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Cloud computing awareness and adoption among accounting practitioners in Malaysia

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Abstract

The main objective of this study is to explore the level of awareness and adoption of cloud computing among the small and medium enterprises (SMEs) in Malaysia. Using accounting practitioners - both in the audit and commercial fields - as the sample, this study investigates as to whether they are aware of this emerging technology, the extent they utilize the technology, and the reasons for (non) adoption. The finding suggests that two-third of the respondents are not aware of cloud computing. The level of adoption is limited to several applications, namely Google Apps Engine and Dropbox. Cost and time saving were cited as the reasons for adoption, while lack of perceived benefits and security were cited as the most important drivers for non-adoption. Though 30% of the respondents claim to be familiar with cloud computing, but only 7% confirm they are very knowledgeable about it. Considering the benefits that cloud computing could offer to businesses, this development urges for more engagement from the government and cloud computing service providers to further promote this technology to the SMEs.

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Keywords: Cloud computing; awareness; accounting practitioners; Malaysia

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1. Introduction

The recent cloud computing (henceforth referred to as cloud) adoption studies among the small and medium enterprises (SMEs) stated that although users realized the opportunities available from the cloud technology, the adoption of the technology is still very low (Aboelmaged, 2010). Therefore, identifying the factors of cloud technology adoption, especially at the firm level, has become paramount importance, hence received much attention from researchers (Ekufu, 2012). Riemenschneider, Harrison, and Mykytyn (2003), stated that studies on SMEs on the use of information technology (IT) at present are both understudied and remain unique. In this regard, Williams (2010) argued that the most reported barriers for cloud adoption are the issues of security and trust. Other commonly reported factors, as highlighted in Shimba, (2010), include the dilemma in recognizing the benefits and the cost of shifting to cloud, the legal compliance issue, and the organizational impact as a result of the adoption.

Despite the benefits and opportunities that cloud could offer, research in this area is still lacking (Jäätmaa, 2010; Obeidat & Turgay, 2012; Sriram & Khajeh-hosseini, 2008). Most of the prior research had largely focused on the adoption effect to the firm and also the technical issues inherent in cloud implementations (Obeidat & Turgay, 2013). Among other cloud issues which had recently being studied were cloud architecture (Saya, Pee, & Kankanhalli, 2010), cloud applications (Liu & Orban, 2008), cloud cost benefits (Dillon, Wu, & Chang, 2010) and cloud adoption process (Alshamaila, Papagiannidis, & Li, 2013). It was also highlighted that the acceptance of cloud computing among SMEs are relatively low (Sahandi, Alkhalil, & OPara-Martins, 2013). However, none of those studies were done in Malaysia. A study on Malaysia is important considering the significant contribution of this industry to the economic development of the country.

The objectives of this study are twofold. Firstly, it explores the level of awareness and adoption of cloud computing among the Malaysian SMEs. Secondly, it examines the reasons for (non)adoption of the technology. The study is pertinent for several reasons. The findings will enrich the existing literature and research on cloud computing in the context of an emerging country which is Malaysia. The study also offers practical insights to the cloud computing developers on the level awareness of cloud computing so that more initiatives could be implemented to further enhance its acceptance and adoption. As information and communication technology sector represents one of the key economic areas of the country, the finding of the study provides important indicator on the extent of technology utilization among businesses in Malaysia. As accountants are the most popular external source of information to SMEs, their level of awareness on cloud computing may trigger the initiatives of the Malaysian government in enhancing the level of cloud computing adoptions among SMEs.

The remainder of the paper is structured as follows. The next section discusses the relevant literature, followed by the research methods section. The findings are discussed in the fourth section. The final section concludes and provides recommendations for future studies.

2. Literature review

Cloud computing can be defined as “a model for enabling convenient, on-demand network access to share pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell & Grance, 2009, p.1). Cloud computing is perceived as an emerging technology and new paradigm for conducting the business (Leimeister, Leimeister, Knebel, & Krcmar, 2009; Lyer & Henderson, 2010). The service model in cloud computing are classified based on the user requirements, namely (1) infrastructure as a service (IaaS), where users have control over the operating systems, storage, network and applications; (2) platform as a service (Paas), where user have the control over applications but not over the infrastructure; (3) and software as a service (SaaS), where users only access services from the service provider and no control over the applications or infrastructure. The type of cloud deployment are also divided into either public cloud (non-exclusive) and private cloud (exclusive) (Mell & Grance, 2009; Shimba, 2010). The applications cover a wide range of areas inclusive of word processing, social media, project management, email, web development, data storage, accounting, file hosting, and note taking.

The advantages of cloud computing include creating economies of scale by waiving the upfront cost for infrastructures acquisition hence leads for cost saving (Shimba, 2010). It allows enterprises to scale down and give more focus to business areas and activities as information system and technology had been taken care of by the

service providers (Azarnik, Shayan, & Alizadeh, 2012; Marston, Bandyopadhyay, & Ghalsasi, 2011). This environment best suits SMEs, which might not have the luxury of resources in terms of money, time, and expertise (Wymer & Regan, 2005). As accounting software is a part of cloud computing SaaS, it offers back up facility for all enterprise's data by storing them on an online server, so there will be no issue of computer crashes.

SME in Malaysia is defined based on annual sales turnover or number of full-time employees and is grouped into three sectors; micro-enterprise, small enterprise and medium enterprise. (http://www.smecorp.gov.my/v4/node/14). Malaysian SME exhibited four key features; low productivity compared to large firms in Malaysia and SMEs in developed countries, relatively low business formation compared to high income countries, small number of high growth firms contribute the most to the economy and material share of informal sector in the economy (SME Masterplan 2012-2020 and Summary, 2012).

During the Budget 2013 speech by Malaysian Prime Minister, YAB Dato' Sri Mohd Najib Tun Haji Abdul Razak, highlighted the need to intensify the growth of SMEs. Malaysia through the National Small and Medium Enterprise Development Council (NSDC) has approved the first phase of a special Master Plan for SMEs i.e. the SME Master Plan (2011-2020), which identifies several forces that drive SMEs' performance. Innovation and technology adoption was the most important performance lever and have the highest impact on total factor productivity and employment growth. In the SME cloud computing programme, SMEs are offered for reimburesement of RM750 for acquisation cost of cloud computing software-as-a-service application (MSCMalaysia.com, 2014). This shows the seriousness of Malaysia Government in suporting the cloud technology adoption. Despite the effort, the adoption level in Malaysia, though it is moving uptrend, is still can be considered as slow adopters especially for new technologies such as cloud computing (Moghavvemi, Hakimian, & Tengku Feissal, 2012).

3. Research methods

This study is exploratory in nature and the data were gathered by using self-administered survey questionnaires. The questions were divided into three parts. Respondent's demographic profiles were asked in Part A. Part B contains the awareness question and reasons for non-adoption for respondents who choose 'NO' as their answer for awareness. The last part requires the respondents to indicate the cloud computing services that they use from the list provided and their expectation of cloud computing diffusion in the future. This part was answered by respondents who choose 'YES' for the awareness of cloud computing. The survey questionnaires were sent to 500 randomly selected accounting practitioners throughout Malaysia via final year Bachelor of Accounting students who underwent industrial training. Accountants were chosen as the sample as they are expected to be more forthcoming in using information technology based on their work nature and prior exposure while doing their accounting degree or certificates. Out of 500 questionnaires, 329 were completed and returned (65.8% response rate) and they were used for further analysis.

The demographic profiles of the respondents are as follows. A total of 74.2% of the respondents are female, and in terms of race distribution, 64.4% are Malays, 22.8% are Chinese and 11% are Indians. Most of them are degree holders (82.2%) with experience of less than 5 years in the field (53.2%). Less than half of the practitioners are the members of professional bodies (38.9%) and, whenever they are members, mostly with the Malaysian Institute of Accountants (59.3%). Out of 329 respondents, 86% of them are working in the audit and accounting services firms, while 10% and 3% in commercial and public listed companies, respectively. Additionally, 37% are working in a fully computerized accounting system, but the large majority (63%) are working in an environment of both computerized and manual accounting systems. Finally, only 21.6% of the respondents claimed that the company are currently utilizing cloud computing.

4. Findings

Out of 329 respondents, only one-third (99 respondents) claimed that they are familiar with cloud computing. The study further evaluates any difference, if any, in the awareness level across demographic profiles. Table 1

depicted the result. Based on the table, familiarity towards cloud computing is higher among the PhD and Masters holders. However, this could be due to small representative from these groups of respondents (i.e., 3 and 12, respectively).

Table 1. Level of respondents' familiarization with cloud computing.

		Yes (1)		No (0)	
Respondent profile		Freq	%	Freq	%
Gender	Male (35.8%)	28	32.9%	57	67.1%
	Female (74.2%)	71	29.1%	171	70.1%
Ethnicity	Malay	63	29.7%	148	69.8%
	Chinese	25	33.3%	49	65.3%
	Indian	11	28.9%	27	71.1%
Level of education	Certificate	3	21.4%	11	78.6%
	Diploma	4	13.8%	25	86.2%
	Degree	82	30.4%	187	69.3%
	Master	8	66.7%	4	33.3%
	PhD	2	66.7%	1	33.3%
Member of professional bodies	Yes	41	32.0%	86	67.2%
	No	55	27.8%	142	71.7%
Years of experience in accounting and auditing field	Less than 5 years	58	33.1%	117	66.9%
	5 years to 10 years	17	23.9%	52	73.2%
	More than 10 years	14	32.6%	29	67.4%

For the respondents who choose 'NOT FAMILIAR' with cloud computing, Table 2 displays the reasons for non-adoption, arranged from the most important to the least important. The most important reason for not using cloud computing is the belief that they do not need the technology. This can be seen from the answer 'Frankly I have never thought about using/not using cloud computing (48%) and 'Because I don't know exactly what can I do with cloud computing' (41%). In essence, they do not perceive that using cloud computing bring any significant benefits to them. This is followed by the issue with data security with the perception that data might be hacked for illegitimate purposes (see Reason No. 4, 5, and 7 in Table 2). The table also shows that the issue of trust and internet availability is regarded as the least important reason for non-adoption.

Table 2. Reasons for not using cloud computing (n = 230).

Reason		Freq	%
1.	Frankly I have never thought about using/not using 'cloud computing'	109	47.8
2.	Because I don't know exactly what can I do with 'cloud computing'	93	40.8
3.	Just don't feel OK about it (a general feeling of skeptic)	84	36.8
4.	Because when the confidential data can be disclosed and published, the data on internet can be accessed easier by hackers	83	36.4
5.	Because I do not trust any of Internet-based services which may be attacked by a group of hackers to steal data	45	19.7
6.	Because using 'cloud computing' is not popular and I am not sure about its future that can be succeed/failed	32	14.0
7.	Because I always think that the owners of Internet can always control and fetch my data whenever they want	28	12.3
8.	Because I don't need 'cloud computing'	21	9.2
9.	Because I don't trust 'cloud computing'	12	5.3
10.	Because I don't have access to high speed internet to be able to use 'cloud computing'	12	5.3

Further questions were asked to the 99 respondents who claim to be familiar with cloud computing. Although not tabulated here, a total of 44.4% of the adopting respondents claimed that they use cloud computing at their work place as 18% on voluntary basis and less than 10% were just figured out its capability. This study offers a list of cloud services/applications for the respondents to determine their usage level. As reported in Table 3, Google Apps Engine represents service with the highest usage among the respondents (47.5%), followed by Dropbox (14.1%). This could be due to its multifunction and storage features and capabilities. Six items listed were not even chosen by the respondents.

To further understand the adoption of cloud computing, the adopting respondents were asked to rank several reasons for their adoption of such technology. This is presented in Table 4. The most important reason is low cost (38.4%) and current update of the system itself (36.4%). This is followed by speed on deploy time (25.3%) and the audit and evidence gathering (22.2%). The audit and evidence gathering is very much relevant to the role of

accountants and auditors. Security reason is ranked fifth. However, this is agreed by a small group of respondents (19.2%). Hence, this provides support to the reason of non-adopters of cloud as they are very much concerned with the security issues.

Finally, although not tabulated here, more than half of the respondents (56.6%) agree that cloud computing may cause a radical shift in information technology innovation. They also feel that this new technology concept will quickly evolve and may face a maturity stage in the near future (62.3%). Respondents also agreed that the current on demand offering by cloud service providers are appropriate to accommodate current business demand (62%).

Table 3. Public Cloud Services (n = 99).

Cloud application		Freq	%
1.	Google Apps Engine	47	47.5
2.	Dropbox	14	14.1
3.	Amazon Web Services	9	9.1
4.	Microsoft SkyDrive	7	7.1
5.	Success Factors	2	2.0
6.	VMware	2	2.0
7.	Salesforce Force.com	2	2.0
8.	Terramark Cloud	1	1.0
9.	OpenStack	1	1.0
10.	Rackspace Cloud	1	1.0

Table 4. Reasons for using cloud computing (n = 99).

Items		Frequency	%
1.	Lower costs (Saving money through lower total costs and reduced upfront investment)	38	38.4
2.	Updates (timely patches, updates and security settings can be rapidly rolled out or adjusted)	36	36.4
3.	Speed to deploy (Time to develop, test, deploy, and procure components goes down with clouds)	25	25.3
4.	Audit and evidence-gathering (clouds can readily analyze possible breaches and generate logs)	22	22.2
5.	Better security (Access to a cloud provider's security infrastructure)	19	19.2
6.	Elasticity (The ability to grow and shrink capacity with demand)	18	18.2
7.	Wide set of services (Cloud providers offering additional services such as message busses, mailing and payment systems, image manipulation, and large-scale storage)	17	17.2
8.	Resources concentration (cheaper and easier to control access to one large facility than many smaller ones)	17	17.2
9.	Just like clouds (Generally positive feeling about utility computing)	9	9.1
10.	Standardized interfaces (large cloud providers can offer a standardized, open interface to managed security services providers)	9	9.1
11.	Resilence (ability of clouds to reallocate resources for authentication, encryption, etc)	7	7.1
12.	Market differentiation (Security concerns motivate providers to improve security practices)	5	5.1
13.	Scale (advanced security measures are more affordable when done on a large scale, allowing cloud providers to invest more in security)	4	4.0

5. Conclusion

The objective of this study is to measure the level of awareness of cloud computing among accounting practitioners in Malaysia. Due to high claim of the slow adoption of cloud computing among SMEs, it is essential to choose the accounting practitioners perception, as they are the most popular source of external advice and support for SMEs with regards to accounting technology (IFAC, 2010). The study also examines the reason(s) for (non)adoption of this new technology.

Using questionnaire survey to achieve the objectives, the findings provide interesting insights. It shows that two-third of the respondents were not familiar with the technology. It is perceived that lack of knowledge on cloud computing had restrained them from embracing the advantages potentially offered by the technology. This is a huge signal to both the service providers and the government. Although Malaysia has embarked on special initiatives to enhance the cloud adoption among SMEs, it seems that more efforts need to be done. In this regard,

cloud computing service providers had made a huge amount of investment for the development of sound and helpful system. However, as the claim put forth by the theory of diffusion of innovation, the advantages of technology can only be experienced if the technology is diffused and used. Hence, more efforts in educating both the accounting practitioners and SMEs are of high priority.

33% from the total respondents claim familiar with cloud computing but still put themselves as somewhat and not really knowledgeable about it. Though they mostly use it because of work, they did confirm that cloud computing offers lower acquisition and maintenance cost as compared to a normal software. This supports the arguments of low cost by Sahandi et al. (2013). Finally, it is confirmed that users sees cloud computing as an advance technology in shifting the shape of business processes.

As this study is exploratory in nature, more studies are required to further investigate the adoption reasons and the adoption process of cloud computing. Future research in measuring the post implementation of cloud computing towards both business process and firm performance may be essential to further support the assertion of cost saving resulting from the implementation of this new technology. As this study only focuses on accounting practitioners, a larger scale study with respondents from various backgrounds and industries may also contribute both to the theoretical and practical advancements of this new technology.

References

Aboelmaged, M. G. (2010). Predicting e-procurement adoption in a developing country: An empirical integration of technology acceptance model and theory of planned behaviour. *Industrial Management and Data Systems*, *110*(3), 392–414.

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

Azarnik, A., Shayan, J., & Alizadeh, M. (2012). Associated Risks of Cloud Computing for SMEs. *Open International Journal of Informatics*, *1*, 37–45.

Dillon, T., Wu, C., & Chang, E. (2010). Cloud Computing: Issues and Challenges. *2010 24th IEEE International Conference on Advanced Information Networking and Applications*, 27–33.

Ekufu, T. K. (2012). *Predicting Cloud Computing Technology Adoption by Organizations: an Empirical integration of Technology Acceptence Model and Theory of Planned Behaviour*. PhD Thesis

Jäätmaa, J. (2010). *Financial Aspects of Cloud Computing Business Models*. Aalto University. Retrieved from http://epub.lib.aalto.fi/fi/ethesis/pdf/12435/hse_ethesis_12435.pdf

Leimeister, S., Leimeister, J. M., Knebel, U., & Krcmar, H. (2009). A cross-national comparison of perceived strategic importance of RFID for CIOs in Germany and Italy. *International Journal of Information Management*, *29*(1), 37–47.

Liu, H. L. H., & Orban, D. (2008). GridBatch: Cloud Computing for Large-Scale Data-Intensive Batch Applications. *2008 Eighth IEEE International Symposium on Cluster Computing and the Grid (CCGRID)*.

Lyer, B., & Henderson, J. C. (2010). PreParing for the future: understanding the seven CaPabilities of Cloud ComPuting. *MIS Quarterly Executive*, *9*(2), 117–131.

Marston, S., Bandyopadhyay, S., & Ghalsasi, A. (2011). Cloud Computing - The Business Perspective. In *2011 44th Hawaii International Conference on System Sciences* (pp. 1–11). Ieee. doi:10.1109/HICSS.2011.102

Mell, T., & Grance, P. (2009). *Draft NIST Working Definition of Cloud Computing*. *National Institute of Standards and Technology* (Vol. 53, p. 50). Retrieved from http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

Moghavvemi, S., Hakimian, F., & Tengku Feissal, T. M. F. (2012). Competitive Advantages Through It Innovation Adoption By Smes. *Social Technologies*, *2*(1), 24–39.

Obeidat, M. A., & Turgay, T. (2012). Empirical Analysis for the Factors Affecting the Adoption of Cloud Computing Initiatives by Information Technology Executives. *Journal of Management Research*, *5*(1), 152–178.

Riemenschneider, C. K., Harrison, D. a., & Mykytyn, P. P. (2003). Understanding it adoption decisions in small business: integrating current theories. *Information and Management*, *40*(4), 269–285.

Sahandi, R., Alkhalil, A., & OPara-Martins, J. (2013). Cloud Computing From Smes Perspective: A Survey- Based Investigation. *Journal of Information Technology Management*, *XXIV*(1), 1–12.

Saya, S., Pee, L. G., & Kankanhalli, A. (2010). The Impact Of Institutional Influences On Perceived Technological Characteristics And Real Options In Cloud Computing Adoption. In *ICIS 2010 Proceedings* (p. 24).

Shimba, F. (2010). *Cloud Computing : Strategies for Cloud Computing Adoption Cloud Computing : Strategies for Cloud Computing Adoption*. Dublin Institute of Technology. Retrieved from http://arrow.dit.ie/cgi/viewcontent.cgi?article=1028andcontext=scschcomdis

SME Masterplan 2012-2020, and Summary. (2012). *SME Masterplan 2012-2020* (pp. 123–127).

Sriram, I., & Khajeh-hosseini, A. (2008). Research Agenda in Cloud Technologies. Retrieved from http://arxiv.org/abs/1001.3259

Wymer, S., & Regan, E. (2005). Factors Influencing e-commerce Adoption and Use by Small and Medium Businesses. *Electronic Markets*, *15*(4), 438–453.