

Elements of Cloud Computing Adoption by SMEs in India

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Abstract: *This world is changing very fast in terms of enterprise systems and industries need very specialized solutions. Industrial problems are very complex and need lot of money and efforts. Business applications are increasingly prevalent in the Small and Medium-sized Enterprises (SMEs) sector. Business vendors are targeting SMEs but many projects fail due to poor planning, lack of resources, organization immaturity and failure to understand the complexity of integrating such applications with existing business systems. This study looks at how SMEs can use Cloud Computing in order to improve the availability of operational and strategic planning information and the constraints imposed on such organizations. The objective of this paper is twofold, first to study the elements of adoption of cloud computing in India and second is to study the challenges faced by them in its implementation. With the advent of technology the acceptance of cloud involves with so many issues and concerns which organizations and the policy makers are dealing with. There is an essence for cloud based services in India to encourage its implementation to assist the organizations to stay competitive. Cloud computing is probable to be transformational but it depends on the system developed for its acceptance.*

Keywords: *Business, Cloud Computing, IT Adoption and SMEs.*

1. Introduction

The technology is changing very fast as per the rapid changes in the demands by the customers in the market. Due to which every day the technologies are becoming obsolete and are replaced by new and innovative technologies. The large companies can adopt the technologies quite easily and effectively as compared to the SME's as they do not have certain constraints in terms of adapting the changes happening in national and international markets. Whereas, SMEs are not in the position of updating themselves with the new technologies as soon as they arrive in the market. The large companies are taking benefits out of it and providing the innovative and new products in the market.

SMEs are considered as integral part of Indian economy as they are always instrumental in raising job opportunities for the people of the country. SMEs are also considered as blood of the Indian economy as they provide entrepreneurial opportunities to the youth of country. But these types of organizations are facing lots of competition and problems from already flourished and established large companies in the national and international markets.

But, at the same time, the advents of new and innovative technologies are able to reduce the problems and issues pertaining to SMEs in the market. Cloud computing is one such technology which is a major development in the computing field. SMEs need business tools integrated with their financial applications so users can access the financial and operational data residing within the system in a quick, easy, efficient and cost effective manner.

Business (also known as enterprise or firm) is an organization involved in the trade of goods, services, or both to consumers. Businesses are predominant in capitalist economies, where most of them are privately owned and administered to earn profit to increase the wealth of their owners. Businesses may also be not-for-profit or state-owned. A business owned by multiple individuals may be referred as company, although that term also has a more precise meaning. The etymology of "Business" relates to the state of being busy either as an individual or society as a whole, doing commercially viable and profitable work. The term "Business" has at least three usages, depending on the scope- the singular usage to mean a particular organization; the generalized usage to refer to a particular market sector; and the broadest meaning, which encompasses all activity by the community of suppliers of goods and services.

2. Literature Review

Maximilien, et al., (2009) Cloud computing is characterized as the new cutting-edge procedure that is fit for giving an adaptable IT foundation, where clients don't have to claim the framework supporting these administrations. Cloud computing alludes to both the applications conveyed over the Internet and the equipment and frameworks programming in the information enters that give those administrations. From a specialized point of view, Cloud Computing fundamentally centers around administration - situated design and virtualization of both equipment and programming.

Saya, Pee, and Kankanhalli,(2010) institutional impacts, for example, saw openness, seen adaptability, saw cost adequacy, and a seen absence of security to upset the appropriation cloud registering .

Misra and C., (2011) Cloud idea appeared mouth-watering, in any case, that despite the accompanying components impedes the appropriation of distributed computing: size of IT assets, assets arrangement designs in SMEs.

Patrignani&Kavathatzopoulus (2015), stated that ethical issues are the main concerns among the management in adopting cloud computing in their organizations.

Diaz-del-Rio, Salmeron-Garcia &Sevillano (2016)suggested that there is a difference between the local and cloud computing service providers. Cloud services are fast and gives more space to the clients.

3. Meaning of cloud computing

"Cloud computing refers as representation to enable the suitable, on-demand system that has various features such as nominal managing required or low interface required. (NIST, August 2009)

Cloud computing is a model which is based on Internet and have certain components such as applications, hardware and the facts hosted by the third party which is provided to the users when the demand is raised by them. The applications are known as "Software as a Service" (SaaS), the hardware and infrastructure is known as "cloud".

In general, cloud computing is storing and accessing the information and data on internet space rather than on your hard drive of the computer.

According to Microsoft study (PTI, 2018) Cloud computing is a very faithful way for SMEs for enabling them to connect with probable customers in various parts of country and/or overseas.

According to the study there was about 2.3 times enhancement in the customer support and 3 times in the faithfulness due to cloud computing. Cloud computing is very effective way for SMEs to access the technology and can figure out the results of large companies with a low investment of capital.

India is still at the emergent and learning phase of cloud computing as SMEs are unaware about its benefits over the existing technology, Due to sudden increase in use of smart

phones and their applications there is enormous effect on the usage of cloud computing services. But due to lack of awareness of SMEs the benefits of this very effective technology is still not availed by them to the fullest. Cloud computing is a very helpful tool which even enables them to access several other software(s) and services. Indian SMEs are facing tough competition by large organizations in the adoption of information technology, although India has crafted a niche in the emerging phase of the utilization of information technology but still a lot more is required.

Cloud computing is the need of today as it is associated with so many features and components such as –

a. Storage of data
b. Word processing
c. Software development
d. Extension of computer resources(CPU, RAM)
e. Backup & Recovery management
f. Social media

Due to the above mentioned features so many small and large companies are adopting and implementing cloud computing in various ways as a support system for their work. In the present age of globalization and cut-throat competition, SMEs are under tremendous pressure to be technologically innovative to show improved performance (Rahman et al., 2016).) Several SMEs have been leveraging IT for critical business processes such as procurement, sales and marketing, production and order fulfilment and to become more efficient (Ravi, 2006).

3.1 Cloud computing services-

Cloud computing services are very helpful to the consumers and different types of services are provided by the vendors. The services have three categories i.e software as service

(SaaS), platform as service (PaaS) and infrastructure as service (IaaS). According to the requirement of the customers the specific services are provided to the customers as mentioned below-

- i. Software as a service (SaaS)-is the uppermost layer which characterized with whole set of application. (Jensen, et al., 2009). In this model the user doesn't have the control on to infrastructure on which the application is running. There are various application which helps in improving the output such as- Google docs, business process functionalities such as Salesforce.com and applications that aims on associations and social networking such as- Facebook, Instagram and LinkedIn.
- ii. Platform as a service (PaaS)-is the segment used to create new applications. This layer supports the users in operating system support and software development frameworks. For example- Google App Engine, Microsoft Windows Azure and Force.com
- iii. Infrastructure as service (IaaS)-This segment deals in data centre and data storage services. . Examples of IaaS providers include Amazon EC2, GoGrid and Flexiscale

4. SMEs-

The government of India defined SMEs under the provisions of MSMED Act, 2006 as “an industrial undertaking or a business concern or any other establishment, by whatever name called, engaged in the manufacture or production of goods, in any manner, pertaining to any industry specified in the First Schedule to the industries (Development and Regulation) Act 1951 or engaged in providing or rendering of any service or services". The definition provided by the Government of India has been used to denote SMEs on the basis of investment in plant and machinery/equipment and seeks to develop and enhance the competitiveness of MSMEs as a whole.

Table 1.1: Investment pattern in Micro, Small and Medium Enterprises

Investment in plant and machinery/equipment (excluding land and building)	
Manufacturing Enterprise	
Micro	Up to Rs. 25 lakh
Small	More than Rs 25 lakh and uptoRs. 5.0 crore
Medium	More than Rs 5.0 crore and uptoRs. 10.0 crore

Source: Ministry of Micro, Small & Medium Enterprises

4.1 *Cloud computing and SMEs-*

SMEs can take major benefit from this technology as it provides solutions to the business problems and can help them to compete with the large organizations in the market. Cloud computing technology gives the companies to customize their business problems in terms of cloud computing. Cloud computing have various benefits which are explained below:

4.2 *Elements in adoption of Cloud computing in SMEs-*

1. **Minimum infrastructural requirement-**The major benefit of cloud computing technology is that it doesn't require any specific infrastructure in the companies for its usage. It will work with the available IT capabilities in the company. It is very useful for the SME's as it is a cost effective measure provided by IT.
2. **Cost flexibility-** Cost associated with the cloud computing technology is flexible as per the usage of the technology. Companies don't need to make an extra investment to use cloud computing as they have to pay as per the usage to the service providers.
3. **Improved mobility-**Cloud computing provides mobility of work. Person using this technology can work from anywhere.
4. **Outstanding accessibility-** Geographical boundaries are not the constraints for the users, cloud makes sure that the data and the application is continually available.
5. **Low cost-** Cloud computing is taking care of the infrastructural cost involvement in the installation of the technology in the company.
6. **Optimization of facility-**The users of cloud computing can easily adjust the capacity of the technology as it can be adjusted according to the requirement of the same.
7. **Environment friendly-**Cloud computing technology is eco-friendly as it doesn't require much infrastructure and data-centers which in turn results in saving of environment.
8. **Assistance in Mergers & Acquisitions-** As now a days Mergers and acquisitions are increasing in the businesses, cloud computing assists the companies in an effective way to conduct the event smoothly whereas, in previous times M & A was a tedious affair.
9. **Improved association-**Cloud computing also helped in improving associations among the departments in the companies as they can easily share the data on cloud for various associations.
10. **Failure restoration-** Large organizations have big budgets to restore the lost data as they have large backup and recovery management systems. But these big budgets are not available with SME's to install backup and recovery systems. Cloud computing is a very effective tool in backing and recovering the data. SME's can enjoy the benefits of cloud computing without making big investments in the company/system.
11. **Improved associations-**Cloud based services provide employees of the company with many benefits such as- accessing, sharing and editing of data anytime and from anywhere. This factor of cloud computing technology has proved to be of great help in building collaborations and associations among the people.
12. **Document manager-**Cloud computing provides central control in accessing, editing and sharing of the

document and conflict management. People can access different versions of files at one point of time. This factor of cloud computing results in better workflow and associations.

13. **Safety and security**-It is very difficult to manage the files and documents physically, in laptops, Computers etc. but cloud computing provides a safest way to store the data virtually which will help people to keep the data safe and to avoid misplacement of the same. It also helps to protect data from going into the wrong hands so the fear is minimized of misusing data.
14. **Better mobility**-It is also an effective way of providing a virtual common workplace to the people working on a similar platform as they can connect from home or work irrespective of their location. By this employees are able to work together and discuss about their work on a single virtual platform.
15. **Lowered the cost of operation**- Cost of operation is reduced as cloud computing helps the companies to access the business applications at low cost.

4.3 Challenges faced by SMEs in adoption of cloud computing

As cloud computing have so many benefits which makes it an eye catcher for various SME's at the same time it have certain challenges which gives them a challenge in adopting the same. The challenges are explained as below-

1. **Lack of awareness among SMEs**-People working in SME's are not aware about cloud computing and they feel that this technology is for large companies and they will not be able to use such technology.
2. **Lack of IT skills**- People associated with SME's are not much familiar with IT skills or they are not comfortable in experimenting with their existing IT measures in the company.

3. **Lack of cloud related policies**- Companies feel that this is a very large application and they don't want to indulge into such kind of complications as they feel that there is lack of policies in relation to handle the conflicts between service providers and companies.
4. **Complexity**-Small companies also feel that cloud computing is complex form of technology as they will be unable to handle it.
5. **Rigidity among the management in using cloud**- The management of such companies are of a rigid nature as they are not open to new changes going in the field of technology. Adopting every change is also almost impossible. SMEs are always comfortable with whatever they are doing for so long and are extremely rigid in accepting changes in their companies. This is also one of a big barrier in accepting cloud computing by the companies. They feel it will create many changes in the company.
6. **Lack of trust on cloud**-Companies are unable to build trust on cloud as they feel that they will not be able to cope up with the same.
7. **Problems with service providers**-Cloud computing is a technology which is supported by service providers and companies feel that if they will use cloud they will indulge in certain problems and that is again a big barrier in accepting cloud by the companies.
8. **Fear of cloud technology**-Companies have a fear in their mind about cloud as they feel that they will not be able to cope up with the same.
9. **Cost**- Cost is also a very big factor in the minds of the companies as they think cloud will not fit in their budget so that's why they are avoiding the cloud computing technology.
10. **Uncertainty**-The uncertainty in data privacy in cloud is also a major factor in reducing the popularity of this technology among the companies.

5. Conclusion

As the scope of cloud computing in SMEs is increasing day by day the study explained about various elements and barriers in adoption of the technology. The study gives a brief idea about various elements in adoption of cloud in SMEs such as low Cost, environment friendly, low cost of operation, safety and security etc. The study also gives insights about few challenges faced by companies in adoption of cloud such as- complexity, lack of awareness, rigidity of management in using cloud, uncertainty etc. Presently, cloud computing is gaining popularity among SMEs but at low speed. This the high time when the SMEs should understand the importance of cloud computing and adopt this technology to grab the benefits of this technology. Cloud providers should also take care of the policy framework and compliance of the same. Cloud computing is a way which provides the solution to so many problem but companies needs to understand its importance so that they can take maximum benefits out of it.

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