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Exploring the Challenge Impacted SMEs to Adopt Cloud ERP

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Abstract

Objective: Cloud Enterprise Resource Planning (ERP) systems provide generic benefits to Small and Medium Enterprises (SMEs). However, SMEs motivation to adopt this system is low. Our study aimed to explore the challenges faced by SMEs to adopt the system. **Methods/Statistical Analysis:** To achieve this objective, exploratory research approach was used with semi-structure interview with SMEs was executed. Semi-structure interview was conducted by means of face to face approach. Interview methods used to extract understanding, opinions and challenge faced SMEs on their way to adopt cloud ERP system. Five (5) SMEs are involved in this study along with one ERP and cloud computing expert in Southern Malaysia. **Findings:** Current study employs conventional content analysis to determine the themes from exploratory approach; the study found eight (8) emerged themes that are reluctance to adopt cloud ERP among SMEs, this is attributed by knowledge, data security, vendor trust, technology trust, system availability and cloud ERP system functional fit. Also study investigate that SMEs needs extra support from government agency and external environment. **Applications/Improvements:** This exploratory study contributes to the lack of literature on cloud ERP adoption and provides insight for future study by researchers and practitioners.

Keywords: Adoption, Cloud ERP, SaaS ERP, SME, Software as Services

1. Introduction

Small and Medium Enterprises (SMEs) are recognized for their significant role in revolutionizing socioeconomic growth. SMEs become well-known for sustainable development of the country and its initiatives. SMEs are recognized as the sources of income of any vibrant economy[1]. Similar scenario in Malaysia, whereby SMEs contributed by 97.3% of the total enterprise, employed 5,854,142 peoples and contributed to 57.4% of total employment; and contributed 32.7% of total GDP as mentioned on Asia Cloud Computing Association Report of 2015. In the developing economy most SMEs has the same characteristics. For example, SMEs in Malaysia contribute to a large share of country economy because majority of companies are SMEs. In addition, Malaysia as a typical developing country, SMEs operate in most business sectors. Concurrently, Malaysia established good strategies for environmental support and economic context to encourage technology adoption among SMEs such as soft loans with minimum interest over five years to encourage them to purchase information systems to support their business operations[2]. In addition, Malaysia Digital Economy Corporation (MDeC) established a project called SME cloud computing aimed to promote local SMEs to adopt cloud solution and to become

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globally competitive by providing a 6-month subscription fees up to MYR 1,500 from any MSC Malaysia Status companies.

SMEs can be better with Enterprise Resource Planning (ERP) system for organization operation process and data management. Enterprise Resource Planning as an integrated system deployed by organization to improve data management and processes, reduce production time, improve quality of the product, enhance decision making process, and provide interdepartmental functionality. ERP systems are recognized with a number of positive features and functions to facilitate business activities[3].

Despite the recognized major benefits or advantages gained when SMEs using ERP system, conventional ERP systems are mostly expensive resources to buy and to maintain thus made SMEs does not commit enough money to it[4]. However, the emergence of cloud technology[5] made ERP offers on the cloud platform with low cost, scalability and resources sharing. In the cloud platform structure, the ERP system provided as a services rather than a product, whereby SMEs can rent the ERP system instead of buying it. Through renting the ERP system, SMEs can minimize upfront cost (cost of implementation and maintenance), and concentrate more on their primary business function, without allocating significant resources to maintain ERP system[6].

Previous studies have addressed several perspectives of on-premises/in-house ERP systems on SMEs adoption and their counterpart large enterprises. The studies has addressed the implementation perspective[7–9], adoption perspectives[10–12] and huge studies focused on critical success factors for on-premises ERP system perspective[13–18].

Thus, advancement of computer technology and web technology leads to the world of cloud computing paradigm. The phrase cloud computing become a buzz word and has changed the way Information Technology industry operate. Cloud computing provides lower cost for the organizations to maintain the entire resources in remote location[19]. Thus, cloud technology provides a distinct advantage for SMEs to drive value from cloud technology with less investment unlike their identical large enterprises which invested large amount of money for on-premise ERP. Al-Johani and Youssef (2013) on their study confirm that ERP on the cloud require very little customization, so they reduce labour cost and development team cost by 50%, reduce 40% cost for maintaining and supporting, software testing cost reduction by 10%, cut requirement analysis effort by 25% and shrink backup management cost by 15% compared and overall project cost decreased by (40-50) % comparing with in-house ERP systems customization[20].

Cloud computing become interested area of research by researchers and practitioners due to its distinct and potential benefits offered to SMEs as well as large enterprises. In addition, cloud computing offered three cloud services model which are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrustructure as a Service (IaaS). Our focus in this study is on Cloud ERP, which is mainly a software system and based on SaaS model.SaaS model is explained "as a model which allows users to run a variety of software applications on the Internet without having possession or managing applications (e.g., Salesforce.com, Gmail, Microsoft Online, etc)"[21]. In particular, the Software as a Service (SaaS) model has emerged as a real alternative to implementing in-house ERP systems.

Several author(s) have conducted the studies on awareness, issue and challenge, drivers and barriers and factors influencing SaaS or cloud computing in different context such authors are[22–27]. Some authors conducted study on SaaS or cloud with respect to SMEs[27–29].

SMEs are the essential backbone of each market. Proper use of Information and Communication Technologies (ICT) by SMEs could increase their ability to compete with large enterprises in their business operation. Literature acknowledged that, new technology helps SMEs to become a competitive in the market and enhanced efficiency, but typically involves high cost. Enterprise Resource Planning (ERP) Systems have been adopted by many enterprises as a tool or strategy to improve efficiency and to achieve strategic objectives by the enterprises[30]. Furthermore, ERP system comes along with many benefits associated with such as integration of organization data and process to improve production level. However, ERP system associated with high upfront cost that associated by hardware, software purchase, hiring expert and upgrading and maintenance cost. At present, ERP system offered on cloud architecture and so called cloud ERP system gradually become famous phenomena in the business environment and researchers as well.

Cloud ERP system studies have been conducted from different perspectives. Elragal and El-Kommos (2012) conducted a study to compare traditional ERP system and cloud ERP system, their work shows that cloud ERP system is faster on implementation, less cost, ease-of-use

and scalability are the main benefit of cloud ERP systems over traditional ERP system[31] conducted an exploratory study on cloud ERP adoption motives and barriers, on their work shows that cloud ERP has been challenged by perceived benefits, modification, integration and system performance in organization[32].

Studies conducted by Seethamraju (2013), Salim (2013) and Peng and Gala (2014) are more focus on critical factors to be considered by enterprise during cloud or SaaS base ERP. Seethamraju (2013) conducted a study to examine the potential determinant to be considered when organization decides to adopt SaaS ERP by using cross-sectional field study. According to his study low total cost of ownership, low investment cost, vendor participation on value co-creation and product improvement are broad benefit achieved when SMEs adopt SaaS ERP system. However, based on his study, he declared that competitive pressures faced by the enterprise, external factors, concerns on the security and integrity of data have no influence on adoption decision. Another study conducted by[33], she conducted a study based on content analysis of 100 studies, they have recognized 27 critical factors or determinants that contribute to decision on cloud ERP adoption. These determinants are classified as "necessary" or "sufficient"; where "necessary" transition factors need to exist in order for the firm to move to the next stage, while "sufficient" means assisting in the movement. Furthermore,[34] on their study classified the cloud ERP system benefit as economical, technical as well as legal factors. Mahara, (2013) study SMEs perspective for election of cloud ERP in India, the study revealed that economical, technological and people are the three perspectives an SME has to analyze the ERP software on Cloud. The economical perspective deals about financial issues, technological perspective involves technical evaluation of the software and the people perspective is concerned with the effect that selection and adoption of ERP will have on the people within the organization[35]. Regardless the volume benefit of cloud ERP system, literature claimed that most of large and small organizations are not rushing to adopt this technology. Some of the mentioned reasons are attributed to it disruptive technology and has not yet achieved to the maturity level, lack of specific conformity to standard; and high related risk and cost[36].

The previous study reveals that most of the existing literatures are focus more on ERP system and cloud computing as separate phenomena. Conversely the research on cloud ERP has limited. Furthermore, the existing literature focus more on benefit and challenges of cloud computing platform and little studies on cloud ERP in particular. Despite the fact that critical constrain and challenge associated with cloud ERP system from SMEs industry have not been fully explored and discussed. The study conducted by Oliveira at el, (2013) on factors affecting cloud computing adoption among SMEs in manufacturing and services sectors using integrated theory through the combination of Diffusion of Innovation theory (DOI) and Technology Organization Environment (TOE) framework, they concluded that manufacturing and services sectors they do not share the common factors on adoption decision. This contributed to the research to have more study in this particular issue.

However, the motivation of SMEs to adopt cloud ERP remains low; thus create questions concerning the ability of SMEs to adopt cloud ERP. As far as our knowledge and understanding, we acknowledged that cloud ERP is a best alternative for SMEs. This study aimed to address this gap by exploring the challenges/constrains that impacting adoption of the cloud ERP by SMEs. The method used was using exploratory-interviews. The main question addressed in this study is: What constrains hinder cloud ERP adoption by Malaysian SMEs?

2. Methodology

This section describe research methodology based on three phases which are; research process, data processing and data collection methods.

2.1 Research Process

The first phase is literature review which was conducted to understand the existing knowledge about the topic. However, cloud ERP is a recent research area, and literature shows that; cloud and ERP were studied separately[34]. The second phase was conducting interviews. In this phase the exploratory study was conducted tolook on thechallenges faced by SMEs on cloud ERP adoption. The final phase in this study was to present the finding (data) and analysis.

2.2 Data Processing

The present study aimed to explore the challenges/constrains that impacted SMEs to adopt cloud ERP. We use exploratory research method to attain the specific objective, as literatures acknowledge cloud ERP is still a

new area of research and there's a limited empirical study. Due to this reasons, an exploratory research is appropriate. The qualitative research method was used in this study to explore the challenges/constrains of cloud ERP adoption. The qualitative research approach as the best approach on understanding individuals and organizations motivations, their reasoning and behaviours, and their beliefs in an in-depth way[37]. Both techniques of data collection were used in this study. The literature review methods used for secondary data collection and on the other hand interview with SMEs were used to collect primary data.

2.3 Data Collection.

There are two main techniques for collection of data which are primary and secondary data[38]. In this research all data collection techniques were used, secondary data can help researcher to made a certain assumption and establish a study background. The primary data can be used most to validate the assumption and reinforce the results and discussion.

Interview is the second data collection methods that used in this study. The interview is conducted in face to face approach[38] and semi-structure interview method is used[39]. All questions are open and its structure motivates the interviewee to talk freely. The question protocol is designed based on literature background from previous studies. Five (5) interviews were conducted in Southern Malaysia at the state of Johor Bahru which involved the participants who are mostly involved in technology adoption decision on their respective SMEs and one expert from ERP system and cloud technology is involved in the interview. The interview session run on average time of 30 minutes per session. Therefore, the total interviews conducted in this study were six (6). Five interviewees are conducted from SMEs perspectives and one expert from practical perspective. The profile of interviewees with their basic information is depicted on the Table 1.

Following the interviews session, the collected data were transcribed[40] and transcribed data are used to extract the challenges/constrains towards adoption of cloud ERP. The data which related to each other were grouped together and themes were extracted. Other information that not much related to our theme was excluded in analysis. Finally, information related to every question which is related to the study topic was analyzed in light of definitions extracted from past studies.

3. Data Analysis and Discussion

Well-known researchers viewed content analysis as a strong technique for text data analysis (Cavanagh, 1997) as cited by Hsieh and Shannon (2005) and its robustness made it more usefully for researchers. The content analysis described in three distinct classifications which are conventional, directed, or summative. Based on the nature of our study, this study used conventional approach to describe a phenomenon. Usually this approach used when existing theory or research literature on a phenomenon is limited[41]. An analysis of the data collected from SMEs and expert from ERP and cloud is presented. During the data analysis process there are eight (8) themes emerged and discussed in the next section.

3.1 Knowledge

In line with the literature, the technology adoption decision process starts with the knowledge. Knowledge

Table 1. Basic information about interviewees

Basic Information	R1	R2	R3	R4	R5	EXP
What is your position in organization	HR - Manager	Sales - Manager	Financial - Manager	Managing Director	Travelling - Manager	Director
How long have you been in your present position	5yrs	6yrs	5yrs	16yrs	5yrs	30yrs
What is your field of study?	Accountant	Office Management	Accountant	Elect. & Electronic Engineered	Business Admin	Information Manager
How are you involved in decision making on technology adoption	By position	By position	By position	Final decision maker	By Position	By Position

R - Represents the respondent; **EXP** - Represent Expert

of technology adoption decision was identified in three forms which are;Awareness-knowledge: describe "the existence of the technology in the market". How-to-knowledge: "describe how to apply knowledge to utilize technology properly" and lastly is principle-knowledge: "*this knowledge describe the operation principles on how and why technology utilized*"[42,43] Discovered that lack of ICT knowledge among academic staff is the challenge to ICT adoption among their institutions. Knowledge was mentioned by all interviewee has an effect on adoption of cloud ERP system, interviewee (R1, R2) stated that "... how could we adopt ERP and cloud ERP while we don't know anything about these software" and interviewee (R3, R4) they declared that "... we will be in trouble because we don't have enough knowledge about the software. Interview (R5) "... I have very little knowledge about ERP and cloud ERP so I can't talk much about its". In addition to that the expert also emphasize on knowledge (EXP) "... yes how can you convinced SMEs to go to wide enterprise solution like cloud ERP without having enough knowledge and reference". Consequently, SMEs were not much aware on existing benefits of this system and theyafraid to adopt it due to wrong perception on cloud ERP from unreliable sources or media. Therefore, knowledge (awareness) left SMEs with low confidence on cloud ERP adoption decision[44].

3.2 Data Security Issue

The study found that data security was the domain concern in our discussion from all interviewee. The concern comes due to the nature of technology itself and on organization data that need to be stored on vendors data centre. All SMEs provided the huge response to data security on organization data in particular. The fear of security is more related to datahacking, environment from cloud ERP vendor, users are sharing the same infrastructure and any unethical related activities. As stated by respondents(R1) "*.....what happened when many users are stored their data together*" and (R2, R3) "*....is there any strong agreement that discussed about data lost, in case of happening who will responsible to* " and interviewee (R4, R5) added that "*... are they capable enough to hold all SMEs data at the same time... and ...what happened when vendor goes out of business*". This concern was also discussed with previous literature where data security concern as a major inhibitor to cloud ERP adoption(25, 26, 45). In contrast with expert view on data security concern (EXP) "*...based on my experience cloud computing infrastructures are very much secure, for example, cloud vendors they install sonic wall which is very expensive technology just for security while the SMEs cannot afford it for them self*". This expert argument is along with some previous studies, they stated that organizations are so confident with SaaS ERP vendors and believed that their data are should be safe when managed by SaaS ERP vendor more than them self.

3.3 Vendor Trust

Interviewee (R1) raised her concerns about vendor on capability and ability to support their customer and most likely talk about local vendor "... some time you can call to you vendor looking for help its more than hours and some took more than a day to come or fix the problem" and added that "... in cloud situation we need to rely much on vendor, this will introduce a lot of risk" on the other hand, expert (EXP) "*... for sure vendor should provide a 24/7 support to their customer, because customer also provide a services to their customer too*". This is the reasons why some enterprises suggest in-house ERP due to the lack of vendor punctuality. However, the finding is consistent with[45].

3.4 Trust on Cloud ERP

Cloud ERP is an emerging technology, individuals and organizations are fear on new technology on its stability, functionality and its ability to perform intended task. All interviewee perceived that cloud ERP still a new technology, they never experience its functionality. However some of the interviewees are agreed that, cloud ERP can shift their SMEs from one level to next level but it needs some time to become familiar. Interviewee (R1, R2) "... this is about a new stories for us, so could be very difficult to commit our self to rush to the new technology" (R3) "... yes off course I heard about cloud ERP just from my friend and I started to read from some blog" (R4, R5) "... for its still a new technology ever if we know some a,b,c about this technology but, it's too early to decide when we will go to cloud ERP". The expert view is also concur with the interviewee (EXP) "*... surely SMEs cannot go if they are not sure about a software functionality as far as their business concern SMEs always want to see a result first*". The results also supported by the studies conducted by[46].

3.5 System Availability

The concern about system availability is another obstacle hinders the cloud ERP adoption among SMEs. This is attributed primarily by the nature of the software delivery model. In this model, user needs to have internet connectivity together with enough bandwidth to access ERP under cloud. More specifically, bandwidth charges, internet latency time, uploading and downloading package were considered determinant that contributed on system availability. Interviewee (R1, R3, R4) all raised this concerned "*... I don't think if we can manage to have a reliable bandwidth to run application remotely*", "*... what happened when the system going down for some time*" and "*... did you have a guarantee about the system availability all time 24/7 a day*" respectively. Fortunately the result is consisted with the finding of[47]. Cloud ERP required predictable, established and consistent internet connection to access web page, upload and download files, failure to one of these will affect business functions. South African SMEs faced this challenge of system availability in spite of having reliable internet connection[45].

3.6 Government support

This theme rose when (R5) asked to state his suggestion on cloud ERP adoption "*... government should support more in resources such as financial and human capital, also setting a proper and good regulation for Malaysia SMEs on cloud issue, specially on data storage*". The finding is concurrently with finding of Kim et al, (2009) regards on data storage and privacy each country should have its on rule and regulation to protect their SMEs data and information.

3.7 External Pressure

Past studies on technology adoption describe that, external pressure as an indicator for adoption decision[48]. SMEs are generally forced by different pressure such as competitor, government and loyalty customer. In this study when interviewee asked about their suggestion on cloud ERP adoption, (R1, R2, R3, R4, R5) theymentioned that they are forced to adopt new technology like cloud ERP by competitor, customer and consultant. (R1) "*...Our main tool for changing or upgrading our system or adopting new technology, usually we hire a consultant and come up with the proposed solution*".(R2) "*... Pointed out that, loyalty customers are becoming a part and parcel to this organization, so we took most of their suggestion to upgrade our services*". (R3, R4, R5) this interviewees stated that"*... the best approach for them is to get closer with competitors and they are happy of this strategy*".

3.8 Cloud ERP fit to Business

Cloud ERP fit to business in this study refers to the level to which cloud ERP match with SMEs business functions. This was the least concern with raised by (R4) on ensuring the function and features of cloud ERP module can fit with the requirement of SMEs in Malaysia context. (R4) he pointed out this concern "*...I think one of our concerns about cloud ERP is the functionality fit with our business requirement and task*".

4. Discussion

Cloud ERP systems are considered to be the potential alternative for SMEs rather than in-house ERP systems. Thus is important to understand the critical challenge that impacted the SMEs to adopt cloud ERP system in their daily business functions. In this study, we have identified eight (8) possible challenges of cloud ERP adoption in Malaysia setting. We deploy qualitative approach using semi-structure interview as the methodology for exploring these challenges. According to this study, challenges such as knowledge, data security, and ability of vendor to provide a support when it needed during implementation phase and after implementation are the main issues to be considered when decisions are made either to adopt or reject the systems. However, the results showed that, still there is a debate on data security concern between SMEs and cloud ERP expert. In addition trust of cloud ERP among SMEs is still low, based on this study trustee contributed much with system availability due to nature of system delivery model which need reliable and stable internet connection and enough bandwidth to run on cloud solution as well as cloud ERP fit to SMEs business requirement. Government support and external pressure are important factors when deciding on cloud ERP. Therefore, it appear that SMEs has gaining interest on cloud ERP solution, but cloud ERP vendors needs to consider their concern.

5. Conclusion and Future Work

The current study presents a critical contribution to information system adoption domain and particularly in cloud ERP topic by exploring the challenges

impacted the SMEs to adopt cloud ERP solution. Thus the current study filled the existing literature gap in the cloud ERP system topic. The study conversely has some limitations. First, it is conducted in just one state of a country (Johor Bahru State) and with minimum number of participants, therefore the study has limited generalizability on its findings. Secondly, the study identified SMEs representative which are not associated with IT professional discipline but are involved in decision on technology adoption, this leads to the limitation of drawing technical results.

Further research needs to address the above limitation such as the study should be conducted in other countries and quantitative approach should be used. Also future studies need to address the use of IT professional as the participant in their study.

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