerous attributes of cloud qualities that are altogether different from customary IT developments, for ex- ample, its target customers, its estimating instrument in cloud based computing and its arrangement models (open/private). These concepts have been rarely examined in the cloud selection literature in the recent past [16]. In contrast to other IT advancements, the cloud computing links previous heteroge- neous innovations into a rational and consistent environment, as opposed to building up another arrangement of frameworks completely. This affirms that the acceptance of the cloud into the IT industry has been enormous. As until now, many

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IT companies have accepted the open door policy irrespective of this issue to augment on its many points of interest.

It is apparent that with all its strengths and weaknesses, the cloud computing is now a reality. It is important both for academia and industry to explore the potential of its adoption by the users and the firms. The multiple benefits of cloud computing have resulted in extensive adoption of this approach in private as well as public sectors, making paths to research on discovering the reasons and their impact on the adaptability of cloud services and computing. The adaptability of cloud computing has been assessed by using different models.

Technological adoption is the first use of a new technology or acceptable to use a new technology or technological product or service. It is a voluntary behavior of an individual [17]. Many researchers have been attempted to explain this behavior of technology adoption by employing different theories and various models and still there is a knowledge gap in relation to the current topic of cloud computing in the Saudi Arabia. The current study will attempt to examine the factors and their impact for adopting cloud computing in Saudi Arabia.

The rest of the article is organized as follows. Section II presents state of art in the field of cloud computing and its adoption in different segments. Section III briefs the preliminaries of the cloud computing by introducing the basic qualities, types of cloud models and their features, etc. Section IV highlights the conceptual framework of Technology Acceptance Model (TAM) for accessing the adaptability of the cloud computing. Section V presents the proposed research model and underlying hypotheses followed the methodology adopted in the current study in Section VI. Results are presented and discussed in Section VII followed by conclusions and recommendations of the proposed study in Section VIII.

2. Literature review

The abnormal state of cloud involvement in the IT industry exudes from its capability to enhance productivity and costs, in addition to the overall enhancement of comfort it brings into the IT segment. Monetary reasons have forced some IT companies to accept and use cloud computing in their learning atmospheres. As previously mentioned, cloud computing can remarkably decrease costs due to the fact that it disposes of costs identified with the advancement and support of large IT foundations. The most important elements for the shift to the cloud are cost reductions and the upgrade of unwavering quality in the utilization of cloud service providers [18]. Most of the business professionals suggested the construction of three reasons in light of the requirement to improve green information technology in their learning atmospheres. This has prompted to appropriate working and adaptable operations in the same manner as research and scholastics. African instructive establishments have not been deserted as far as utilizing the cloud as a part of their exploration and learning [19]. In the absence of a sufficient IT foundation, numerous African instructive foundations has begun to appropriate usage of the cloud in relation to programming and equipment updates.

Cloud computing is recognized by having three layers through which clients can use these technological innovations [20]. The public cloud is shoddy and available, yet less secure than private. While, the half and half blended model is level between moderateness and high security. Similarly, the people-group cloud is coordination between some associations to utilize the cloud innovation [21]. The following content abridges the basic attributes of benefits and describes different cloud computing models [21].

3. Preliminaries of cloud computing

The following subsections describe the preliminaries of the cloud computing, including basic characteristics, types of cloud models and their features etc.

a) Basic characteristics

Cloud computing has the applied basic qualities as described below:

1) On-request self-service: Cloud computing enables processing of administrative tasks like servers, stockpiling and virtual machines access naturally on the demand basis without or minimal human collaboration and cloud specialist organi- zations.
2) Wide system access: Figuring administrations can be achieved to over a system utilizing distinctive gadgets, e.g. portable PCs and cell phones.
3) Pooled Assets: The technological assets required by the users are pooled for use by multiple customers by using multi- inhabitant approach. This approach organizes resources for distributed access at the request of the user, and these can be distributed according to the request of the customers.
4) Rapid flexibility: The resources are not limited to spe- cific users or group of users. The resources can be expanded with ease and in quick response time whenever such upgrade is required.
5) Measured services: Different measurements can be used for the calculation of resource utilizations. Some of these are stockpiling, dynamic client records and data transmissions. These are utilized to quantify the use of the figuring administrations. This gives straightforwardness of the used support of the cloud specialist organization of the client. With the improvement of software engineering and the Internet frameworks, distributed computing is now a solid business model [22]. Distributed computing is the essence of the cloud based computing model. The cloud contains three most important layers referred to as service structure. A detailed description of each of the layers is as below. In the first layer of service, customers can make utilization of applications that are running in the cloud using a web program. The customers do not have the rights to control or deal with the cloud foundation that is running the product [2]. In the second layer, the customers are furnished with programming and execution situations through which they can run and get applications with their own decision. The customers are unable to control the basic cloud foundation yet, however. Though, the customer has access and control to the applications, this control is also limited as per the level of control acquired by users. In the third layer, customers administrate their own resources in the cloud, like stockpiling, preparing and systems to manage their IT needs.

b) Types of cloud models and their features

Cloud computing facilitates the use of different structures of cloud management, rights and ownerships. Some of these types of structures are as described below.

1) Private cloud: When the cloud foundation works for the most part to serve one association which may be overseen by the association itself or an outer cloud supplier, then it is a private cloud.
2) Community cloud: When several associations share resources in the cloud foundation and give administrations to a particular group that has comparative needs, then it is a community cloud.
3) Public cloud: When the cloud framework is accessible by anybody and is normally possessed by a vast association, then it is a public cloud.
4) Hybrid cloud: A hybrid cloud is a mix of two or more than two areas which are, the greater part of the community cloud and the public cloud.

In addition, later experimental reviews propose that the firms having a smaller size view information security less significantly than their biggest partners. Independent venturesare in a superior position to arrange an exchange off between the advantages of distributed computing and information security. This has also been the focus of many researchers [23]. Since, the customer information is stored with cloud service providers. They offer ascend to the discernment and doubt that cloud service providers may mishandle their favored access to the customer information for their own particular business advantage without their knowledge or assent. For

smaller organizations, seeking to receive cloud-based ERP frameworks, information security speaks to a standout amongst the greatest impediments to its prominence and gathering [24]. Cloud computing is perceived as a vital development that can possibly change how organizations utilize IT to direct their operations. In the meantime, there is an impressive detached amongst the excitement and activity, as IT experts do not see the cloud items to be steady and developed enough for reception. The same cannot be said for the bookkeeping business, which seems, by all accounts, to be encountering noteworthy changes in light of the new distributed computing innovation [25]. Cloud computing is characterized as a technology usage model of an omnipresent, organized, helpful, instantly accessible, centralized bank of configurable resources which can be provided for users on demand with minimal administrative efforts [25]. The Global Financial Crisis has seriously reduced organizations' capital speculations and debilitated hazard taking conduct [24]. Since cloud-construct administrations are situated in light of utilization or membership, organizations can obtain new IT frameworks without bringing about considerable expenses in attaining the essential IT equipment, programming licenses or the continuous upkeep cost. Later experimental reviews in this field propose that smaller firms see information security less important than the bigger firms. Private companies are in a superior position to arrange an exchange off between the advantages of distributed computing and information security [23]. Cloud-based frameworks are thought to be gainful for staff, individuals and casual groups. However, receiving the distributed computing for the association needs obvious advantages in doing as such. The intrigue towards distributed computing impeded by the potential dangers, for example, the loss of control over data frameworks, shrouded costs and the need to retrain staff individuals. Cloud computing operates by employing distant servers within the Internet to provide a range of services. It is a good solution to reduce the initial cost of a business or an IT initiative. Cloud services has distributed applications and services, which makes it a good investment as the cost of a cloud service is not that complex and is very affordable by firms to enhance their operations [1]. There are two given features associated with cloud computing, which accentuate two interesting components of distributed computing as described below. The first feature is Visualization, which is the capacity that processing assets need to empower a solitary machine and offers the fantasy of numerous smaller machines working in a virtual environment. These virtual machines (VMs) are supposed to be running distinctive working framework occasions [26]. The VMs can have a separate working framework situations and they can make utilization of various parts of assets on one machine [3]. The second feature is Dynamic Provisioning, which is a strategy to schedule computing assets depending on the needs of the users. In this process, assets are begun and then halted to manage the volatile demand patterns by users [27]. Armbrust and his group alluded to distributed computing as the applications conveyed as administrations over the web and the equipment and framework programming in the server farms that give those administrations [1]. They depicted the administrations conveyed over the web as SaaS' and the server equipment and programming as a cloud; which could either be an open cloud or a private cloud. Distributed computing is a concept of empowering omnipresent, advantageous, on-request arranged access to a centralized pool of computing resources, which can be configured and can be quickly deployed to the users based on their demands and rights with negligible administration exertion or specialist organization collaboration [2]. Even with the widespread use of cloud computing concepts worldwide, several challenges still exists that includes privacy, trust and security etc. [1]. It is difficult to measure the customers' willingness to depend on a cloud service based on the promised service qualities [28].

4. Conceptual framework

With its foundations in the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM) was first posited by Ajzen and Fishbein [29]. It has become one of the most influential theories within the field of technology. It is very effective and successfully predicts the adoption of different technology services and solutions. The model has been so popular among users due to its ability to be user friendly [30]. TAM was first proposed in 1986 by Fred Davis [31-32]. Later, it was commonly adopted by many researchers as part of their theory related to the acceptance and adoption of technology [33]. Many studies have found that TAM is a valid, robust theory and explained the technological adoption at the firm level [34]. Using the Perceived Usefulness (PU) and the Perceived Ease-of-Use (PEOU) as benchmarks, it is clear that TAM enables the acceptance of IT by the users. The main notable characteristic of TAM is one related to design rather than coincidence. It was the intention of the designers to incorporate the PU and PEOU features in TAM in order to maximize the usability of the model. When a user accepts any technology, its usefulness and efficiency is measured by two main factors, which are its ability to reduce costs and increase productivity [35]. It has been established that the perceived usability of technology is influenced negatively by the cost, but influenced positively by production [36]. Several studies support the claim that PU improves the attitude towards the emerging technologies and, consequently, it increases the likelihood that individuals will use the technology itself [37-38]. It is safe to say that PU has a positive relation to the attitude of the users towards usage as well as behavioral intention to use any new technology [36]. The second component of the TAM model is PEOU. It is argued that it is positively related to the attitude of the users [31-32]. This argument was later supported by the research as it was noticed that lower the complexity of a technology and its use results in lowering the costs of learning and operations, which thus gives more value to technology [35]. PEOU also impacts PU in a positive manner, which was tested in different research projects on different technologies, such as email, online banking and online shopping. These projects tested the impact of PEOU on PU in case of adoption of email [39], online shopping [40], and banking online [41]. These studies proved that there is a positive impact of PEOU and PU. Fishbein et al. (2011) revealed that the consumer's perceived usability of the product increased the likelihood that they would actually use the product and assessing the factors which motivate the usage of cloud computing in Saudi Arabia [41]. TAM has been a frequently used model to measure the acceptance and adoption of any new technology. TAM has been employed as an assessment tool to establish the acceptance of new technologies, such as the adoption of personal computers [42]. The adoption of personal computers was also tested using the same model. TAM was also used to measure the adoption of spreadsheets and word processing applications by Chau (1996) [43]. In recent times, the same model has been used to measure the adoption of course websites by Selim (2003) [44]. It is necessary, however, that other external factors and variables have to be used in the TAM model, especially those which impact the perceived ease in using the technology and perceived usefulness of the technology. Lou et al. (2000) used critical mass as an external factor in testing the adoption of Groupware using the TAM model [45]. As technology has developed rapidly, the adoption of each technological innovation depends on other external factors. This study will couple TAM with a separate external variable to assess the adoption of cloud computing in Saudi Arabia.

5. The proposed research model and hypotheses

The proposed model is designed to explain the acceptance and change in attitude of the users towards cloud computing with the effect of enhanced technical support on the cloud computing as depicted in Figure 1. The proposed model will examine the impact and effect of different factors such as the ease-of-use, usefulness and technological support on intention to buy and attitude of the users towards cloud computing. External variables are used in this study as a technical support. These factors have been reviewed alongside the TAM model, creating an extended version of the

TAM model. It has been noticed that technical support aid in creating better awareness and reduce the fear of change in any technological adoption or advancement. Technical support is the process where people with knowledge of technology help the people who are using the technology [46]. Technical support includes people, physical assets and processes. Technical support can be delivered through help desks, call agents, online chats, and intelligent IT systems. The presence of technical support has been shown to be important to consumers both in terms ofuser satisfaction and product acceptance [47]. In an earlier study, it was found that information centre support plays a vital role in building users' favorable attitude towards a technology or system, leading to greater success [42]. As per finding of the state of art in the field of PU, there are three hypotheses (H1 to H3 and H13 to H14). In the generic TAM model, the relationship that flows from belief to attitude to behavior has been proven in various research studies. No such model has been tested for measuring the impact of the proposed model on the adoption of cloud computing by the users of the KSA. The proposed study not only examines the impact of technical factors on PU and PEOU, but also measures the concept provided by Davis (1989) [31] that PEOU has a positive impact on any technology's PU. It is important to distinguish between PEOU and PU here. The extent to which the user considers the technology in question to be user friendly is termed as PEOU. On the other hand, PU refers to the extent to which the technology will simplify the user's job or the task at hand. The TAM model suggests that both PU and PEOU have a positive impact on the attitude of a user towards any technology [31]. Attitude is a measurement of interest. It directly impacts the consumer's intention to purchase the technology in question [32]. The proposed study will examine the impact of PU and PEOU on the consumer's intention to use the product and their intention to purchase the product. Keeping in view of the findings of the literature and the proposed model designed in the current study, the proposed hypothesis used are from H4 to H8. The PU and PEOU influence the extent to which a technology is used [44]; this is due to the users themselves who choose to employ the technological system in the first place [32]. We have extended the proposed model to test the model not only to intention, but also to the actual usage of the cloud computing. For this purpose, the hypothesis H9 to H12 has been developed as described in the following section.

6. Research methodology

The following subsection describes the research methodology followed during the current study, including its design, method, sampling of population, and measurement of various aspects of the proposed study.

a) Research design

We conducted an empirical research for describing the characteristics of a particular population or market. The proposed research includes pilot surveys and primary data analysis using quantitative and statistical techniques.

b) Research method

We used quantitative research to know about the impact of the cloud computing acceptability on the residents of Saudi Arabia. Through the use of questionnaires, we analyzed their opinions and attitude of the respondents in the proposed study.

c) Sample size

We used convenience sampling for this study from a population of residents of Saudi Arabia. The sample size of this research is 350 individuals of Saudi Arabia.

d) Measurement

The research model used a questionnaire as a tool for gathering the data. The survey was separated into two parts. The first part includes biographical data of the respondent consisting of name, gender, marital status, education, profession, company name, and designation respectively. The second part includes information about the questionnaire variables in the survey. For the purpose of measurement, the questionnaire used five-point Likert Scale questions, as advised by Low et al. (2011) [13]. In the questionnaire, measurement options were shown in the following manner. Strongly disagree is shown as an option (1), Disagree is shown as an option (2), Neutral is shown as an option (3), Agree is shown as an option (4), Strongly Agree is shown as an option (5). The entire questionnaire along with every item was examined for validity of the questionnaire. The preliminary questionnaire was pilot tested from twenty five respondents, selected randomly. The final questionnaire was tested by measuring Cornbach's Alpha for the questionnaire and its individual constructs. Cronbach's Alpha is used to indicate the degree by which a group of items is measured as a uni dimensional latent construct.

e) Research Instrument

A questionnaire was the primary tool used to conduct this research. This was because the questionnaire is a more structured, quick and easy way to gather the required data. Each construct was tested on five questions with one question as negatively skewed, in order to test the validity of the response from respondents. A Likert scale was recommended by Ajzen et al (1980) [29], and this was used in this study to measure both the attitude of and the intention to use technology.

f) Sampling Technique

Probability sampling was used to pick the sample. Out of the probability sampling, random sampling was used [48].

g) Analysis Design

SPSS Software is used in this study for the analysis of primary data. Statistical tools have been employed, such as the reliability test for the content and construct validity of the questionnaire. Descriptive analysis, using ANOVA, correlation and regression testing were conducted using SPSS on the data gathered through questionnaires. The analysis was done to test the hypothesis developed for the proposed model.

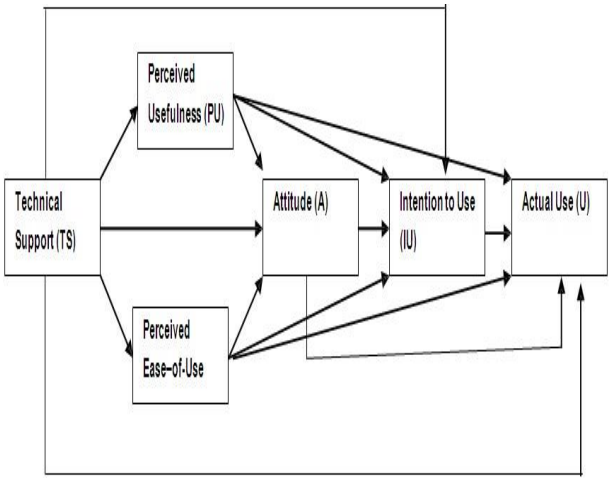


Fig. 1: The Research Model.

Table 1: PI L OT Study Results

Variables	Number of	Cronbach's Alpha of	Cronbach's Alpha of
Technological Support (TS)	5	0.831	0.775
PU	5	0.797	0.712
PEOU	5	0.793	0.759
Attitude (AT)	5	0.805	0.733
Intention (IU)	5	0.796	0.782
Actual use (AU)	5	0.809	0.698

7. Results and discussion

This research is based upon the study of the adoption of cloud computing through the TAM model with technical support as a variable of external component. The model was tested with multiple hypotheses. We have examined the information based on different calculating tools and collected the data from the customers, using questionnaires with high reliability ratios. Overall, the TAM model proved to be applicable in the context of this research, though one

hypothesis derived from the TAM model failed to prove its acceptance, which is the impact of ease-of-use on the perceived usability of cloud computing. A pilot questionnaire was tested with twenty five respondents, selected randomly. A final questionnaire was tested by measuring Cornbach's Alpha for the questionnaire and its individual constructs as depicted in Table I. The Cronbach's Alpha of the pilot study as well as the field study all filled with the acceptable range, thus the questionnaire proved to be the most reliable instrument of measurement for the purpose of this study.

Social Sciences (SPSS) rendition 22.0 was utilized for detailed statistical analysis and investigation. It was derived from the theory that the relationship between factors must be inspected. This is based on the grounds of whether the relationship among the variables existed or not [49]. The Table II shows moderate and strong correlations between the independent and dependent variables. Furthermore, we did not find any strong correlations among the independent variables, which may depict the multi co-linearity.

Table 2: Correlation

N=35	TS	PU	PEOU	AT	IU	AU
TS	1					
PU	0.41	1				
PEOU	0.66	0.50	1			
AT	0.51	0.74	0.79	1		
IU	0.54	0.69	0.77	0.80	1	
AU	0.67	0.78	0.68	0.79	0.81	1

The test results demonstrated that technical support plays a significant role in the adoption of cloud computing. The results show that the availability of technical support increases both the perceived usefulness and ease-of-use of the product. Other hypotheses suggest that technical support also creates an impact on attitudes of people towards cloud computing, their intent to use cloud computing, and finally the actual use of the technology. Table III depicts the hypothesis testing and results.

Table 3: Hypothesis Testing (H1-H4)

	Beta	P-value	Status
H1. Technical support has a positive impact on the perceived usefulness of cloud computing. H0: Technical support does not have a positive impact on the perceived usefulness of cloud computing.	0.21	0.00	H1: Accepted
H2. Technical support has a positive impact on the perceived ease-of-use of cloud computing. H0: Technical support does not have a positive impact on the perceived ease-of-use of cloud computing.	0.24	0.01	H1: Accepted
H3. Technical support has a positive impact on users' attitudes towards cloud computing. H0: Technical support does not have a positive impact on the perceived ease-of-use of cloud computing.	0.18	0.00	H1: Accepted
H4. The perceived ease-of-use of cloud computing has a direct impact on the perceived usefulness of cloud computing. H0. The perceived ease-of-use of cloud computing does not have a direct impact on the perceived usefulness of cloud computing.	0.19	0.08	H1: Rejected

The relationship between TS and PEOU shows a correlation coefficient of 0.66 and p <0.05. This shows that the technical support impacts the perceived ease-of-use. Furthermore, the coefficient between TS and PU is 0.41 and p <0.05, which shows a positive relationship between both constructs. The relationship between PEOU and PU has a correlation of 0.50 with p >0.05, which shows that there is no significant correlation existing between these constructs. The data provide evidence to support hypotheses 1, 2 and 3, such that the availability of technical support improves PU, PEOU and attitudes towards cloud computing. The positive relationship of technical support with PU is proven, as H1 is accepted. The positive relationship of technical support with PEOU is proven as H2 is also accepted. The impact of technical support on reported attitudes and behaviors towards cloud computing is also proven as it was tested by H3, and accepted. The findings of the research show that technical support has a strong effect on both PU as well as PEOU. The impact of technical support on attitudes is also proven to be significant, although the direct impact of PEOU on PU is insignificant, as H4 is rejected as depicted in Table III.

Table 4: Hypothesis Testing (H5-H8)

	Beta	P-value	Status
H5. The perceived ease-of-use of cloud computing directly impacts attitudes towards the use of cloud computing. H0. The perceived ease-of-use of cloud computing does not have a direct impact on atti- tudes toward the use of cloud computing.	0.25	0.00	H1:Accepted
H6. The perceived ease-of-use of cloud computing has a direct impact on the intention to use cloud computing. H0. The perceived ease-of-use of cloud computing does not have a direct impact on the intention to use cloud computing.	0.31	0.01	H1:Accepted
H7. The perceived usefulness of cloud computing has a direct impact on the intention to use cloud computing. H0. The perceived usefulness of cloud computing does not have a direct impact on the intention to use cloud computing.	0.17	0.03	H1:Accepted
H8. Attitudes towards using cloud computing have a positive impact on the intention to use the system. H0. Attitudes towards using cloud computing do not have a positive impact on the intention to use the system.	0.18	0.00	H1:Accepted

H5 and H6 investigated the relationship of PEOU and PU computing and this was also proven as it was tested by H3, and accepted. The results indicate that the availability of technical support increases Pu and PEOU. However, no direct impact was found; therefore H4 and H5 are rejected. Technical support also significantly improved attitude of the users towards cloud computing, as H4 is rejected.

H5 and H7 have investigated the relationship of PEOU and PU respectively against attitude (AT), and which proved to be true as both hypotheses are accepted. The relationship between PEOU and AT shows a correlation coefficient of 0.25 and p=0.00, which shows that the PEOU has a positive impact on AT of users toward cloud computing. The relationship between PU and AT shows a correlation coefficient of 0.17 and p =0.03, which shows that the PEOU I mproves the attitude of the users towards cloud computing. This relationship between PEOU and IU shows a correlation coefficient of 0.31 and p =0.01, which shows that the PEOU improved the IU of cloud computing among users with a correlation coefficient of 0.18 and p=0.00.

As depicted in Table V, Hypotheses 9 and 10 confirm that PEOU and PU impact Actual Use (AU) of cloud computing. The relationship between PEOU and AU shows a correlation coefficient of 0.11 and p=0.04, which confirms that the PEOU significantly improves attitudes towards cloud computing, with a correlation coefficient of 0.26 and p=0.03. Hypotheses 11 and 12 confirm that both the attitude of users and their intention to use cloud computing have a significant relationship with the actual use of cloud computing.

Table 5: Hypothesis Testing (H9-H12)

	Beta	P-value	Status
H9. The perceived ease-of-use of cloud computing has a direct impact on the use of cloud computing. H0. The perceived ease-of-use of cloud computing does not have a direct impact on the use of cloud computing.	0.25	0.04	H1:Accepted
H10. The perceived usefulness of cloud computing has a direct impact on the use of cloud computing. H0. The perceived usefulness of cloud computing does not have a direct impact on the use of cloud computing.	0.31	0.03	H1:Accepted
H11. Attitudes towards using cloud computing have a direct impact on the use of cloud computing. H0. Attitudes towards using cloud computing do not have a direct impact on the use of cloud computing.	0.17	0.04	H1:Accepted

H12. The intention to use cloud computing has a direct impact on the use of cloud computing. H0. The intention to use cloud computing does not have a direct impact on the use of cloud computing.	0.180.02	H1:Accepted

Hypotheses 13 and 14 depicted in Table VI confirm that technical support also exercises a direct influence over the intention to use and actual usage of cloud computing under this model. Hence, this proves the importance of technical support in not only creating initial perceived images of usefulness or usability, but also by its ability to impact the attitudes, behaviors and actual decisions in the adoption of cloud computing. The R2 of the all five individual statistical regression models were all above 0.70 which shows a good model fit and more than 70% explanatory power of the model.

Table 6: Hypothesis Testing (H13-H14)

	Beta	P-value	Status
H13. Technical support has a positive impact on the intention to use cloud computing H0: Technical support does not have a positive impact on the intention to use cloud computing	0.030.12		H1:Rejected
H:14 Technical support has a positive impact on the actual use of cloud computing H0: Technical support does not have a positive impact on the actual use of cloud computing	0.200.01		H1:Accepted

8. Conclusion and recommendations

This research is based upon the study of the adoption of cloud computing through the TAM model with technical sup- port as a variable of external component. The model was tested through the use of multiple hypotheses. We have examined some information on the basis of different calculation tools and collected the data from the customers, using questionnaires with high reliability ratios. Overall, the TAM model proved to be applicable in the context of this research, though one hypothesis derived from the TAM model failed to prove its acceptance, which is the influence of PEOU on cloud computing. The findings of this research prove that the TAM model can be applied on measuring the expected adoption of cloud computing. It also proves the importance of technical support as an external variable which has significantly impacted on all the depended variables leading to the positive adoption of cloud computing. Although technical support has been proven to be a major contributor towards the successful adoption of cloud computing, it is also important that other related external variables should also be tested alongside technical support and the TAM model to accurately judge the impact of different variables on the adoption of cloud computing.

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