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CONCEPTUAL FRAMEWORK ON SUCCESS FACTORS RELATED TO CLOUD COMPUTING

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ABSTRACT

Our study examines the effect of relational, managerial and technical IT-based capabilities on cloud computing success; and analyzes how this success impacts firm performance with respect to the processes and operations supported by cloud computing. Additionally, we investigated the complex relationships that exist between IT capabilities and the public, private and hybrid cloud delivery models. The aim of this study is to identify the critical success factors that impact the organization to use cloud computing in their business processes. The author conduct a literature review study to identify the factors by collecting thirty papers from reputable database journal such as emerald, science direct, IEEE and Google Scholar. The author was using "cloud computing" as a keyword. The author found that cost reducing, flexible, redundancy and reliability, scalability, collaboration, efficiency, virtually and availability as critical success factors as the impact of the use of cloud computing for organizations. Further research can be conducted to validate this finding by developing an instrument and take a survey of organizations. Furthermore, an evaluation of the interrelationships indicates that the public and hybrid cloud delivery models may be more dependent on relational IT capabilities for cloud success while the flexibility and agility of the firm's internal IT (technical IT capability) facilitates the public cloud. We discuss how IT-based capabilities may be used to leverage cloud delivery models to positively influence the successful implementation of cloud computing, and ultimately, firm performance for the processes and operations supported by the cloud.

KEYWORDS: IT capabilities, Public cloud, Hybrid cloud, Private cloud, Firm performance.

INTRODUCTION

Cloud computing is a technology that has been adopted by organizations because of its dynamic, scalability and availability of its resources so that users can use it virtually. Other author stated cloud computing is a new

technology in an IT that make change, how, internet and information system to operate all over the world. The early concept of cloud computing was to provide software and hardware resources which can be accessed by organizations and individu. As the next generation of data center, cloud computing has virtual services like hardware, user-interface and logic application with a variety of QoS (Quality of Service) depend on the need of the user. These services can be spread through the internet. Cloud computing can be the new alternative for companies to maintain their data. One of cloud computing services is data management application. This application will reduce the cost of the company to maintain the hardware in their office. Although people in an organization already know about the benefit of cloud computing, the use cloud computing still has obstacles. This is because the organization does not understand how cloud computing can affect the way they are working.

Cloud computing is quickly changing the nature of business and represents a projected $3.3 trillion transformation in the computing environment (Ballmer, 2010). A large number of organizations and government agencies are expected to rely on the cloud for more than half of their IT services by 2020 (Gartner, 2011). About 90% of business and technology leaders expect to implement some type of cloud computing by 2015 (Berman, Kesterson-Townes, Marshall, & Srivathsa, 2012) leaving many organizations scrambling to develop coherent plans for successful cloud deployment (Windstream, 2014). Cloud computing represents a transformational shift in IT that is rapidly changing the way in which organizations manage and deliver IT services over the internet (Shawish & Salama, 2014).As cloud computing becomes mainstream with a broad set of enterprise applications, the role of IT in organizations is strategically shifting toward reliance on external suppliers of infrastructure, software and services (Fauscette, 2013).

Innovative technology adoptions such as cloud computing present challenges to the organization’s bottom line (Zhuang, 2005). To this point, Lim and Oh (2012), claim that cloud delivery models may impact differently the effects of IT capabilities on cloud success. Therefore, research that focuses on how a firm uses its capabilities to successfully meet those challenges will inform others about the specific IT capabilities that will more likely lead to cloud success. The research questions addressed in our study include: (1) What is the distinct influence of relational, technical and managerial IT capabilities on cloud implementation success? (2) How do the relationships in the model differ according to the cloud delivery structure that is chosen? The research model is tested using data collected from a global sample of 302 organizations that have adopted one of three general types of cloud delivery structures: public cloud, private cloud, or hybrid cloud. The empirical results indicate that, in general, relational IT capabilities are the most influential in cloud success. However, the results also show the specific ways in which firms combine their IT capabilities to best facilitate public, private or hybrid cloud delivery structures. While relational IT capability offers advantages for private and hybrid cloud delivery, technical IT capabilities are an important facilitator of the public cloud, and managerial IT capability is fundamental in any cloud delivery approach.

CLOUD COMPUTING

Cloud computing is a pool of configurable computing network (e.g., networks, servers, storage, applications, and service) that is accessible as an on-demand network with minimal management effort or service provider interaction. In another article the author mention that a cloud computing is a virtual and distributed computing over internet using web and software services. Cloud computing also refers to the use of computing resources as a service, over a network. For accessing of services, the tenants should pay for it. From all of definitions of cloud computing above, the author can conclude cloud computing is on-demand computing with services that can be accessed through the internet. All of services are virtually, because the consumers only access those services every time they are needed for using it. There three services that covered by cloud computing providers:

a. SaaS: an application that can be used by hosts and managers in their own data center. Those users will access this application over the web. SaaS providers also combine its service with PaaS or IaaS as their expanding services.

b. PaaS: The occupants are using this application to develop and deploy their website. They do not need to worry about the infrastructure to develop a website. This service is able to support the complete life cycle of building and delivering web applications and services completely available from the internet.

c. IaaS: as its name, this service provides hardware (server, storage and network) and software (operating system, virtualization technology, file system) as a service. The tenants save their money and time. This service has been created to replace a traditional hosting system that does not require any long term commitment. Users only use this service on demand.

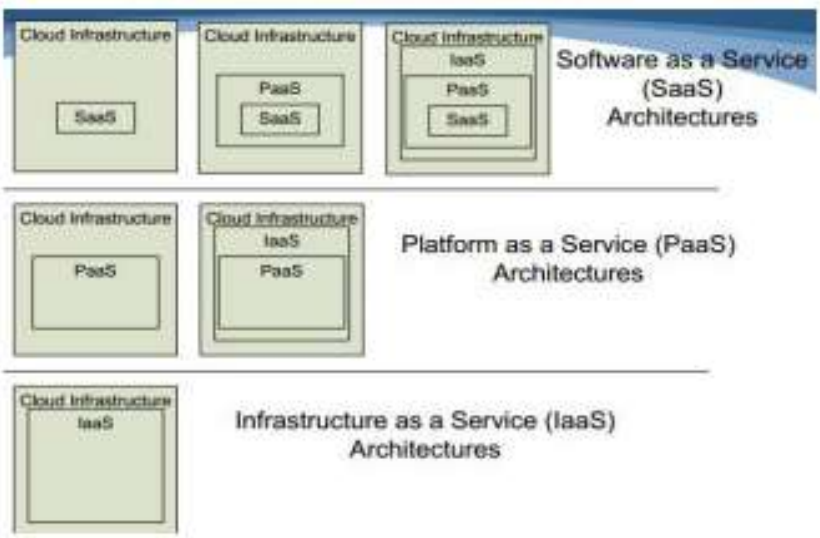

Fig 1. Service Model Architecture

There three models of cloud computing. Applications that can be accessed through the web page called by the public cloud, for example social network, email services and sharing photos and document application. If cloud computing services only can be accessed in private networks, this service called private cloud. The hybrid cloud is also running on physical servers and ensures the proper function of other variants. Another part of cloud computing is its architecture. There are two layers of its architecture, lower layer which is placed for physical resources such as storage servers and application servers. This layer management separately by virtual level to share services, storage capacity and security context.

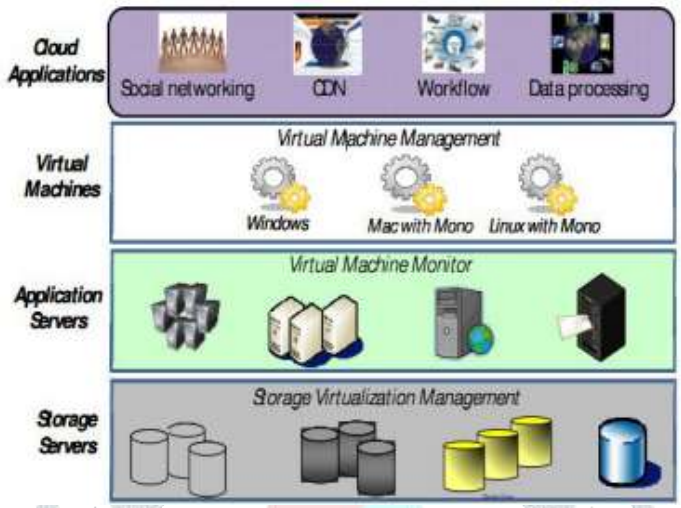

Fig 2.Typical Data Center

ORGANIZATIONS USE CLOUD COMPUTING

A. Cost Reducing

The profits that cloud computing providers get are from the cost which is paid by the consumers for accessing these services. In other hand, consumers, such as enterprise, are enamored by the chance to reduce costs because of the cloud computing providers reserve “in-house” provision of these services, another benefit of cloud computing pays only for what you use. This motto means, the consumers charged by single service that they use, when they access computing services. In addition, consumers no longer need to put a lot of money to build and maintain IT infrastructure. At any time they can use computer utilities that are sold by the providers. Moreover, servers from cloud computing are capable to do multi-tasking of the computation so that the consumers can get results as quickly as they expect. Pay separately per resource is another aspect of reducing cost of cloud computing because most applications do not make equal of computation, storage, and network bandwidth, some are CPU-bound, others network-bound, and so on, and may saturate one resource while underutilizing others.

B. Flexible

Flexibility of cloud computing services can be achieved by proving ability to access its services of any kind of device. It does not matter what kind of hardware and software that providers use. It is because the providers isolate the user's devices from its infrastructure. As the business grows enough for the first time, providers can add their infrastructure such as hardware resources without notification to their consumers and the consumers do not realize it. To increase the speed of their services, the providers use different interfaces to their compute resources utilizing varied architectures and implementation technologies for consumers. Base on their need, users can increase or decrease the level of use of the computing resources and services flexibly and easily.

C. Redundancy and reliability

By placing their infrastructures around the world, the cloud computing providers are avoiding site failures and provide redundancy also ensure reliability. Dividing the workload to multiple clouds in many places can save time and more reliable from consumer perspective.

D. Scalability

Most of interface of cloud computing is user-friendly. Therefore, scalability can be achieved by expanding computing infrastructure. As a center of platform, the application-content makes user can adapt between content items and their needs.

E. Collaboration

Because of the similarity and flexibility of architecture, facilities, collaboration can be done among cloud computing providers. Another aspect of collaboration is a homogenous manner of management of computer resources from different cloud computing providers. From the consumer side, with proper application, members of group that using cloud computing services can share their documents without afraid of outsiders who can access their documents and discuss any topic in that group.

F. Efficiency

Using email services that provided by email providers such as yahoo.com, MSN Hotmail, Windows Live Hotmail and Gmail are an example of efficiency of cloud computing. For receiving professional mail, the company can count on mail providers, with the result that the company does not to buy equipments to provide mail server for their employees. Moreover, the company does not need to buy software to create mail server. Those are done by cloud mail system providers. Efficiency can be achieved because of users can access all services everywhere without considering the computer type and its storage, etc.

G. Virtually

Using VMs (Virtual Machines), consumers are able to install their own application in their devices. Any applications run by the consumer have to be virtual towards computation, storage and communication model to cover up the implementation of cloud computing infrastructure. Another fact of virtual of cloud computing is user do not need any background of the services because all of the resources are virtual that can be shared by the users.

H. Availability

Providers of cloud computing, manage the infrastructure of it. The providers have control to the contents of cloud computing services in any aspect of study and available to the consumers whenever they request. To access these contents, a new application is created by the application developers. Many kinds of services are cloud-based applications and can be accessed by the consumers like social network, file sharing, website and online video viewers. Each of these application types has a different composition, configuration, and deployment requirements. A large cloud computing providers with data centers scattered around the world have the ability to provide a high level of fault tolerance by replicating data across vast geographic distances.

IT-BASED CAPABILITIES AND RESOURCE-BASED THEORY

In general, capabilities represent the ability of the organization to combine resources (i.e., physical and human capital) in ways that result in greater performance. Capabilities also describe the ability to combine unique competencies with firm resources to diversify the firm from competitors. A variety of IT-based capabilities have been identified and include managerial IT skills, technical IT skills and IT infrastructure, IT-enabled processes, and relationship infrastructure and IT business experience. IT capabilities encompass both IT-based assets and routines. A common finding among the research examining IT capabilities is the significant positive relationship between different IT capabilities and performance or competitive advantage. Since capabilities are considered organizationally embedded, non-transferable and firm-specific, they have the attributes that, when leveraged, may lead to firm level competitive advantage. IT-based capabilities are commonly studied using resource-based theory (RBV) which views the firm in terms of its available resources and how those resources may be combined in effective growth strategies and firm diversification. Management researchers state that firm performance originates from firm-specific capabilities and assets that, along with isolating mechanisms, helped to establish and sustain competitive advantage. The resource-based approach in explaining the sources of competitive advantage in the firm often highlights firm-level efficiency advantages, which may be achieved when IT capabilities are sufficiently leveraged. It has been noted that direct effects models in prior research clearly show that IT capabilities contribute to firm advantage; however, due to their simplicity they fall short in explaining the complexities that underlie the relationship. Recent research on resource-based (i.e., business and managerial) and process-based (technical and behavioral) IT capabilities concluded that different structural

mechanisms are responsible for determining the value of different IT capabilities. For example, while technical and behavioral capabilities did not directly influence IT-based competitive advantage, they had a significant indirect influence via their effect on physical and managerial capabilities this supports the notion that the value of different IT capabilities may result from more complex interrelationships and causally ambiguous processes. While RBV is fundamental to establishing the link between IT capabilities and performance or advantage, research that examines IT capabilities in more complex relationships will clarify the strategic value of IT.

CONCLUSION

Overall, our study results indicate that organizations employ specific IT-based capabilities for a specific cloud delivery model in order to meet performance objectives. Relational, managerial and technical IT capabilities are uniquely employed in the cloud implementation to facilitate positive outcomes such as IT economies of scale, cost reductions and access to professional skills. The combination of firm-specific IT capabilities and the three specific cloud delivery structures implies that cloud success may be dependent on matching the IT capabilities. In a practical sense, our findings clarify the prominent role of relational IT capabilities in the public and hybrid cloud structures as well as the importance of technical IT capabilities for the public cloud. Additionally, organizations that effectively employ the hybrid cloud may be poised to realize the greatest advantages. Management researchers have acknowledged that firm performance originates from firm-specific capabilities and assets that, along with isolating mechanisms, help to establish and sustain firm-level advantages. We surmise that the strategic value of IT-based capabilities may lie with how they are combined and how distinct combinations of relational, managerial and technical capabilities interact with internal and external IT assets to create competitive advantage.

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