ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 8, Issue, 11, pp. 21355-21361, November, 2017

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

CLOUD COMPUTING IS GENERATING ECONOMIC GROWTH AND EMPLOYMENT OPPORTUNITIES IN INDIA

Paramita Chatterjee[1] and Nabanita De[2]

[1]Department of Computer Science, Charuchandra College, University of Calcutta
[2]Department of Economics, Charuchandra College, University of Calcutta

DOI: http://dx.doi.org/10.24327/ijrsr.2017.0810.1057

ARTICLE INFO

Article History:

Received 17th August, 2017
Received in revised form 21th September, 2017
Accepted 28th October, 2017
Published online 28th November, 2017

Key Words:

Cloud computing, vision 2020, E-governance, ICT, Economic growth, Digital Economy

ABSTRACT

The emergence of the internet and the World Wide Web (WWW) were technological triumphs. When this common architecture for digital information and communications become wedded to Broad Band networks, it melded previously distinct communication markets for data, voice and broadcast content. This also enabled a new generation of computer software embodied in the very large arrays of cheap data storage and processor that is popularly describe as the 'CLOUD'. Cloud computing (CC) is scalable on demand provision of remote computing and data storage. Its dramatic growth is captured in a 2011 study by Gartner Research, which predicted that over 60 %(2014) of the world's server workloads have taken place on virtualized cloud servers. This growth emerges from the cloud economic advantages of scale and scope that lower costs, improve speed of service, expand operational flexibility for users and reduce risks in IT development. The cloud also enables an eco- system of innovative information and communications technology (ICT) applications in low and middle-income economies that can advance their economic growth and social goals. The Indian vision 2020 documents by the planning commission states that "India's economic and technological transition will be accompanied by a multifaceted political transformation that will have profound impact on the function of govt. E- Governance has the potential if fully harnessed and rightly utilised to radically improve the speed, convenience, quality and transparency of public administrative services, while enhancing the ability of individual citizens to express and ensure their democratic rights. Vision 2020 document mandates that vision of India's future should be both comprehensive and harmonious. It envisages that: -"the people of India will be more numerous, better educated, healthier and more prosperous than any time in our long history". The present paper using secondary data studied that Cloud Computing is rapidly changing the economic scenario of India, the potential benefits of its promoting economic growth, emerging employment and enabling innovation and collaboration. People are used to scarce resources and the idea of virtualization of resources is forcing a change from a paradigm of scarcity to one of abundance.

INTRODUCTION

In recent years, the developing Countries have received considerable attention from global cloud computing players. For instance, IBM has established cloud computing centres in China, India, and Brazil. Other cloud players such as Microsoft, VMware, Salesforce and Parallels are active in the developing world. Similarly, developing world based firms have jumped on the cloud bandwagon. Cloud related venture capital (VC) and other investments are also flowing into developing economies (Sanyal 2008; Zhoudong 2008)[1]. Three commonly used designations for deployment models are private, public, and hybrid cloud[2]. In the long run, cloud computing is turning out to bring a transformative change in the business landscape [4]. A study by the research firm International Data Corporation (IDC) suggested that developing markets such as India and China are likely to be important market forces to drive the global shift toward the cloud. Likewise, according to Springboard Research, India have the greatest potential in the mid to long term for cloud related services. On the other hand, studies have indicated that there has been a lack of awareness of the cloud, even among large enterprises. According to a survey conducted among large enterprises by Gartner in 2009, half of the respondents in developing markets either had not heard of or did not know what cloud computing meant (Burt 2009) [1]. Digital India will transform citizen service delivery, catalyses new economic activity and a whole slew of start-ups offering new jobs by

Corresponding author:* **Paramita Chatterjee
Department of Computer Science, Charuchandra College, University of Calcutta

leveraging technology in an integrated manner. This will be driven by data centres, which will be at the heart of Digital India. Data centres are the engine for digital services, and all the services, offerings, envisioned through Digital India to transform India will only be as good as the Cloud Data Centres powering it--from a scalability, speed, as well as security perspective. And hence, there's growing demand for data centres from banks and financial institutions, telecom, IT and social media, all of which will grow faster thanks to Digital India, in a win-win cycle. For instance, Gartner states that 60 percent of all banks will process a majority of their transactions on the cloud. With growth of 12-15 percent CAGR expected over the next five years and aided by financial inclusion programmes driven by the government as part of the Digital India vision, Indian BFSI (The Indian Banking, Financial Services and Insurance will require massive data centres to meet customer expectations and business growth [10].

LITERATURE REVIEW

In theory, it is possible for the developing economies to catch up with the West as the cloud allows them to have access to the same IT infrastructure, data centers and applications. For instance, the cloud would help developing world-based researchers to access to data required for research as well as telecommunications and computing infrastructures (Werth 2009). As to the cloud's potential in the developing countries, the first observation is that cloud computing reduces infrastructure costs and levels the playing field for small and medium-sized enterprises (SMEs) (Irani 2008). The second commonplace observation is that, unlike client-based computing, which requires installation and configuration of software and update with each new release as well as revisions of other programs with every update, software on the cloud would be easier to install, maintain and update (Parikh 2009; Gruman & Knorr 2008). This benefit is especially important for the rural users who have less IT training (McFedries 2008). Third, cloud services arguably provide an adopter with the flexibility of scaling up the use if the demand increases (Grossman 2009). This approach requires a low upfront investment and is thus ideal for SMEs. Fourth, proponents of the cloud also cite observers who argue that as software becomes free via web-based applications or available in Software as a Service (SaaS), software piracy is likely to reduce (Bhanoo 2009). Fifth, others have speculated that the cloud can overcome barriers related to the poor broadband deployment in developing economies (Hillesley 2008). A final observation is that the cloud allows a business model in which third parties can provide a cost-effective security for SMEs (Grossman 2009). However, these observations may have underscored how economic and institutional problems remain central to the diffusion of ICTs in the developing countries [1]. According to the World Economic Forum's Global Information Technology Report (2015) (which includes a wide array of topics such as Internet penetration and cost, regulatory environment and laws relating to ICT, infrastructure and digital content and ICT use for business-to-business and business-to-consumer transactions), the top 20 countries in the Network Readiness Index are all high income advanced economies. Even though some non-OECD countries are making significant advances regarding their ICT development efforts, most development, market opportunities and business needs are among the wealthiest and most technologically developed nations. However, some of the less advanced IT societies are increasing demand of cloud-based services [2]. The greatest opportunity of cloud adoption by SMEs is provided by the surge in mobile internet users in the country. As per the latest report of the Internet and Mobile Association of India (IAMAI) and consultancy firm KPMG, mobile internet users are going to get nearly doubled from 159 million in 2014 to 314 million in 2017 (Alawadhi, 2015)[23].

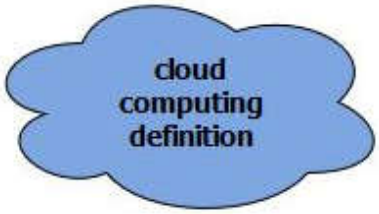
Objectives of the Study

1. The concept, Characteristics, benefits & Implications of cloud computing in India.
2. Cloud models uses in different sectors.
3. The potential benefits for promoting economic growth and employment, job opportunities in India.
4. Changing economic scenario and security in India.

Data Source: This paper is based on secondary data from different articles, Journals, published books, web-sites and magazines and news media, company's reports. Different govts published data sources like sample surveys, annual reports.

Analysis and Interpretations

Definition, benefits and Implications of Cloud Computing



Cloud computing (CC) is a type of computing that relies on ***sharing computing resources*** rather than having local servers or personal devices to handle applications. In cloud computing, the word cloud (also phrased as "the cloud") is used as a metaphor for "*the Internet,"* so the phrase *cloud computing* means "a type of Internet-based computing," where different services-such as servers, storage and applications-are delivered to an organization's computers and devices through the Internet. CC is a model for delivering information technology services in which resources are retrieved from the internet through web-based tools and applications rather than a direct connection to a server [6].

Table 1 The Economic Characteristic of the CLOUD market [3]

Dominated by a global "hub and spoke" network because of advantages for
a. Economies of scale and scope
b. Responding to characteristics of particular data management needs
c. Peak load management
Growing diversification of facility locations and increasing array of competitive entrants both in large data centers and Cloud-enabled services
a. Geographic distribution for response times, redundancy and peak load management
b. Major ICT firms and specialized new entrants
c. Growing role of firms from emerging

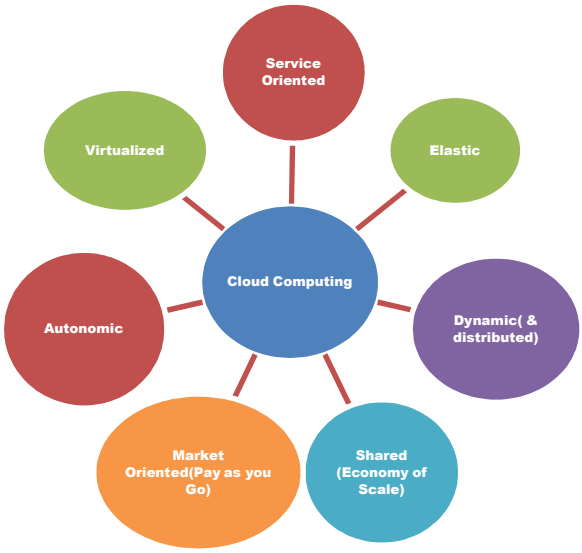


Fig 1 Characteristics of Cloud computing [28]

The full benefits of the Cloud

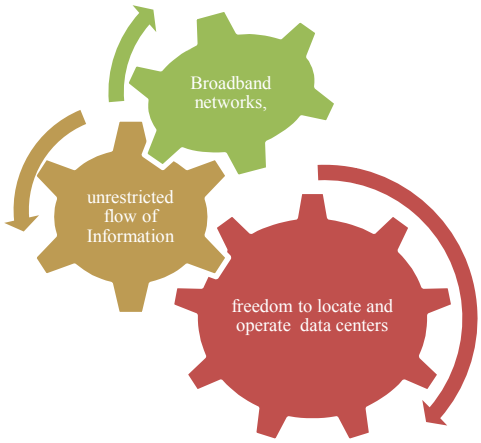


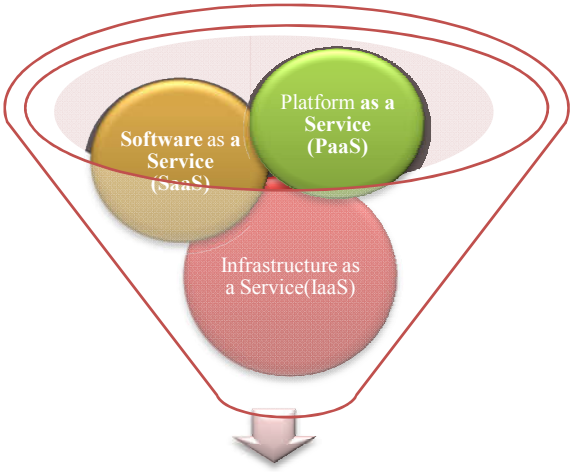
Fig 2

Cloud has five implications for bolstering the well-being of lower-and middle-income countries:

1. The Cloud is central to being competitive in higher value-added products because both goods and services in the world economy are becoming more ICT intensive.
2. Cloud ICT is vital to being competitive in the fastest growing share of world trade and investment and the future home to most of the world's middle class. The Cloud opens the way for lower and middle income countries to participate more fully in the world's switch to a "knowledge economy" as both consumers and creators of knowledge based products.
3. Cloud computing can greatly strengthen small and medium enterprises (SMEs), thereby stimulating job creation. The Cloud reduces the cost, the upfront investment and the operational complexities of using ICT to help build smaller businesses into larger ones. At the same time, both SMEs and individual users are relying on many "free" Cloud services that are in turn paid for by Cloud-enabled advertising, often delivered trans-border.
4. The Cloud creates significant benefits for both individual users and governments. All three country studies demonstrate emerging changes in the capacity of government to deliver its core services more economically and effectively to the benefit of citizens.
5. The Cloud and the build-out of broadband infrastructures have strong synergies in developing economies. An effective Cloud infrastructure improves the economic case for creating broadband networks in lower income countries because Cloud services create new revenue opportunities for networks.

An additional implication of the country studies is the enormous benefit of experimentation and "learning by doing" in an environment driven by market competition and a national policy to invest in rapidly transforming digital capabilities. This approach will require the embedding of national experimentation and innovation in the context of global experimentation and innovation. Governments can play a positive role in reducing the uncertainty about the rules of road concerning questions about privacy, security and equity.[3]

Common Cloud Service Models



Common Cloud Service Models

Fig 3

Cloud services are typically deployed based on the end-user (business) requirements. The primary services include the following:

1. ***Software as a Service (SaaS):*** These services are applications over internet. User can run these applications using web-browser. An example of this kind of services may be Google Docs.
2. ***Platform as a Service (PaaS):*** These kinds of services are focused on the deployment of applications or services online letting to the developer manage the hardware or software necessary, including solutions. This service includes all the life-cycle of the deployment of applications/service such as design, implementation, testing, deployment, integrity with databases etc .An example of these services is Google App engine.
3. ***Infrastructure as a Service (IaaS):*** This service offers computer architecture. All the servers, connections, software and other resources are offered by the providers. The users see it like an entire infrastructure hosted in the same organization [10].

The market in India had grown 35.9 % in 2016 to total $1.3 billion, according to Gartner, Inc. The highest growth came from (infrastructure as a service [IaaS]) is 45.5 % followed by platform as a service (PaaS) estimated 33.5% (see Table 2)."The overall global public cloud market matured, and its growth rate will slightly slow down from 17.2 percent in 2016 to a 15.2 percent increase in 2020," said research director at Gartner.

Table 2 India Public Cloud Services estimated (Millions of U.S. Dollars)

	2015	2016	2017	2018	2019	2020
Cloud Business Process Services (BPaaS)	71	87	112	144	186	239
Cloud Application Services (SaaS)	297	395	524	671	819	1,000
Cloud Application Infrastructure Services (PaaS)	80	107	140	181	229	286
Cloud System Infrastructure Services (IaaS)	333	485	721	1,045	1,464	2,016
Cloud Management and Security Services	80	104	134	168	206	249
Cloud Advertising	96	123	158	189	223	266
Total	957	1,301	1,790	2,398	3,126	4,055

Source: Gartner (November 2016)

"As buyers intensify and increase IaaS activity, they will be getting more for their investment: ongoing enhancement of performance, more memory, more storage for the same money (which will drive increases in consumptions) [13].

Cloud Economy

User application**:** Scientific Computing, Enterprise ISV, Social Networking, Gaming

User -Level and Infrastructure level platform:

- Cloud Programming Environment & tools: WEB 2.0, Mashups, Workflow, Concurrent & distributed Programming.
- Cloud hosting Platforms: SLA management, Admission Control, Pricing, Monitoring.

Infrastructure: Cloud Physical Resources: Storage Virtualized Clusters, Servers, Network [28]**.**

Green Cloud Architecture

Fig 4

Factors Responsible for Cloud Growth in India

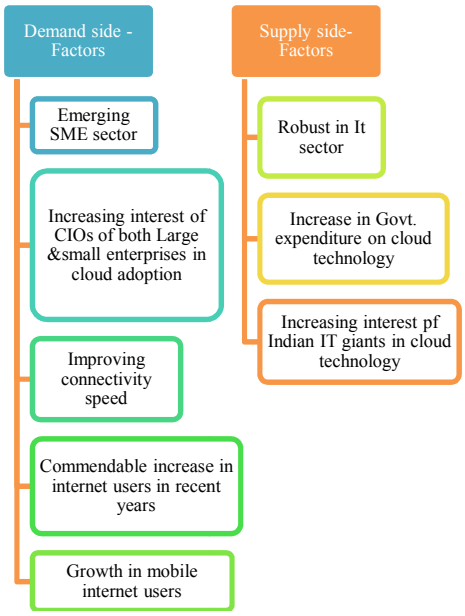


Fig 5

Opportunities for India in the Digital Economy

A strategic Internet of Everything-based opportunity abounds in the public and private sectors. The digital economy is the third industrial revolution. It is referred to as the Internet Economy or Internet of Everything (IoE). This digital revolution is expected to generate a wealth of new market growth opportunities and jobs, and become the biggest business opportunity of mankind in the next 30 to 40 years. Goldman Sachs predicts that India, which comprises 15 percent of the world population with a growth rate of 7 to 8 percent, could be the second largest economy by 2030. There is no doubt that the leadership of the country sees the digital economy as a major growth enabler. According to research conducted by Cisco Consulting Services, the global IoE value at stake (VAS) is estimated to be US$19 trillion from 2013 through 2022 in private and public sectors combined. VAS is defined as the combination of net new revenues, cost savings, and the value that flows to organizations and industries that take advantage of new IoE connection-based capabilities. Recently the Department of Electronics & Information Technology of India (DeitY) published the draft Internet of Things (IoT) policy, which shows that the country expects to create an IoT industry in India of US$15 billion by 2020. The DeitY estimates that India will have a share of 5 to 6 percent of the global IoT industry with a focus on agriculture, health, water quality, natural disasters, transportation, security, automobile, supply chain management, smart cities, automated metering and monitoring of utilities, waste management, and oil and gas. Major enablers for India will be the growth of broadband penetration, machine-to-machine connections, and mobility. The broadband penetration, which today is 9 percent, is growing fast. The mobile broadband penetration of 49 percent will grow [11].

Digital Economy: a Strategy for India's Growth and Job Creation

India recognizes the importance of national policy leadership in digitalization. With one-third of the world's population online,

the need to coordinate government policies and commercial strategies for rolling out and using Information and Communication Technologies (ICTs) has never been greater. This importance calls for investment in digitalization in the public and private sectors. Digitalization has emerged as a vital economic driver of accelerated growth and job creation. According to Cisco estimates, an increase of 10 percent in a country's digitalization score fuels a 0.75 percent growth in its per-capita GDP. A 10-point increase in the digitalization score leads to a 1 percent drop in the unemployment rate. The launch of the Digital India Program of the Government, which aims at "transforming India into a digitally empowered society and knowledge economy, The digital economy opens new investment opportunities for Indian government and business leaders[11]. The e-commerce sector in India is on a growth trajectory and is projected to cross USD 103 billion by 2020 at an impressive CAGR of 41%. The major segment is e-tail, which forms the fastest growing segment, and is also expected to account for 67% (USD 68.8 billion) of the total e-commerce market. The ongoing expansion and robust outlook have led to a progress which will positively impact the entire e-commerce ecosystem. While the most encouraging aspect is its impact on the creation of employment opportunities. Online seller base is projected to grow to 1.3 million by 2020 an is expected to add more than 10 million net new jobs. The thriving startup culture in the country has been enriched by e-commerce creating enabling conditions for entrepreneurship across the value chain. It is creating opportunities for entrepreneurs to become 'service providers' to the larger e-tailing industry by venturing into logistics, technology, services, marketing to provide customized solution [20]. Today's IT environments are built on a series of costly compromises that drive unintended consequence. A cloud-oriented environment avoids these compromises even as it enables high levels of efficiency, flexibility, and responsiveness while ensuring a way to control IT costs. At the same time, a cloud environment enables new business models and opportunities. For example, it can deliver levels of customer self-service previously not possible or allow for the creation and delivery of new automated on-demand revenue producing services [21]. In addition, consortiums may have a significant positive impact, such as the one created in Bangalore where veterans from Tech Mahindra, GE, Vodafone, Cisco, Philips, and Tesco are forming an India Internet of Things panel to build open source IoT solutions for solving problems in healthcare, education, and agriculture, among others. However, in most cases, an ecosystem of businesses and technology can seize serious IoE opportunities. Chief among these opportunities are the following (in no particular order) [11].

Employment Generation

"The cloud is going to have a huge impact on job creation," says Susan Hauser, Microsoft corporate vice president of the Worldwide Enterprise and Partner Group. "It's a transformative technology that will drive down costs, spur innovation, and open up new jobs and skill sets across the globe." One way in which the cloud is helping companies to be more innovative is by freeing up IT managers to work on more mission-critical projects. In addition, many businesses are using the cloud to improve how they work with customers and partners [12]. The basic rationale for job growth is that IT innovation allows for business innovation, which leads to business revenue, which leads to job creation-To create a model that analyzes the role of cloud in job creation, IDC calculated the number of cloud-generated jobs by weighing several factors, including available country workforce, unemployment rates, GDP, IT spend by industry and company size, industry mix by country and city, technology infrastructure by country and city, regulatory environment, and other factors[22] ."One of the trends seeing is that companies are using cloud-based collaboration software not just for their internal employees, but to engage and share information with partners and vendors," says Aaron Nettles, co-founder and CEO of Vorsite. Among the enterprises making use of the cloud to boost innovation is Underwriters Laboratories (UL), a global company that provides safety testing and certification for a wide range of product categories. In recent years, the company has acquired several businesses to broaden the services it offers to customers [12]. The distribution of cloud-related jobs by region is a mix of employment by region crossed by investment in IT cloud services by region. Asia/Pacific, except for a few small countries that account for only about 5% of the total workforce, is dominated by two countries in terms of job creation-China and India. The region is a more aggressive adopter of public IT cloud services than one might think, accounting for 12% of such services worldwide (compared with 25% of IT spending). In addition, the region has two other factors in favour of cloud-based job creation: (1) Infrastructure challenges will help spur investment in private IT cloud services, and (2) in such an emerging market, spending on IT cloud services will be subject to less "legacy drag" than in developing regions. But, of course, the primary reason for such high job numbers is the immense workforce in the region [22].

Best Practices for Security in Cloud Adoption by Indian Banks

Three types of possible lock-in can affect cloud service use:

- ***Platform Lock-in****:* Cloud services tend to be built on one of several possible virtualization platforms; for example, VMWare or Xen. Migrating from a cloud service provider using one platform to a cloud service provider using a different platform could be very complicated.
- ***Data Lock-in****:* Since the cloud is still new, standards of ownership-i.e., who actually owns the data once it lives on a cloud computing platform-are not yet developed, which could make it complicated if cloud computing users ever decide to move data off a cloud vendor's platform.
- ***Tools Lock-in****:* If tools built to manage a cloud computing environment are not compatible with different kinds of both virtual and physical infrastructure, those tools will only be able to manage data or apps that live in the vendor's particular cloud computing environment [5].

A Review of the Studies of India Highlight Three Clusters of Policy Issues

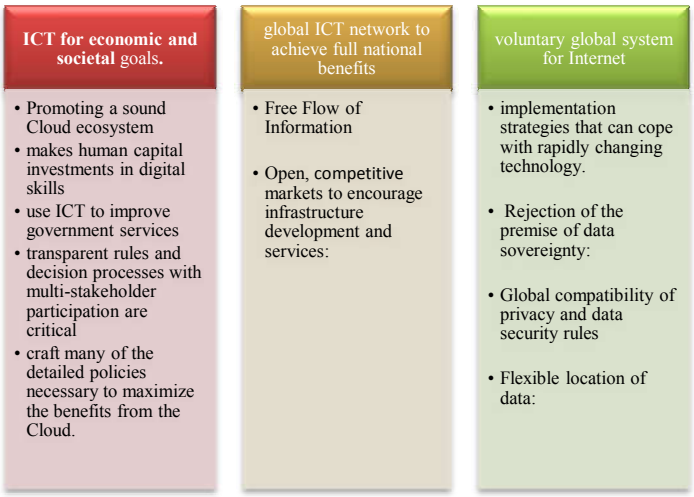


Fig 6

Opportunities and Threats for Cloud Computing In India

Worldwide cloud computing adoption in increasing very rapidly. India is not an exception for this. "In India, cloud services revenue is projected to have a five-year projected compound annual growth rate (CAGR) of 33.2 percent from 2012 through 2017 across all segments of the cloud computing market. Segments such as software as a service (SaaS) and infrastructure as a service (IaaS) have even higher projected CAGR growth rates of 34.4 percent and 39.8 percent," said Ed Anderson, research director at Gartner [8]. The research by IDC titled "Indian Cloud Market Overview 2011-2016" provides estimates that Indian cloud market will grow over 70% from 2014. This section illustrates the opportunities and threats for cloud computing in India [22]**.**

Opportunities

- The Indian government's Digital India project provides potential opportunities for cloud adoption at a cost of $19 billion between 2014-2018.
- Indian manufacturing sector has come a long way and the use of IT in manufacturing can be found since last over two decades. Since 2010, CIOs in Indian manufacturing have started adopting cloud models.
- Government of India has embarked upon an ambitious initiative called GI Cloud also named Megh Raj. This decision has been taken to utilize and harness the benefits of cloud computing.
- Microsoft to invest Rs 1,400 crore in India cloud data centres. Microsoft Launches Cloud .Accelerator Program for Indian Enterprises & Government. TCS involved in putting data centers in India.
- Increased number of IT companies and ISPs in India.
- The key drivers for IT growth in India is highlighted by the growing acceptance of cloud based solutions, embracing merging technologies like Internet of Things (IoT), Big Data, mobile technologies (3G, 4G) and fuelled by Indian government's initiatives for a digital India.
- Energy Efficiency & Lower Carbon Footprint.
- Resources Optimization.
- Pricing Flexibility
- Disaster Recovery.

Threats

- Data transfer bottlenecks and therefore the available network bandwidth constraint issue may arise.
- Poor connectivity degrades the quality of service, comfort label of IT Staff with Cloud.
- Although the government of India has initiated the movement of using the cloud for e-governance applications, no common legal issues across India for cloud services.
- India is not yet economically strong therefore direct service cost and hidden cost (backup, system recovery and problem solving) may affect the adoption of cloud.
- No clear procurement rules for cloud implementation in India[11]
- Market & technology Immaturity.
- Cloud Solution not Secure enough [30]

Cloud is a Good Platform for E-Business

1. ***On-demand flexibility and scalability***-The flexibility and scalability of cloud is well-suited for e-business, whether to support online marketing campaigns or other traffic spikes.
2. ***Increased business agility***-Cloud based systems improve for example, a retailer's agility in opening new stores or locations, speed up the supply chain, and increase competitiveness, while also reducing the cost of ownership compared to a traditionally deployed, multi-channel retail system.
3. ***Uptime and a smooth customer journey-***At the customer interface; cloud technology can help ensure a smooth and glitch-free online experience for customers. As a technology renowned for its scalability, cloud is flexible enough to cope with unexpected peaks in traffic.

In an ever more demanding and competitive retail market, cloud-based technology can help retailers give customers what they want, while getting more from them [9].

CONCLUSION

In today's global competitive market, companies must innovate and get the most from its resources to succeed. This requires enabling its employees, business partners, and users with the platforms and collaboration tools that promote innovation. Cloud computing infrastructures are next generation platforms that can provide tremendous value to companies of any size. They can help companies achieve more efficient use of their IT hardware and software investments and provide a means to accelerate the adoption of innovations. Cloud computing increases profitability by improving resource utilization. Costs are driven down by delivering appropriate resources only for the time those resources are needed. Cloud computing has enabled teams and organizations to streamline lengthy procurement processes.

Cloud computing is still a very young technology and still having more room for improvement. Although the meaning of cloud computing may be differ from one point of view of a person to another, it still all boils down to sharing one meaning

which is-delivering information over the internet. [19] Emerging markets, small cities, and small businesses have as much access to the benefits of cloud computing as large enterprises or developing nations. The availability of private IT cloud services as an option where public cloud IT services is not fully available or where there are infrastructure challenges is a nice hedge for emerging markets. Beyond this, the use that cloud computing can be put to beyond mere capital cost avoidance. Organizations large and small can host their own cloud services for their own customers. IT cloud services can support other industry services offered in the cloud, from e-government and online health records to product development and design, logistics, and billing. And here may be an even bigger payoff for local economies than the adoption of IT cloud services alone [22].

References

1. Khetri Nir, "Cloud Computing in developing Economics Drivers, Effects, and policy Measures", University of North Carolina-Greensboro, PTC'10 proceedings
2. "2016 Top Markets Report Cloud Computing", April 2016, A Market Assessment Tool for U.S. Exporters, U.S. Department of Commerce, International Trade Administration, Industry & Analysis (I & A)
3. Cowhey Peter, Kleeman Michael "Unlocking the benefits of Cloud Computing for Emerging Economics-A Policy Overview" UC San Diego
4. "Silver lining Cloud Computing is a powerful tool that can transform India's Govern ance, research, and economic and social development", 16th August 2010, Economic Times
5. A White Paper, March 2015," Best Practices for Security in Cloud Adoption by Indian Banks ",Members of the Open Group Security Forum
6. https://blogs.wsj.com/indiarealtime/2015/07/13/how-cloud-computing-is-raining-on-indias-outsourcing-parade/
7. http://www.thehindu.com/business/Industry/indian-it-industry-the-cloud-opens- up/article7141568.ece
8. http://www.academia.edu/2343480/Impact_of_Cloud_Computing_on_IT_Industry_A_Review_and_Analysis
9. http://www.emeraldinsight.com/doi/pdfplus/10.1108/10878571211242920
10. Talukdar Jyotismita, 24-30 October 2015, "Career in Cloud Computing", Employment News (weekly), New Delhi
11. C, Adamuthe Amol, D.Salunkhe Vikram, H.Patil Sema, T.Thampi Gopakumaran, September 2015," Cloud Computing- A market perspective and research directions", I.J. Information Technology and Computer Science, 42-53, MECS (http:// www.mecs-press.org/) DOI:10.5815/ijites.2015.10.06
12. Buyya Rajkumar, Ye Shin Chee, Venugopal Srikumar, "Market-Oriented Cloud Computing : Vision, Hype, and Reality for delivering IT Services as Computing utilities"
13. Shah Bharadwaj Sangeeta, Lal Prerna, "Exploring the Impact of Cloud Computing Adoption on Organizational Fexibility: A Client Perspetive", Proceedings of 2012 International of Cloud Computing, Technologies, Applications & Management
14. Gangwar Hemlata, Date Hema, February 2015, "Understanding determinants of Cloud Computing adoption using an integrated TAM-TOE Model", *Journal of Enterprise Information Management*
15. R. Wadhe Vaishali, April 2016, " Future and Scope of Cloud Computing in India ", *Elixir International Journal,* ISSN 2229-712X, www.elixirpublishers.com
16. Dr. Srivastava Nidhi, March 2016, "Effective e-governance through Cloud Computing", *International Journal of Innovative Research in Computer and Communication Engineering,* Vol.4, Issue 3, ISSN (Online) : 2320-9801,ISSN(Print) : 2320-9798
17. Frank Malcolm, Moore Geoffrey. December 2000," The Future of Work, Anew Approach to Productivity and Competitive Advantage", Cognizant and TCG Advisors
18. "The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution", January 2016, Global Challenge Insight Report, World Economic Forum
19. Murthy Sudhir, "Business Impact of Cloud Computing in India", Wipro India
20. Neves Caldeira Pedro, Schmer Bradley, Bernardino Jorge, Camara Javier, "Big Data in Cloud Computing : features and issues"
21. Subashini .S, Kavitha. V, "A Survey on security issues in service delivery models of Cloud Computing", *Journal of Network and Computer Applications*, ElSEVIER
22. Nazir Mohsin, (Nov.-Dec 2012), "Cloud Computing: Overview & Current Research Challenges", IOSR *Journal of Computer Engineering,* Vol. 8, Issue 1, ISSN: 2278-0661, ISBN: 2278-8727
23. Padhy Prasad Rabi, Patra Ranjan Manas, Satapathy Chandra Suresh, December 2011, "Cloud Computing : Security Issues and Research Challenges", *International Journal of Computer Science and Information Technology & Security*, vol. 1,No 2, ISSN -2249-9555
24. Ghosh Abhiroop, Prof. Sahoo Anirudha, "Cloud Computing", IIT Bombay, Dept. of Computer Science & Engineering
25. Harauz John, Kaufman M.Lorl, Potter Bruce, "Data Security in te World of Cloud Computing"
26. Ghanam Yaser, Ferreira Jennifer, Maurer Frank, 26th Nov, 2012, " Emerging Issues & Challenges in Cloud Computing - A Hybrid Approach', *Journal of Software Engineering and Applications*,923-937
27. Gantz F. John, Toncheva Anna, Minton Stephen, March 2012, "Cloud Computing's Role in Job Creation", White Paper,IDC, Microsoft
28. Garg Kumar Saurabh, Buyya Rajkumar,"Green Cloud Computing and Environmental Sustainability"
29. Atrey Ankita, Jain Nikita, N.Ch.S.N Iyengar, 2013, "A Study on Green Cloud Computing", *International Journal of Grid and Distributed Computing*, Vol. 6, No. 6,pp 93-102, ISSN :2005-4262
30. Adamuthe Amol C., Salunkhe Vikram D., Patil Seema H., Thampi Gopakumaran T., September 2015, " Cloud Computing-A market Perspective and Research Directions ", *I.J. Information Technology & Computer Science,* 42-53, MECS.