EMPIRICAL STUDIES ON CLOUD COMPUTING ADOPTION: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Cloud computing is a major topic of discussion among IT professionals. This practice is a good alternative for higher education institutions of limited budget in operating their information system efficiently without spending high capital for infrastructure resource. According to the annual report of educational indicators of the Republic of Yemen, the education and training sectors in Yemen face several obstacles and challenges in delivering quality education to the entire population of the country; for example, limited infrastructure resources and IT budget, and lack of teaching staff, technical experts, and IT skilled personnel. This study aims to (1) review empirical studies on cloud computing adoption in general, (2) identify the influencing factors of cloud computing adoption, and (3) categorize these influencing factors into technological, organizational, environmental, and individual factors. The influencing factors of cloud computing adoption in the government and industrial and educational sectors are also reviewed. Cloud computing adoption in the educational sector is clearly demonstrated. A total of 50 models are reviewed and discussed. Findings show that theoretical and empirical studies on cloud computing adoption in the educational sector are few. Moreover, 18% and 82% of studies investigate factors related to cloud computing adoption in the educational and industrial sectors, respectively. Furthermore, 26% of studies use individual-level theory for cloud computing adoption, 61% use organizational level theory, and 13% integrate individual- and organizational-level theories.

Keywords: *Cloud Computing, Cloud Computing Adoption, Higher Education Institution (HEI), Individual-Level Theory, Organizational-Level Theory.*

1. INTRODUCTION

Cloud computing is a popular technology for delivering IT-related services and infrastructure. This practice is the result of advancements in several technologies, including hardware, system management, the Internet, and distributed computing [1]. Organizations have started to transform their IT strategy toward cloud computing due to the flexibility of cloud computing services and the economic benefits from cloud computing adoption [2]. According to the US National Institute of Standards and Technology, cloud computing has three service models: Infrastructure as a Service, Software as a Service, and Platform as a Service; cloud computing also has four deployment models: private cloud, public cloud, community cloud, and hybrid cloud [3].

Cloud computing is comparatively new to higher education institutions (HEIs). According to [4], cloud computing enables academic and non-academic staff as well as students and researchers of HEIs to access resources and services provided by the cloud service provider. In [5], the traditional educational system resource and maintenance, which are located onsite and owned by the HEIs, are reported to require high investments. HEIs with cloud computing adoption can reduce the cost associated with IT equipment maintenance and energy usage, as well as allow for virtualization of IT resources, such as operating system, server, storage device, or network resources [6]. According to the studies in [7], cloud computing is essential for distance and online education program, mobile learning, and e-learning.

HEIs can adopt three main cloud computing deployment models as follows: a) HEIs obtain the paid services provided by a cloud computing service provider [8], which is called Educational and Learning as a service [9]; b) HEIs form association among themselves to establish a cloud computing infrastructure [10]; c) HEIs

create their own cloud computing environment which is called private clouds [11, 12].

According to the studies in [13-15], educational cloud is considered one of the most interesting cloud applications. Educational cloud harnesses the power of thousands of networked computers to allow collaboration among researchers and students, as HEIs can open their educational cloud infrastructure to be used by the public and private sectors for research purposes. Cloud computing possesses many unique and interesting characteristics which can encourage cloud computing adoption by HEIs. These characteristics are indicated by Lian, Yen [16] as follows:

- Low cost: The costs associated with cloud computing implementation or renting of cloud services are lower than acquiring and maintaining the required resources or services onsite. Thus, this implementation reduces the management cost in the long run.
- Scalability: Cloud computing offers dynamic scalability based on demand. Thus, organizations need to invest only on the required infrastructure and services.
- Computing resource virtualization: Computer resources can be utilized remotely; in this way, end users can access to computing resources from their devices anytime and anywhere without determining the actual physical location of the computer resources [17, 18].
- High performance: Super computing power, powerful data analysis capability, and large data storage capacity are provided.

HEIs in developing countries are currently facing several challenges in providing quality education to their entire population. These challenges are summarized as follows:

- Limited funding to support the needs of educational and training institutions in terms of infrastructure and availability of placements for potential students.
- The current learning and teaching resources are distributed across education institutions not based on their needs but on personal reasons or rationales, thereby resulting in unbalanced development among the institutions.

- Qualified educators are currently located in a few specific areas; thus, imbalanced distribution of expertise among the institutions occurs.
- Lack of technical expertise to support, maintain, and operate the existing infrastructure in certain educational institutions.

Therefore, cloud computing adoption can help address the challenges encountered by HEIs in developing countries in utilizing the traditional computing approach. Cloud computing adoption in HEIs in these countries is expected to help improve the education provisions to the current students in particular, and increase the literacy level of the nation in the long run.

Despite the benefits of cloud computing in the education environment, the study by Ercan [19] found that cloud computing adoption in the educational sector is very marginal at only 4%. Thus, the factors that affect the decision of HEIs to adopt cloud computing should be understood to determine the main reasons and rationales behind the adoption. This understanding can assist HEIs in developing countries that plan to adopt cloud computing to be well prepared and well planned. This study aims to (1) review empirical studies on cloud computing adoption in general, (2) identify the influencing factors of cloud computing adoption, and (3) categorize these influencing factors into technological, organizational, environmental, and individual factors .In this study, 1) empirical studies on cloud computing adoption are discussed, 2) the influencing factors of cloud computing adoption are identified, and 3) these influencing factors are categorized into technological, organizational, environmental, and individual factors.

2. THEORIES OF ICT INNOVATION ADOPTION

Adoption theories can be ontologically categorized into two different units of analysis: individual (micro level) and organization (macro level). For individual level, many theories in the field of adoption and acceptance of the technology exist. In [20], eight models and theories in the field of individual acceptance are mentioned as follows: theory of reasoned action (TRA), technology acceptance model (TAM), unified theory of acceptance and use of technology (UTAUT), theory of

planned behavior (TPB), PC utilization model, motivational model, and combined TAM and TPB. These models mainly aim to determine which factors affect user adoption and usage behavior [21]. In [22], theories and models employed in studying ICT adoption and post-adoption behaviors of individuals are identified as TRA, TAM, TPB, Technology Acceptance Model 2, and UTAUT. For firm level, several theories, such as TOE and DOI, are applied to study the technology adoption at the organizations.

3.   RESEARCH METHOD

The systematic literature review (SLR) approach is adopted in this study. In particular, seven online databases, namely, Science Direct, Emerald, IEEE Xplore, Springer link, AISel, ACM, and ProQuest, are used in the literature search using the keywords "cloud computing" with "adoption," "diffusion," or "acceptance," as well as the entire string of keywords. The revised search returns a sensible number of studies, from which relevant empirical studies are selected. The inclusion criteria are as follows: (1) behavioral studies that investigate and collect data, (2) works that focus on cloud computing adoption in the industrial and educational sectors, and (3) papers that are written in English. The exclusion criteria are as follows: (1) studies that do not investigate factors related to cloud computing adoption, (2) technical studies, and (3) studies in non-English language. Table 1 shows details of the search according to the criteria discussed earlier.

Table 1. Selected Studies Related To The Criteria.

Database	Total of research	No. of excluded studies	No. of selected studies
Springer Link	133	126	7
Emerald	27	21	6
Science Direct	108	100	8
IEEE	64	57	7
ACM	8	5	3
AISeL	122	115	7
ProQuest	22	10	12
Total	484	434	50

The study identifies and classifies all factors into four groups: technological factors, which depict the external and internal technologies relevant to organization [23, 24]; organizational factors, which indicate the characteristics and resources of a firm that constrain or facilitate the adoption innovation [25]; environmental factors, which describe the external factors to the higher education that affect the cloud computing adoption [25-28]; and individual factors, which refer to individual characteristics of employees, such as behavior, intention, attitude, and interaction with the firm.

The identified factors are validated using a semi-structured interview method from [26]. Five IT experts in Yemen are interviewed to identify the significance of the said factors from the IT expert perspective. The semi-structured interview method can assist in exploring the influencing factors of ICT adoption [29], and the results can serve as a basis for the survey study.

4.   LITERATURE REVIEW

The initial literature search returns 484 relevant studies. After the screening based on the inclusion criteria, only 50 relevant papers are shortlisted. Then, the influencing factors of cloud computing adoption as discussed in these papers are classified into four groups, namely,

technological, organizational, environmental, and individual factors. Appendix A presents the 50 studies selected on the basis of the inclusion criteria.

5.   RESULTS AND DISCUSSION

Appendix A shows that 18% of studies investigate factors related to cloud computing adoption in the educational sector [30-36], while 82% investigate factors related to cloud computing adoption in the industrial sector. This finding indicates that empirical studies on cloud computing adoption in the educational sector are few. Furthermore, the educational sector shows hesitation and reluctance in adopting cloud computing despite the perceived benefits. Figure 1 shows the number of studies in the industrial and educational sectors.
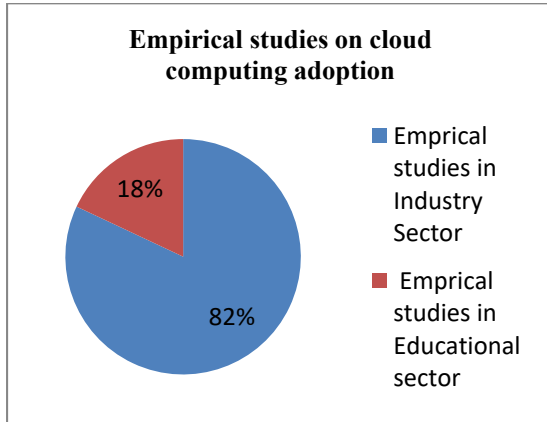

Figure 1: Empirical Studies In The Industrial And Educational Sectors.

The literature review shows that most studies on cloud computing adoption concentrate on the organizational level, followed by the individual level. However, a few studies combine the individual and organizational levels. According to the SLR results, 61% of empirical studies use organizational-level theory, 26% use individual-level theory, and 13% integrate individual- and organizational-level theories (Figure 2).
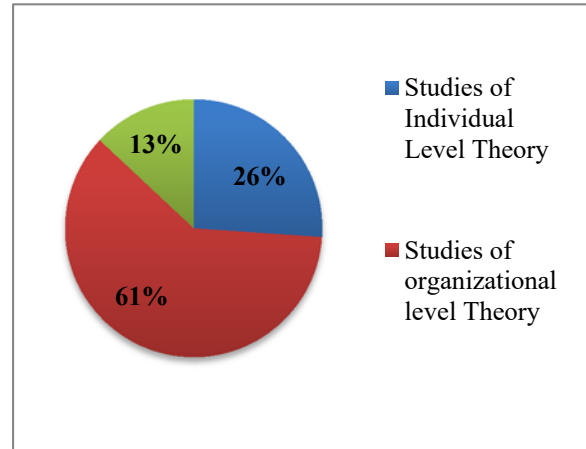

Figure 2. Studies Using Individual- And Organization-Level Theories.

Furthermore, 34% of studies use TOE framework, 22% use TAM, 5% use TBP, and 3% use TRA theory. These results show that most studies focus on decision makers with the ability to adopt cloud computing and ignore the people who handle the technology. Thus, studies integrating individual- and organizational-level theories are few.

The SLR results show that 80% of studies are quantitative exploratory studies, 12% are qualitative exploratory studies, and 8% are a mix of both. Figure 3 shows the studies using the quantitative, qualitative, and mixed approach.
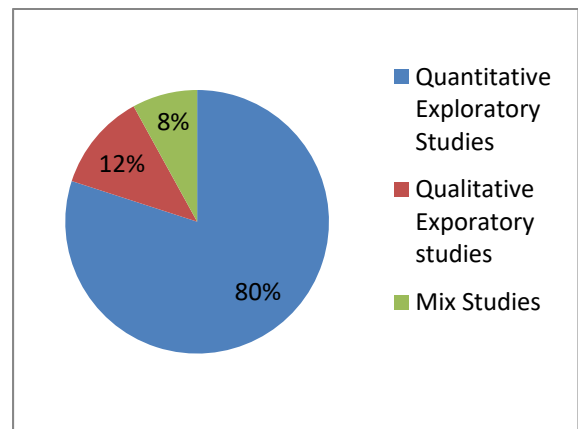

Figure 3. Qualitative And Quantitative Studies.

Most of the studies are conducted in developed countries whereas a few studies are conducted in developing countries, as shown in Figure 4. This finding indicates that awareness regarding the

benefits of adopting and using cloud computing in developing countries is insufficient.
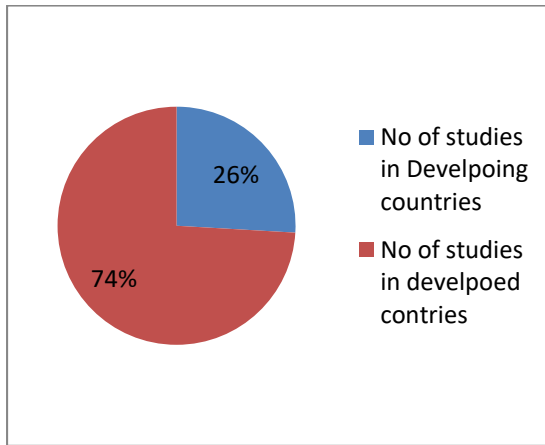

Figure 4. Cloud Computing Adoption In Developed And Developing Countries.

On the basis of the literature review and the similarity of factors, the influencing factors are divided into four groups: technological, organizational, environmental, and individual

factors. The semi-structured interview method is adopted from [26]. In particular, IT experts are interviewed to identify the significance of the said factors from the perspective of IT experts in Yemen. Table 2 presents the significant variables obtained from the interview with IT experts in Yemen.

The results serve as a basis in developing a conceptual framework for cloud computing adoption in the higher education of Yemen.

Table2. Variables For Their Relative Importance

Dimension	Factors	Description	Theory/Model Adopted	Level of Analysis
Technological-related	Relative advantage	It indicates to the degree to which innovation is perceived as being more beneficial than its predecessor [37].	DOI/ TOE	Organizational
	Compatibility	It refers to the extent to which an innovation is perceived as consistent with the existing values, past experience and needs of potential adopter[37].	DOI/ TOE	
	Complexity	Complexity is defined as "the degree to which an innovation is perceived as relatively difficult to understand and use [37].	DOI/ TOE	
	Data concern	Data concern is seen as audit-ability, data confidentiality, data storage security loss of data and breach of privacy in the business operations [[33].	TOE	
Organizational-related	Top management support	Indicates to the attitude of top management support toward the technology and the level of support devoted for the adoption[33].	TOE	
	Technology -readiness	defined as 'managers' perception and evaluation of the degree to which they believe that their organization has the resources, commitment, awareness and governance's adopt IT [38].	TOE	

Environmental-related	Regulatory policy	indicates to the policies imposed by the government to regulate cloud computing market[33].	TOE	
	Awareness	Indicates to how a person understand the activities of other, which provide a context for his own activities [39].	TOE	
Individual	Perceived ease of use	Is defined as the degree to which the person believes using new technology will enhance her or his performance [40].	TAM	Individual
	Perceived usefulness	Perceived Ease of Use (PEOU) refers to the degree to which the prospective user expects the target system to be free of effort[41].	TAM	
	Attitude	Attitude refers to individual's negative or positive feeling toward target behavior [42].	TAM-TBP	
	Subjective Norm	Subjective Norm (SN) indicates to individual's perception that most of people to her/him think he or she should or should not perform the behavior[43].	TPB	
	Cloud self-efficacy	Refers to personal judgments of ability to use cloud computing applications in diverse situation [44]	SE	

6.   CONCLUSION

Cloud computing is a new technology for providing IT services which contain rental resources located in the cloud. Most tasks at present are increasingly conducted online, such as checking emails, social media communication, editing and writing documents, collaboration, watching videos, and creating images and personal documents. In this study, the trend of research on cloud computing adoption is examined. This study mainly aims to show the current state of research endeavors in cloud computing adoption in the educational sector, determine any gaps, identify and categorize the influencing factors of cloud computing adoption, and propose a conceptual model for future direction. Cloud computing is increasingly being adopted, especially by many educational institutions. Cloud computing is adopted in the educational sector mainly because of financial reasons. Many factors affect the behavior of the decision makers, IT manager, and IT staff in adopting cloud computing, especially in the educational sector in Yemen. These influencing factors are identified through semi-structured interview method and are categorized into four dimensions: technological, organizational, environment, and individual factors. Although all efforts are made during the literature search in seven major databases, this review cannot be considered a comprehensive study because of the diverse outlets of cloud computing publications and the large number of journals around the world.

REFERENCES

[1]   Buyya, R., J. Broberg, and A.M. Goscinski, Cloud computing: Principles and paradigms. Vol. 87. 2010: John Wiley & Sons.

[2]   Armbrust, M., et al., A view of cloud computing. Communications of the ACM, 2010. 53(4): p. 50-58.

[3]   Liu, F., et al., NIST cloud computing reference architecture. NIST special publication, 2011. 500(2011): p. 292.

[4]   Sultan, N.A., Reaching for the "cloud": How SMEs can manage. International journal of information management, 2011. 31(3): p. 272-278.

[5]   Masud, M.A.H. and X. Huang, An e-learning system architecture based on cloud computing. system, 2012. 10(11).

[6]   A Vouk, M., Cloud computing–issues, research and implementations. CIT.

Journal of Computing and Information Technology, 2008. 16(4): p. 235-246.

[7]   Vishwakarma, A.K. and A. Narayanan. E-learning as a service: A new era for academic cloud approach. in Recent Advances in Information Technology (RAIT), 2012 1st International Conference on. 2012. IEEE.

[8]   Microsoft. State University of New York moves to Microsoft's cloud 2010.

[9]   Alabbadi, M.M. Cloud computing for education and learning: Education and learning as a service (ELaaS). in Interactive Collaborative Learning (ICL), 2011 14th International Conference on. 2011. IEEE.

[10]   Crawford, D., Angers., M, & Dunington, B EduCloud Server - Low-cost, On-demand Servers for Higher Education. 2015.

[11]   Chen, Y., X. Li, and F. Chen. Overview and analysis of cloud computing research and application. in E-Business and E-Government (ICEE), 2011 International Conference on. 2011. IEEE.

[12]   Pund, B.G., S.S. Nair, and P.P. Deshmukh, USING CLOUD COMPUTING ON E-LEARNING. 2012.

13.   Biswas, S. HOW CAN CLOUD COMPUTING HELP IN EDUCATION? 2011; Available from: http://cloudtweaks.com/2011/02/how-can-cloud-computing-help-in-education/.

[14]   Morrill, D. Cloud Computing in Education. 2011; Available from: https://www.cloudave.com/14857/cloud-computing-in-education/.

[15]   Mircea, M. and A.I. Andreescu, Using cloud computing in higher education: A strategy to improve agility in the current financial crisis. Communications of the IBIMA, 2011.

[16]   Lian, J.-W., D.C. Yen, and Y.-T. Wang, An exploratory study to understand the critical factors affecting the decision to adopt cloud computing in Taiwan hospital. International Journal of Information Management, 2014. 34(1): p. 28-36.

[17]   Zhang, S., et al. Cloud computing research and development trend. in Future Networks, 2010. ICFN'10.

Second International Conference on. 2010. Ieee.

[18]   Mokhtar, S.A., et al. Cloud computing in academic institutions. in Proceedings of the 7th international Conference on Ubiquitous information Management and Communication. 2013. ACM.

[19]   Ercan, T., Effective use of cloud computing in educational institutions. Procedia-Social and Behavioral Sciences, 2010. 2(2): p. 938-942.

[20]   Venkatesh, V., et al., User acceptance of information technology: Toward a unified view. MIS quarterly, 2003: p. 425-478.

[21]   Oly Ndubisi, N. and M. Jantan, Evaluating IS usage in Malaysian small and medium-sized firms using the technology acceptance model. Logistics Information Management, 2003. 16(6): p. 440-450.

[22]   Kim, J., et al., Training soft skills via e-learning: international chain hotels. International Journal of Contemporary Hospitality Management, 2011. 23(6): p. 739-763.

[23]   RUI, G., Information systems innovation adoption among organizations-A match-based framework and empirical studies. 2007.

[24]   Oliveira, T. and M.F. Martins. Information technology adoption models at firm level: review of literature. in European Conference on Information Management and Evaluation. 2010. Academic Conferences International Limited.

[25]   Tornatzky, L., J. Eveland, and M. Fleischer, Technological innovation as a process. The Processes of Technological Innovation, Lexington Books, Lexington, MA, 1990: p. 27-50.

[26]   Alshamaila, Y., S. Papagiannidis, and F. Li, Cloud computing adoption by SMEs in the north east of England: A multi-perspective framework. Journal of Enterprise Information Management, 2013. 26(3): p. 250-275.

[27]   Hsu, P.-F., S. Ray, and Y.-Y. Li-Hsieh, Examining cloud computing adoption intention, pricing mechanism, and deployment model. International Journal of Information Management, 2014. 34(4): p. 474-488.

[28]   Oliveira, T., M. Thomas, and M. Espadanal, Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. Information & Management, 2014. 51(5): p. 497-510.

[29]   Leedy, P.D. and J.E. Ormrod, Practical research. 2005: publisher not identified.

[30]   Sabi, H.M., et al., Conceptualizing a model for adoption of cloud computing in education. International Journal of Information Management, 2016. 36(2): p. 183-191.

[31]   Klug, W. and X. Bai, FACTORS AFFECTING CLOUD COMPUTING ADOPTION AMONG UNIVERSITIES AND COLLEGES IN THE UNITED STATES AND CANADA. Issues in Information Systems, 2015. 16(3).

[32]   Dawson, H.G., Clearing the clouds: Factors of technology adoption and their relationship to cloud computing adoption in United States higher education-An extended TAM study. 2015, CAPELLA UNIVERSITY.

[33]   Tashkandi, A.N. and I.M. Al-Jabri, Cloud computing adoption by higher education institutions in Saudi Arabia: an exploratory study. Cluster Computing, 2015. 18(4): p. 1527-1537.

[34]   Mansour, A.J., The Adoption of Cloud Computing Technology in Higher Education Institutions: Concerns and Challenges. 2013.

[35]   Li, Y. and K.-c. Chang, A study on user acceptance of cloud computing: A multi-theoretical perspective. 2012.

[36]   Yuvaraj, M. and M. Yuvaraj, Determining factors for the adoption of cloud computing in developing countries: A case study of Indian academic libraries. The Bottom Line, 2016. 29(4): p. 259-272.

[37]   Rogers, E., Diffusion of Innovations. New York. A Division of Simon & Schuster. 1995, Inc.

[38]   Tan, J., K. Tyler, and A. Manica, Business-to-business adoption of eCommerce in China. Information & management, 2007. 44(3): p. 332-351.

[39]   Dourish, P. and V. Bellotti. Awareness and coordination in shared workspaces. in Proceedings of the 1992 ACM conference on Computer-supported cooperative work. 1992. ACM.

[40]   Nasri, W. and L. Charfeddine, An exploration of facebook. com adoption in Tunisia using technology acceptance model (TAM) and theory of reasoned action (TRA). Interdisciplinary Journal of Contemporary Research in Business, 2012. 4(5): p. 948.

[41]   Davis, F.D., R.P. Bagozzi, and P.R. Warshaw, User acceptance of computer technology: a comparison of two theoretical models. Management science, 1989. 35(8): p. 982-1003.

[42]   Ajzen, I. and M. Fishbein, Understanding attitudes and predicting social behaviour. 1980.

[43]   Ajzen, I. and M. Fishbein, Belief, attitude, intention and behavior: An introduction to theory and research. 1975, Reading, MA: Addison-Wesley.

[44]   Shiau, W.-L. and P.Y. Chau, Understanding behavioral intention to use a cloud computing classroom: A multiple model comparison approach. Information & Management, 2016. 53(3): p. 355-365.

[45]   Sabi, H.M., et al., A cross-country model of contextual factors impacting cloud computing adoption at universities in sub-Saharan Africa. Information Systems Frontiers, 2016: p. 1-24.

[46]   Bhatiasevi, V. and M. Naglis, Investigating the structural relationship for the determinants of cloud computing adoption in education. Education and Information Technologies, 2015: p. 1-27.

[47]   Tashkandi, A. and I. Al-Jabri. Cloud Computing Adoption by Higher Education Institutions in Saudi Arabia: Analysis Based on TOE. in Cloud Computing (ICCC), 2015 International Conference on. 2015. IEEE.

[48]   Senyo, P.K., et al., Preliminary insight into cloud computing adoption in a developing country. Journal of Enterprise Information Management, 2016. 29(4).

[49]   Smith Jr, M.L., Personal decision factors considered by information technology executives: Their impacts on business intentions and consequent cloud computing services adoption rates. 2016, University of the Incarnate Word.

[50] Isma'ili, A., et al., Cloud computing services adoption in Australian SMEs: a firm-level investigation. 2016.

[51] Asadi, S., et al., Customers perspectives on adoption of cloud computing in banking sector. Information Technology and Management, 2016: p. 1-26.

[52] Hsu, C.-L. and J.C.-C. Lin, Factors affecting the adoption of cloud services in enterprises. Information Systems and e-Business Management, 2016: p. 1-32.

[53] Alharbi, F., A. Atkins, and C. Stanier, Understanding the determinants of Cloud Computing adoption in Saudi healthcare organisations. Complex & Intelligent Systems, 2016. 2(3): p. 155-171.

[54] Polyviou, A., K. Pramatari, and P. Nancy, Cloud Adoption Factors in a Specific Business Area: Challenging the Findings of Organisation-Wide Cloud Computing Research. 2016.

[55] Osman, A., Examining the Fundamental Obstructs of Adopting Cloud Computing for 9-1-1 Dispatch Centers in the USA. 2016: NORTHCENTRAL UNIVERSITY.

[56] Lee, T.H., Regression Analysis of Cloud Computing Adoption for US Hospitals. 2015.

[57] Kyriakou, N. and E. Loukis, Firm Characteristics and Propensity for Cloud Computing Adoption. 2015.

[58] Gangwar, H., H. Date, and R. Ramaswamy, Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. Journal of Enterprise Information Management, 2015. 28(1): p. 107-130.

[59] LAL, P., et al., Understanding the Impact of Cloud-Based Services Adoption on Organizational Flexibility: An Exploratory Study. Journal of Enterprise Information Management, 2016. 29(4).

[60] Scholtz, B., J. Govender, and J.M. Gomez, Technical and Environmental Factors Affecting Cloud Computing Adoption in the South African Public Sector. 2016.

[61] Gutierrez, A., E. Boukrami, and R. Lumsden, Technological, Organisational and Environmental factors influencing managers' decision to adopt cloud computing in the UK. Journal of Enterprise Information Management, 2015. 28(6): p. 788-807.

[62] Polyviou, A. and N. Pouloudi. Understanding Cloud Adoption Decisions in the Public Sector. in System Sciences (HICSS), 2015 48th Hawaii International Conference on. 2015. IEEE.

[63] Aharony, N., An exploratory study on factors affecting the adoption of cloud computing by information professionals. The Electronic Library, 2015. 33(2): p. 308-323.

[64] Lian, J.-W., Critical factors for cloud based e-invoice service adoption in Taiwan: An empirical study. International Journal of Information Management, 2015. 35(1): p. 98-109.

[65] Hutchison, D.D., Factors Influencing the Adoption of Cloud Computing-Based File Storage by Health Care Information Technology Professionals, in ProQuest LLC. 2014.

[66] Alkhater, N., G. Wills, and R. Walters. Factors influencing an organisation's intention to adopt cloud computing in Saudi Arabia. in Cloud Computing Technology and Science (CloudCom), 2014 IEEE 6th International Conference on. 2014. IEEE.

[67] Tehrani, S.R. and F. Shirazi, Factors influencing the adoption of cloud computing by small and medium size enterprises (SMEs), in Human Interface and the Management of Information. Information and Knowledge in Applications and Services. 2014, Springer. p. 631-642.

[68] Ibrahim, H.M., Assessing cloud computing adoption by it professionals in small business using the technology acceptance model. 2014: Northcentral University.

[69] Cohen, J.F., J. Mou, and J. Trope. Adoption of cloud computing by South African firms: The role of institutional forces, absorptive capacity, and top management. in Proceedings of the Southern African Institute for Computer Scientist and Information Technologists Annual Conference 2014 on SAICSIT 2014 Empowered by Technology. 2014. ACM.

[70] Sulaiman, H. and A.I. Magaireah. Factors affecting the adoption of integrated cloudbased e-health record in healthcare organizations: a case study of Jordan. in Information Technology and Multimedia (ICIMU), 2014 International Conference on. 2014. IEEE.

[71] Kuiper, E., et al. Factors influencing the adoption of and business case for Cloud computing in the public sector. in eChallenges e-2014 Conference Proceedings. 2014. IEEE.

[72] Shin, D.-H., User centric cloud service model in public sectors: Policy implications of cloud services. Government Information Quarterly, 2013. 30(2): p. 194-203.

[73] Gupta, P., A. Seetharaman, and J.R. Raj, The usage and adoption of cloud computing by small and medium businesses. International Journal of Information Management, 2013. 33(5): p. 861-874.

[74] Borgman, H.P., et al. Cloudrise: exploring cloud computing adoption and governance with the TOE framework. in System Sciences (HICSS), 2013 46th Hawaii International Conference on. 2013. IEEE.

[75] Ekufu, T.K., Predicting cloud computing technology adoption by organizations: An empirical integration of technology acceptance model and theory of planned behavior. 2012.

[76] Opala, O.J., An analysis of security, cost-effectiveness, and IT compliance factors influencing cloud adoption by IT managers. 2012.

[77] Bharadwaj, S.S. and P. Lal. Exploring the impact of Cloud Computing adoption on organizational flexibility: A client perspective. in Cloud Computing Technologies, Applications and Management (ICCCTAM), 2012 International Conference on. 2012. IEEE.

[78] Opitz, N., et al. Technology acceptance of cloud computing: empirical evidence from German IT departments. in System Science (HICSS), 2012 45th Hawaii International Conference on. 2012. IEEE.

[79] Malak, J., An Analysis of the Technological, Organizational, and Environmental Factors Influencing Cloud Adoption. 2016.

80. Tweel, A., Examining the relationship between technological, organizational, and environmental factors and cloud computing adoption. 2012: Northcentral University.

[81] Stankov, I., Y. Miroshnychenko, and K. Kurbel. Cloud computing adoption in German Internet start-up companies. in Proceedings of BLED Conference, BLED. 2012.

[82] Lin, A. and N.-C. Chen, Cloud computing as an innovation: Percepetion, attitude, and adoption. International Journal of Information Management, 2012. 32(6): p. 533-540.

[83] Powelson, S.E., An Examination of Small Businesses' Propensity to Adopt Cloud-Computing Innovation. 2011.

[84] Low, C., Y. Chen, and M. Wu, Understanding the determinants of cloud computing adoption. Industrial management & data systems, 2011. 111(7): p. 1006-1023.

[85] Saya, S., L.G. Pee, and A. Kankanhalli. The Impact of Institutional Influences on Perceived Technological Characteristics and Real Options in Cloud Computing Adoption. in ICIS. 2010.

[86] Ross, V.W., Factors Influencing the Adoption of Cloud Computing by Decision Making Managers. 2010: ERIC.

Appendix A: Influencing FACTORS OF CLOUD COMPUTING ADOPTION.

Author	Factors				Approach	Results
	Technological (T)	**Organizational (O)**	**Environmental (E)**	**Individual (I)**		
[45]	• Relative advantage • Complexity • Compatibility • Trailability • Observability • Result demonstrable • Cost • Risk • Data security • Infrastructure	• university size • university age	• Socio-cultural • Awareness • University location	• Perceived Usefulness (PU) • Perceived Ease Of Use (PEOU) • Individual age	**Method:** A quantitative study using questionnaire **Respondents:** (355) respondents from public and private universities in four SSA countries (Cameroon, Ghana, Nigeria, and Uganda) , as well as members of the Association of Information Systems Southern African Chapter (AISSAC). **Theories used:** -Diffusion of Innovation (DOI) - Technology Acceptance Model (TAM).	The results show that data security, result demonstrable, use fullness, Socio-cultural, age of university, size of university, and individual age have significant effect on intent to adopt cloud computing .
[36]	• Scalability • Availability • Security risk • Privacy risk	• Return on time		• Perceived Usefulness (PU) • Perceived Ease Of Use (PEOU) • Attitude	**Method:** A quantitative study using questionnaire **Respondents:** Library professionals in 28 central universities in India. **Theories used:** -Technology Acceptance Model (TAM).	The results show that PEOU, PU, availability have significant towards behavior intention to adopt cloud computing in libraries.
[46]	• Perceived Convenience • Trust • Software Functionality			• Subjective norm • Computer self-efficacy • PU • PEOU	**Method:** A quantitative study using questionnaire **Respondents:** (393) from Mahidol university international college, and Thammasat university in Thailand.	The results showed that PU, PEOU, Perceived Convenience, Trust, Software Functionality have a positive relationship to intention to adopt cloud computing

				Theories used: -Technology Acceptance Model (TAM).	
[31]	• Relative advantage • Complexity • Compatibility	• Technology readiness • Institutional size • Perceived barriers	• Regulatory polices • Service provider support		**Method:** • A quantitative study using questionnaire **Respondents:** (119)CIO and IT managers in U.S universities **Theories used:** -Technological, Organizational and Environmental (TOE) framework	The findings showed that all factors are statistically significant in determining cloud computing adoption except relative advantage, regulatory policy, and service provider support.
[32]	• Perceived security • Perceived Reliability • Perceived benefits			• PU • PEOU	**Method:** A quantitative study using questionnaire **Respondents:** (217) higher education in USA **Theories used:** -Technology Acceptance Model (TAM).	The results showed that all factors have a significant correlation to cloud computing adoption
[47]	• Relative advantage • Compatibility • Privacy Concerns • Vendor lock- in • Complexity	• Top management support	• Regulatory policies • Government pressure • Peer pressure		**Method:** A quantitative study using questionnaire **Respondents:** (33) responses of IT decision maker in higher education in KSA. Theories used: -Technological, Organizational and Environmental (TOE)	Three Factors were found significant in this context study: Relative Advantage, Data Privacy and Complexity are the most Significant factors.
[35]	• security concerns • privacy concerns • vendor lock-in	• Transfer skill	• vendor reputation	• attitude • perceived behavioral control(PBC) • subjective norm • PEOU • PU • voluntariness	**Method:** A quantitative study using questionnaire **Respondents:** (225) students at a leading private university in Taiwan. **Theories used:** -Theory Planed Behavior (TPB). -Technology Acceptance Model (TAM).	The results shows that a person's attitude toward cloud applications, subjective norm, and perceived behavioral control have direct impacts on the person's behavioral intention to use the applications. Meanwhile, privacy and security concerns, concerns about vendor lock-in, perceived vendor reputation, perceived usefulness, perceived

Ref					Method	Results
						ease of use, and perceived transferability of previously learned computer skills, have indirect impacts on behavioral intention.
[44]	• Trialability • Result demonstrable • Visibility • Compatibility • cloud service quality • Applications service quality			• voluntariness • self-efficacy • cloud self-efficacy • PBC • PEOU • PP • PU • Attitude • Subjective norms	**Method:** A quantitative study using questionnaire **Respondents:** (478) students at medium size university in Taiwan **Theories used:** -Service Quality Model(SQ). -Motivational Model (MM). -Technology Acceptance Model (TAM). -Theory of Reason Action(TRA) -Theory of Planed Behavior (TPB). -Innovation diffusion Theory (IDT).	The results found that all factors have significantly positive effects on the intention to use cloud computing
[48]	• Relative advantage • Security concern • Compatibility	• Top Management support • Firm Size • Firm Scope	• Competitive pressure • Trading partners' pressure • Regulatory support		**Method:** A quantitative study using questionnaire **Respondents:** (305) organizations from different industries in Ghana. **Theories used:** -Technological, Organizational and Environmental (TOE).	The results showed that all factors have significant effect on adopt cloud computing except compatibility, firm size, scope size and regulatory support.
[49]	•	• Top Management support • Technology readiness		• monetary incentive • advancement opportunities • Recognition and satisfaction • Job terminator • Diminishment of personal image	**Method:** A quantitative study using questionnaire **Respondents:** (189) IT executes of companies in USA. **Theories used:** -Technological, Organizational and Environmental (TOE). - Transaction Cost Theory (TCT). - Agency Theory. -Motivation theory.	The result revealed that advancement, recognition and satisfaction from accomplishments, top management support, diminishment of personal image, and pattern of technology readiness have a positive influence on business intentions to adopt cloud computing services.
[50]	• Security Concern	• Top Management	• Competitive		**Method:**	The results showed that all

					Method / Respondents / Theories	Results
	• Relative advantage • Compatibility • Complexity • Uncertainty • Trailability	support • Firm Size • Innovativeness of firm • IT experience	pressure • Industry • Market Scope • External Computing support		A qualitative study using Semi-structured Interviews. **Respondents:** (15) Firms in Australia. **Theories used:** -Technological, Organizational and Environmental (TOE). -Diffusion of Innovation theory (DOI). -Actor Network Theory (ANT).	factors have significant effect on adopt cloud computing except complexity and competitive pressure.
[51]	• Security & Privacy • Trust • Perceived benefit	• Cost		• Social influence • PU • PEOU	**Method:** A quantitative study using questionnaire Respondents: (192) Malaysian banking customers which already using online banking services. **Theories used:** -Technology Acceptance Model (TAM). Diffusion Theory Model (DTM).	The results show that PU, PEOU, attitude toward cloud, reduce cost, and trust have a significant influence customers' behavioral intention to adopt cloud computing.
[52]	• Relative advantage • PEOU • Compatibility • Trailability • Observability • Security	• Firm size • Global Scope • Financial Costs • Satisfaction with existing IS •	• Competition intensity • Regulatory environment		**Method:** A quantitative study using questionnaire **Respondents:** (1000) president companies in Taiwan. **Theories used:** -Technological, Organizational and Environmental (TOE).	The results showed that all factors were positively related to intention to adopt cloud computing.
[53]	• Relative advantage • Technology readiness • Compatibility • Complexity	• Top Management Support • Hard financial analysis • Soft financial analysis	• Regulatory compliance • Business ecosystem partner pressure • external expertise	• COI innovativeness • internal expertise • prior technology experience	**Method:** A quantitative study using questionnaire **Respondents:** (201) IT specialists, health professional, and administrative in Saudi health care organization. **Theories used:** -Technological, Organizational and Environmental (TOE). -Human, Organization, Technology (HOT-fit).	The results showed that all technology, organizational, environment, and human have a significant influence on adoption cloud computing in healthcare organization in KSA.

				Method / Respondents / Theories used	Results
[54]	• Reduction cost • Remote access • security	• Managerial innovativeness • Personnel innovativeness			**Method:** A quantitative study using questionnaire **Respondents:** (74) CIO in Greek firms. **Theories used:** -Diffusion of Innovation (DOI). -Organizational Capability.	The results indicated that reduction cost, remote access and personnel innovativeness had a significant effects towards intention to adopt cloud computing while security and managerial innovativeness had insignificant effect to intent to adopt cloud computing.
[55]	• Relative advantage • Complexity • Security	• Top management support • Funding • Firm size			**Method:** A quantitative study using questionnaire **Respondents:** (326) out of (347) consisting (Directors, IT staff, and middle manager IT) in 9-1-1 dispatch center in USA. **Theories used:** -Technological, Organizational and Environmental (TOE).	The result indicated that all factors had significant determinants of adoption cloud computing except complexity and security.
[56]	• Relative advantage • Complexity • Compatibility	• Organizational size • structure	• culture		**Method:** A quantitative study using questionnaire **Respondents:** (118) information technology manager from qualified USA hospitals **Theories used:** -Technological, Organizational and Environmental (TOE). -Diffusion of Innovation (DOI).	The findings revealed that all factors had significant correlation with public cloud adoption intent.
[57]	• complexity • telework • IT infrastructure • electronic interconnection • data warehouse and mining • mobile service • IT outsourcing	• IT investment reduction strategy • Innovation orientation strategy • Process innovation strategy		• Skill of IT personnel	**Method:** A quantitative study using questionnaire. **Respondents:** (676) European firms from six European countries (Germany, France, Italy, Poland, Spain , UK . **Theories used:** - Leavitt's Diamond framework.	The result indicated that all factors had a significant effects on the propensity to adopt cloud computing.
[58]	• Complexity	• Top management	• Trading partner	• PU	**Method:**	The results showed that relative advantage, compatibility,

	• Compatibility - Relative advantage • Cloud concern security	support • Technology readiness • Training and education	pressure • Competitive pressure	• PEOU	A mix method using interview and questionnaire **Respondents:** (280) companies in IT, manufacturing and finance sectors in India. **Theories used:** -Technological, Organizational and Environmental (TOE). -Technology Acceptance Model (TAM)	complexity, Technology readiness, top management , and training and education as important variables for affecting cloud computing adoption using perceived ease of use (PEOU) and perceived usefulness (PU) as mediating variables. Also, competitive pressure and trading partner support were found directly affecting intention of cloud computing adoption .
[59]	• Relative advantage	• Top management support	• Vendor credibility	• PU • PEOU	**Method:** A qualitative study using interview. **Respondents:** (21) Indian cases were studied by interacting with respondents having similar profiles (i.e. CIOs, CTOs, systems managers and technology heads. **Theories used:** -Diffusion of Innovation theory (DOI). -Technological, Organizational and Environmental (TOE). -Technology Acceptance Model (TAM).	The study showed that all factors have a significant influence on the adoption of cloud – base services.
[60]	• availability • privacy • Lack of control of data • Multitenancy • Cyber attacks • System performance • Difficulty to integrate with in-house system • Not enough ability to customize • Difficult to bring		• Lack of approved cloud standard. • No national cloud computing policy. • No national, local l or agency cloud adoption strategy. • Regulatory requirements. • Trans-border information flow. • Lack of specialist public sector local vendors.		**Method:** A quantitative study using questionnaire. **Respondents:** (51) Respondents comprising of government CIO, government senior management and IT decision makers in South Africa. **Theories used:** -None	The findings revealed that the majority of the respondents showed concern regarding the availability and privacy of data. The environmental factors that were of the most importance to respondents were adoption strategies of cloud computing implementations as well as the provision of usage guidelines and regulatory requirements in organizations.

					Method/Respondents/Theories	Results
	back in-house • Lack of support from vendors • Lack of compatibility with proprietary software • Poor IT infrastructure currently in place		• Electricity availability. • Broadband connectivity. • Sustainability and carbon efficiency.			
[61]	• Relative advantage • Complexity • Compatibility	• Top management support • Firm size • Technology Readiness	• Trading partner pressure • Competitive pressure		**Method:** A quantitative study using questionnaire. **Respondents:** (257) mid-to-senior level decision –making business and IT professionals from arrange of UK end user organizations. **Theories used:** -Technological, Organizational and Environmental (TOE).	The results showed that competitive pressure, complexity , technology reediness , and trading partner pressure have a significant effect on adopt cloud computing.
[62]	• Relative advantage • Compatibility • complexity	• Interoperability • Focus on key • business processes • More organization • Meet security • standards • Meet • environmental • standard • Transparency of • processes standards	• Bureaucracy • Political matters • Legal issues		**Method:** A qualitative study using Semi-structured Interviews. **Respondents:** (21) participants in public sector in six European countries(UK, Greece, Germany, Italy and Poland. **Theories used:** -Technological, Organizational and Environmental (TOE). -Diffusion of Innovation theory (DOI).	The results showed the technological factors (except complexity) and organizational nature seem to be positively influencing the adoption of cloud in the public sector whereas environmental factors seem to be making the adoption decision difficult and lengthy.
[63]	• Threat • challenge	• computer use	• social media use	• openness to experience • self efficacy • personal innovativeness • self-efficacy • PEOU	**Method:** A quantitative study using questionnaire. **Respondents:** (140) librarian & information specialist from 700 members in Israeli library and information science. **Theories used:**	The results showed that all factors have significant correlations towards behavior intention to use cloud computing except threat.

				-Technology Acceptance Model (TAM).	
[64]	• Trust in e-government • Security concern • perceived risk		• social influence	• performance expectancy • Effort expectancy • facilitating condition	**Method:** A quantitative study using questionnaire. **Respondents:** (251) valid responses for adoption cloud computing based e-invoicing, a novel e-government service in Taiwan. **Theories used:** -Unified Theory of Acceptance and Use of Technology (UTAUT).	The findings indicate that effort expectation, social influence, trust in e-government, and perceived risk have significant effects on the intention to use cloud computing.
[65]			• Social influence	• Performance expectancy • Effort expectancy • Facility condition • voluntariness • Experience • Gender	**Method:** A quantitative study using questionnaire. **Respondents:** (381) Health care IT professionals in hospitals in USA. **Theories used:** - Unified Theory of Acceptance and Use of Technology (UTAUT).	The results found that performance expectancy and effort expectancy have a significant and positive influence on behavioral intent to adopt cloud computing based file storage and that facilitating conditions has a significant and positive influence on use behavior. The experience moderator had moderating effects on performance expectancy and social influence and the gender moderator had a moderating effect on facilitating conditions.
[66]	• Availability • Reliability • Trust • Security • Privacy • Relative advantage • Compatibility • Complexity •	• Top management support • Organizational size • Technology readiness	• Compliance with regulation, • Competitive pressure • Trading partner pressure • Physical location		**Method:** A qualitative study using semi-structured interviews. **Respondents:** (20) IT experts at different organizations in Saudi Arabia. **Theories used:** -Technological, Organizational and Environmental (TOE). -Diffusion of Innovation Theory (DOI).	The results showed that all factors have a significant effect to adopt cloud computing except trading partner.
[67]	• Relative advantage • cost	• Employees IS knowledge	• External support • Competitive	• -decision maker innovativeness (H)	**Method:** A quantitative study using	The results of regression analysis reveal that decision maker's knowledge about cloud omputing

				Method / Respondents / Theories	Results
	• Security • Privacy • Trailability • Complexity • compatibility	• information intensity	pressure	• -cloud knowledge of decision maker (H)	questionnaire and developed and modified by a panel of experts. **Respondents:** Decision makers of 101 SMEs agreed to participate in this survey. **Theories used:** -Diffusion of Innovation Theory (DOI). - Technological, Organizational and Environmental (TOE).	is the main influential factor in adopting this technology.
[68]	• Performance (PRF) • -Security (SEC) • Adaptability (ADP) • Compatibility (CMP)			• Perceived ease of use (PEOU) • Perceived usefulness (PU) •	**Method:** A quantitative study using questionnaire. **Respondents:** (153) respondents in IT organization in US . **Theories used:** -Technology Acceptance Model (TAM)	The results showed that all external variables have a significant correlation to PU, thus, The variables of performance and security have significant correlation to PEOU. Furthermore PU and PEOU showed a significant correlation with the Behavioral intention to use cloud computing.
[69]	• Compatibility • Complexity	• Top management support • Absorptive capacity	• Mimetic pressure • Normative pressure		**Method:** A quantitative study using questionnaire. **Respondents:** (87) firms in south Africa by targeting decision makers with IT responsibilities in their firms **Theories used:** -Instructional theory. -Absorptive capacity theory.	The results showed that all factors have significant influence on adoption cloud computing except normative pressure.
[16]	• Complexity • Compatibility • Data Security • Relative advantage	• Top Management Support • Adequate Resource • Costs	• Government policy • Industry pressure	• CIO Innovativeness • Technical competence	**Method:** A quantitative study using questionnaire. **Respondents:** (106) medical centered and metropolitan hospitals in Taiwan by targeting CIOs. **Theories used:** -Technological, Organizational and Environmental (TOE). -Human, Organization, Technology(HOT-fit).	The findings showed that the most critical factors are: data security, Technical competence, Costs, Top Management Support and complexity toward adoption cloud computing. Among four dimensions, the most important one is Technology followed by Human (individual), organizational and environment.

[70]	• Relative advantage • Complexity • Compatibility	• Top Management Support • Firm size • Technology Readiness	• Competitive pressure • Trading partner pressure		**Method:** A qualitative study using interview. **Respondents:** (5)IT experts in the healthcare sector in Jordon. **Theories used:** -Technological, Organizational and Environmental (TOE).	The results found that there are a technological, organizational and environmental factors affect adoption of integrated cloud-based E-health record.
[71]	• Relative advantage • Compatibility • Complexity • Trailability • Observability • Security • Risk	• Traceability • Auditability •	• perception of term cloud	• Convincing IT manager	**Method:** A quantitative study using questionnaire. **Respondents:** Respondent survey in Spain ,Netherlands, Austria, Norway, Portugal and Belgium **Theories used:** - Diffusion of Innovation theory	The findings showed that all factors were the most important factors for cloud computing adoption.
[28]	• Relative advantage • Security concern • Cost saving • complexity • Compatibility	• Technology readiness • Top management support • Firm size	• Competitive pressure • Regulatory support		**Method:** A quantitative study using questionnaire. **Respondents:** (369) firms in Portugal by targeting (CIOs, directors, Senior IS manager). **Theories used:** -Diffusion Innovation Theory (DOI). -Technological, Organizational and Environmental (TOE).	The result show that relative advantage, complexity, technological readiness, top management support and firm size have a direct effect on a firm's adoption cloud computing while security concern and cost saving have indirect effect.
[72]	• Availability • Security • Reliability • Access			• PU • PEOU • SN	**Method:** A quantitative study using questionnaire. **Respondents:** 23 government central ministries, 39 regional government offices and 31 government supported research in south Korea **Theories used:** - Technology Acceptance Model (TAM) - Theory of Reason Action(TRA).	The findings showed that user intention and behavior is affected by perceived feature of cloud service.

				Method / Respondents / Theories	Findings
[26]	• Relative advantage • Uncertainty • Compatibility • Complexity • Trailability	• Size firm • Top management Support • Innovativeness • prior IT experience •	• Competitive pressure • Industry • Market scope • Supplier effort and external computing support		**Method:** A mix method using questionnaire and interview. **Respondents:** (15) different SMEs and service providers in the north east of England. **Theories used:** -Technological, Organizational and Environmental (TOE).	The finding showed that all factors have a significant effect to adopt cloud computing except competitive pressure.
[73]	• Ease of use and Convenience • Reliability • Sharing and collaboration • Security and privacy	• Cost reduction			**Method:** A mix method using interview and questionnaire. **Respondents:** (30) respondents in small and medium businesses in Singapore . **Theories used:** -Non	Findings showed that cost reduction, Ease of use and convenience and privacy and security are supported whereas reliability and sharing and collaboration are not supported.
[74]	• Relative advantage • Complexity • Compatibility	• Firm Size • Top management support • IT expertise of business users	• Competitive intensity • Regulatory environment		**Method:** A quantitative study using questionnaire. **Respondents:** (669)global IT executives and other senior executive decision makers from24 global enterprises. **Theories used:** -Technological, Organizational and Environmental (TOE).	The results indeed indicate that the technology and Organization context affect implementation decisions to adopt cloud computing.
[75]				• PEOU • PU • Attitude • PBC • SN	**Method:** A quantitative study using questionnaire. **Respondents:** (105) out of 250 IT managers and decision makers in organizations that have implemented or were in the process of implementing cloud computing in USA. **Theories used:** -Technology Acceptance Model (TAM). -Theory Behavioral Planed (TBP).	The results show that there is a positive relationship between five factors and Behavioral intention to adopt cloud computing.

				Method	Results
[76]	• cloud security	• cost effectiveness	• IT compliance		**Method:** A quantitative study using questionnaire. **Respondents:** (282) IT leader of companies in US including CIO, CTO, Director of IT, and IT enterprises managers . **Theories used:** -Non	The results indeed indicate management's perception of security, cost-effectiveness and IT compliance factors significantly influence the decisions to adopt cloud computing.
[77]	• Relative advantage • PU • PEOU	• Organization's attitude toward using technology	• Vendor Credibility		**Method:** Case study approach was used for this study. **Respondents:** (10)from 25 IT professional from different company in India **Theories used:** - Technology Acceptance Model (TAM). - Dynamic Capability Theory(DCT) -Diffusion of Innovation (DOI) .-Contingency Theory.	The results suggest that decision to adopt cloud computing depend on factors such as relative advantage, PU, PEOU, vendor credibility, organization's attitude toward using technology.
[78]	• Result demonstrability • output quality	• experience	• subjective norms	• Image • PU • PEOU • Job relevance	**Method:** A quantitative study using questionnaire. **Respondents:** (100)CIOs and IT managers stock indexed Companies in Germany. **Theories used:** - Technology Acceptance Model (TAM2).	The results of study showed that all factors have significant effect to intent to use cloud computing.
[79]	• Compatibility • Relative advantage	• Top management support • Organizational readiness • Organizational size	• Coercive pressure • Normative pressure • Mimetic pressure		**Method:** A quantitative study using questionnaire. **Respondents:** (136) Decision makers included CTOs, CIOs, IT VPs and directors, data center managers, and network managers, in addition to other IT	The results indicated that all independent factors have a positive impact on predictors of IT decision makers' intent to adopt cloud computing except organizational size.

					Method:	
					operations and from different U.S. industries **Theories used:** -Technological, Organizational and Environmental (TOE). -Diffusion Innovation Theory (DOI).	
[80]	• Compatibility • Relative advantage	• top management support • Organizational readiness • Organizational size	• Coercive pressure • Normative pressure • Mimetic pressure		**Method:** A quantitative study using questionnaire **Respondents:** (221) expert IT decision makers from different U.S. industries **Theories used:** -Technological, Organizational and Environmental (TOE). -Diffusion Innovation Theory (DOI). - Institutional Theory.	The results revealed that these factors emerged as significant determinants of IT managers' interest in adopting cloud computing Except organizational size
[81]	• Scalability • cost savings • Technological flexibility • high level of functionality • access to advanced technology • security and privacy of customer data • integration with current systems • performance		• location of data storage		**Method:** A quantitative study using questionnaire. **Respondents:** (327) companies in Germany. **Theories used:** Non	The results showed that 39% of German Internet start-up companies currently use cloud computing in their business activities. Another 56% of respondents are familiar with cloud computing technology, but do not use in practice. Only 5% have never heard of cloud computing and 3% heard about CC but don't know what it is
[82]	• Compatibility • Complexity • Relative advantages • Observability • Trialability				**Method:** A qualitative study using semi-structured interview. **Respondents:** (19) professionals IT in organization in Taiwan **Theories used:** -Diffusion Innovation Theory (DOI).	The result showed that the primary concern of IT professionals were on IT development environment, compatibility of cloud computing adoption with companies' existing policy, relative advantage and business need. The results also suggested that most of IT companies in Taiwan would

				Method / Respondents / Theories	Results
					not adopt cloud computing until uncertainties associated with cloud computing.
[83]	• Compatibility • Complexity • Relative advantages • Observability • Trialability • Demonstrable Result			• Voluntariness	**Method:** A quantitative study using questionnaire . **Respondents:** 151 from (3,897) small business leaders in U.S. **Theories used:** -Diffusion Innovation Theory (DOI).	The results of the study indicated a high correlation between all of the predictor variables and the intent to use cloud computing , except for voluntariness.
[84]	• Relative • advantage • Compatibility • Complexity	• Top management support • Technology readiness • Firm size	• Trading partner pressure • Competitive pressure		**Method:** A quantitative study using questionnaire. **Respondents:** (111) firms belonging to the high-tech industry in Taiwan. **Theories used:** -Technological, Organizational and Environmental (TOE).	The results showed that relative advantage, top management support, firm size, competitive pressure, and trading partner pressure characteristics have a significant effect on the adoption of cloud computing.
[85]	• Perceived accessibility • Perceived scalability • Perceived security • Perceived cost-effectiveness	•	• Institutional influences • Growth options • Abandonment options • Deferral option •		**Method:** A quantitative study using questionnaire. **Respondents:** (101) IT professional from (124) participants who were employed in managerial positions in Singapore. **Theories used:** -Institutional theory - Real Option Theory (ROT).	The results showed that institutional influences had a significant effects on the technological characteristics factors towards intention cloud computing.
[86]	• The need of cloud computing • Security effectiveness • Reliability	• cost effectiveness			**Method:** A quantitative study using questionnaire. **Respondents:** (30) managers of information technology in organization in USA. **Theories used:** -Non	the A strong positive relationship was found between each of these four independent variables: and the dependent variable: the management interest in adopting cloud Computing technology.