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Cloud computing as an operational model for ERP services: Definitions and challenges

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ABSTRACT: Cloud computing is the modern operational model of the enterprise recourse planning (ERP) systems, almost of the major ERP providers such as Google, SAP, INFOR and others began to provide Cloud ERP services to attract a new clients specially small and medium enterprises (SME). Many researchers focus on the benefits that organization will obtain when they move from managing their own ERP system to use the Cloud computing as an operational model for the ERP services. Our goal in this paper is to explore the challenges of adopting cloud ERP services.

KEYWORDS: Enterprise Resource Planning (ERP), Cloud ERP services, challenges of cloud ERP.

1 INTRODUCTION

ERP system is one of the most popular systems that organizations implement in their business, Staehr define ERP as "ERP systems are integrated software packages with a common database that support business processes in companies". [16]

The most important reasons encourage organizations to adopt the ERP systems are decreasing operation cost, improving the process of decision making, increasing the quality and flexibility of operations and achieving a new market opportunity.[1]

ERP system one of systems that has a complex architecture which needs a sensitive and comprehensive changes in the organizational operations and structures, it needs an IT staff specialist in managing like these systems and it changes the roles and authorities of organization`s sections which is needed to care about the change management. The major challenge of adopting these systems is the cost of implementing and maintenance such system, which always compares with return of investment (ROI) in it. [7] These costs are depending on organizational size, user's numbers, processes complexity, system boundaries, and system scope, [13] these criteria's specify the infrastructure must be prepare to implement system as hardware, software, training, networks, etc...[10]. ERP providers accordingly begun to orient their servicers to cloud computing as an operational model of ERP system.

2 CLOUD ERP

Cloud computing model arise as a new technology depending on providing application and systems services for clients without need to hardware, software, networks, but through using of the provider portal.[2]

Organizations interested in this model started to study it as alternative to their systems, the providers of systems and software converted to providing their service through the cloud computing model as ORACLE, GOOGLE, DATABIS MICROSOFT and SAP etc... These providers expect cloud computing model will become a first choice for all organizations looking for systems and software services, also the SME encourage this model; because it become the way to use system services without paying the infrastructure cost.[17]

There are three definitions for Margaret Rouse to explain the nature of cloud computing services which are SaaS, IaaS, and PaaS:

"Software as a Service (SaaS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet". [11]

"Infrastructure as a Service (IaaS) is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis". [11]

"Platform as a Service (PaaS) is a way to rent hardware, operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones". [11]

A lot of organizations that adopt cloud computing are using it on support application like office work software not on main application like ERP or CRM etc…[15]

3 CHALLENGES OF CLOUD ERP ADOPTION

Although cloud computing is known in many fields and applications; and despite of the entrance of large providers in this fields and keeping in mind the benefits that were mentioned by related researches; many organizations still use their internally owned systems and they are refusing this technology. So the researcher collects these challenges in his study that face adopting Cloud computing as operational model of ERP which are:

3.1 COMPATIBILITY CHALLENGES

Flexible service does not mean compatibility with all customers requirement; customers have different skills, processes, and scope. Providers expect from customer to adjust their skills, processes, and technology to be compatible with the cloud services; because they described as one size fit all. [9]

3.2 DISRUPTIVE TECHNOLOGY

Cloud computing is still considered new technology which needs to standardizing evaluation for proper deployment, customers look for adopting and evaluating cloud from organizations that have experience with it. Most of organizations that adopted cloud ERP are SME and this does not encourage larger organizations to take the risk. [4]

3.3 IMPLEMENTATION CHALLENGES

Cloud services must be flexible; because the customers usually change their requirements; as number of licenses (number of users), boundaries, and amount of data etc… changes, so the Cloud ERP providers must implement their services with expanding possibility as customers need. Another implementation challenge is the tools that a customer uses to access services on provider portal to cloud service; customers may use tools as PC, TAP, smart phones with different browsers.[8]

3.4 SERVICE LEVEL AGREEMENT (SLA)

Contract or SLA between cloud ERP providers and customers govern the service level, scope, and boundaries. customers should care about the conditions in the contract and what will happen if they need to modify any level of service as the number of licenses, bandwidth etc… [12]

3.5 LEGACY SYSTEM

Every organization that exists in the market or is working for some period has its in house developed application or system to manage its operations and it has in house operated databases. If the user wishes to move to new way or technology to manage systems, he will put its historical data in priority; moving data from an old system to new system still impose challenges when we develop in house system. And the challenge will expand when we move the data from old database to the cloud database. The problem comes from the different database, rules, report and data structure. [6]

3.6 COST CHALLENGES

All past researches promoted cloud services through the cost redaction benefit [12]. This benefit is good for organizations that do not have their own systems, or their systems are obsolete, but organizations that have operating systems and infrastructures will compare the cost of their system maintenance with cost of annual subscription for cloud ERP services.

3.7 PROVIDER POWER

Provider will have power of ownership once the contract is signed alongside with governance and entrance to your data; this will raise issues in case of late payment of annual subscription, or subscription cancelation. Which will lead to questions such as: what will happen to the data and customer operations? Is cloud ERP contract infinite?

3.8 TRUST

Trust is one of major challenges that affect adopting cloud ERP services, in the Burton group Analysis "Building an IT organization`s confidence in a solution requires a combination of consistent performance, verifiable results, service guarantees, transparency, and plans for contingencies"[3]. Lack of confidence come from two reasons, first one come from the criticality of data that will move it to provider`s servers, the second is cloud ERP still not dispersed too much between famous organization and their isn't best practice.[10]

3.9 START-UP SUPPORT

Organization need support from cloud ERP provider to facilitate the transformation to cloud services, customers need support for training and change management.[14]

3.10 SECURITY AND PRIVACY

This challenge impose itself as an important challenge that cloud is facing nowadays, which is the bigger issue that doesn't allow organizations with sensitive data adopt cloud computing freely. The reasons behind that can be summarized as: organization`s data exposed for the cloud ERP service provider; and the possibility of being faced with hackers if they manage to compromise security of provider`s servers. [5]

Cloud ERP providers spend millions of dollars on developing tools and software to improve servers security, but if they secure data externally; the internal use of that data still raise exposing issues. There are many legal and ethical challenges in this field that the providers should consider.

4 CONCLUSION

Most of enterprises whether they are large or SME are interested in gaining from cloud ERP benefits; but still there are many challenges face cloud computing as operational model for ERP services adoption. This paper collects the challenges that delayed adoption of the cloud ERP as follows: Security and Privacy, Legacy system, Implementation challenges, Compatibility challenges, Disruptive technology, Service level agreement (SLA), Cost challenges, Provider power, Trust, and Start-up support challenges. Cloud ERP providers should pay attention to these challenges. For future research, we will attempt to conduct a field study to get a comprehensive view of the challenges, and we will try to apply study on a particular area of economy to be more specific.

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