Cloud Computing and its Economic Perspective

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ABSTRACT
The economies around the world are increasingly becoming dependent on ICT system. A marginal change in this is reflected in huge financial numbers and economic analysis. The ICT system is experiencing a remarkable shift in the form of cloud computing. Cloud computing is changing the landscape of the traditional information technology infrastructure. And likewise is changing the economic perspective associated with it. Economics forms the basis of every business decision and it is also the underlying force beneath the major decisions of the governments of different countries. This technology has forced the businesses and governments equally to remodel the existing system and the way the work is being carried out regarding the use of Information and Communication technology. This research paper reflects on associated benefits, economics and obstacles on the road to wider acceptance of cloud computing.

KEYWORDS
Cloud Computing, Cloud Economics, Direct Cost Savings, SLA.

1. INTRODUCTION
Rapid advancements of technology and innovations affect the very basis of businesses – infrastructure, technique, organization and most importantly economics. The adaptability of any business decides its future. The inception of Information & Computer Technology proves this point and the talk of the town today is cloud computing. Just as the information technology adoption brought about a sea change in the economic aspect of the businesses, likewise the migration to cloud computing is going to remodel the economics of information technology.

The increasing use of diverse information technology services in multifaceted businesses have resulted into increasing demand for finances and time for the information technology infrastructure set-up both on individual and collective scale. This development has set the course of cloud computing. But to set the rhythm for cloud computing adoption, the first requirement is to test its viability. Businesses and even governments are now in a process to explore this phenomenon with great interest and effort. This research paper is an effort in this direction discussing cloud computing and the associated gains, cloud economics and the impediments in the adoption of cloud computing on a large scale.

2. CLOUD COMPUTING – ASSOCIATED GAINS
Adoption of cloud computing mainly directs towards two types of gains: instant gains and long-term gains [1].

A. Instant Gains
- Trims down the information technology related costs: Vilfredo Pareto gave the 80-20 rule which applies on the information technology maintenance of the industries also. 20% cost is generally incurred by the software applications, whereas 80% cost is incurred by the information technology maintenance which includes the core computer technology, operating system (including related system software, firmware, etc.), and hardware like servers, cooling equipment, etc. Moving the organization’s work on cloud slashes down the information technology related costs tremendously. The organization can utilize this saved amount on operational activities.

- Improves and enhances flexibility: Getting resources on demand is a blessing for any organization. Scaling up or scaling down of resources as per the demand by the use of cloud increases the overall profit of the organization.

- Increases the organization’s efficiency: When money is available for business operations (instead of spending it on maintenance), and resources are also there according to the demand, the combination of the two in turn increases the business process efficiency of the organization/industry.

- Promotes competitiveness: Before cloud computing era, it used to take great efforts and time both to match things at par with a competitor; but cloud promotes the neck to neck competition. This keeps the organizations on their toes all the time. From the point of view of a consumer, such a scenario a very good, as it offers fast and better options.

- Shooting to higher levels of techniques and technology: Technological advancements in the yester years were like an inverted pyramid. Every new tool/technique/technology

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used to start like the tip of the inverted pyramid and gradually with time used to expand to different types of industries or organizations. Now, leaping to higher levels of advancements (related to information technology) has become an instantaneous and hassle free job for most of the upcoming industries.

- **Improves and promotes collaboration**: When a common platform is offered in form of the cloud, many aspects like security, privacy, etc. can be managed mutually or by a third party. The operational part of an organization can be clubbed with other organizations to achieve agility and higher degree of performance.

- **Equal opportunities for all**: Earlier, there was a big gap between the big players of the market and the small ones. One with more money used to have access to better tools, technology, infrastructure, etc. With the emergence of cloud computing, access to such resources have become very easy and affordable for all the players, whether big or small.

- **Leads to sustainability**: Environmental protection has become a major concern for societies and governments across the globe. For sustainable development, the most important aspect related to the economies is the reconsideration of the usage of energy. The sources of energy need to be more clean and green. Though the use of conventional sources of energy is not decreasing but there has been increased awareness and efforts regarding the renewable sources of energy. Cloud computing is paving way for green computing and thus leading towards sustainability.

**B. Long-term Gains**

- **Development of human resources**: Availability of resources, up-gradation of existing resources, access to the latest technologies, etc., are all key features that an organization enjoys while employing the cloud resources. In the long run, it enhances the skills and capabilities of the employees which eventually results in better trained and experienced employees.

- **Paves new path for innovation**: When an organization has capable and hard working employees, but cannot afford to invest in the required software and hardware, the organization is not able to harness the capabilities of its employees to the fullest. Cloud computing has removed such barriers now, and even the small scale industries have the opportunities to come forward with brilliant innovations.

- **Increases risk taking capabilities**: In earlier times, when an organization wished to do something new where the setup demanded high expenditure, the cost of failure attached to such a project was also high. By shifting on to the cloud, new risks can be taken, because the associated cost of failure will be quite low.

**3. CLOUD COMPUTING – ASSOCIATED ECONOMICS**

Though there are varied reasons, still the focus behind shifting the gear towards cloud computing is mainly due to cloud economics. Cost saving is always the prime objective, but in order to achieve this four distinct mechanisms have been proposed:

- By lowering the opportunity cost of running technology
- By allowing for a shift from capital expenditure to operating expenditure
- By lowering the total cost of ownership (TCO) of technology
- By giving organizations the ability to add business value by renewed focus on core activities [2].

Based on cloud economics, the benefits of cloud economics can be broadly classified into three categories:

- **Direct Cost Savings (reduced cost per unit of output)**: the largest and most identifiable economic benefit of cloud computing is the direct cost savings from changes within the organization (e.g. reduced information technology maintenance) and external economies of scale (e.g. large data centres housing the information technology infrastructure).

- **Productivity improvements (increased output per unit of cost)**: changes to business can be achieved without the need for detailed capacity planning, changes to installed technology or new technology purchases.

- **Innovation (ability to deliver new and evolving products)**: organizations can gain further benefits in business flexibility and agility, collaboration, and taking new products and services to the market [3].

**4. CLOUD COMPUTING – ASSOCIATED IMPEDIMENTS**

Though the associated gains are quite lucrative and the future with cloud computing seems to be highly rewarding and productive, yet there are number of obstacles in the path. The major issues [4] are discussed as follows:

- **Data Privacy**: If an organization puts its essential services on the cloud, data privacy becomes the prime area of concern as a third party is involved and thus there are higher chances for breach of data integrity.

- **Information and Network Security**: This is mainly related to access control, logging, and attack prevention over the network. Specific rules need to be formulated and
stringently applied for identity verification and rights management.

- **Real Benefits / Business Outcome:** Enterprises need to take a good view into the real benefits of cloud computing rather than seeing the potential of cloud computing to add value. The return on investment (ROI) on cloud needs to be substantiated by comparing specific metrics of traditional IT with Cloud Computing solutions that can show savings that demonstrate cost, time, quality, compliance, revenue and profitability improvement. The cloud ROI model should include things such as indicators for comparing the availability, performance versus recovery SLA, Workload-wise assessments, Capex versus Opex costs benefits, utilization, etc. [5].

- **Transparency of Service Delivery and Billing:** Billing of a service depends on type and location of data processing. There needs to complete transparency and the organization using the service should be informed before a change is carried out. Another issue is related to licence management. Thirdly quality assurance and monitoring of SLAs (related to availability, scalability and performance) also becomes an area of concern.

- **Effectiveness of Service Usage and Control:** This area encompasses the contracts including questions of liability, control of services by users and governance mechanism.

- **Performance / Insufficient responsiveness over network:** Delivery of complex services through the network is clearly impossible if the network bandwidth is not adequate. Many of the businesses are waiting for improved bandwidth and lower costs before they consider moving into the cloud. Many cloud applications are still too bandwidth intensive [5].

- **Integration:** Many applications have complex integration needs to connect to other cloud applications as well as other on-premise applications. These include integrating existing cloud applications with existing enterprise applications and data structures. There is a need to connect the cloud application with the rest of the enterprise in a simple, quick and cost effective way [5].

- **Fear of Vendor Lock-in:** Data portability or service portability can always take place, but regulations to be followed ought to be monitored by some international regulatory body, so that the vendor or the service provider does not impede the portability process.

- **Less-than-knowledgeable people making strategic calls around the use of cloud computing:** Generally, those in the organization who have the most political pull are selected as the ones to pick the technology. However, they may not have the knowledge or the skills to evaluate and select the right technology. This has been going on for years, and cloud computing is no exception, other than the fact that such decisions will truly kill the business [6].

**CONCLUSION**

Cloud computing is a phenomenon with gigantic potential to impart economic gains to the concerned parties be it industries, institutions, businesses, governments or rather the complete economies. The key focus areas for the adoption of cloud computing are affiliated costs & benefits, time dimension, security and policies. The efforts in this direction ought to be in a mode of collective action – from individuals to businesses to governments. In order to harness this potential to the fullest, the stress should be on rational use, meeting the challenges, deliberation on the solutions and overcoming the problems with the objective of development of a sustainable technology.

**REFERENCES**


