



Cloud ERP in Malaysia: Benefits, Challenges, and Opportunities

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ABSTRACT

Cloud ERP systems are the recent trend of ERP systems and Cloud ERP is experiencing tremendous growth as well as it is considered as an alternative to local ERP systems due to its benefits associated with the deployment of cloud ERP compared to traditional ERP and the other characteristics that cloud computing technology bring it, cloud ERP does not require much prior investment and can be deployed immediately. Cloud ERP systems provide several advantages for small and medium businesses (SMEs). However, the adoption rate of this system in SMEs is below expectations. Because of the lack of success stories, companies do not have enough confidence, so they are reluctant to embrace cloud computing. before making the decision that whether to adopt cloud technology or not, SMEs prefer waiting in order to see and monitor and hear other companies' feedback on cloud ERP adoption. This paper highlights cloud ERP and its benefits, challenges, and opportunities. This paper will be useful to potential cloud ERP adopters and decision-makers in SMEs as well as service providers.

Key words: Cloud ERP, Cloud computing, ERP, SMEs, Adoption.

1. INTRODUCTION

Considering the intense competition, data and information are the critical assets of any company. This helps companies better understand customers, business issues, and users [1]. Because of the importance of big data, many companies are trying to adopt advanced information systems to organize, process, and store this data. ERP is one of the most important and most popular information systems for business enterprises, that was first used in the 1990s [2]. It is referred to as an integrated information system utilized to integrate each departmental function through entire the organization and to provide communication between them and suppliers [3]. The popularity of this solution is the common database which can share the information across operational areas and its functionality for integrated data department.

One of the most important goals that ERP system developers have sought is to address legacy, fragmented systems by integrating all functions into one system [4],[5],[6]. Merging jobs and businesses into one system creates value for the system and reduces costs via providing a right information to the right people at the appropriate time, thus helps to make good decisions [7]. Several studies have pointed to the importance of ERP in large, small and medium size enterprises [7–10]. The saturation of the ERP marketplace in large companies has made ERP suppliers emphasis on meeting the needs of SMEs [12]. SMEs make great efforts to find solutions to facilitate the implementation of information systems such as ERP which allow them to increase their sustainability in the business markets [13]. ERP vendors took advantage of new technological innovations such as cloud computing to use them to deliver the ERP system at a lower cost and new features that meet the needs of SME and croduce cloud ERP. Cloud ERP system is an ERP system that is rendered stacked with cloud architecture [14]. Using Cloud ERP in organizations has many benefits, including reducing massive financial spending. These companies will not be forced to purchase software licenses, servers, hardware, and other equipment and install them inside the company as it was previously when they were using the traditional ERP system. In addition to other features on cloud ERP include the OnDemand service, this service enables consumers to configure computing resources to be suitable to their current needs and access computing resources via the Internet using laptop computers, tablets, and mobile phones, and also enables the collection and sharing of computing resources among users, at the same time it could increasing or reducing these resources depend on the needs of the user. As can also be used to provide transparency about consumer use and invoices [15], [16].

2. ENTERPRISE RESOURCE PLANNING

One of the most popular and widely used information systems in organizations is ERP, which has been in use since the 1990s. The enhancing of competition in organizations has led to the spread of the ERP between the organizations. Additionally, it is considered one of the most used daily business functions in organizations [17]. The ERP system is

used to integrate the functions of departments in all departments of the organization and to keep contacts with all branches of the organization, regardless of geographical location [3], [18], [19]. The integrative characteristics of this system and its ability to exchange information across operational areas using databases have made this solution the most popular among all other information systems [1], [20], [21]. For ERP to be adopted, many organizational changes are required, which involve significant risks, so planned, executed and managed must be fully implemented [1],[22]. ERP integrates database including management of (material, sales and distribution, production, quality management, project management, planning management, service feedback and control, human resource, accounting and finance with industry best business practices defined by capability maturity model (CMM)) [17],[23],[25]. ERP enabled organization provides real-time online information that helps organization in decision making. Whenever any data is entered ERP software, it processes the entered data immediately and ensures the updated information available for sharing to every department of the organization. Moreover, present ERP systems are very user friendly and easy to use that fulfils all the dynamic information requirements of different sets of businesses and service provider industries.

Through the successful ERP implementation, we can link the departments of management, finance, manufacturing, human resource management, customer and external supplier to a common, integrated and visual database. This link will provide a lot of information about inventory, financial situation, processing, requests for supply, customer orders and desires, market needs [26]. These modules are a functional support for these departments. The common database in ERP increases the integration and access of employees to data in a way that facilitates seamless. Several previous studies have recognized the importance of ERP in the daily business of large and small and medium enterprises alike [27], [28]. For the importance of small and medium companies in the economies of countries, vendors of ERP are beginning to focus on meeting the requirements of small and medium companies, after the ERP market has saturated in large companies. However, the limitation of resources of small and medium companies created some difficulties to adopt information systems in their businesses [13]. The adopting of information systems like ERP in small and medium-sized companies is very important for them to be more sustainable and maintain their continuity and competition and expand their operations in the market. SMEs have made efforts to find solutions that enable them to adopt the ERP system [29].

3. CLOUD COMPUTING

NIST and “International Organization for Standardization” (ISO/IEC 17788) defined the Cloud computing as a model that can enable everywhere computing, conveniently, accessing to the network on demand in order to an of configurable computing resources shared pool e.g.(software

apps, wide networks, server, storages, and services) which could be fast provided and release with minimum management efforts or services providers interactions, and major characteristics for cloud computing such as on-demand [15],[30],[31]. NIST and “International Organization for Standardization” (ISO/IEC 17788) also described cloud computing in tow terms of "service models" and "deployment models". Cloud computing is classifying regarding to Service model into three types: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) as shown in figure 1.

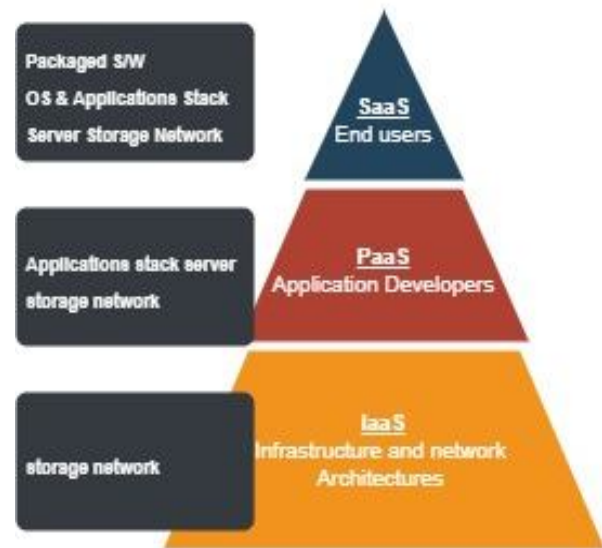


Figure 1: Cloud Computing Service Model

However, there are four deployment models in cloud computing: Public cloud, Private cloud, Hybrid cloud and Community cloud as shown in figure 2.

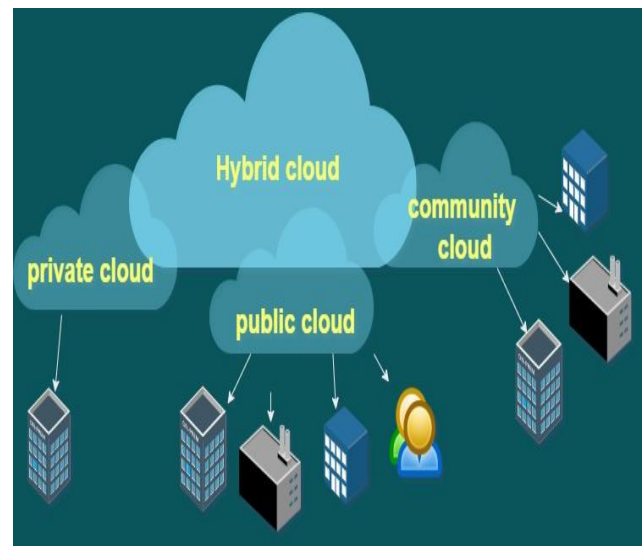


Figure 2: Cloud Computing Deployment Models

Over the past two decades, cloud computing has grown steadily and rapidly. This model enables the user to access computing resources and use them easily, conveniently and from anywhere, and can be launched with minimal

administrative effort and service provider interaction, these resources include (software, storage, servers..etc) [15], [32]. Cloud computing is still an evolving innovation, but cloud computing has already had a major impact on the day-to-day operations of organization. The use of cloud computing in companies gave many advantages to these companies such as reducing costs, bearing the costs of specialized services, and meeting customer needs [33]. Reports released predict that the cloud computing market will grow significantly from \$ (40.7) billion in 2011 to \$ (241) billion in 2020 [34]. Despite the many benefits that cloud computing has brought to organizations, the adoption of this technology is still below expectations [35]. Nevertheless, researchers expect a steady increase in the adoption and expansion of the cloud computing services market [36]. From the point of view of researchers, the adoption, implementation, and study of the benefits and challenges of cloud computing services is still an interesting research topic. Adopting IT innovations in organizations provides great opportunities to increase the efficiency of an organization's operations and improve its services while reducing costs and increasing business value [37],[38]. due to the adoption of innovations in information technology has become an integral part of organizations today, so decision-makers, whether vendors or top managers, must understand and analyse the factors that make up the adoption and implementation decision.

In light of the global business environment and intense competition, decision-makers must make critical and bold decisions regarding the adoption of information technology in institutions and this needs a broad understanding and awareness of this technology by managers of information technology by assessing the current state of the information technology environment and what are the options available and how to choose solutions The occasion as per the privacy and needs of the institution [37],[39],[40].

3.1 Malaysian Cloud Readiness

In 2020, Gartner expects that the public cloud services market will grow up 6.3% to reach \$(257.9) billion in 2020, up from \$(242.7) billion in 2019. Software as a service (SaaS) remains the largest market segment and is forecast to grow to \$104.7 billion in 2020, then followed by the Cloud System Infrastructure Services (IaaS) to reach (50,393) billion [41]. In order to know how prepared the countries are in adopting cloud computing, "Asia Cloud Computing Association" (ACCA) Readiness Index 2018 has evaluated (14) countries across the Asia Pacific region based on (10) factors. these factors include cloud (infrastructures, security, regulation, and governance, etc). Malaysia ranked as the 8th position for 2018 on the Asian level by (ACCA) evaluating, and for the second year in a row in same position [42]. that means the cloud computing adoption among Malaysian organizations is still not encouraging for adopting if we compared to other countries like Singapore and Hong Kong. According to (ACCA) evaluating, Malaysia perform in government regulatory and security factors was very good on, but it is not so good on cloud governance and cloud infrastructure factors.

In 2018, a survey conducted by Huawei showed that the 56 % of small and medium companies do not use cloud computing and that 44% use cloud computing related to storage such as Dropbox and Google Drive [43].

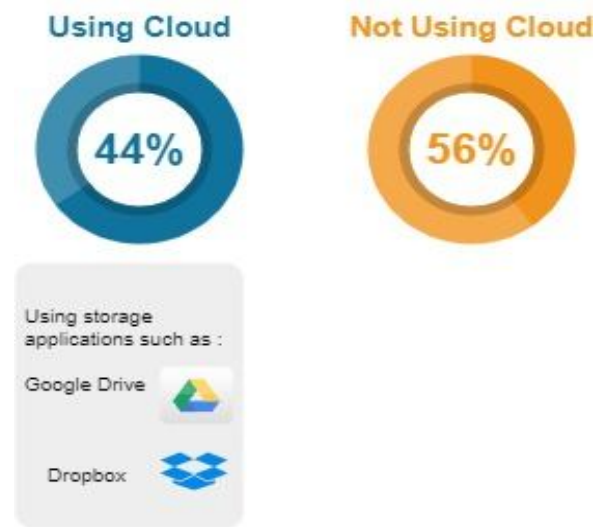


Figure 3: Cloud Computing using in Malaysian SMEs

Despite the rapid growth of cloud computing in Malaysia, the use of cloud computing has not yet matured. The adoption of transformation into cloud computing has become a very important trend. this trend expected to grow from \$ (43) millions in the year 2012 to \$ (900) millions by 2020 [44]. Given the great importance of cloud computing technology for the economy, the Malaysian government has supported and encouraged the organizations in all sectors to adopt cloud computing. According to "The National ICT Roadmap 2012", Malaysia ICT trends include (wireless intelligence, cloud computing, big data, connectivity, e-services, security, and analytic). As a result, for this support, cloud computing has started to be used in many sectors such as (government service, education, healthcare, business, tourism, transportation, and scientific) [45]. In 2017, Malaysian government has announced through (MDEC) the "Cloud First" initiative which aims to deliver cloud-based public services as well as to prompt the private sector to use and adopt cloud computing technologies [46].

4. CLOUD ERP

Cloud ERP has grown up Significantly worldwide in recent few years, Cloud ERP consider as a new delivery model for ERP systems that can provide the organizations more characteristics such as competitive advantages and reduce the cost. Quite a few organizations worldwide have either implemented or have the intention to implement systems of cloud ERP. In Panorama report, a consulting company specializing in ERP systems, the cloud ERP market share increased from 11% to 27% just in one year only, from 2015 to 2016 [47],[48]. The organization can implement new ERP systems in an extremely short period of time if they use cloud services models [49]. Oracle detected that about 70% of CFOs of companies indicated that they would consider cloud ERP

for their organization for the next 5 years [50]. The costs control, and the more customer satisfaction through the provision of services in real time, All this with the emergence of scalable on-demand software solutions led to the transformation of many organizations to a strategic shift is to move away from on-premise software solution [51]. ERP Cloud has many advantages, and the most important of this advantage is the mode of deployment. This is because ERP will make organizations save cost of purchase of the system, provide infrastructure, running, installation as well as maintenance. The costs will be limited only to the purchase of a license for use according to the need of the organization and thus will reduce costs significantly and enable organizations that do not have the necessary funding to work on the ERP and will be available for all regardless of the size of the organization. despite these benefits and advantages provided by the Cloud ERP that, the adoption rate is not as high as expected, and organizations seem to be reluctant of adopting applications of cloud-based enterprise solutions. We need to understand the full range of critical success factors and to know what the barriers to greater deployment of this technology are, to enable companies to adopt cloud computing and build solutions based on them. In literature we note there is a lot of research that study the critical success factors of traditional ERP while we note the lack of those research that is handling Cloud ERP. The Enterprise Resource Planning (ERP) systems vendors began to offer their best business processes as cloud solutions whenever more and more organizations that adopts on-demand software solutions. Vendors can provide the right conditions for SMEs, increase their competitiveness, and achieve sustainability by reducing costs through the adoption of cloud computing solutions. Previously ERP program suppliers began serving large organizations mainly due to the high costs associated with initial program purchase and licensing, operation, configuration, and subsequent maintenance costs. Then it seemed open to small and medium-sized companies (SMEs) that formed the backbone of the country's economy. With more and more software solutions as a (SaaS) ERP service in the market, SMEs are starting to think about adopting these solutions instead of internally developed applications, trying to provide a better relationship with customers, gain new markets and increase profits among other benefits.

4.1 Benefits and Challenges of Cloud ERP

Until recently many SMEs could not afford adoption traditional ERP systems, , due to the costs of this system and the management of ERP systems in On-premise were expensive and significant resources commitment is required [52]. On-premise ERP systems include huge investments in hardware infrastructures and software licenses, and their implementing require costs, time-consuming, and wide risks and changes in business processes [53]. Therefore, it was natural that most of ERP's clients were the large and most profitable organizations [51]. In order to cater to the needs of SMEs, ERP vendors such as SAP, Oracle, and Microsoft

employed cloud technology to offering scaled-down and less expensive on-premise solutions [27].

despite of advantages and benefits provided by cloud ERP, there are many difficulties and challenges [28], [54].

According to [55] survey, one of the largest cloud-based ERP surveys (800 responses), the main benefits of cloud ERP were: firstly, lower TCO. simply maintaining existing systems. Cloud-based ERP could reduce the expense of ownership via percentage 50 +, free-up IT budget in order to concentrate on the project's funding needs. Secondly, it could be at any time and wherever accessing. This mostly under the notified benefits of the cloud. With web-based ERP it could accessing to the information in secure way from wherever, it is like ability access your Gmail or Amazon accounts. Third, is related to streamline business processes, due to fact is that cloud ERP systems are more novel than their old on-premise counterparts.

regarding the concerns, the major one was related to security. It is essential to handling: "are own data lower secure if it is in a data centre, against in own server room?"

Other areas of concern were more reliable if compare with in-house systems. The third area was customizing. "can I be capable to customize a cloud-based ERP system as much my on-premise?".

[28] determined several benefits and issues in cloud ERP adoption that frequented repeatedly discussed by different researchers. the benefits were: Cost Aspect (Low Maintenance Cost, Low Upfront Investment cost), Technology Aspect (Increase scalability, Continuously system enhancement, Reliability). regards to issues were: (Security Aspect- Lack of control, Privilege Abuse) Technology Aspect (Unpredictable Performance, Difficulty in Integration, Limited Customization), Vendor Aspect (Vendor Lock-In). While [54] indicated that the benefits were: reduce up-front cost, a decline in operation cost, fast implementing, scale, concentrate on core competencies, use advances technologies, fast update and upgrade, Improve ability to access, navigation, and easy use, easily integrated with cloud service, Improve system availability and disasters recovering, costs transparencies, automating the sales, use security standard, complimentary trial. And the challenges were: Subscriptions costs, Security risk, risk in perform, risk in strategy, Compliance risk, Losing of information technology competency, Functionality limitation, SLA problems, Sensitive of information, Controlling of cloud ERP, the ambiguous cost in the contract (hidden cost), Lose of knowledge technically, Migrations among CSPs, ERP needs as services standard, awareness about the cloud, Start-up supporting, Organization challenge, Choose among cloud ERP systems.

5. SMALL AND MEDIUM ENTERPRISES (SMES) IN MALAYSIA

SMEs are known for the sustainable development of the country and its initiatives and have a major role in bringing about the economic growth of the country [56]. It is the backbone of any country's economy, especially developing countries. In Malaysia, SMEs account for 97.3% of the total

number of companies in Malaysia, and they employed 5,854,142 people, equivalent to 57.4% of the total employment in the country; The percentage of Gross domestic product (GDP) for SMEs was 38.3%, as mentioned in the Department of Statistics Malaysia (2018)[57].

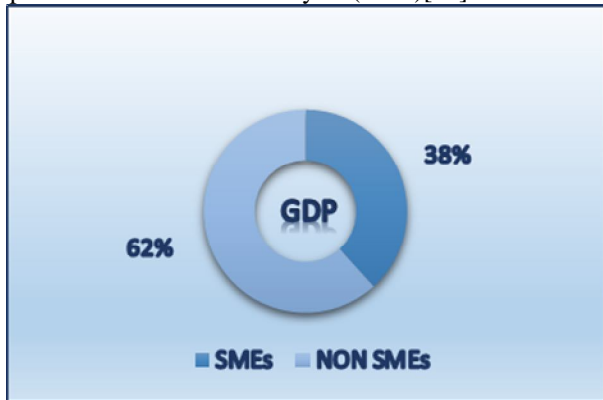


Figure 4: SME Contribution of Malaysian GDP

SMEs in Malaysia can be defined into two categories base on (1) the total of sales turn-over annually. (2) the number of fulltime staffs [57]. Generally, SMEs could categorize to major three categories as shown in figure 5:

- i. According to the manufacturing field, SMEs define as firms with sales capital that didn't exceed RM50 m, or the number of fulltime staff didn't exceed 200.
- ii. related to the service and further fields, SMEs define as firms with sales capital didn't exceed RM20 m, or the number of fulltime staff didn't exceed 75.

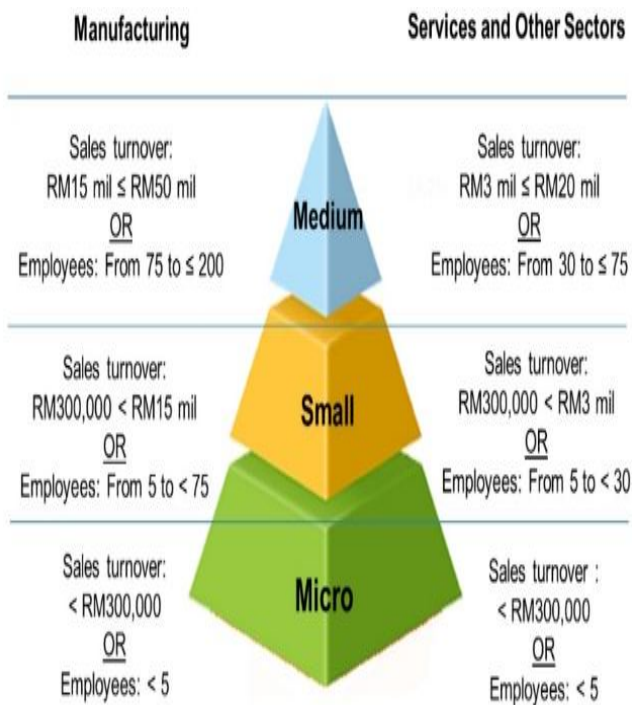


Figure 5: SME category source [57]

Malaysian SMEs are striving to adapt to new business landscape to survive and succeed. Through continuous technological development and improving product quality, local small and medium-sized companies were able to play a pivotal role in maintaining economic growth [58].

Malaysia has worked to encourage the adoption of technology among small and medium-sized enterprises by developing motivated and supported strategies for the environmental and economic context. It has launched many initiatives that support small and medium enterprises (SMEs) such as soft loans over five years with minimal interest to urge them to purchase and use information systems to support their businesses [56]. Small and Medium Enterprises (SMEs) can increase their ability to compete with large companies in their businesses by employing information and communication technology (ICT). Through the use of ERP it can help organization manage business operations systematically [59]. According [11] to Malaysian SMEs are very careful and slow in ERP adaptation and some of the risks which prevent the SMEs to take step in implementation of these systems into their business flow are also discussed.

5. CONCLUSION

Cloud computing enables firms to deploy and adopt innovative technologies such as Cloud ERP. The continuity that the Internet provides to the Cloud ERP and the increasing reliability of the cloud infrastructure has made it economically viable and enabled it to gradually replace the traditional ERP. There are many benefits associated with the deployment of cloud ERP compared to traditional ERP systems such as continuity, low implementation costs, licensing and support, reduced implementation time of IT projects, and increased speed that enables enterprises to adapt to changing market environments, etc. Overall, Cloud ERP is experiencing tremendous growth and it could possibly be a force to be reckoned with in the future. Despite the many benefits of cloud ERP such as low upfront and cost of implementation and decrease in the duration of implementation that comes in the adoption of Cloud ERP, there is however a clear aversion in its adoption by several SMEs and still below expectations. Several studies have attempted to discover and study the factors that encourage organizations to adopt a cloud ERP system. Some studies identified factors such as ease of use, scalability, the ability to focus on core business activities, and lower implementation costs, as factors that have a major impact on adopting cloud ERP. Unless these factors are studied How it evolved over time, the overall vision of cloud ERP adoption cannot be achieved. The previous studies only focused on ERP implementation in large organizations, while research on ERP implementation in SMEs is still lacking. Even ERP vendors focused on ERP implementation in large organizations because SMEs companies are unable to bear the costs of purchasing and implementing ERP systems. In the last period, after the large corporate market was saturated, and given the recognition of the importance of SMEs to their significant contribution to countries' Gross Domestic Product

(GDP), many ERP providers began to introduce cloud-based ERP systems to meet the needs of SMEs. This includes Microsoft Azure, SAP, and Oracle NetSuite. Because of the lack of success stories, companies do not have enough confidence, so they are reluctant to embrace cloud computing. before making the decision that whether to adopt cloud technology or not, SMEs prefer waiting in order to see and monitor and hear other companies' feedback on cloud ERP adoption.

ACKNOWLEDGEMENT

A special thanks to Optimization Modelling Analytic and Simulation (OPTIMAS) research group under Center for Advanced Computing Technology (C-ACT); and Faculty of Information and Communication Technology (FTMK) for the use of the existing facilities to complete this research

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