

## Determining Factors for Adoption of Cloud Computing by Indian Academic Librarians

**Mayank Yuvaraj**

*Junior Research Fellow, Department of Library & Information Science, Banaras Hindu University, Varanasi, Uttar Pradesh, India*  
Email id: mayank.yuvaraj@gmail.com

### ABSTRACT

Cloud Computing has emerged as the latest buzzword in the Information Technology (IT) sector. Libraries are no longer an exception which are keen to migrate themselves from brick and mortar to the cloud. The present study tries to explore the factors that drive the adoption of cloud computing in academic libraries. The study investigates the impact of librarian's personal traits on adoption of cloud computing through Technology Acceptance Model (TAM). Questionnaire survey was conducted in 29 central university libraries in India, which were analysed through Pearson's correlation tests. The results revealed that TAM variables to a great extent catalysed the cloud computing adoption.

**Keywords:** Cloud Computing, TAM Model, Library Professionals, Academic Librarians, Cloud Computing Factors

### 1. INTRODUCTION

In the recent years, IT sector has witnessed technological turmoil in the form of thunders of cloud computing. Cloud computing is an outcome of the advancements of various technologies: The Internet, hardware, systems management and distributed computing (Buyya *et al.*, 2011). There are various milestones of the evolution of cloud computing:

- 1961– Birth of the idea
- 1993– Advent of search engines
- 1996– E-mail services
- 2006– Online software, platforms and infrastructure (Mokhtar *et al.*, 2013).

Although the concept was in use long time back, but the term was formally announced by Google in 2010. (Armbrust, 2009) argues that cloud computing is a collection of applications, and hardware and software systems that deliver services to end users via the Internet. It offers a variety of

services, such as storage and different modes of use (Leavitt, 2009). Cloud computing enables organisations to deliver support applications, avoid the need for them to develop their own IT systems (Feuerlicht *et al.*, 2010).

With an upsurge in the cloud computing phenomena, it becomes important to determine the factor that influences the adoption of cloud computing in the libraries. Assuming that using new technologies may improve information organisations' functions, this study is an attempt to explore if library professionals who deal a lot with technology and use it as an important vehicle in their workplace, are familiar with technological innovations and whether they are ready to use them in their workplaces. As the phenomenon of cloud computing is relatively new, there are not many surveys that focus on it and, furthermore, no one has so far focused on library professionals attitudes towards cloud computing. The research may contribute to an understanding of the variables that influence library professionals' attitudes towards cloud computing, and may lead to further inquiry in this field.

The current study uses the TAM, a well-known theory for explaining individuals' technology behaviours (Davis, 1989; Venkatesh, 2000), as well as personal characteristics such as cognitive appraisal and openness to experience as theoretical bases from which we can predict factors that may influence library professionals adopting cloud computing in their workplaces.

## 2. OBJECTIVES

The objectives of this study are:

- (a) To what extent does the TAM explain library professionals intentions towards cloud computing and;
- (b) To what extent do personal characteristics such as cognitive appraisal and openness to experience explain library professionals intentions to use cloud computing.

## 3. THEORETICAL BACKGROUND

### 3.1. Cloud Computing

Cloud computing is basically the computing services on demand over the Internet. It is nothing more than a collection of computing software and services that can be accessed via the Internet rather than residing on a desktop or internal server (Stroh *et al.*, 2009). Cloud computing derives its name from Cloud, which represents data centres, technologies, infrastructure and services delivered through internet (Tadwalkar, 2009). Some scholars argue that the term "Cloud" originated in the telecommunications world where telecommunications networks and the Internet were visualised on technology diagrams as Clouds, signifying areas where information was moving and being processed, without the average person needing to know exactly how that happens (Molen and Fred Van Der, 2010); (Mokhtar *et al.*, 2013) present some main characteristics of

cloud computing: (1) *Flexible scale* that enables flexible scale capabilities for computing, (2) *virtualisation* that offers a new way of getting computing resources remotely, regardless of the location of the user or the resources, (3) *high trust*, since the cloud offers more reliability to end users than relying on local resources, (4) *versatility*, because cloud services can serve different sectors in various disciplines still use the same cloud, (5) *on demand service*, as end users can tailor their service needs and pay accordingly.

Cloud computing in particular is beneficial to the library sector that has not much to do with the IT sector rather than serving people with information. Shifting library core applications to cloud-based services will reduce or eliminate most or the entire local technical needs in managing server hardware and operating systems that underlie the applications (Liu and Cai, 2013). Also implementation of cloud computing can enable more energy-efficient use of computing power, especially when the users' predominant computing tasks are of low intensity or arise infrequently (Baliga *et al.*, 2010). There are four core areas of cloud computing solutions in the libraries: technology, data hosting archives, information and community (Patel *et al.*, 2012). Many scholars are of the opinion that a cloud computing is already in practise in the libraries. Many library patrons are already using cloud products such as Gmail, Google Docs and bibliographic management tools for their daily needs (Hoy, 2012). Moreover, the number of applications available in the cloud has increased substantially in recent years. Libraries use database vendors or integrated library system providers who provide external servers to host library software and data in the cloud (Cohn *et al.*, 2002). There are various cloud based tools for reference service needs of the libraries such as "cloud-based video services" (e.g., YouTube, TeacherTube), "information collection services" (e.g., Google forms) and "file sharing services" (e.g., Dropbox). The revolutionary development to a cloud based library services is WorldCat Local where OCLC along with Google are exchanging data in the cloud to facilitate the discovery of library collections through Google search services in a single interface (Jordan, 2010).

As cloud computing is relatively new, there are not a lot of surveys that focus on it. Several researchers conducted in-depth interviews investigating respondents' attitudes towards keeping their virtual possessions in the online world (Odom *et al.*, 2012); (Teneyuca, 2011) reported a survey of cloud computing usage trends that included information technology professionals. Results revealed preferences for virtualisation and cloud computing technologies. However, the major reasons for cloud computing adoption being impeded were the lack of cloud computing training (43%) and security concerns (36%). Another report (Ipsos, 2011) showed that nearly 40% of Americans think that saving data to their hard drive is more secure than saving it to a cloud (Teneyuca, 2011). A further study (Ion *et al.*, 2011) explored private users' privacy attitudes and beliefs about cloud computing in comparison with those in companies. Mokhtar *et al.* (2013) investigated cloud computing in an academic institution, claiming that cloud computing technology enhances performance within the academic institution. A study that was carried out in the education arena examined factors that led students to adopt cloud computing technology (Behrend *et al.*, 2010).

### 3.2. Technology Acceptance Model

The TAM (Davis, 1989) is a sociotechnical model that aims to explain user acceptance of an information system. It is based on the Theory of Reasoned Action (Fishbein and Ajzen, 1975) that seeks to understand how people construct behaviours. The model suggests that technology acceptance can be explained according to the individual's beliefs, attitudes and intentions (Davis, 1989). The TAM hypothesizes that one's intention is the best predictor of usage behaviour and suggests that an individual's behavioural intention to use technology is determined by two beliefs: perceived usefulness (PU) and perceived ease of use (PEOU). PU refers to the individual's perception that using a technology will improve performance, and PEOU addresses a user's perceptions that using a particular system would be free of effort (Davis, 1989). The current study concentrates on one element of the TAM: PEOU, as the researcher wanted to examine if library professionals' perceptions about new technology is affected by its' simplicity and friendly interface.

Earlier research mainly investigated personal behaviour to use new information systems and technology in corporate environments (Gefen and Straub, 1997; Igbaria *et al.*, 1999), web shopping (Chang *et al.*, 2002; Koo, 2003; Lederer *et al.*, 2000; Lin and Lu, 2000; Moon and Kim, 2001), education "particularly e-learning (Park, 2009; Park *et al.*, 2009), m-learning (Aharony, 2013; Jairak *et al.*, 2009), and the library arena (Aharony 2013; Park *et al.*, 2009; Thong *et al.*, 2002).

### 4. HYPOTHESES

In accordance to the research objectives this study tested the following hypotheses:

**H1:** PEOU will have significant influence on the behavioural intention to use cloud computing in libraries.

**H2:** Personal innovativeness (PI) will have significant influence on the behavioural intention to use cloud computing in libraries.

**H3:** High scores in respondents' challenge will have significant influence on the behavioural intention to use cloud computing in libraries.

**H4:** High scores in respondents' self-efficacy will have significant influence on the behavioural intention to use cloud computing in libraries.

**H5:** Respondents' openness to experience will have significant influence on the behavioural intention to use cloud computing in libraries.

**H6:** Respondents' computer competence will have significant influence on the behavioural intention to use cloud computing in libraries.

## **5. METHODLOGY**

### **5.1. Data Collection**

The research was conducted in Indian Academic libraries and encompassed five groups of library professionals: technical assistants, professional assistants, assistant librarians, deputy librarians and university librarians. A questionnaire survey was used for collection of data from a purposive sample of 488 library professionals drawn from a countrywide population of 29 central university libraries of India. Researcher explained the study's purpose and asking the members to complete the questionnaire. The questionnaire was divided into two parts. Part 1 was designed to record the demographic characteristics of the respondents. Part 2 was based in the context of the usage of cloud computing applications and was subsequently developed from the scales used in TAM (Davis *et al.*, 1989) and Venkatesh, (2000). TAM model comprised of 20 items which were used to measure PU, PEOU, attitude towards the usage and the behavioural intentions which was recorded on 7-point Likert scale. Questionnaires were mailed and personally administered to the selected 488 library professionals over a period of eleven months. Softcopy of the questionnaire was also available for completion upon request. Out of the 488 questionnaires administered 424 respondents (86%) returned completed questionnaires. On close analysis, the information was found incomplete in 17 responses. Finally, 407 (84%) of the sample) valid questionnaires were selected for data analysis and interpretation. The data were interpreted, classified and transferred into coded form, entered into Microsoft Excel and transferred in Statistical Package for Social Sciences. A frequency analysis was run for detection and removal of errors and missing numbers.

### **5.2. Data Analysis**

Of the participants, 320 (78.62 %) were male and 87 (21.3 %) were female. Their average age was 42.34 years.

### **5.3. Measures**

Researcher used seven questionnaires to gather the following data: personal details, computer competence, and attitudes to cloud computing, behavioural intention, openness to experience a cognitive appraisal, and a self-efficacy. The personal details questionnaire had two statements.

The computer competence questionnaire consisted of two statements rated on a 5-point Likert scale (1= strongest disagreement; 5= strongest agreement). The cloud computing attitude questionnaire, based on (Liu *et al.*, 2010), was modified for this study and consisted of six statements rated on a 7-point Likert scale (1=strongest disagreement; 7= strongest agreement). A principal components factor analysis using Varimax rotation with Kaiser Normalisation was conducted and explained 82.98% of the variance. Principal components factor analysis revealed two distinct factors. The first related to information librarians' PI (items 2, 3, 5), and the second to library professionals' perceptions about PEOU (items 1, 4, 6). The values of Cronbach's Alpha were .87 and .88 respectively.

The behavioural intention questionnaire, based on Liu *et al.* (2010), was modified for this study and consisted of three statements rated on a 6-point Likert scale (1=strongest disagreement; 6= strongest agreement). Its Cronbach's Alpha was .72. The openness to experience questionnaire was derived from the Big Five questionnaire (John *et al.*, 1991) consisted of eight statements rated on a 5-point Likert scale (1=strongest disagreement; 5= strongest agreement). Cronbach's Alpha was .79. The cognitive appraisal questionnaire measured library professionals' feelings of threat versus challenge when confronted with new situations. It consisted of 10 statements rated on a 6-point scale (1= fully disagree; 6= fully agree). This questionnaire was previously used (Aharony, 2013; Yekutieli, 1990) and consisted of two factors: threat (items 1, 2, 3, 5, 7, 8) and challenge (items 4, 6, 9, 10). Cronbach's Alpha was .70 for the threat factor and .89 for the challenge factor. The self-efficacy questionnaire was based on Askar and Umay, (2001) questionnaire and consisted of 18 statements rated on a 5-point scale (1= Fully disagree; 5= Fully agree). The Cronbach's Alpha was 92.

## 6. RESULTS

In order to examine the relationship between openness to experience, cognitive appraisal (threat, challenge, and self-efficacy), TAM variables (PI, and PEOU) and behavioural intention to use cloud computing, researcher performed Pearson correlations, which are given in Table 1.

**Table 1: Pearson correlations of cloud computing use (n=407)**

Measures	Openness	Threat	Challenge	Self-efficacy	Innovative	PEOU
Openness						
Threat	-0.20*					
Challenge	0.25**	-0.10				
Self-efficacy	0.53***	-0.36***	0.19*			
Innovative	0.48***	-0.28***	0.33***	0.53***		
PEOU	0.34***	-0.31***	0.21*	0.60***	0.66**	
Intention	0.36***	-0.38***	0.37***	0.56***	0.57***	0.62***

\* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$

Table 1 presents significant correlations between research variables and the dependent variable (behavioural intention to use cloud computing). All correlations are positive, except the one between threat and behavioural intention to use cloud computing. Hence, the higher these measures, the greater the behavioural intention to use cloud computing. A significant, negative correlation was found between threat and the dependent variable. Therefore, the more threatened respondents are, the lower their behavioural intention to use cloud computing.

Regarding the correlations between research variables, significant, positive correlations were found between openness to experience and challenge, self-efficacy, PI, and PEOU. A negative,

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significant correlation was found between openness to experience and threat. That is; the more open to experience respondents are, the more challenged they are, the higher their self-efficacy, PI, and PEOU, and the less threatened they are. In addition, significant negative correlations were found between threat and self-efficacy, PI, and PEOU. We can conclude that the more threatened respondents are, the less they are self-efficient, personally innovative, and the less they perceive the cloud computing as easy to use. Positive significant correlations were also found between self-efficacy and PI, and PEOU. Thus, the more self-efficient respondents are the more personally innovative they are and, the more they perceive the cloud computing as easy to use.

The study also examined two variables associated with computer competence: computer use and social media use. Table 2 presents correlations between these two variables and the other research variables.

**Table 2: Pearson correlations of computer and social media use on behavioural intention to use cloud computing (n=407)**

Measures	Openness	Threat	Challenge	Self-efficacy	Innovative	PEOU	Intention
Computer use	0.30***	-0.11	0.04	0.34***	0.37***	0.37***	0.27***
Use of cloud apps	0.22**	-0.08	0.01	0.32***	0.35***	0.40***	0.28***

\*\* $P < 0.01$ , \*\*\* $P < 0.001$

Significant, high correlations were found between computer competence variables and openness to experience, self-efficacy, PI, PEOU, and behavioural intention to use cloud computing. Hence, the higher respondents' computer competence is, the more they are open to experience, self-efficient, personally innovative, perceive cloud computing is easy to use and the higher is their behavioural intention to use cloud computing.

Researcher also examined relationships with demographic variables. In order to examine the relationship between age and other research variables, researcher performed Pearson correlations. A significant negative correlation was found between age and PEOU,  $r = -.21$ ,  $P < .05$ . We may assume that the younger respondents are, the more they perceive cloud computing as easy to use. In order to examine whether there are differences between males and females concerning the research variables, a MANOVA was performed and did not reveal a significant difference between the two groups concerning research variables,  $F(7,130) = 1.88$ ,  $P > .05$ .

Researcher also conducted a hierarchical regression using behavioural intention to use cloud computing as a dependent variable. The predictors were entered as five steps: (1) Respondents' openness to experience; (2) respondents' computer competence (computer use and social media use); (3) cognitive appraisal (threat, challenge, and self-efficacy); (4) TAM variables (PI and PEOU); and (5) interactions with the TAM variables. The entrance of the four first steps was

forced, while the interactions were done according to their contribution to the explained variance of behavioural intention to use cloud computing. The regression explained 54% of behavioural intention to use cloud computing. Table 3 presents the standardised and unstandardized coefficients of the hierarchical regression of respondents' behavioural intention to use cloud computing.

**Table 3: Hierarchical regression coefficients of respondents' behavioural intention to use cloud computing (n=407)**

S.No	Predictors	B	b	R <sup>2</sup>	DR <sup>2</sup>
1.	Openness	0.68	0.36**	0.13***	0.13***
2.	Openness	0.54	0.29***	0.18***	0.05*
	Computer	0.18	0.11		
	Social media	0.18	0.17*		
3.	Openness	0.32	0.01	0.43***	0.25***
	Computer	0.09	0.05		
	Social media	0.12	0.11		
	Threat	-0.32	-0.20**		
	Challenge	0.34	0.26***		
	Self-efficacy	0.68	0.36***		
4.	Openness	0.00	0.00	0.52***	0.09***
	Computer	-0.00	-0.00		
	Social media	0.03	0.02		
	Threat	-0.24	-0.15		
	Challenge	0.26	0.20***		
	Self-efficacy	0.35	0.18***		
	Innovation	0.11	0.13		
	PEOU	0.30	0.32***		
5.	Openness	-0.01	-0.00	0.54***	0.02*
	Computer	-0.17	-0.10		
	Social media	0.01	0.01		
	Threat	-0.24	-0.15*		
	Challenge	0.26	0.20**		
	Self-efficacy	0.34	0.18*		
	Innovation	0.12	0.14		
	PEOU	0.31	0.33***		
	Computer and innovation	-0.17	0.16*		

\* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$



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The first step introduced the openness variable that contributed significantly by adding 13% to the explained variance of behavioural intention to use cloud computing. The  $\beta$  coefficient of the openness variable is positive; hence, the more open to experience respondents are, the higher their behavioural intention to use cloud computing. The second step introduced the two computer competence variables (computer use and social media use) which contributed 5% to the explained variance of behavioural intention. Of these two variables, only the social media variable contributed significantly, and its beta coefficient was positive. In other words, the more respondents use social media, the higher their behavioural intention to use cloud computing. Note that Pearson correlations found significant positive correlations between these two variables and behavioural intention to use cloud computing. It seems that because of the correlation between these two variables,  $r = .33$ ,  $P < .001$ , the computer use variable did not contribute to the regression.

As the third step, researcher added respondents' personal appraisal variables (threat and challenge, and self-efficacy), and this also contributed significantly by adding 25% to the explained variance of behavioural intention. The beta coefficients of challenge and self-efficacy were positive, while that of threat was negative. Therefore, we may conclude that the more respondents perceived themselves as challenged and self-efficient, and the less they perceived themselves as threatened, the higher their behavioural intention to use cloud computing. The inclusion of this step caused a decrease in the  $\beta$  size of the openness to experience variable that changed it into an insignificant one, and may suggest the possibility of mediation. Sobel tests indicated that self-efficacy mediates between openness to experience and behavioural intention ( $z = 4.68$ ,  $P < .001$ ). Hence, the more respondents are open to experience; the higher is their self-efficacy and, as a result, the higher is their behavioural intention to use cloud computing.

The fourth step added the TAM variables (respondents' PEOU and personal innovation), and this also contributed significantly by adding 9% to the explained variance of behavioural intention to use cloud computing. The beta coefficient of this variable was positive; therefore, the more respondents perceived themselves, as personally innovative and cloud computing as easy to use, the higher is their behavioural intention to use cloud computing. Note that, in this step, there was a decrease in the  $\beta$  size of self-efficacy. Sobel tests indicated that of the two variables, PEOU mediates between self-efficacy and behavioural intention ( $z = 4.77$ ,  $P < .001$ ). Thus, the more respondents perceive themselves as self-efficient, the higher they perceive cloud computing's PEOU and, as a result, the higher is their behavioural intention to use it. As the fifth step, researcher added the interaction between computer use XPI. This interaction added 2% to the explained variance of behavioural intention to use cloud computing and were presented in Figure 1.

Figure 1 shows a correlation between personal innovation and behavioural intention to use cloud computing among respondents who are low and high in computer use. This correlation is higher among respondents who are low in computer use,  $\beta = .40$ ,  $P < .05$ , than among those who are high in computer use,  $\beta = .04$ ,  $P < .05$ . It seems that especially among participants who are low in computer use, the higher their PI the higher their behavioural intention to use cloud computing.

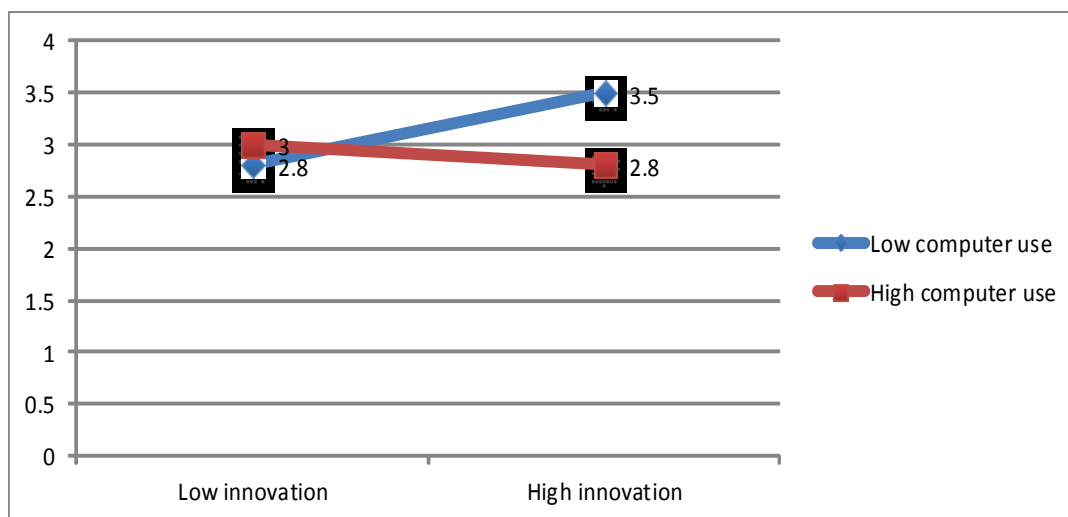


Figure 1: Relationship between innovation and computer use

## 7. DISCUSSION

The present research explored the extent to which the TAM, and personal characteristics such as threat and challenge, self-efficacy, and openness to experience explain library professionals' perspectives about cloud computing. Researcher divided the study hypotheses into three categories. The first (consisting of H1-H2) refers to the TAM, the second (H3-H5) to personality characteristics, and H6 to computer competence. All hypotheses were accepted. Regarding the first category of hypotheses, results show that both were accepted. Findings suggest that high scores in PEOU and PI are associated with high scores in respondents' intention to adopt cloud computing. These findings can be associated with previous ones that found that PEOU as well as PI affect the intention to use information technology (Agarwal and Prasad, 1998; Aharony 2013; Al- Gahtani, 2001; Rose and Straub, 1998; Serenko, 2008; Uray and Dedeoglu, 1997; Venkatraman, 1991). Therefore, we may assume that library professionals would use cloud computing if they think it would not require a lot of efforts, and if they perceive themselves as personally innovative. If library professionals assume that adopting novel technologies will improve their organisations' functioning, and if they like their employees to use novel technologies within their organisations, they should expose them to these technologies and emphasise their simplicity and ease of use, thus lowering any previous assumptions about the complexity of technology. In addition, when they recruit new employees, they may wish to look for people who are technologically adventurous, assuming they would bring a fresh perspective to their workplace.

Addressing the second category (H3-H5), findings indicate that these three hypotheses were also

accepted. It should be noted that in the hierarchical regression, the cognitive appraisal variables (threat, challenge, and self-efficacy) contributed the most (25%) to the behavioural intention to use cloud computing. Hence, we may assume that personality characteristics are major factors that influence respondents' behavioural intention to use cloud computing.

H3 emphasises that the more challenged and the less threatened respondents are when they think about cloud computing, the higher their behavioural intention to use it. This finding echoes a previous one (Shoham and Gonen, 2008) that found that threat and challenge are mediating variables predicting attitudes towards computer use. We may assume that those library professionals who have experienced or predict failure when coping with novel technologies have lower intentions to use cloud computing. However, those participants who are challenged foresee the potential for growth and are excited and eager to try and use a novel technology such as cloud computing. Library professionals should be exposed to and experience cloud computing within their workplace, to reduce their level of threat. It was also not unexpected to see H4 accepted. We can say, then, that the more self-efficient respondents are, the higher their behavioural intention to use cloud computing. This finding can be related to Bandura, (1986) who postulates that people who have high self-efficacy will take more challenging tasks than those with low self-efficacy. In the present study, then, they will be more willing to try and use cloud computing. Various studies have shown that training and experience play an important role in computer self-efficacy (Compeau and Higgins, 1995; Kinzie *et al.*, 1994; Stone and Henry, 2003).

Thus, again, it is suggested that higher authorities and university librarians should enable the working professionals to experience working with new technological platforms. H5 reveals that high scores in respondents' openness to experience is associated with high scores in behavioural intention to use cloud computing. This finding was not surprising, as openness to experience is related to creativity, curiosity, and preference for novelty (McCrae and Sutin, 2009). In addition, previous studies (Colquitt *et al.*, 2002; Sykes *et al.*, 2011) have indicated an association between openness to experience and computer use. We can then assume that this personality trait is essential when considering the issue of adopting novel technologies and suggest that university librarians be aware of individual differences such as openness to experience if they would like to incorporate new technological tools into their libraries.

The last category refers to computer competence and was confirmed. Results show that participants, who have high scores in computer use and social media use, also have higher scores in behavioural intention to use cloud computing. We may conclude that the more expertise participants have with computers and social media, the higher their intentional behaviour to use cloud computing. We may further posit that those people are aware of the advantages and disadvantages of their future use of technological innovations, and have decided that it is better for them to adopt, use, and master new technologies within their organisations. In addition, the interaction between computer use and PI suggests that among library professionals who have low scores in computer use, the higher their PI, the higher their behavioural intention to use cloud

computing. In other words, this finding again shows the importance of personal characteristics. Even though respondents are not computer savvy, the fact that they are personally innovative affects their behavioural intention to use cloud computing.

## 8. LIMITATIONS OF THE STUDY

This study has some limitations. The first is that because of the fact that it was carried out only in Indian academic libraries, I suggest that this study will be perceived as an exploratory one. In addition, researcher suggests that an international perspective on cloud computing be obtained by carrying out the study in other countries. Secondly, in order to gain a broader perspective, it is recommended that another study which includes both students and library professionals be conducted. Lastly, a future study may also use qualitative methods such as open questions or interviews to supplement the quantitative analysis, and thereby enrich the findings by adding other dimensions to the inquiry process.

## 9. CONCLUSION

To conclude, the current study found that the behavioural intention to use cloud computing was impacted by several of the TAM variables, personal characteristics, and computer competence. This article has a number of theoretical and practical implications: It expands the scope of research about the TAM by applying it to library professionals and cloud computing and highlights the importance of individual traits such as cognitive appraisal, PI, openness to experience, and computer competence when considering technology acceptance. Estimating that using new technologies will improve information organisations' functioning, the current study proposes that directors of information organisations should be familiar with both the TAM and the issue of individual differences. These factors may help them choose the most appropriate workers.

## REFERENCES

- Agarwal R and Prasad J (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research*, 9(2), 204-215.
- Aharony N (2013). Mobile libraries: Librarians' and students' perspectives. *College and Research Libraries*, 72(2), 111-126.
- Al-Gahtani S (2001). The applicability of TAM outside North America: an empirical test in the United Kingdom, *Information Resources Management Journal*, 14(3), 37-46.
- Armbrust M (2009). Above the clouds: A Berkeley view of cloud computing. Available at: <http://www.eecs.berkeley.edu/Pubs/TechRpts/2009/EECS-2009-28.pdf>. Accessed 29 May 2013.
- Askar P and Umay A (2001). Perceived computer self-efficacy of the students in the elementary mathematics teaching programme. *The Journal of Education*, 21, 1-8.

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- Baliga J, Ayre RWA, Hinton K and Tucker RS (2010). Green cloud computing: balancing energy in processing, storage, and transport. *Proceedings of the IEEE*, 99(1), 149-167.
- Bandura A (1986). *Social foundations of thought and action: a social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Behrend TS, London JE, Wiebe EN and Johnson EC (2010). Cloud computing adoption and usage in community colleges. *Behaviour & Information Technology*, 30, 231-240.
- Buyya R, Broberg J and Goscinski A (2011). *Cloud Computing: Principles and Paradigms*. New Jersey, USA: Willy Online library.
- Chang HS, Kim JK and Oh CG (2002). Technology acceptance model with web interactivity. *Journal of MIS Research*, 12(4), 55-75.
- Cohn JM, Kelsey AL, Fiels KM and Salter D (2002). *Planning for Integrated Systems and Technologies: A How-to-do-it-Manual for Librarians*. UK: Facet.
- Colquitt J, Hollenbeck J, Ilgen D, LePine J and Sheppard L (2002). Computer-assisted communication and team decision-making performance: the moderating effect of openness to experience. *Journal of Applied Psychology*, 87(2), 402-410.
- Compeau DR and Higgins CA (1995). Computer self - efficacy: development of a measure and initial test', *MIS Quarterly*, 19(2), 189-211.
- Davis F (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology, *MIS Quarterly*, 13(3), 319-339.
- Feuerlicht G, Snášel V, Szczepaniak P, Abraham A and Kacprzyk J (2010). Next generation SOA: Can SOA survive cloud computing? In: *Advances in Intelligent Web Mastering*. Vol. 2. Berlin: Springer.
- Fishbein M and Ajzen I (1975). *Belief, Attitude, Intention, and Behaviour: An Introduction to Theory and Research*. MA: Addison-Wesley.
- Gefen D and Straub DW (1997). Gender differences in perception and adoption of e-mail: An extension to the technology acceptance model. *MIS Quarterly*, 21(4), 389-400.
- Hoy MB (2012). Cloud computing basics for librarians. *Medical Reference Services Quarterly*, 31(1), 84-91.
- Igbaria M, Gumaraes T and Davis GB (1999). Testing the determinants of microcomputer usage via structural equation model. *Journal of Management Information Systems*, 11(4), 87-114.
- Ion I, Sachdeva N, Kumaraguru P and Capkun S (2011). Home is safer than the cloud! Privacy concerns for consumer cloud storage. *Paper presented at the Symposium on Usable Privacy and Security (SOUPS), July 14-16, 2011, Pittsburgh, USA*. Available at: [http://precog.iitd.edu.in/Publications\\_files/a13\\_Sachdeva.pdf](http://precog.iitd.edu.in/Publications_files/a13_Sachdeva.pdf). Accessed 18 May 2013.

- Ipsos OTX Media CT (2011). Head in the clouds? Cloud computing and consumers. Free Year Round Insights. Available at: <http://www.ipsos.com/mediact/sites/ipsos.com/mediact/files/pdf/Head%20in%20the%20clouds.pdf>. Accessed 20 May 2013.
- Jairak K, Praneetpolgrang P and Mekhabunchakij M (2009). An acceptance of mobile learning for higher education students in Thailand. Paper presented at the Sixth International Conference of eLearning for Knowledge-Based Society, December 17-18, 2009, Bangkok, Thailand. *Special Issue of the International Journal of the Computer, the Internet and Management*, 17, 36.1-36.8.
- John OP, Donahue EM and Kentle RL (1991). *The Big Five inventory - versions 4a and 54*. University of California, Institute of Personality and Social Research. CA: Berkeley.
- Jordan J (2010). Climbing out of the box and into the cloud: Building web-scale for libraries. *Journal of Library Administration*, 51(1), 3-17.
- Kinzie MB, Delcourt MAB and Powers SM (1994). Computer technologies: attitudes and self-efficacy across undergraduate disciplines. *Research in Higher Education*, 35(6), 745-768.
- Koo DM (2003). An investigation on consumer's internet shopping behavior explained by the technology acceptance model. *Journal of MIS Research*, 13(1), 141-170.
- Leavitt N (2009). Is cloud computing really ready for prime time? *Computer*, 42(1), 15-20.
- Lederer AL, Maupin DJ, Sena MP and Zhuang Y (2000). The technology acceptance model and the World Wide Web. *Decision Support Systems*, 29(3), 269-282.
- Lin JC and Lu H (2000). Towards an understanding of the behavioural intention to use a web site. *International Journal of Information Management*, 20, 197-208.
- Liu W and Cai HH (2013). Embracing the shift to cloud computing: Knowledge and skills for systems librarians. *OCLC Systems & Services: International Digital Library Perspectives*, 29(1), 22-29.
- McCrae RR and Sutin AR (2009). Openness to experience and its social consequences. In: Leary, M.R. and Hoyle, R.H. (eds.), *Handbook of individual differences in social behaviour*, NY: Guilford Press, pp. 257-273.
- Mokhtar SA, Ali SHS, Al-Sharafi A and Aborujilah A (2013). Cloud computing in academic institutions. *Paper Presented at the 7<sup>th</sup> International Conference on Ubiquitous Information Management and Communication ICUIMC, 17-19 January*, Kota Kinabalu, Malaysia. Available at: <http://dl.acm.org/citation.cfm?id=2448558>. Accessed 10 May 2013.
- Molen, Fred Van Der (2010). *Get Ready for Cloud Computing: A Comprehensive Guide to Virtualization and Cloud Computing*. Zaltbommel: Van Haren Publishing.
- Moon JW and Kim YG (2001). Extending the TAM for a World-Wide- Web context. *Information and Management*, 38(4), 217-230.

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- Odom W, Sellen A, Harper H and Thereska E (2012). Lost in translation: Understanding the possession of digital things in the cloud. Available at: [http://research.microsoft.com / pubs/158029/odom2012.pdf](http://research.microsoft.com/pubs/158029/odom2012.pdf). 12 August 2013.
- Park N, Roman R, Lee S and Chung J (2009). User acceptance of a digital library system in developing countries: An application of the technology acceptance model. *International Journal of Information Management*, 29(3), 196-209.
- Park SY (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society*, 12(3), 150-162.
- Patel A, Seyfi A, Tew Y and Jaradat A (2012). A comparative study and review of grid, cloud, utility computing and software as a service for use by libraries. *Library Hi Tech News*, 11(3), 25-32.
- Rose G and Straub D (1998). Predicting general IT use: applying TAM to the Arabic World. *Journal of Global Information Management*, 6(3), 39-46.
- Serenko A (2008). A model of user adoption of interface agents for email notification. *Interacting with computers*, 20(4-5), 461-472.
- Shoham S and Gonen A (2008). Intentions of hospital nurses to work with computers: based on the theory of planned behaviour. *Computing Informatics Nursing*, 26(2), 106-116.
- Stone RW and Henry JW (2003). The roles of computer self-efficacy and outcome expectancy in influencing the computer end-user's organizational commitment. *Journal of End User Computing*, 15(1), 38-53.
- Stroh S, Acker O and Kumar A (2009). *The Cloud is Ready for You, Are You Ready for Cloud?* USA: Booz & Company.
- Sykes T, Venkatesh V and Rai A (2011). Explaining physicians' use of EMR systems and performance in the shakedown phase. *Journal of the American Medical Informatics Association*, 18(2), 125-130.
- Tadwalkar S (2009). Cloud computing- still a long way to go. Available at: [http://www.mahindrasatyam.com / corporate/ ... /Cloud\\_Computing.pdf](http://www.mahindrasatyam.com/corporate/.../Cloud_Computing.pdf). Accessed 18 August 2013.
- Teneyuca D (2011). Internet cloud security: The illusion of inclusion. *Information Security Technical Report*, 16(3-4), 102-107.
- Thong JYL, Hong W and Tam K (2002). Understanding user acceptance of digital libraries: What are the roles of interface characteristics, organizational context, and individual differences? *International Journal of Human-Computer Studies*, 57, 215-242.
- Uray N and Dedeoglu D (1997). Identifying fashion clothing innovators by self-report method. *Journal of Euromarketing*, 6(3), 27-46.

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- Venkatesh V (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information System Research*, 11(4), 342-365.
- Venkatraman PM (1991). The impact of innovativeness and innovation type and adoption. *Journal of Retailing*, 67(1), 51-67.
- Yekutieli S (1990). Father's and Mother's confrontation with the transition of parenthood. (unpublished master's thesis, Bar-Ilan University).

### **About the Author**

**Mayank Yuvaraj**, an arts graduate from Delhi University did his post-graduation in Library and Information Science from Banaras Hindu University. He secured the BHU Gold medal in 2011 for securing the highest marks. He also qualified Junior Research Fellow examination two times (June 2011, 2012). Presently he is doing his research on implication of Cloud Computing in Indian Academic Libraries in the Department of Library and Information Science, Banaras Hindu University. He received the Second best Poster Paper Award on Cloud Computing at ICAL 2013. He was also invited to deliver his lecture on Cloud Computing at 13<sup>th</sup> annual research symposium at University of Kelaniya, Sri Lanka. His research interests include Cloud Computing and new technologies for library services. He has written eight articles on cloud computing and is co-author of two books.