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A REVIEW OF KNOWLEDGE MANAGEMENT IMPLEMENTATION THROUGH CLOUD COMPUTING IN MALAYSIA

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ABSTRACT. Knowledge Management (KM) is moving towards new paradigm in which organizations are expected to change how knowledge are created and managed, by adopting new tools such as cloud computing. Cloud computing has started to be one of the new opportunities for organizations in Malaysia in the current business landscape. This paper attempts to explore the new perspective of KM through its implementation in cloud computing; by discussing on the challenges and benefits of using cloud computing as the technology platform for supporting KM implementation in organizations.

Keywords: Cloud computing, knowledge management, Malaysia

INTRODUCTION

Most of the organizations have begun to realize and acknowledge the existence and importance of knowledge management (KM) and its ability to improve organizational performance and ensuring sustainability in the competitive marketplace. Knowledge from different resources has become the strategic weapon for organizations to be different from the competitors.

In relation to this recognition of the value of knowledge, organizations have started to strategize their own KM initiatives; covering activities such as finding, mapping, gathering, filtering information, developing new knowledge, and converting personal knowledge resources as well as adding value to information to transform into knowledge. *"KM is a dynamic process that can be seen by two related perspectives that are business and technology"* (Aksoy & Algawiaz, 2014). Therefore, in order to achieve successful KM implementation in organizations, KM should be aligned with business objectives as well as technology, which is changing rapidly. This notion is stated by Sveiby (1997), where he sees KM approaches are focused on three dimensions; i.e. People, Process and Technology.

In the same study by Sveiby (1997), it can be noted that technology plays a big role in supporting KM implementation in organizations. Therefore, the needs of tools and technology as a platform for KM are detrimental as these tools and technology not only facilitate KM processes, but also determine KM success in fulfilling the operational and strategic needs and requirements of the organizations.

The rapid changes in technology nowadays has led to the emergent of many new tools and platforms. One of the pertinent new technologies is cloud computing, whereby cloud computing based platform for KM implementations in organizations has also emerged (Gunadham, 2015). Cloud storage application is given significant attention due its high availability and easy accessibility especially for the knowledge workers. Gartner (2009)

described cloud computing as *"a service that offering IT capability with the huge expansion power to different external stakeholders such as servicing customers through the Internet services".*

This paper discusses the challenges and benefits of using cloud computing as a platform for supporting KM implementation in organizations. This paper then pursues to discuss the implementation of KM through cloud computing in Malaysian environment.

LITERATURE REVIEW

Knowledge Management (KM) & Knowledge Management System (KMS)

The concepts of KM started more than two decades ago (Rafiq, Bashar, & Shaikh, 2014). Many researchers have different views and perspectives regarding knowledge as well as KM, thus leads to no standardized definition of both terms as they are depending on the context of use.

Davenport and Prusak (1998) defined knowledge as a fluid mix of framed experience, values, contextual information, experts' insight and grounded intuition that provides an environment of approach and framework for evaluating and incorporating new experience and information. This understanding is supported with the research done by Alavi & Leidner (1999), where knowledge is defined as a process of information through the mind of individual. Undoubtedly, knowledge needs to be shared within organization to reap its value. Hence, the key challenge in managing knowledge is the ability to integrate and apply specific knowledge of organizational members to create and sustain competitive advantage (Gunadham, 2015).

Generally, the purpose of KM is to make knowledge usable in organization as a whole and to share it among individuals (Bimol, Saikia, & Devi, 2014). Despite the various definitions of KM, it can basically be defined as a set of spectrum which includes the creation, acquisition, representation, transfer and application of knowledge. In other words, KM assists organizations to organize and transfer important and valuable information for decision making, planning and analysis to achieve the organisations' goals and targets. According to the various definitions, it can be concluded that KM concentrates on *'doing the right thing'* instead of *'doing things right'* (Moshari, 2013).

Therefore, to have an effective knowledge sharing, collaboration and information delivery environment, organizations need to consider the adoption of Knowledge Management Systems (KMS). KMS consists of hardware, software, people and environment of an organization that supports the creation, transfer and dissemination of knowledge among employees, thus assisting in establishing a valuable knowledge ecosystem in organization. According to King and Marks (2008), when an employee's knowledge-sharing behaviour is measured, it has a strong relationship with organizational support, and thus can contribute to the achievement of the organizational objectives.

Cloud Computing

Cloud computing is an emerging application platform and has drawn much attention from industries and academic fields. The term cloud computing first emerged in 1997 but it only became prevalent recently. The term 'cloud' is metaphorical and usually refers to a massive pool of resources such as hardware and software that are usable and easily accessible over the Internet (Lin, 2012).

The main objective of cloud computing is to share data and services among organizational users in IT environment. In addition, cloud computing can assist in reducing IT barriers to

innovation. For instance, Facebook and YouTube can be considered as the main IT-services innovators, which most of these IT-services are made possible by adopting cloud computing. Therefore, cloud computing is a new practical concept of computing based on network access. In other words, it is a technology which allows sharing of resources including hardware, software and information over a network.

Accessing KM through Cloud Computing

Conventionally, KM processes such as knowledge creation and transfer have occurred through various traditional methods such as discussion, face-to-face communications, counselling, staff development and job rotation (Singh, 2013). However, as organizations expand virtually and globally, these traditional approaches may become inadequate and ineffective. Cloud computing helps in overcoming the organizational boundary limitations by allowing automatic update and access to the newest and most relevant knowledge in real-time basis to enhance the provision of services and open access management.

Cloud computing has been identified as one of the new approaches in KM and has a great influence in the development of KMS. Cloud computing not only provides a central location to manage data/information and knowledge, but also provides a platform to make them available on-demand, like other computing resources. Among the benefits of integrating Cloud Computing with KMS are to cut costs, adopt new practices, explore new business models and provide Knowledge as a Service (KaaS) (Rafiq, Bashar & Shaikh, 2014).

Current literatures such as Gunadham (2015) pointed out the link between KM and cloud computing in improving organizational performance. Numerous researches have also indicated on KM improvements by using cloud computing technologies; which have formed a new dimension for KM implementation. Thus, cloud-based KM will help to minimize the financial expenditure associated with KM implementation as it does not require organizations to buy and maintain the required equipment, infrastructure and applications. This notion is also supported by Liao, Chih and Fu (2011) who indicate that cloud computing contributes in achieving KM's main objectives in a more effective and efficient manner.

KM ADOPTION IN CLOUD COMPUTING

Since the emergence of the concept of KM through cloud computing, several related researches and works were undertaken to study the different perspectives of KM in the cloud. Table 1 describes the works related to KM in cloud computing platform.

Table 1. Related Works and Findings Concerning KM in Cloud Computing

Author	Findings/Results
Chow (2007)	In using cloud as the storage platform, this application can help in improving the quality of the operations, inventory management and employee satisfaction.
Delic and Riley (2009)	The users in the cloud environment will have to have a different set of skills in order to gather, process and present the knowledge of the business
Abdullah, Eri and Talib (2011)	KMS model can be implemented by using KM functionality and through networked computer. In order to ensure that KMS and cloud computing can be used effectively, authorities need to consider on SLA.
Krstić and Petrović (2012)	Organizational learning can be supported by using knowledge sharing through cloud computing which could result in more positive performance of the organization.
Bimol et al.(2014)	Cloud based computing is key that any devices can be connected with each

	other for learning purpose. The most common application for KM through cloud computing is OCLC by exchanging data and facilitate all the information by using Google for each services.

Cloud environment provides organizations the possibility to access the required organizational information from anywhere. It has a great possibility and capability for providing KM services that can be used extensively for various business areas. According to Ishaq and Rana (n.d.), *"developing countries can follow models and best practices adopted by other governments by utilizing cloud computing technologies to achieve similar success".* The studies listed in Table 1 show that a number of positive contributions can be attained in the application of Cloud Computing in KMS domain such as improved knowledge sharing and better organization of knowledge, thus can be considered as a promising ICT approach to improve the way people and businesses perceive ICT as a service.

CHALLENGES ON KM IMPLEMENTATION IN CLOUD COMPUTING

Although KM in cloud computing is perceived as a way forward for KM, many organizations are still facing some challenges in adopting this approach. All these challenges need to be considered and addressed during the implementation stage to ensure the success of KM adoption through cloud computing. Below are the relevant challenges obtained from the literature and it is synthesized into three categories:

Change Management

The key concerns about KM implementation in organizations primarily focus on the culture, managerial and instructive issues. For cultural issue, the organizations are worried over the implications for change management, including the capability to persuade individuals or groups of people (i.e. knowledge source) to volunteer or share their insights to other parties (i.e. knowledge recipient), especially when the knowledge source is in charge of demonstrating benefits. Another main challenge focuses on the members' involvement in implementing KM, whereby it requires collaboration among the numerous players such as technical staff, business users, top level management, and the experts on approaches to execute KMS efficiently.

Lack of Trust

Although the popularity of cloud computing is increasing rapidly, potential customers may perceive security issues as one the factors inhibiting wider adoption of cloud computing services. This can be due to lack of trust, which may be caused by the perceived lack of clarity in service level agreements (SLAs); security or privacy policies; standard terms and conditions, and sometimes in the immaturity of cloud services. Transparency of cloud service providers in their approach to information security is the key to building trust in their services. According to Alharbi (2014), a study by Fujitsu Research Institute showed that 88% of potential cloud consumers are worried about "who" have access to their data and demanded more transparency on the management of the backend cloud physical server. This issue is likely due to the resources in cloud are shared with other unknown parties as well as the lack of control over these resources in cloud computing environment.

Under the National Key Economic Area (NKEA) Business Services (BC) Entry Project 2 (EPP2), a new project called Government Data Centre (PDCA) was initiated by the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU). Among the main item in PDCA is on the compliance with SLA minimum standard on data centre and disaster recovery infrastructure and services, which could support the capability of KMS through

cloud computing implementation. 49 agencies in Malaysia have participated in this initiative and is considered as one of the milestones for KMS through cloud computing initiatives in Malaysian public sector.

Data Leakage and Security Issues

KM through cloud computing contains and stores infinite amount of valuable data and information. This information is vital for organizations in this new era and to keep these information secure from any threats have become imperative. The challenge is not only to secure the valuable information, but also to ensure the integrity, confidentiality and availability of information at all time.

A survey conducted on Malaysian SMEs found that only a few of them take security as one their main priorities as compared to other business related priorities, despite that majority of them believe information security breach would be harmful in achieving their business objectives. There was also a research conducted by Cyber Security Malaysia to assist SMEs to effectively prevent and minimize possible security threats and encourage security-related measures adoption, which aims to build the confidence among SMEs to conduct business online through KMS.

KM THROUGH CLOUD COMPUTING SCENARIO IN MALAYSIA

There are limited research papers regarding KM implementation through cloud computing in Malaysia. Only limited number of research was available, focusing on Small and Medium (SME) enterprises; education; services and health sectors.

Table 2: KM through Cloud Based Oppurtunities in Malaysia

Sector	Cloud Based KM Opportunities
Transportation	GrabCar apps taxi booking via a cloud-based mobile reservation system. Back end administrator of GrabCar is able to trace booking record logs and movement of subscribed taxi drivers.
Education	1Gov*Net and 1Bestarinet is a network infrastructure includes 1000 CPU cores to enable access to cloud-based education. KM through cloud can also be found through knowledge sharing services among teachers and management community in MOE. Public universities in Malaysia are also expanding their research and development with cloud service adoption.
Healthcare	Using real time cloud based medical system; it will integrate between ambulance, medical history of the patient and on time notification to the doctors. The integration of these elements will expedite the process flow as essential steps to save patients.

The emergent of cloud storage application is derived from cloud computing concept and the popularity is rapidly increasing. For example, among the popular cloud storage application in the market are Google Drive, Dropbox, OneDrive, Box and etc. the cloud storage application is widely used including in Malaysia as Dropbox is considered as one of the most common KM tools in cloud computing with 274% growth in users in Malaysia (Millward, 2013).

Cloud computing is a revolution that could resolve KM problems in many organizations, including in Malaysia. The collaboration and relation between both areas is a new strategy that offers new paradigm of gathering and redistributing knowledge with cloud-based

enterprise applications which assist in improving organizational performance. Within the collaboration, KM can be accessed by individual knowledge workers through the cloud platform anywhere and anytime needed.

Based on above discussion, it can be observed that KM in cloud computing provides more flexibility, lower costs, greater scalability, ease of use and, if done correctly, increased security and facilitate disaster recovery. This facility will help organizations to gain competitive advantage and indirectly will enhance organizational performance. It can also be observed that the implementation of KM through cloud computing in Malaysia is still in infancy stage. Kassim, Azman and Daud (2014) claimed that cloud technology implementation in Malaysia is considered new and only a few have realized the benefits and begin to take advantage of existing applications hosted on cloud platform. Thus, many angles and perspectives need to be explored further to prove that KM can be successfully implemented in cloud computing environment.

CONCLUSION

KM is moving towards new phases whereby the organizations are expected to change the approach to knowledge creation and management by adopting new tools; known as cloud computing. It can be observed that the use of KM through cloud will help organizations in Malaysia in sharing resources and knowledge in a faster, reliable and more cost effective manner. This approach will help the organization to gain benefits and vast opportunities for enhancing the services to the customers or stakeholder. At the same time, this approach will also reduce costs and other technology complexity and improving workload optimization. Cloud computing also promotes employee satisfaction and better knowledge representation and management.

To attain the benefits mentioned above, organizations in Malaysia need to have proactive attitudes and start to adopt KM in cloud computing. Cloud computing has begun to transform the way systems are built and services delivered, as well as providing with an opportunity to extend their impacts. In addition, organization needs to harness the benefits of cloud computing in knowledge management as this will go a long way in reducing the difficulties faced in the traditional knowledge management system.

Hence, due to the limited studies related to KM implementation through cloud computing in Malaysia, it opens for future works on the level of acceptance among public sector as well as on the associated risks in using cloud as the platform for KM. This will provide significant benefits and clearer picture of KM through cloud computing practices in Malaysia.

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