



IMPACTS OF CLOUD COMPUTING ON ACCOUNTING: AIDS, CHALLENGES AND ITS FUTURE GROWTH

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ABSTRACT

KEYWORDS:

Cloud Computing, Cloud accounting, Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), Infrastructure-as-a-Service (IaaS)

Cloud Computing emerged as the source of transformation in the field of accounting as many firms and individuals are driving towards the technology for recording and interpretation rather than relying on conservative methods of accounting. It is assisting in increasing the pace of work as well as providing the flexibility to record, modify or delete the information. This paper attempts to influence of cloud computing on accounting in current scenario. It also outlines the benefits and challenges faced by it and scope for its future growth. For the purpose of the study, secondary data has been intensively studied and personal knowledge and reasoning is applied for deriving conclusions. It is observed that cloud computing is prevailing over the time due to its cost effectiveness and flexibility while second thought on its adaptation is given because of its security issues and lack of support from stakeholders. It is concluded that human intervention is integral part of cloud computing as working on cloud is done by them, hence individuals who are doing accounting using conventional methods usually resist the growth of cloud computing due to their lack of interest in accepting this change and they are not supportive enough to learn new technology.

INTRODUCTION

In 1961, Dr. John McCarthy generated an idea of selling computing like a utility, but due to lack of technology and acquaintance it couldn't have been flourished that time. As the time passed and technology emerged, Salesforce.com started delivering applications to enterprises using simple website in 1999. Later in 2002, Amazon started Web services providing storage, computation and even human intelligence. Another milestone came in 2009 when Google started to offer cloud computing enterprise applications in the form of Google Apps. [16, 22]

Cloud computing is a practice of managing, storing and processing data over the internet rather than on local server or personal computer in order to make it accessible to concerned parties easily. It allows the users and enterprises with various capabilities to store and processes their data in either privately owned cloud or on a third-party server in order to make data accessing mechanisms much more convenient and reliable. [1-5,7,9,10]. Generally, it is categorised into following services:

- **Software-as-a-Service (SaaS):** It is a service of providing software applications over the internet to the user on demand. It can be on a subscription basis or trial basis. A cloud provider manage the software application it provides and administer any

maintenance required such as upgrades, bug fixes etc.

- **Platform-as-a-Service (PaaS):** It is a service available for developers to create web or mobile application without setting up an underlying infrastructure of servers, database or network needed for development. It provides an environment or platform to develop, test, deliver or manage software applications.
- **Infrastructure-as-a-Service (IaaS):** It is a service provided by a cloud provider in which IT infrastructure can be rented i.e. servers, virtual machines, operating systems, network etc. on a pay-as-you-go basis. [12,23]

The type of cloud service can be retrieved on the basis of purpose and goals. Further, there can be the usage of cloud by the parties differently. Not all type of data needs to be accessed by every person. So there are four deployments of cloud:

- **Public Cloud:** This type of cloud is owned and managed by third party i.e. cloud service provider. The network, server or any other computing resource are provided to the user by managing his account in web browser by the cloud service provider. The hardware, software and other

- supporting infrastructure vests in the cloud service provider.
- **Private Cloud:** This type of cloud is managed and controlled by a single business or organisation. It can be physically located on the on-site data centre of that organisation. In this, services and infrastructure are maintained on a private network and only accessible to the parties concerned to that organisation.
 - **Hybrid Cloud:** This type of cloud is a blend of Public and Private Cloud. It allows data and applications to be shared between them facilitating greater flexibility and more deployment options to the business.
 - **Community Cloud:** This type of cloud is shared between organisations for a shared cause and may be managed by them or third party. [19,23]

Benefits of Cloud Computing

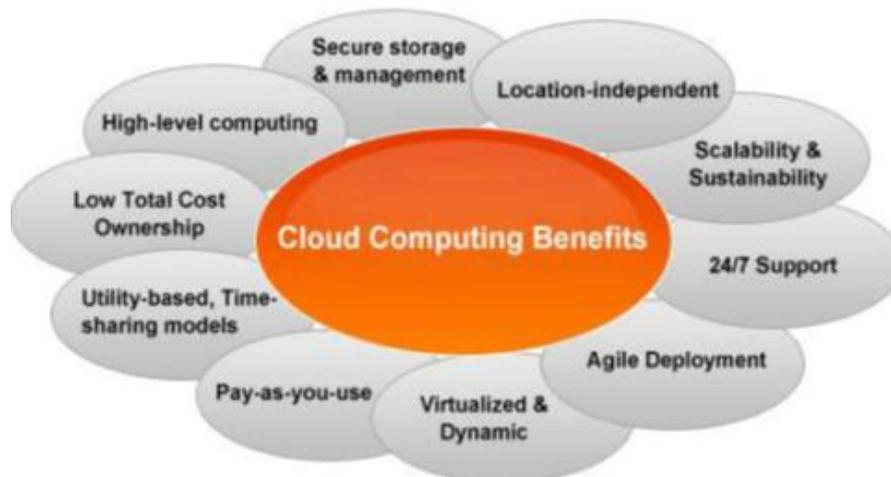


Fig. 1: Advantages of Cloud Computing in Business (Adapted from Presentation in the seminar in Pentecost University College IT level 100 weekend school)

Accounting in the Cloud

With the growth of the modern human society, basic essential services in which people are having their interest are commonly provided in such a way that everyone can easily get access to them. These utility services are accessed so frequently that they need to be available whenever the consumer requires them. Business realized that they need to develop and as huge cost is involved to pace up with advancements; they also knew that they are required to save money. Hence they thought that novel ideas and methods may generate better results with rising acceptance of innovative technologies. This gave rise to the growing prevalence of cloud computing in Information Technology (IT) in recent times. The world we live in is changing rapidly and accounting is also a part of it. Accounting in cloud has become a practice that is favoured by most of the business due to its convenience and exposure [2-4, 7, 9, 10].

Cloud accounting is performing accounting function over the internet. In this, it is not required to install software in local server rather all the accounting functions will be performed by user through login portal over the cloud [6, 10, 23]. Cloud service providers provide remote servers or applications against some fee and online access to them will be granted for managing and maintaining accounting records [23]. The data is stored in cloud at real time ensuring the reliability of accessed data and different users can reach to the data simultaneously, thus ensuring easy collaboration with your team and clients [4, 6, 8].

REVIEW OF LITERATURE

Gupta et al. (2013) in their paper described the perceived inclination of small and medium enterprises towards cloud computing. They used identification of existing core variables

approach after extensive literature review and questionnaire filled by 211 respondents of small and medium enterprises based in APAC region to gather formal data. The hypothesis framed regarding cost reduction, ease and convenience, reliability and security of cloud computing. It is observed that SMEs favours cloud computing in terms of ease of use, security concerns and cost reduction. But they feel hesitant to adopt it in terms of reliability and sharing and collaboration with its stakeholders.

Ebenezer et al. (2014) in their paper seek to identify if cloud computing can also be used in accounting and its positive effects on accounting. They used Ghanaian setting for their research. They employed quantitative and qualitative research methods for collection of data. Primary data was collected through questionnaire and interviews of accountants and students pursuing programme in accounting in Ghana region. While Secondary data was gathered from journals, internet, books from around the world and Ghana. It is observed that accountants who have an immense knowledge of cloud computing reckon that it can be utilized for accounting purposes due to its cost effectiveness and speed but it also possess data security concerns as it involves financial data which is confidential.

Drew (2015) in his article examines the movement of accounting firms slowly towards cloud. He points out that 9 out of 10 CPAs agrees that accounting profession need to evolve quickly in order to cope up with rapidly changing business environment. He underlined that though CPA firms are far away on the path to paperless than on the working on cloud but it hope for that gap to close in forthcoming years. They believe digitization is increasing rapidly and they need to upgrade themselves in order to ensure their competitiveness in business environment.

Cerqua (2016) in his article pointed out the benefits and problems CPA firms faces in cloud computing. He observed that greater infrastructure at low cost, transition to paperless office, time saving, prevention of data loss, elimination of internal IT department are some of the benefits enjoyed by CPA firms while there can be few problems they face such as security and reliability, regulation compliance, application integration etc. It is recommended that using cloud computing in accounting can drive even small CPA to compete with larger firms without concerning about its size and profitability.

Al- Zoubi (2017) in his research paper explains the impact of cloud computing on the elements of accounting in terms of financial operations, firm's entity, accounting books, financial reporting etc. The descriptive approach has been adopted for the research study and data has been collected from previous literature. He inferred that emergence of cloud computing has reduced the size of the companies in terms of physical structure. It also facilitated the financial operations by deriving accurate and reliable results. It reduced the barriers for customers that now company's executives and customers need not to communicate or visit personally as customer can check their records electronically from any place they are feasible to and lastly individuals and firms can use software and physical equipment; they don't need to buy them or install in their computer.

OBJECTIVES OF THE STUDY

The main objective of this study to underline the aids to accounting provided by the cloud computing and challenges it faces in adopting and implementation of cloud technology in its day to day operations.

Another objective is to highlight the growth of cloud computing in accounting and other business aspects in forthcoming years.

METHODOLOGY

Data was obtained from existing literature and supporting documents from internet, books, journals for the purpose of research. While analyzing the data personal knowledge, information from literature review and logical reasoning is used to derive conclusions.

Cost Effectiveness of Cloud Computing

The distinctive feature of cloud computing is its cost saving in operations and management. By switching to cloud computing, the need for installing servers and hardware which reduces the company's IT cost considerably. Moreover, cloud upgrades and maintains itself on a regular basis without making an effort to it which results in availability of applications whenever it is needed. Due to less suspension company can enjoy increased productivity, more revenue and greater opportunities. Here are a few points underlined to show the cost effectiveness of cloud computing over on-premise software: [14,18].

Table 1: Cost Comparison between On-Premise Software and Cloud Computing

Basis	On-Premise Software	Cloud Computing
Ownership Costs	Requires huge investment in terms of buying hardware, software and servers and a trained IT staff to manage the system. Moreover cost of up gradation and maintenance is also associated.	Requires low initial investment as nothing is needed to install physically in it. It is just needed to contrive the software and access it using internet. Up gradation and maintenance is done by service provider himself.
Flexibility	Less flexible in working and expansion as infrastructure and staff needed to employ separately. And it seldom requires complicated security profiles for data to be accessed by a third party.	More flexible as it can be accessed from any browser in the world. And since data in cloud is hosted externally, it is more convenient to provide access to third party.
Security	It is considered less secure than cloud as it is affected by human factors. Still most people have faith on it.	It is considered more secure than on-premise software as cloud providers keep data safe through encrypted solutions, firewalls, backup recovery etc. Still most of the people remain doubtful about cloud services
Customization	It is tailor-made according to the needs of the business.	It is operated at a large scale and is not capable of being customized according to the particular business.

IMPACT OF CLOUD COMPUTING ON ACCOUNTING

Accounting in the cloud or say "Cloud Accountancy" works same as book-keeping works but using internet [17]. Cloud provider provides the online server from where any user, company or organisation can access their data through internet. Currently cloud computing in the field of accounting is originating from informational society which is ready to transform itself from using traditional method of data handling and storage to web-based information solutions. Moreover, fusion of a document scanning is a significant part of cloud computing. Invoices can be scanned promptly and disseminated to the accounting system automatically after which checking and confirming the entry can be done by accountant [9]. It leads to cost saving in processing as the

scanning of invoices can be done in mass by client themselves. In order to assess their business performance, they just need to log into the accounting firm's portal. The information of currency fluctuation's impact or tracking of cash flow can be done which is helpful in developing faith in business decisions of clients. Various services like business analysis or cash flow forecasting can be rendered by accountants for the purpose of offering an in-depth financial expertise which is essential to ensure growth of business [13].

Further, Cloud-based accounting systems provide the tools to eradicate risks of inaccuracy and inconsistency of data that systems operated by predecessor created. Further, in order to make audits and historical tracking convenient, most cloud-based platforms form an audit trail as component of their general ledger.

Research shows that cloud accounting solutions leads to considerable increase in productivity because it unleash accounting firms or accountants to provide more time to their clients for guiding them in their financial matters. Moreover, an assistance to small and medium business clients can be given by accountants to take better advantage of financial advice and make better and rapid decisions, thus improving overall financial performance. [12]

And in the event of fluctuations, the feature of flexibility of cloud based services correspond to the needs of clients and requirements of business. It has several other benefits like any business irrespective of its size can be operated by cloud accounting solutions, without incurring much expense on hardware and servers, and in order to support company at every stage of growth, it provides information induced by analysis of data and statistics. An accountants and accounting firms are required that can adopt innovative platforms in rapidly changing business environment which curtail the burden of data entry and other reporting work. A service of cloud computing help firms to develop inclusive approach and give preference to real-time and actionable financial advice for clients [25].

AIDS TO ACCOUNTING [6,21]

As moving to the cloud simplifies the work of accounting and ensures low cost productivity in business, it also serves several other benefits which are enlisted below:

Speed up the functioning time

It is evident that if accounting work is done using online services and cloud computing, concerned clients or parties will get the real-time information and processing.

Can work without physical presence

Data can be accessed from any corner of the world as far as the internet facility is available. There is no need to present physically to operate or perform any accounting task while dealing through cloud.

Low-cost infrastructure

It doesn't put a hole in your pocket while enlarging the scale of business. All you need is cloud access at a very low subscription or monthly cost, thus eliminating the need to maintain hardware or complete system resulting in reduction in costs.

Transition to Paperless office

Adoption of cloud computing in accounting curb down the burden of maintaining documents and bunch of files as all the data is available and processed on server on real time basis and consistently backed up in a day, thus ensuring security and reliability of data far more better in comparison with physical handling of files and documents.

Elimination of Need of Separate IT department

It is not required to perform IT function while working in accounting field. Moving your business to the cloud means let technology experts handle your data and processing on server so that you can focus more on your business and clients.

Use of latest version

A service provider updates the software and hardware himself on a regular basis, thus your technology is always upgraded and all the people and firm using cloud get to access the same technology at a particular time that too at a reduced implementation cost.

CHALLENGES OF THE CLOUD IN ACCOUNTING [6,26]

Despite lot of benefits of adopting cloud in accounting, it faces few challenges too which are listed below:

Security & Reliability

Since accounting involves financial data which is highly confidential it is important to ensure its security. Cloud is nothing but an internet which can easily be manipulated or disrupted by professional hackers or third parties. All the processing and storage lies in hands of service provider hence hampering the security and reliability of data.

Internet Reliability

It requires the consistent and uninterrupted internet connectivity that too on maintained speed. Since accounting function is a wide process it requires high speed to process on internet as there are lot of parties and firm dealing with it at a particular time. To ensure access to them effectively maintenance of internet connection at high speed is significant.

Regulation Compliance

It is important to ensure before getting the cloud service from provider that it meets the compliance requirements of Gramm-Leach-Bliley and PCI-DSS(Payment Card Industry Data Security Standard) where both ensures the fulfilment of security standards, protection of consumer information and safeguard rules which asserts that information security programmes and controls should be developed to protect financial data. Many of the providers fail to meet this compliance so it is important to keep check if cloud service provider meets this compliance or not.

Managing Transformation

It is not easy for people to adapt with the change easily. They faces problem in learning new thing and when it is technical it requires experts to impart them knowledge and training on cloud application on accounting, as it will be managed by the human resource of the firm and they are required to be well acquainted with the technology to avoid flaws and inefficiency in work.

Data Ownership & Migration

If you want to migrate your data from one system to another and it is essential to make sure the exit strategies of current vendor and the cost involved in it. Mostly, it is not feasible to transfer data in this way. It is also important to make sure that whether the vendor will help in transferring your data from current applications.

RECENT TRENDS & DATA

According to Forbes Report, there are few projections which mark the growing importance of cloud in the business which are as follows: [15]

- According to IDC, an increase in the expenditure on cloud computing is estimated at a growth rate of 19% compounded annually with the amount of \$67B in 2015 to \$162B in 2020.
- Wikibon is predicting cloud spending in enterprise between 2015 & 2026 with the growth rate of 16% compounded annually.

Table 2: Showing Projected Growth of Public Cloud Services Market in Coming Years

	2016	2017	2018	2019	2020
Cloud Business Process Services (BPaaS)	40,812	43,772	47,556	51,652	56,176
Cloud Application Infrastructure Services (PaaS)	7,169	8,851	10,616	12,580	14,798
Cloud Application Services (SaaS)	38,567	46,331	55,143	64,870	75,734
Cloud Management and Security Services	7,150	8,768	10,427	12,159	14,004
Cloud System Infrastructure Services (IaaS)	25,290	34,603	45,559	57,897	71,552
Cloud Advertising	90,257	104,516	118,520	133,566	151,091
Total Market	209,244	246,841	287,820	332,723	383,355

Source: Gartner (February 2017)

- According to the prediction of Deloitte Global, total expenditure of \$547B on IT-as-a-Service for data centers, software and services is likely to incur by the end of 2018.
- The revenue of cloud IT market globally anticipated to grow at the rate of 17% compounded annually amounted to \$180B in 2015 to \$390B in 2020.

FINDINGS AND CONCLUSION

By extensive study it is found that most of the accounting firms are favouring cloud computing over their traditional methods of accounting due its simplicity, convenience, efficiency and real-time processing. And it is also observed that cloud computing in business is growing substantially and most of the business houses and accounting & auditing firms are moving towards cloud. But somewhere as it involves financial data and being a software it ensures security to some extent but does not guarantee it which give clients the second thought on its adaptation. It is throwing contradictory impact as, on one side it is reducing cost of functioning of accounting and on other side by getting technological advancement it is increasing the cost of training to people concerned. And those who are working on traditional methods since so long may not embrace this change or finds it difficult to learn accounting over the cloud.

Though accounting over the cloud is recommended as it ensures accuracy and effectiveness of operations in accounting, security and reliability concern at first and further human factors cannot be ignored while adopting cloud technology in accounting. It helps smaller firms to compete with larger firms but imparting knowledge of this technology and its use to them also is a considerable factor which is not that convenient to implement. So, the conclusion drawn out of this is, it is conducive to have cloud computing in accounting but whole accounting process cannot be solely dependent on the cloud service provider. An accounting firm or accountants need to have in-depth acquaintance with the technology concerned in order to ensure security and successful implementation.

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