

Cloud Computing in IT Organisations: A Study of India Heartland

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Today organisations are attaching great importance to the rationalization of their business processes because BP can be the main source of competitive advantage. As the development of Cloud Computing is gaining momentum, it is placed to outrun the web. This technology will allow multiple users to access software and databases and will save money on capital expenditure. Using a platform on the cloud for its business processes an organisation provides its stakeholders/users access to information by streamlining data and procedures into one central location.

The main objective of the study was to find the extent of acceptance of the concept of the cloud in organizations and its extent of implementation. It also discusses the layers being used and what business processes are being taken into consideration for the same. It also tries to gauge whether the concept of cloud creates any competitive advantage for organizations and goes on to further focus on the issues of concern related to the usage of cloud.

The study of cloud computing technology in India Heartland points to various entry barriers and ways to counter them. For organizations to sustain in the market today, they need to create POD (point of difference) rather than POP (point of parity) The data collected were analyzed using several statistical tools such as mean, standard deviation, percentiles, Chi Square test, ANOVA test.

The result show that 'Reduced Costs' & 'Increased Storage' are the most important benefits that the Organisations are expecting from Cloud Computing and Security & Privacy continues to be the biggest concern for the organisations when looking at Cloud adoption. The paper ends by offering useful suggestions to the management involved in the IT organisations.

Keywords: Business Processes, Competitive Advantage, Cloud Computing, POD, POP.

Introduction

Cloud Computing

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. (Mell P & Grance T 2009).

The essential characteristics of the cloud are:

- On demand self service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service

Cloud Computing can be categorized into three parts:

1. Infrastructure as a service (IaaS).
2. Platform as a service (PaaS).
3. Software as a service (SaaS).

A cloud can be private or public. A public cloud is the one which sells services to anyone on the internet and a private cloud is the one which has a propriety network or data center that supplies services to a limited number of users. Whether private or public the ultimate objective of the cloud computing technology is to provide easy, scalable access to computing resources and IT services. Instead of writing software for a workstation, software developers are now writing software programs that will run on internet servers, which may run on servers outside the organisation on other companies data center. Individual applications running on the internet was the past, today is the time when entire data centers re moving on to the cloud.

Review of Literature

Many researches have been done in the field of cloud computing technology. The results have shown that the cloud technology will prove to be a breakthrough technology in the near future helping organisations in various aspects like achieving operating efficiencies etc. Some of the important studies are as follows:

Boss G et al. (2007) conducted a research in which he said that Cloud Computing Infrastructure is next generation platform that will provide tremendous value to companies of any size. It will

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also increase profitability by improving resource utilization hence reducing costs on the basis of pay per use approach.

Winans TB & Brown JS (2008) said that Cloud Computing will be used to address regular problems which IT always faces i.e. like resource availability and reliability, data center costs, and operational process standardization. Hence these objectives are enough for justification to use cloud computing across business processes in organisations.

Dee H (2009) says that with respect to high performance computing (HPC) environmental impact is also a key issue. To be commercially viable the systems need to be energy efficient. The ultimate aim where HPC can make a difference is the ability to turn raw data into intelligence which can be used to make our systems more efficient and responsive.

Li Q et al. (2010) outlined that with time the IT industry infrastructure is becoming more complex and internet services are also expanding dramatically as a result of which offering reliable, scalable and inexpensive computing utilities to end users is becoming a key challenge for service providers. In such a scenario Cloud Computing will come to the rescue.

Damoulakis J (2010) says that many organisations have already deployed cloud-based applications via software as a service (SaaS) providers rather than hosting and managing it in-house. Also any organisation wanting to indulge into cloud services should have a solid understanding of the service level attributes that it currently has with regard to data location, accessibility and availability.

Field P (2010) outlines that with more data flowing between the enterprise and utility service providers, corporate information security management needs to be carefully reviewed and evolved. Information availability becomes paramount when services are outside your control. Hence, large cloud providers will generally need to fund more significant security measures.

Iball J (2010) outlines that Cloud computing offers an opportunity to be more competitive as it gives access to the latest technologies without exposing the business to any financial and operational risk normally associated with implementing in house IT systems. Important factors to be taken into account in this case are compliance to specifications which shall not be taken for granted at all.

Berl D et al. (2009) propose that cloud computing with virtualization as a way forward to

(i) identify the main sources of energy consumption, and the significant trade-offs between performance, QoS and energy efficiency and (ii) offer insight into the manner in which energy savings can be achieved in large-scale computer services that integrate communication needs.

Hence after reading all the above citations we felt that there is a need to identify the issues related to the implementation of the Cloud and also what can be the probable solutions so as to be able to utilize the technology at its best. Also there is a need to analyze how organisations are trying to innovate through this technology and hence trying to create POD's for themselves through acquiring competitive advantage over the competitors.

Objectives of the Study

The primary objective was to study the cloud computing scenario, its enhancements, its risks and at the same time trying to find what has been its effect on the Organisations.

The main objective is divided into some sub objectives so as to have a clear picture and understanding each individually. These objectives are as follows:

- To study the extent of acceptance of the cloud concept in organisations.
- To study the extent of implementation of the cloud concept in organisations.
- To study whether the cloud concept creates Competitive Advantage for organisations.
- To study the entry barriers related to the cloud concept.

Research Methodology

Sampling:

For the purpose of this study the IT organisations in and around Delhi/NCR Region are selected on the basis of judgmental sampling and the respondents on the basis of non probability sampling method of snowball sampling.

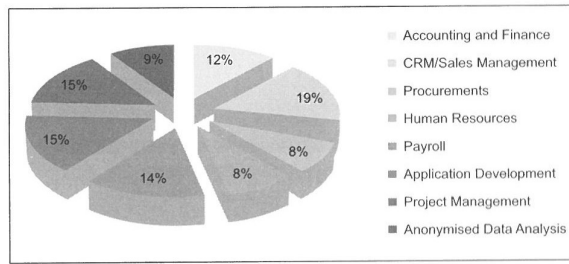
Data Collection:

To fulfill the objective of study, data was gathered through primary research by designing a questionnaire. Secondary data was collected through internet, business magazines, newspaper, websites, etc.

Data was also collected through personal meetings and interviews with the IT organisation employees so as to gain insight about the presence of the technology in their organisations. Sample size of the research was 50.

Data Analysis & Research findings

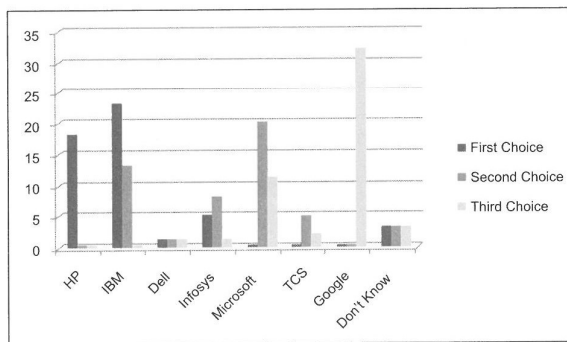
Graph 1



Here we can see that the major chunk of IT services/Applications that can be outsourced is taken by CRM/Sales Management is 19%. Application Development and Project management is 15%. As per the Pareto's principle it's the 20% of the customers who contribute to the 80% of the profit of an organisation hence having a highly automated and flexible CRM system is the need of the hour and can help organisations create Competitive Advantage over others.

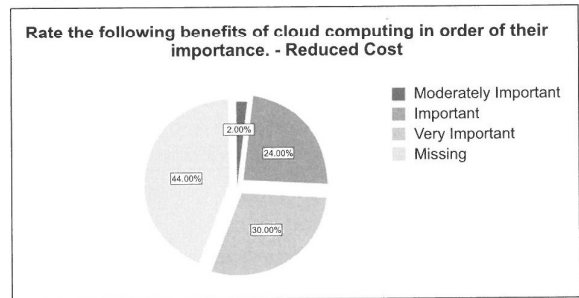
Also application development and project management are the two pillars of any business process hence they are the star of the show if implemented on the cloud because it will then result in reducing operating cost and hence prove to benefit the organisation.

Graph 2



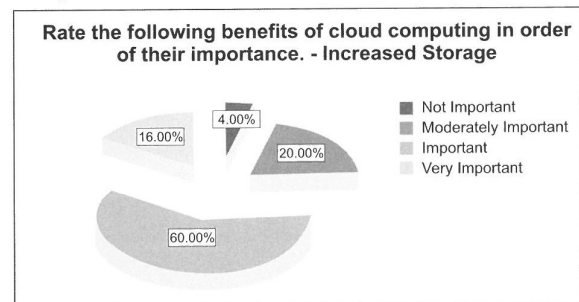
As far as the current implementations are concerned, it seems companies lag to educate their employees as well as customers. Most of the respondents are aware of the fact that company's like Google and IBM are using the cloud concept hence it proves the inadequacy in the companies trying to educate the stakeholders about the benefits which is not good because until and unless the market as well as the stakeholders of the organization know about the technology how will they be able to vouch on the numerous business opportunities it provides?

Graph 3



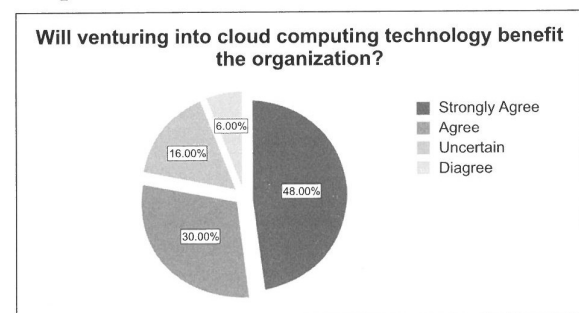
Reduced cost is the most important benefit of cloud computing technology says 44% of the respondents. If we consider the 30% of respondents who say that it is important as a benefit they together make it 74%, hence most of the respondents believe that reducing the current operational costs stands as an important benefit of the cloud.

Graph 4



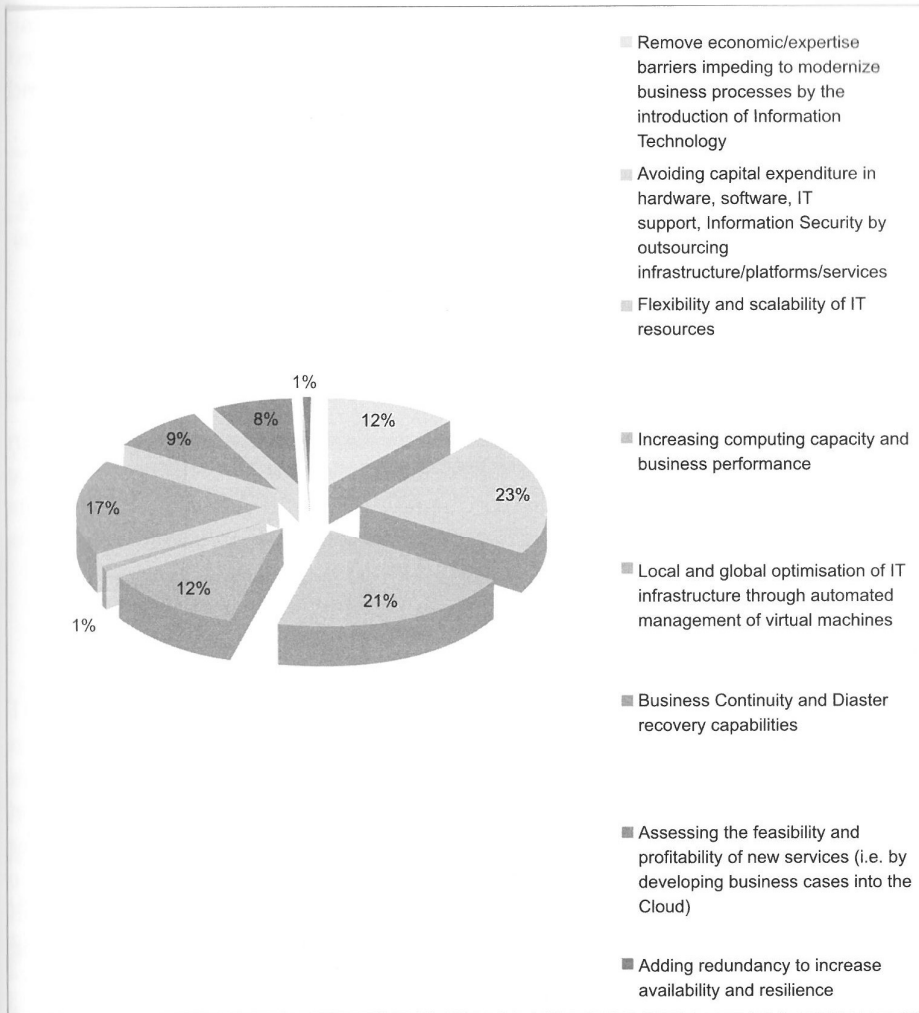
With every passing day the amount of data to be stored is increasing at an exponential rate so amidst such situations, 60% of the respondents have voted that Cloud Computing will prove to benefit the organisation because it will Increase Storage and reduce infrastructure cost.

Graph 5



A majority of the respondents ie 48% of them say that venturing into the cloud computing technology will benefit the organisation because of its elastic capabilities to scale up and down, self provisioning, a pay-as-you-use model with billing and monitoring & application programming interfaces. All of these advantages makes it an attractive solution for the organisations.

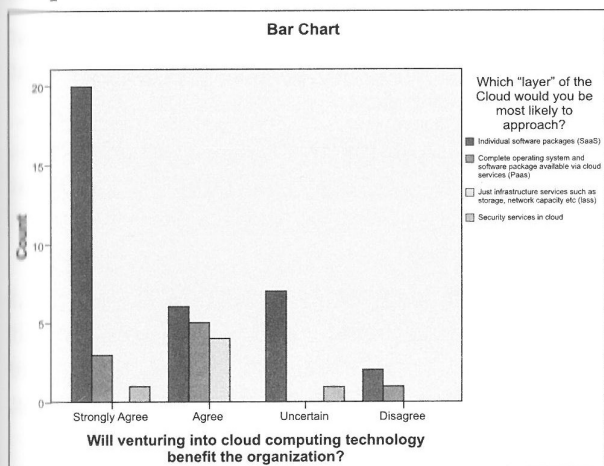
Graph 6



The main reasons behind the possible engagement of an organisation in the cloud computing technology are:

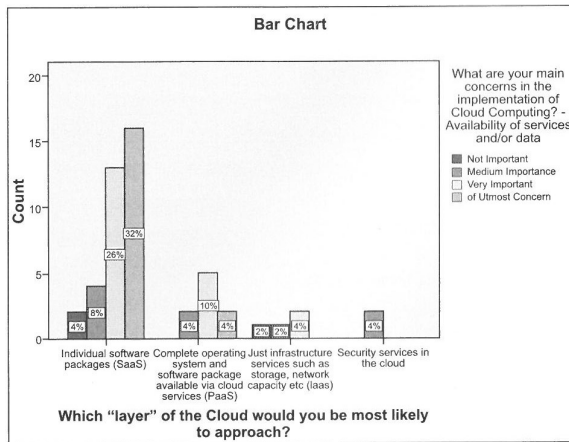
- Avoiding capital expenditure in hardware, software, IT support, Information Security by outsourcing infrastructure/platforms/services (23%)
- Flexibility and scalability of IT resources (21%)
- Business continuity and disaster recovery capabilities (17%)

Graph 7



A majority of respondents say that it is the Individual Software Packages i.e. SaaS layer that is most likely to be approached and which is why it is one of the prominent reasons that they strongly agree that venturing into the cloud will definitely benefit the organisation.

Graph 8



As most of the respondents say that SaaS is the most likely layer of the cloud to be approached hence the availability of services and/or data in that case stands of utmost concern in the implementation of individual software packages.

9. Null Hypothesis: There is no relation between the layer of the cloud being used and its utility for the organisation.

Alternate Hypothesis: There is a strong relation between the layer of the cloud being used and its utility for the organization.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.587 ^a	9	.029
Likelihood Ratio	20.386	9	.016
Linear-by-Linear Association	.466	1	.495
N of Valid Cases	50		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is .12.

Thus we can see that value of $p = .029$ which is less than $.05$, therefore null hypothesis is rejected. Therefore the layer of the cloud being utilized will influence how beneficial the cloud will prove for the organisation.

10. Null hypothesis: There is no significant relation between departments in which cloud computing is used and its benefits for the organization.

Alternate Hypothesis: There is a significant relation between departments in which cloud computing is used and its benefits for the organization.

ANOVA

Which IT services/Applications supporting business processes are most likely to be outsourced to a Cloud Computing service provider? - Second Choice

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.000	3	3.000	1.614	.199
Within Groups	85.500	46	1.859		
Total	94.500	49			

Thus we can see that value of p is greater than $.05$, therefore null hypothesis is accepted. Hence there is no significant relation between departments in which cloud computing is used and its benefits for the organization.

Conclusions

- Cloud Computing is being used by most IT organisations today. Especially an organisation's important business processes such as CRM/Sales Management, Application Development & Project Management are being outsourced to cloud computing service providers. Hence, it is believed that it will be an important part of their IT strategy in the coming years.
- IT organisations today are evaluating Cloud Computing on the basis of cost and benefit analysis. 'Reduced Costs' & 'Increased Storage' are the most important benefits that the Organisations are expecting from Cloud Computing. This is followed by better flexibility and Higher Automation as far as SaaS is concerned.
- Security & Privacy continues to be the biggest concern for the organisations when looking at Cloud adoption.
- Individual Software Packages i.e. SaaS (90%) is seen as the most preferred service that Organisations expect to have on the Cloud in the near-term.
- With a long list of benefits that the cloud technology provides it is believed to be a benefit to the organisation and hence also create competitive advantage for them by offering varied services.

Suggestions

- In the coming few years cloud computing will emerge into different platforms which may be a mix of open and proprietary technology employed to create advantages for the organisations.
- By combining the social graph and commerce with consumers in the cloud, we see an increased and accelerated investment the process of sales, leads, and overall collaboration with individuals.
- Decision makers in large businesses will see a distinct opportunity in investing in cloud computing as the tool to service consumers' real-time appetite.
- Today we're in the middle of a massive transition. The next phase of the cloud will be about powering social enterprises, and will be even more disruptive than the first.
- Companies that see the potential in this transition will not only thrive, they'll help determine the path the cloud will take for years to come.

Bibliography

Books:

- Naresh K. Malhotra, 2009, Marketing Research: An Applied Orientation, 6th edition, Pearson College Div
- Philip Kotler, Prafulla Y. Agnihotri, Ehsan Ul Haque, Gary Armstrong, 2010, Principles Of Marketing : A South Asian Perspective, 13th edition, Pearson Education
- Charles Babcock, 2010, Management Strategies for the Cloud Revolution: How Cloud Computing Is Transforming Business and Why You Can't Afford to Be Left Behind, 1st edition, McGraw-Hill
- Michael Miller, 2008, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que

Websites

- <http://cloud-computing.alltop.com/>
- <http://cloudcomputingnewsdesk.sys-con.com/>
- <http://www.cloudtweaks.com/>
- <http://www.cloudbzz.com/>

White Papers

- Anuradha (2011). *Business school delivers SAP courses with IBM Cloud*. Retrieved from <http://www.cloudtweaks.com/2011/06/business-school-delivers-sap-courses-with-ibm-cloud/>
- Babcock, C. (2010). *Management strategies for the cloud revolution: How cloud computing is transforming business and why you can't afford to be left behind?* (1st ed.). McGraw-Hill.
- Berl, D., Gelenbe, E., Girolamo, M., Giuliani, G., Meer, H., Dang, M.Q., & Pentikousis, K. (2010). Energy-Efficient Cloud Computing. *The Computer Journal*.
- Boss, G., Malladi, P., Quan, D., Legregni, L., Hall, H. (2007). IBM Cloud Computing. *High Performance on Demand Solution*, IBM.
- Brookbanks, M. (2010). More Clouds. *ITNOW*.
- Cloud New Desk (2008). *Six benefits of cloud computing*. Retrieved from <http://cloudcomputing.sys-con.com/node/640237>
- Damoulakis, J. (2010). In Clouds we Trust. *ITNOW*.
- Dee, H. (2009). Head in the Clouds. *ITNOW*.
- Field, P. (2010). Get More From The Cloud. *ITNOW*.
- Green, K. (2010). Data Sharing Embrace The Cloud. *ITNOW*.
- Iball, J. (2010). Don't Cloud-Data Security. *ITNOW*.
- John (2011). *SeaMicro: Atom and the ants*. Retrieved from <http://www.cloudbzz.com/seamicro-atom-and-the-ants/>
- Kotler, P., Agnihotri, P. Y., Hauque, E, U., & Armstrong, G. (2010). *Principles of marketing: A South Asian perspective* (13th ed.). Pearson Education.
- Li, Q., Hao, Q.F., Xiao, L.M., & Li, Z.J. (2010). An integrated approach to automatic management of virtualized resources in cloud environments. *The Computer Journal Advance Access*.
- Malhotra, N. K. (2009). *Marketing research: An applied orientation* (6th ed.). Pearson College Div.
- Miller, D., Creese, S., & Smith, A. (2010). Cloud security cloud cuckoo land. *ITNOW*.
- Miller, M. (2008). *Cloud computing: Web-based applications that change the way you work and collaborate online*. Que.
- Winans, T B., Brown, J S. (2008). Deloitte Cloud Computing. Deloitte Consulting. Deloitte.