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E-Business and Cloud Computing Awareness for Malaysian SMEs: A Recommendation from Academic and Industry Perspectives

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***Abstract*: This paper presents literature review that covered key areas in this research such as e-Business development, Cloud Computing concept and opportunities for Malaysian SMEs. This research aims to investigate the best practices of Cloud Computing within the e-Business context for the Malaysian SMEs. This paper also discussed the qualitative and quantitative approaches that were used to gather data on how the Cloud Computing can strategically provide technology and business opportunities to the SMEs in Malaysia. Deliverable from this research will be a set of recommendations to guide the Malaysian SMEs to adopt both e-Business and Cloud Computing technologies. This paper will only discuss a recommendation for creating awareness of Cloud Computing approach among the SMEs for their e-Business needs.**

Keyword: e-Business, Cloud Computing, SMEs

I. INTRODUCTION

The advancement in Internet technology have created a new business landscape that have changed the way business is conducted, increased ability to venture into wider and borderless marketplace, and accessibility at any time and pace. E-Business has become new mantra of businesses in today's world thus it is no longer perceived as just a business option but more as business requirements. However, studies showed that the e-Business adoption among the SMEs in particular is still considered low due to various factors [1, 15, 26, 27]. For example, lack of technical knowledge and skill and high cost for e-Business infrastructure [26]. The emergence of Cloud Computing concept is seems as one of solutions to assist Malaysian SMEs for adopting e-Business. The aim of this research is to investigate the common and current practices of online enterprises with regards to Cloud Computing. This concept was explored in this research and see how it has been discussed and attracted many enterprises for e-Business growth. Among the reasons claimed are the flexibility and efficiency that become one of good options for enterprises to extend or improve their current business operation [3]. Cloud Computing was also reported to offer great potential to improve productivity and reduce operation costs. The outcome from this research is a set of recommendation or guides that could assist the enterprises especially the SMEs to use and utilize the available technology for their e-Business development.

This paper contributes to the empirical evidence about the awareness level among the Malaysian SMEs with regards to e-Business and Cloud Computing concepts. By developing a better understanding of the awareness and exposure to e-business and Cloud Computing implementation, the SMEs will be able to see its adoption as one of strategic decisions and could take some measures to maximize the effectiveness of this transformation. This paper is organized as follows: First, we explain the research in general. In the second section, we present the Cloud Computing concept and the third section discusses the e-Business development and current practices among the SMEs and the possibility of having both e-Business and Cloud for initiating changes in current business processes and identifying new needs. The fourth section explains the methodology used and in the fifth section, we present the results. The discussion of the results and recommendation, the limitations of the paper and future lines of research are described in the same section.

II. CLOUD COMPUTING

Cloud Computing concept is defined in many ways. Garter (2009) described Cloud Computing as "*a service that offering IT capability with huge expansion power to different external stakeholders such as servicing customers through the Internet services*". With this definition, Cloud Computing has potential to provide high availability and ease of access to new IT consumers [4]. This includes, data access, software and storage in which the physical location of a system that delivers the services may not be transparent to the end users [5]. It is also reported that the Cloud Computing concept is going to be the common trending in IT services, which moves data away from personal computers into large data centers. With a large-scale growth of the Internet technology and usage all over the world, no doubt that any applications such as human resource and customer relationship management can now be delivered as common services over the Internet. A study that was conducted by Microsoft showed that companies from all over the world started to use cloud services via a subscription models such as in the U.S., Singapore, Malaysia, India and Hong Kong. Data security on Cloud is one of main issues highlighted by the SMEs; however they

do acknowledge that transparency on security practices would boost their confidence in the cloud [3].

A. TYPE OF SERVICES UNDER CLOUD COMPUTING

There are different types of Cloud Computing services which are supplied to clients depending on their needs. Cloud services model can be divided into three types of services namely, *Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as Service (IaaS)* [6].

- *Software as a service (SaaS):* A software delivery model that provides customers access to business functionality remotely or via the internet as its main services [7]. The most related and subscribed SaaS by most SMEs is Google applications such as Gmail, Google Docs and Google apps.
- *Platform as a Service (PaaS):* A cloud service model that operates on lower level of abstraction comparing to SaaS. Among the services offered to customer is to develop, deploy and maintain applications based on cloud infrastructure such as Microsoft and Google [7].
- *Infrastructures as a service (IaaS):* In this type of services, enterprises may keep their data and may use the processing and storage that initially provided by their own data center. Enterprises may utilize computational power based on their demand like Amazon web services[7].

For SMEs it can be seen that the suitable applications could be the SaaS, as recent studies shows SMEs are willing to use the applications under these services [8]. In the e-Business context, the SMEs could make use of SaaS as it does not involved any system development thus could help to overcome the lack of technical knowledge and skills for in house development and maintenance among the SMEs. It is also seemed to be more convenience for SMEs as no application incorporation issues involved and could save some cost in terms of implementation and maintenance [8]. Furthermore, to benefit the SMEs, the release of services do not demand any software variation thus, they do not need to spend additional resources for this initiative. It is reported in the review, that the most used SaaS applications by SMEs is from established organization such as Google (example Gmail, Google Docs and Google apps) [9]. However, in this study, an empirical study was conducted to investigate the Malaysian SMEs perception, acceptance and utilization of Cloud Computing in the context of e-Business.

B. BENEFITS OF CLOUD COMPUTING

Previous studies have reported the benefits of Cloud Computing in a general context [10, 11]. Among the benefits that can be seen through the Cloud Computing is: *Fewer maintenance issues, Lower IT costs, Unlimited storage capacity and disaster management, and collaboration of works* [12]. Table1 shows the benefits provided by using Cloud Computing.

Table 1: The benefits of Cloud Computing

Benefit	Description	Authors
Less maintenance issues	The maintenance of any software or hardware is simple.	[11],[10]
Low IT investment	Cloud Computing reduce IT cost and helps SMEs to save money.	[11],[10],[13]
Unlimited storage capacity	The cloud provides virtually limitless storage capacity.	[10]
Easier group collaboration	Cloud Computing no longer demands the correspondence of files from one user to another.	[12],[10], [11]

According to Kloch et al (2011) the most significant benefits of Cloud Computing can be summarized in four, scalability, virtualization, ubiquity and usage-bound payment models. [14, 15]. Miller highlighted the benefits of the Cloud Computing from the management and operation aspects such as easy to manage reduce operation cost, uninterrupted services and manage disaster recovery [11]. These benefits could make the large and small enterprises to start considering on how they can utilize the enabled technology. Another benefit, it could help enterprises to do business in a more efficient and flexible way especially for SMEs as well as increase the possibility to venture into online businesses. With the Cloud Computing, it could help to minimize the SMEs constraints such as limited budgets for in-house development or buying commercial applications, lack of IT infrastructure, and lack of technical knowledge and skills.

C. PROBLEMS AND ISSUES OF CLOUD COMPUTING

Previous studies have reported the problems of Cloud Computing in a general context [10, 13]. Among the problems and issues that had been highlighted in previous studies are: *security and privacy, network and performance*. According to Kerr and Teng, the security and privacy issues has caused some lack of trust among the SMEs [16]. This is especially when the SMEs have no direct controls of data stored in data center somewhere, where they cannot get physical access to it [10]. Among the available solution is to apply encryption to all data that includes system access credentials from unauthorized interception [13, 14]. Kerr and Teng stated that it is important for the SMEs to be aware of their responsibilities with regards to data confidentiality, integrity, and availability as well as the related information systems. Providing a standard operating procedure before any data transmission could also overcome the issues above [16]. Jadeja highlighted on performance issues that caused poor connection quality between the user and the Cloud Computing server [10]. Among the reasons are many users are connecting to the server at the same time

and large amounts of data are transmitted between the end user and the cloud server [10].

Based on the reviews above, it is observed that the problems and issues of implementing Cloud could make the enterprises reluctant to adopt the Cloud technology. However, they have to realize that Cloud Computing could also bring more benefits despite the reported problems and issues as mention above [14]. Thus, it can be seen that it is important to develop some awareness among the SMEs on the positive side of Cloud Computing. For instance, the companies can reduce cost by using *pay-as-you-go cloud*, means the enterprises only need to pay based on their usage [17]. Cost for systems implementation and maintenance can also be reduced as no application incorporation issues involved [18]. Cloud Computing was also commonly discussed within e-Business context such as online payment and customer relationship management that could assist the SMEs in their e-Business initiative.

III. E-BUSINESS: AN OVERVIEW

E-Business is defined by IBM as '*the transformation of key business processes through the use of Internet technologies*' [26]. This definition described e-Business as an integration of information communication technologies with business processes and management practices via the Internet [26]. It includes the business transaction and accessibility to reach the global virtual marketplace to improve current businesses, develop competitive advantage [19, 27]. It can be said that the emergence of Internet technology and its technological advancement have changed the way of performing businesses. E-Business can be presented in four states: *advance of internet, transformation, interaction and cooperation*. Using the Internet technology, it will allow enterprises of different sizes to develop new online business models that lead towards the improvement on how they operate and communicate with business partners and other stakeholders. In addition, e-business technological development is used significantly by larger companies too foster their business strategies particularly in the marketing process. Therefore, the SMEs can apply the same technology.[20]. But with the SMEs limitations, the progress towards e-Business adoption was slowed down by many factors such as cost, time, skills, technology and many more [27].

A. E-BUSINESS DEVELOPMENT AND OPPORTUNITIES FOR SMEs

In Malaysia, e-business has been confirmed to be an efficient and succeeded concept for evolving business and has been practiced globally. In fact, it has been applied as one of the medium to permeate international markets and it is no longer comprehend as a choice for business but more as business demand [22, 29]. As Malaysia moved toward developed information, communications and multimedia services, the awareness of any new technology among Malaysian enterprises are increased highly day by day [22]. Thus, a great number of high technology enterprises from around the world have participated in Malaysia Multimedia Super Corridor (MSC) Projects [22]. Ideally, SMEs are considered to be in a very good position to adopt and adapt to new technology due to its organization structure, less complex infrastructure and flexibility to implement changes at small scale compared to larger enterprises [25, 26]. It was reported that e-Business can offer SMEs various opportunities and benefits such as to reach new customers and suppliers, penetrate into markets international, regional or local, and increase their competitive advantages [23]. Further, it could also improve decision-making process and interactions with customers or suppliers online transaction and communication [22, 25, 26].

B. E-BUSINESS AND CLOUD COMPUTING

In e-business context, Cloud Computing potentials is not just about saving money, however it is also about rising profit, stay contact with the advance technology and assist business to support their business relation [2]. The adoption of Cloud Computing can profit the small businesses by assist them to gain competitive advantage over their rivals and quick access to popular use of business applications at affordable cost [18]. People have started to become relaxed with online programs and data storage space. The level of expectations in regards to simple and fast information is improving day by day. Many companies started to use Cloud Computing in their business process such as information and communication firms, financial firms, trading firms' law firms and hospitals. Cloud Computing services may be used with different industries to different size of enterprises. This is by providing IT service providers with new ways of dealing with business which provides benefits for non-IT enterprises or any other new e-Business start-up to earn benefits by using the Cloud Computing services in their business operation. This can also be done through resource sharing, minimizing organizational expenditure and collaboration between networks or organizations [26, 29].

Currently, Cloud Computing is mostly used by large enterprises for cost saving and the development of new ideas. It is observed that SMEs can also gain the same advantages due to their financial capabilities. Cloud brings scalability, flexibility and increase collaboration in e-business. Findings from this review indicate that it is beneficial for both large and small enterprises to apply Cloud Computing technology. However, a further study is required to identify the best practices that the SMEs should

follow with regards to Cloud Computing usage for their business processes.

IV. METHODOLOGY

In this research, both qualitative and quantitative approaches are used by using a structured questionnaire and interview. This research strategy was used to provide a breadth and depth of this research especially during the data collection process [28]. Qualitative research approach was chosen in this research to identify Cloud Computing awareness, applications and services among Malaysian SMEs in-depth this was accomplished by conducting an interview with an expert also it required an observation of SMEs common practices and future intention. For quantitative approach, a survey using questionnaire technique was used to reach more respondents that can contribute to this research. Malaysian SMEs were the sample populations in this study which consists of 58 companies. The outcome are a set of recommendations for Malaysian SMEs that was evaluated with SMEs to gain feedbacks on the proposed recommendations that was constructed to assist the SMEs based on Malaysia environment. Figure 1 elaborates on how this study was conducted.

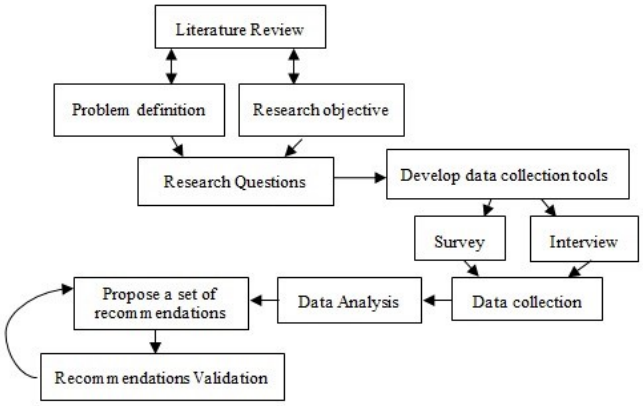

Figure 1: Key stages in the research process

V. RESULTS AND DISCUSSION

The questionnaires were distributed as many as possible but only 58 responses were used in this research. The results showed that 34% of the respondents were IT employees, support personnel and administrative officers, whereas 32% of the respondents were senior engineer, engineer and software engineer, 18% of the respondents were professional workers and the rest were managers. Majority of the respondents are working in the IT field, thus it was relevant as they possessed ample knowledge to answer the questionnaire. The results indicated that majority of the SMEs are aware of Cloud Computing by its definition (97%). However, there is still lack of knowledge of available Cloud Computing services and the opportunities that they can achieved. Table 2 below shows the results received to identify the awareness of Cloud Computing services and its characteristics. The results indicated that majority only knows the benefit of Cloud Computing in terms of data storage and data backup. However, they are still lacking in getting what Cloud Computing can offer at different platform, the availability of pay per use services and the deployment of Cloud Computing services in terms of what, why, where, when and how to use and position these services within their existing business processes as well as to speed up e-Business adoption.

Table 2: Awareness of Cloud Computing

The awareness of cloud characteristics and services	Survey results	Interview results
The SMEs aware that Cloud Computing can be used as software, storage capacity, data backups, etc	44%	They do know about it and may not aware of the services they use are Cloud Computing services.
Easy access to their business from any devices such as (Computer ,tablet and mobile)	28%	Yes
Aware of Cloud Computing services are the most common: SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service)	13%	Not aware of the available services
Aware of deployment model Private, Public, Hybrid and Community Cloud	9%	No clear understanding
Knowledge of Cloud Computing requirement	4%	No clear understanding
Aware of Pay- per-use services which means pay only for what you use.	2%	No clear understanding

A. RECOMMENDATION: CREATE AND ENHANCE AWARENESS OF CLOUD COMPUTING CONCEPT

The proposed recommendation consists of five recommendations: *1) Create and Enhance awareness of Cloud Computing concept, 2) Choose a suitable Cloud service models, 3) Choose a suitable Cloud provider 4) Choose a suitable Cloud deployment model 5) Test then apply the Cloud*. In this paper, we only discuss the first recommendation that is to *"create and enhance awareness of Cloud Computing concept*". As the results from the survey and interview showed that majority of respondents still have lack of understanding of what they can get from Cloud, it is significant for this research to propose this recommendation at a first step.

Table 3: Stages in Creating and Enhancing Awareness on Cloud Computing

Stage 1: Get to know the Cloud Computing concept **Objective:** To get to know what Cloud Computing is all about and how they can enhance their understanding.	**Stage 2:Get to Know Cloud Computing Potentials** **Objective:** To describes the Cloud Computing potentials.	**Stage 3: Assess your needs** **Objective:** To suggests ways on how SMEs can assess their needs and how Cloud Computing can be deployed for future e-business needs.
i) Self-learning through books, websites, online courses and free video tutorials such as "*IT WorldCloudComputingtutorial"(http://* www.itworld.com/saas/97423/cloud-computing-tutorial*).*	i) Self-explore and expose to Cloud Computing potential. For example, enroll into hands-on workshops such as "Cloud Ready workshop" (*http://www.cloudcompare.ie/cloud-ready-workshops/)*	i) SMEs self- assessment and business analysis using the available business tools such as SWOT analysis, value chain analysis and other available tools
ii) Formal training and attending workshop, seminar and conferences such as *Cloud applications workshops and Rackspace formal training*.	ii) Learn the benefits of Cloud Computing such as cost reduction that related to communication, system development and .Business outsourcing	ii) Conduct focus groups with employees to seek feedback regarding current applications and services, problem and issues and new potential.
iii) Actively involved in online discussion such as social network and online groups such as *Facebook and special groups' discussion on cloud such as "Perth Cloud Computing Special InterestGroup*	**iv)** Opportunity for business growth:The SMEs can think about turning over at least some of their infrastructure to a service provider**,** particularly if they're just starting out and building their infrastructure from scratch	iii) Consult an expert or Cloud Computing service providers

The aims are to guide the Malaysian SMEs on how they should start to get to know what Cloud Computing is all about, how they can benefit from it, and what they should do to opt for Cloud Computing. This recommendation is divided into three stages: *Get to know Cloud Computing, Get to know Cloud Computing Potentials and Assess your Needs*. The stages involve are summarized in Table 3.

VI. CONCLUSION

Cloud Computing can bring a great benefit to an enterprise's especially for SMEs due to their limitation such as lack of IT infrastructure, low IT investment and lack of technical knowledge and skills. However, there are some risks and issues that need to be considered when applying Cloud Computing. The adoption of e-business and Cloud Computing technologies and its development will lead to main changes in enterprises and its competitive space. These changes may create opportunities or could be new threats to the enterprises. This study investigates the potential of Cloud Computing within e-Business context and to examine the current practices among the SMEs in Malaysia with regards to Cloud Computing. Based on the results, a set of recommendations was proposed and evaluated by the selected SMEs. However, it can be seen that if more companies can participate in this research a better result can be produced.

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