CHAPTER 6: CONCLUSION, IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

The chapter discusses conclusions of the study along with theoretical and managerial implications of the final results. Also, this study presents the limitations and scope for future research directions in the area of cloud computing adoption.

6.1 Conclusions

This study focuses on user acceptance of cloud computing through behavioral intention to use and actual usage of cloud computing in organizations. Based on the model proposed, a questionnaire was developed. The measurement scales for all the constructs were adopted from previous studies, which are widely recognized and used.

Data was collected from senior managers of the firm who are responsible for decision making having at least two years of experience in using cloud computing. These firms can be adopters or non-adopters of cloud computing. Simple random sampling was performed to select firms from the list of 7448 companies. The list of the companies was achieved from NIIR project consultancy company database. Initial data were collected through personal visits to the companies and web-links. Additional data were collected with the help of Hyderabad based market research firm, and 538 usable responses were received, on which data analysis may be performed.

The demographic profiles of respondents were analyzed in terms of age, gender and overall experience. In addition, firm-wise comparison of adopter and non-adopter firms, in terms of the
type of industry, size of the firm and organizational structure of firms was also systematically analyzed. The descriptive statistics of all the items are also analyzed and reported, showing the mean, standard deviation, skewness and kurtosis. Two major analytical approaches for data analysis used in this study, namely, EFA and SEM. EFA was performed to test the underlying structure of the factor and suitability of data for factor analysis. Under SEM, CFA was performed to assess goodness of model fit and to analyze measurement model. In addition, it was used to establish convergent and discriminant validity. Finally, path analysis under SEM was performed to test the hypotheses.

In EFA, the values for Barlett’s test and KMO indicates that the correlations among the underlying constructs are sufficient for factor loadings. PCA with varimax rotation was used and a total of 9 clear factors is extracted that explained 78.37% of the variance, and none of the scale items had cross-loadings on multiple constructs. These results from EFA conclude that the individual items are loaded well on factor as per the expectation from the theory and found that data set is adequate for further analysis like SEM.

CFA was applied on measurement model. All the item loadings are found to be significant. Based on values of theses loadings, AVE and construct reliability were derived. All the constructs showed sufficient reliability. Using the AVE values, convergent and discriminant validity were established. The goodness of fit (GOF) of measurement model is analyzed using $\chi^2$/df, CFI, IFI, and RMSEA. The derived values of all these indices are within the acceptable limit, as reported in literature. Hence, the model fit of measurement model is established.
Path analysis under SEM was used to establish the significance of path coefficients and to assess structural model fit. The proposed hypotheses are tested based on the significance of the path coefficients in structural models. Path analysis of structural model was performed twice - with moderator and without a moderator, ‘Job Relevance’. The path coefficients of eight paths in the structural model showed a significant p-values. Hence, eight hypotheses (H1, H3, H4, H5, H7, H8, H9 and H10) were supported. Perceived usefulness, perceived ubiquity, perceived benefits and perceived risks are found to have an influence on behavioral intention to use cloud computing. Perceived ease of use positively influences perceived usefulness. Moderating effect of job relevance is found on perceived usefulness and behavioral intention to use cloud computing. The direct effect of behavioral intention and perceived ease of use on actual usage is observed. The direct effects of perceived ease of use and perceived costs on behavioral intention are not found significant. Overall, with all the eight validated hypotheses, the final validated research model has been developed. Two out of ten hypotheses were not supported (H2 and H6). The two hypotheses which are not supported require further research attention.

6.2 Theoretical Implications

By testing the proposed model and deriving important findings, this study has contributed to the literature on CCT adoption. The literature review made on cloud computing adoption and the factors that influence behavioral intention to use and actual usage of cloud computing will benefit the researchers in gaining some conceptual views on these topics and provide a platform for future research. On the theoretical side, apart from two core variables of TAM, this study includes additional factors of perceived ubiquity, perceived benefits and perceived risks as an important factors that influence behavioral intention to use and actual usage of cloud computing.
This study adds to current literature by considering factors influencing behavioral intention to use CCT into two parts - cognitive influence processes and technological influence processes. Previous research based on TAM focused on the significance of perceived ease of use and perceived usefulness as main factors of behavioral intention to use a technology. But findings of this study showed that perceived usefulness affects behavioral intention, whereas perceived ease of use does not affect behavioral intention to use CCT. This study adds to the current literature the resultant influence of perceived ease of use and behavioral intention on actual usage of CCT. It also examined the interaction effect of job relevance on relationship between perceived usefulness and behavioral intention to use cloud computing. This is a valuable contribution to existing literature on CCT adoption.

Since there is meager research work done in the area of user acceptance (Behavioral intention to use and actual usage) of cloud computing, this work along with its results would become significant therein. This study is the first of its kind that has extended TAM by adding five constructs, namely, perceived ubiquity, perceived benefits, perceived risks, perceived costs and job relevance and later omitting the factor of perceived costs based on the results obtained. These important results derived in relevance to adoption of cloud computing, that is a promising technology in the Indian business market contribute considerably to the literature on cloud computing theory and practice.
6.3 Managerial Implications

This study contains several important implications for managers and the organization as a whole to note and pay attention to specific factors that affect successful adoption of CCT. The empirical analysis of data also gives several insights into the contribution and significance of these factors. When a firm either plans or implements cloud computing, it is important to consult the managers who have knowledge and experience in cloud computing. The managers can analyze not only the benefits but also the challenges and business impacts of cloud computing adoption. This study analyzed the data collected from such managers of adopter and non-adopter firms of cloud computing. Hence, the results derived have proper relevance to help the managers.

Since the study found that factor of perceived risks has a negative influence on behavioral intention to use CCT, it provides an important managerial insight that the firms should focus more on promoting cloud benefits by ensuring privacy of information and security of data to avoid any risks associated with cloud computing adoption. In addition, cloud providing firms should develop a cloud computing paradigm with job relevance in mind. This study demonstrated that most of the large sized firms are adopting cloud computing, which is fitted well with the IDC report (2012), that large organizations are increasingly adopting cloud computing in India, because of their mature IT infrastructure. The economically viable firms with their IT infrastructure and readiness to adopt cloud computing can handle the risks associated with cloud related to data privacy and security.

The study has examined the direct influence of perceived usefulness on behavioral intention and also moderating effect of job relevance on this relationship. This means that cloud computing
technology is capable of supporting the set of tasks of a manager’s job in the organization. Therefore, based on the job, the suitable application available in the cloud can be accessed and used by the user.

The results can benefit the senior managers of organizations in the successful CCT adoption in their organizations by understanding significance of different cognitive and technological factors that influence the behavioral intention to use and actual usage of cloud computing. From results of this study, IT professionals and managers are able to understand that in future, CCT adoption is affected by job relevance, benefits and risks such as reliability, privacy and security. Hence, this study will also help the senior managers to take corrective decisions and actions in implementing and adopting cloud computing in the organization.

This study suggests that the managers should present a conversion plan for the employees to shift from legacy system to CCT paradigm along with the implementation of a training program for the users wherever necessary.

### 6.4 Future Research Directions

In spite of drawing significant results and implications, this study has some limitations in terms of geographical locations, sample population and mediating effects of other factors. The research was conducted in India, particularly in the metropolitan cities like Hyderabad, Bangalore, Chennai, Mumbai and Delhi and thus it might not a true representation of the suitable population of India. Hence the future research may be directed to enhance the sample size by covering all the metropolitan cities of India proportionally. The study analyzed the data collected from both
adopter and non-adopter firms of cloud computing in the ratio of 418:120. The future study may include more sample size with a focus on enhancing the sample size of non-adopter firms. Another limitation is that this study reveals the situation of cloud computing adoption in India only. To enhance its scope and validity of its results, the sample size should include other countries which are active in CCT adoption.

Since managers of non-adopter firms do not use cloud computing, bias is possible when they respond to the questionnaire in context of actual usage of CCT in their organization. In view of this problem, the future research is intended to avoid the inclusion of the construct ‘Actual Usage of cloud computing in the model while collecting data from non-adopter firms.

This study considered a limited set of variables in the light of extending TAM in context of cloud computing. Apart from variables mentioned in this study that influence behavioral intention and actual usage of cloud computing, there must be the inclusion of control variables like firm size, organizational structure, industry type and cloud computing experience, which can influence behavioral intention and actual usage of cloud computing in organizations.

In the present study, factors influencing behavioral intention to use cloud computing are divided into cognitive influence processes and technological influence processes. Apart from these processes, the inclusion of social influence processes like subjective norm, image and voluntariness would enhance the scope of analysis, which is not done so far and can be taken up in future.
This study focused on overall cloud computing paradigm covering the three types of models related to service like software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS) and four types of models related to deployment like public, private, hybrid and community cloud. Future study is directed to limit to any single type of service model or deployment model of CCT and improve the research focus.

This work is limited to application of extended TAM to cloud computing adoption. Future research may combine TAM and its extensions with other models like TOE (Technology Organization Environment) and DOI (Diffusion of Innovation) to identify more constructs in the model in order to explore better understanding of cloud computing adoption.