Factors Influencing Professionals' Decision for Cloud Computing Adoption

Authors: Suman Kishore Mathur[1], Tejal V Dhulla[2]

Assistant Professor - Dr. V. N. Bedekar Institute of Management Studies, Thane (Mumbai)

Abstract

Technology adoption is a process that includes knowledge, awareness and usage of the technology. According to Bridges toTechnology Corp. (2005), technology adoption process comprises- awareness, assessment, acceptance, learning and usage. This study analyses the behavioral approach of 'Chartered Accountants' (CAs) towards adoption of Cloud computing. UTAUT2 model is used for the study, which is an extension of UTAUT model. According to Venkatesh et.al. UTAUT model explained about 70% of the variance in behavioral intention to use a technology and about 50% of the variance in technology use. This study analyses the correlation among the constructs of UTAUT2 model and the impact of these constructs for adoption of Cloud computing by CAs.

Keywords: Cloud computing, UTAUT, Chartered Accountants, Technology

1. INTRODUCTION

Developments in technology drive users to adopt and make best use of the same. The move from one technology to other is a challenge because of several characteristics viz. market impact, political impact, personal intention, compatibility and availability of resources. Earlier, a diary was used for information, addresses, locations et. al. but today we can manage by using a portable 'SMART PHONE' with GPS and manage it , in and outside the country. Technology has become a hand held tool for gathering information and communication. Technology user has more and more information. Technology has power to centralize and decentralize the power of information and communication (Lessig, 2001). Professionals are more alert towards the technology change. They examine and analyze the implications, and after that adopt the same to increase the efficiency of their work. This study analyses the behavioral approach of 'Chartered Accountants' (CAs) towards adoption of Cloud computing[1]. Technology adoption is a process that includes knowledge, awareness and usage of the technology. According to Bridges to Technology Corp. (2005), technology adoption process comprises- awareness, assessment, acceptance, learning and usage.

According to Taylor (2010) technology adoption is a process of search and selection which is influenced by social status, availability, individual belief and mobility. CA Rafeq (2011), stated that CAs understand the Cloud computing concept, its services, deployment models and risk management. That is why CAs use Cloud services not only for tax filing but also providing information and solutions to their clients.

Many theoretical models have been used by the researchers for analyzing the behavioral approach of users towards technology adoption and use. To understand the professionals group i.e. Chartered Accountants' approach towards adoption of Cloud computing, we have used UTAUT2 (Unified Theory of Acceptance and Use of Technology) model (Venkatesh, 2012) for this study. UTAUT2 model is an extension of UTAUT model. This model is being used by researchers for analyzing the user acceptance towards technology. UTAUT model includes four constructs viz. performance expectancy, effort expectancy, social influence and facilitating conditions. These four constructs contemplate to fundamental determinants i.e. behavior usage and behavior intention. Further, direct determinants determine the influence of age, experience, and voluntariness. According to Venkatesh et.al. UTAUT model explained about 70% of the variance in behavioral intention to use a technology and about 50% of the variance in technology use.

In the UTAUT2 model (Venkatesh,2012) focus is on consumer usage context. That is why three constructs viz. HM, PV and HB have been included to understand the strong key points related to the adoption of new technology. Further for our study we have removed age

---

[1] Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Source NIST -Peter Mell & Tim Grance, 2009.

(demographic variable) , only two variables i.e. gender and experience are being included in the model as shown in Figure 1 below.

Following objectives have been addressed in this study -

1. To understand the UTAUT2 model context.
2. To identify the constructs influencing the adoption of Cloud computing among professional (CAs).
3. To analyze the influence of UTAUT2 models on adoption of Cloud computing adoption among professionals (CAs).
4. Gender, experience and expenditure influence on the main constructs of UTAUT2 model.

Proposed Research Model

Figure : 1 Proposed Model
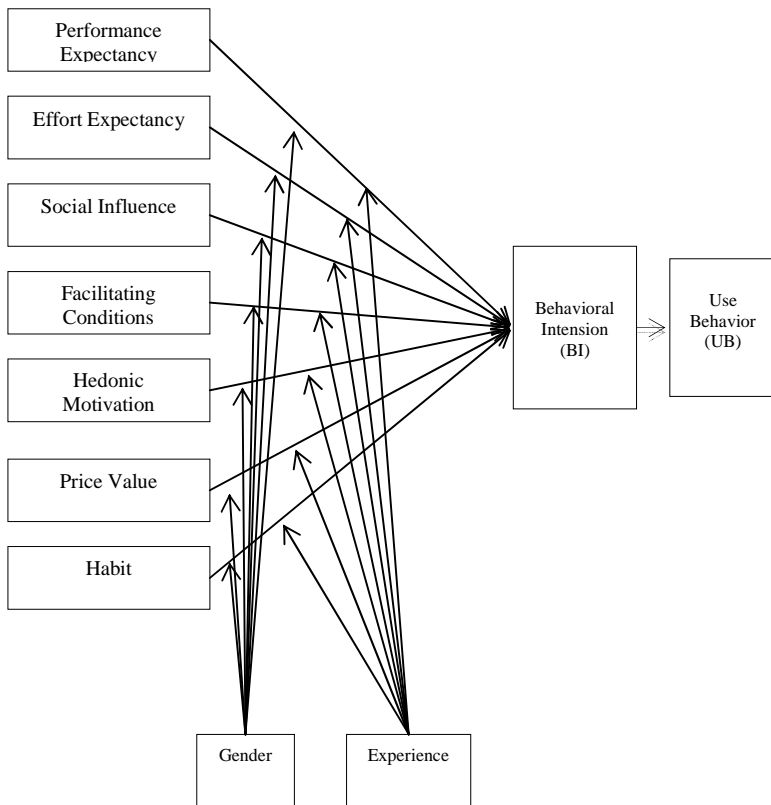
The key theme of the study is to identify influencing constructs and impact of the determinants- gender, experience and expenditure. Proposed model includes seven constructs. Study will emphasis on the influence of these constructs on the behavior intension and usage of professionals towards adoption of Cloud computing.

Construct	Definition
Behavior Intention (BI)	The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior. (Venkatesh, et.al. 2003).
Usage Behavior (UB)	Individual's positive or negative feeling about performing the target behavior For example - using a system (Venkatesh, et.al. 2003).
Performance Expectancy (PE)	The degree to which an individual believes that adopting the technology will help him or her to increase the work performance (Venkatesh, et.al. 2012).
Effort Expectancy (EE)	The degree of ease associated with the use of the technology (Venkatesh, et.al. 2012).
Social influence (SI)	The degree to which an individual perceives that it is important others believe he or she should use the new technology (Venkatesh, et.al. 2012).
Facilitation Condition (FC)	The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh, et.al. 2012).
Hedonic Motivation (HM)	It is defined as an enjoyment or happiness resultant from using a new technology and play significant part in determining new technology adoption (Brown and Venkatesh 2005).
Price Value (PV)	It refers to the cost associated with the purchase of device and service, which user has to bear (Venkatesh, et.al. 2012).
Habit (HB)	It is defined as behavior. The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior (Venkatesh, et.al. 2012).

Table : 1 Constructs Definition

Major Hypothesis

Hypothesis 1: All seven constructs (PE,EE, SI,FC,HM,PV, HB) are influenced by gender, experience and expenditure.

Hypothesis 2: There is positive correlation among all seven constructs (PE,EE, SI,FC,HM,PV, HB).

Research Data Analysis:

The first Step carried before the statistical analysis of hypothesis was to get the Reliability check of the instrument used in the research study:

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.869	**.878**	**10**

Table : 2 Reliability Statistics

The above calculation of coefficient of Cronbach's Alpha was carried out to test the instruments reliability, the methodology opted to determine and statistically calculate Cronbach's Alpha. It provides proportion of variance estimation in the test scores that can be attributed to true score variance. Cronbach's Alpha is .869 for 10 items which indicates that the 86% items have relatively high internal consistency. According to Sattler, .60 is lowest and considered as unreliable, .70 is considered relatively reliable and .80 and .90 is highly acceptable. (Note that a reliability coefficient of .70 or higher is considered "acceptable" in most social science research situations.)

The Second step carried out in the data analysis was to check whether the sample size is appropriate with number of variables taken for the study. In this regard, we have used KMO and Bartlett's Test. KMO measures the sampling adequacy (which should be greater than 0.5) for a successful factor analysis. Bartlett's test is another indicator to measure the strength of relationship among variables.

KMO and Bartlett's Test		
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.838
Bartlett's Test of Sphericity	Approx. Chi-Square	743.636
	df	55
	Sig.	.000

Table : 3 KMO and Bartlett's Test

From the above KMO and Bartlett's Test analysis the calculated value of .838 is considered to be "acceptable" in most social science research situations. Table 4 explains Total Variance as the next step in the process of data analysis, which highlights the contributing factor.

Total Variance Explained		
Component	Initial Eigenvalues	

	Total	% of Variance	Cumulative %
1	5.080	46.185	
2	1.251	11.369	
3	.966	8.785	66.339
4	.761	6.917	73.256
5	.712	6.469	79.725
6	.550	5.004	84.729
7	.534	4.854	89.584
8	.409	3.723	93.306
9	.323	2.939	96.245
10	.279	2.535	98.780
11	.134	1.220	100.000
Extraction Method: Principal Component Analysis.			

Table : 4 Total Variance

From the above table, Eigen value of the first factor is larger than the Eigen value of the next factor (5.080 versus 01.251). Additionally, the first factor accounts for 46.185% of the total variance. This suggests that the scale items are uni-dimensional.

The starting point of factor analysis is a correlation matrix, in which the inter-correlations between the studied variables as Correlation Matrix are presented below in the Correlation Matrix Table 5.

	Gender	PE	EE	SI	FC	HM	PV	HB	BI	UB	Experience
Gender	1	.168*	.002	.096	.158	.115	.181*	.028	.147	.133	-.054
PE	.168*	1	.464**	.276**	.384**	.373**	.312**	.358*	.492**	.502**	-.111
EE	.002	.464**	1	.491**	.412**	.557**	.481**	.419**	.603**	.639**	.076
SI	.096	.276**	.491**	1	.413**	.432**	.417**	.372**	.384**	.472**	.057
FC	.158	.384**	.412**	.413**	1	.604**	.501**	.470**	.648**	.595**	.132
HM	.115	.373**	.557**	.432**	.604**	1	.468**	.429**	.700**	.698**	.137
PV	.181*	.312**	.481**	.417**	.501**	.468**	1	.327**	.723**	.619**	-.060
HB	.028	.358*	.419**	.372**	.470**	.429**	.327**	1	.582**	.519**	.312**
BI	.147	.492**	.603**	.384**	.648**	.700**	.723**	.582**	1	.703**	.089
UB	.133	.502**	.639**	.472**	.595**	.698**	.619**	.519**	.703**	1	.105
Experience	-.054	-.111	.076	.057	.132	.137	-.060	.312**	.089	.105	1
*. Correlation is significant at the 0.05 level (2-tailed). , **. Correlation is significant at the 0.01 level (2-tailed).											

Table : 5 Correlation Matrix

It has been observed from Table 5 that Gender has significant positive correlation with PE nodel i.e r=+0.168 & PV is r =0.181 significant at the 0.05 level (2-tailed).Therefore, we can state that gender has

positive influence on PE & PV. On the other hand Experience as a variable has been found to have positive relation of influence on HB, where experience has negative relation with Gender, PE & PV and with other variable Experience does not have any influence. This statement partially accepts hypothesis 1 which states that all seven constructs (PE,EE, SI,FC,HM,PV, HB) are influenced by gender, experience and expenditure.

From the Above table it can be stated that each of the variable ie. PE, EE, SI, FC, HM, PV, HB,BI & UB has a positive correlation at 0.01 level of significance based on which we accept hypothesis 2 which states that there is positive correlation among all seven constructs (PE,EE, SI,FC,HM,PV, HB). Hence we can conclude that PE, EE, SI, FC, HM, PV & HB have an influence on BI and impacts UB for adoption of Cloud computing by professionals.

As its being observed in the analysis, PE is more influential variable for adoption of cloud computing amongst the professionals, as stated by Venkatesh et al. (2003) PE as "the degree to which an individual believes that using the system will help a person to attain gains in job performance". It is also evident from other models viz. TAM/TAM2 (Technology Acceptance Model), TPB (Technology Planned Behavior) et.al. that PE is a strong predictor of behavioral intention to adopt and use of information technology. Davis et. al. (1989) has mentioned in his study that PE decides the degree of adoption rate. The potential of technology adoption will proliferate, if user believes technology adoption will increase the efficiency of their work. For example we know sending a SMS and an Email to a communicator is faster than a speed post or courier. It indicates that performance increased the possibility of adoption and usage of technology.

EE is related with ease of use, existing research study supports the same (Venkatesh & Morris, 2000; Venkatesh, Morris, & Ackerman, 2000; Vankatesh et al., 2003). Analysis shows that EE is second influential variable amongst professionals which relates to flexibility and availability. Cloud computing allows user to access from anywhere-any time. On demand nature of Cloud computing, influences usage of technology and intention of using technology. Cloud computing service providers provide ready to use application/ software, which significantly impacts on behavior intention and usage.

SI has significant impact on behavior intention and usage. Behavior intention and usage is influenced by peers, family and society. Existing studies indicates that society influences users' perception in both intention

and usage Igbaria, Schiffman, & Wieckowski, 1994; Karahanna & Straub, 1999). For example college students prefer to watch a movie suggested by their friends and peers.

FC is related to the conditions in which technology can be adapted by users. Cloud computing services are offered by service provider. Analysis indicates there is no impact of experience on technology usage. If these services are delivered to the user without any interruption, it will increase the potential of behavior intention towards Cloud computing adoption.

In this research gender and experience have no influence on HM, which refers to the enjoyment and fun of using technology. It also includes motivation which explains the reason for adoption of technology. Many research studies have defined hedonic motivation as the design of physical framework and trust (Kourouthanassis et al., 2008).

According to the analysis, it was found that gender has significant influence on PV for decision making towards Cloud computing adoption. Certainly, price value (PV) is important for new technology adoption. One of the advantages of Cloud computing adoption is reduced cost (NIST, 2012). Users access Cloud services based on their needs, which can help to reduce costs. Cost flexibility is an appealing proposition towards adoption of Cloud computing. As per the IBM survey, 31% of executives cited reduced fixed IT costs and pay as you use model, as two important variables for Cloud computing adoption.

HB refers to the experience of using technology. In the context of consumer decision making, women have been found to exhibit greater sensitivity to details than men exhibit when making judgments or decisions (e.g., Farina 1982; Meyers-Levy and Tybout 1989) but the existing research does not supports the impact of gender on HB. Thus habit has no direct effect on technology adoption and experience has significant positive impact on HB. Venkatesh et al. (2012) mentioned habit as having direct and indirect effect through behavioral intention.

Conclusion

The result of the study shows that except gender and experience all other constructs viz. PE,EE, SI,FC,HM,PV, HB and determinants are correlated. New paradigm defined as Cloud accounting, changed the approach of users because of performance expectancy. Ease of use brings agility in the work performance. It also helps to develop a collaborative real time environment. Gender and experience are no longer important for adoption of Cloud computing among CAs.

Cloud computing is a dynamic platform, built from core components that include resources, management of resources and technical competence to build and deploy services. It states that availability of Cloud computing services is one of the necessary variables and depends on the speed of the internet. That's why facilitating condition (FC) contributes for influencing adoption of Cloud computing. UTAUT2 model acknowledges the validity of the study and explains that behavioral intention and usage, are two important determinants for adoption of Cloud computing by CAs'. Cloud computing adoption provides CAs' a cost benefit proposition, system audit, assistance and consultancy to clients. This study contributes knowledge among the researchers and is an attempt to highlight the factors influencing the adoption of Cloud computing by CAs'.

References

[1] CA Rafiq. (2011). "*Cloud Computing: Concepts, Challenges and opportunities for Chartered Accountants*" The Chartered Accountant Journal, pp. 461-468.

[2] Davis, F. D., Bagozzi, R. P., and Warshaw, P. R. (1989). "*User Acceptance of Computer Technology: A Comparison of Two Theoretical Models*", Management Science, 35 (8), pp.982-1003.

[3] Igbaria, M., Schiffman, S. J., & Wieckowski, T. J. (1994). "*The respective roles of perceived usefulness and perceived fun in the acceptance of microcomputer technology*". Behavior & Information Technology, 13(6), 349-361.

[4] Kourouthanassis et al. (2008). "*Enhancing the user experience with pervasive information systems*", International Journal of Information Management (27), pp. 319–335.

[5] Lessig, L.(2001)."The future of ideas: The fate of the commons in a connected world", New York: Random House.

[6] Mell P.,Grance T., "*The NIST Definition of Cloud Computing*", NIST US Department of Commerce, Special Edition 800-145,2011,pp.1-3.

[7] Morris, M. G., Venkatesh, V., and Ackerman, P. L. (2005). "*Genderand Age Differences in Employee Decisions about New Technology: An Extension to the Theory of Planned Behavior*," IEEE Transactions on Engineering Management, (52:1), pp. 69-84.

[8] Shaughnessy, J. J., Zechmeister, E. B and Zechmeister, J. S (2006)."*Research methods in psychology*".*Seventh edition*. New York: McGraw-Hill.

[9] Taylor. (2010). "The Next Generation: Technology Adoption and Integration through Internal Communication in new product", Organization Science, (21) 1, pp. 23-41.

[10] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). "*User acceptance of information technology: Toward a unified view*". MIS Quarterly, 27, 425.

[11] Venkatesh, V., Thong, J Y.L., Xin X.(2012). "*Consumer acceptance and use of information Technology: extending the unified theory of acceptance and use of technology*," MIS Quarterly Vol. 36 No. 1 pp. 157-178.

_____

Biographical Sketch-
[1]Suman Kishore Mathur is a Ph.D. scholar and currently associated as an Assistant Professor with Dr. V. N. Bedekar Institute of Management Studies, Thane,(Mumbai)- Maharashtra. She has contributed/presented research papers at national and international conferences in India and outside India. Her major interests are information technology management, research methodology, general management and project management.
Email: mathurkishore.suman@gmail.com, smathur@vpmthane.org

[2]Tejal V Dhulla is a Ph.D. scholar and currently associated as an Assistant Professor with Dr. V. N. Bedekar Institute of Management Studies, Thane,(Mumbai)- Maharashtra. She has contributed/presented research papers at national and international level in India. Her major interests are information technology management, industrial psychology and human resource management.
Email : tejaldhulla@gmail.com, tdhulla@vpmthane.org