Cloud Technology-Based Auditing and Accounting Services: General Outlook, Conditions, Issues and Review of Nigerian Accounting System

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Abstract

The purpose of this paper is to identifying the impact of Cloud Computing on the Elements of the Accounting and auditing Information System represented by: Establishment "Accounting Entity and internal controls.", Financial Operations, Documents, Accounting Books, Financial Reporting, Users, Procedures, Software, Physical Devices. Cloud technology-based auditing and accounting is one of the most promising and anticipated technologies in recent years. The technology is not a new concept for most of the sectors and with proper planning could increase operational efficiency. Integration of accounting and auditing information systems into cloud systems introduces many advantages and opportunities compared to traditional systems (Allahverdi, 2017). Change in platform from in-house to cloud solution cannot change the role of the accounting information systems as a base for providing the financial information for decision-making to internal and external users, and therefore auditors will need to assess the risks associated with cloud accounting and they must gain knowledge of the new environment. Cloud technology-based auditing and accounting brought changes to auditing procedures but Security has been always raised as one of the most critical issues of cloud computing where resolving such an issue would result in constant growth in the use and popularity of the cloud. Security requirements represent a major issue that has to be met in order of easing some of these obstacles (Alam, 2020). As the focus is on information governance, IT management, network, data, contingency and encryption controls, auditors should have the appropriate knowledge of these areas and (as cloud technology-based auditing and accounting services depends on web services). Cloud accounting software enables its users a real time access to business finances, easy set up and easy use, access to information from anywhere, work with sales force, to synchronize instantly with bank, make tax returns precise and effortless. Cloud technology-based auditing and accounting offers a short implementation time and low initial costs and it is offered by ERP providers in the SaaS (Software as a Service) mode. As accounting data are very valuable, security, such as encryption of data, granting access to the data and backups are necessary conditions to ensure their proper treatment. This paper is based on Cloud technology-

based auditing and accounting which has a very vast potential and is still unexplored. The capabilities of Cloud technology-based auditing and accounting are endless. Cloud technology-based auditing and accounting provides everything to the user as a service which includes platform as a service, application as a service, infrastructure as a service. Cloud technology-based auditing and accounting is the widely used technology all over the world and is gaining the popularity day by day but it has also got many issues which should be addressed properly or else it may lead to poor performance which can make the technology unsuccessful.

***Keywords**: Cloud technology-based auditing and accounting services, general outlook, conditions and Nigerian accounting system*
***JEL Codes**: E66, M61, M15, M41.*

1.0 Introduction

Cloud (2018) claims that cloud accounting is an integrated, yet transportable accounting system that uses financial data from a server with the help of suitable accounting software over an internet connection in an electronic device. According to Shah *et al.* (2011), traditional accounting systems are unable to meet the demands of modern accounting since they need a lot of manual data entry, whereas cloud-based accounting significantly reduces the amount of time that accountants must spend performing these duties. File sharing across the company network to numerous different computers, tablets, laptops, and the like is ensured by cloud accounting. Even when the accountant is not immediately available, files can still be retrieved. The degree of access that people have to your data can also be controlled (Alam, 2020).

According to Mishra and Mohanty (2017), cloud accounting is online accounting that functions like a computer program on users' computers but provides services over the Internet and permits access from remote servers. Cloud technology-based auditing and accounting services delivers IT-related capabilities as a service through internet to multiple customers and these services are charged based on consumption. Many cloud technology-based auditing and accounting services providers such as Google, Microsoft, Yahoo, IBM and Amazon are moving towards adoption of cloud technology leading to considerable escalation in the usage of various cloud services. Amazon is the pioneer in this field because of its more number of architectural features compared to others. To meet the needs of cloud service providers and customers various open source tools and commercial tools are being developed. Though many more developments have been taken place in cloud technology-based auditing and accounting services area, many challenges such as security, interoperability, resource scheduling, virtualisation etc. are yet to be fine-tuned in area of auditing and accounting services. The role of accounting is to satisfy information needs of its users and to deliver relevant and reliable information necessary for their decision-making (Alam, 2020). To achieve this goal, financial statements shall provide true and fair representation of the economic reality. The relevance of accounting information depends on the quality of financial reporting standards used in the preparation of financial statements; the reliability is co-determined by the integrity of processing of accounting records in the accounting system.

Fig.1: Architecture of Cloud Computing Technology
Source: Alam (2020)

Cloud technology-based auditing and accounting services is a technology that uses the internet and central remote servers to maintain data and applications. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth. Cloud technology-based auditing and accounting services have aimed to allow access to large amounts of computing power in a fully virtualized manner, by aggregating resources and give a picture of a single system (Khanom, 2017).

Accounting Information systems is a collection of data and processing procedures that creates needs information for its users. Another definition is "a unified structure within an entity, that employs physical resources and other components to transform economic data into accounting information, with the objective of satisfying the information needs of variety of users." Furthermore, accounting information system is "the whole of the related components that are put together to collect information, raw data or ordinary data and transform them into financial data for the purpose of reporting them to decision makers. Accounting Books After the provision of the documentary cycle in addressed so that all the financial statements are adjusted for the facility. The use of accounting books aims at this treatment in terms of registration and classification, summarization and analysis. Financial Reporting Is the final product of the accounting system information where: Preparation of financial reports on the enterprise for use by both internal and external parties. Internal Reports: Preparation Managerial accounting to communication financial information needed by management to plan, control, and evaluate company. External Reports: Preparation Financial accounting to communication financial information needed by Investors, Creditors and Unions and this Reports as to get to International accounting auditing standards: Statement of Comprehensive Income, Financial Position, Statement network access to a shared pool of configurable of change in equity, Statement of cash flow (Rao-Thirmal *et al.*, 2017).

Cloud technology-based auditing and accounting services can be defined as "Cloud is a parallel and distributed computing system consisting of a collection of inter-connected and virtualized computers that are dynamically provisioned and presented as one or more

unified computing resources based on service-level agreements (SLA) established through negotiation between the service provider and consumers" (Rao-Thirmal *et al.*, 2017).

Google, Microsoft, Yahoo, IBM and Amazon have started providing cloud computing services. Amazon is the pioneer in this field. Smaller companies, which is an online photo hosting site, has used cloud services for storing all the data and doing some of its services. technology-based auditing and accounting services can be described as any activity of using and/or developing computer hardware and software for auditing and accounting services. It includes everything that sits in the bottom layer, i.e. everything from raw compute power to storage capabilities. Cloud technology-based auditing and accounting services ties together all these entities and delivers them as a single integrated entity under its own sophisticated management.

According to Alarm (2018), the central ideas behind cloud technology are Utility Computing, SOA – Service-Oriented Architecture and SLA – Service-Level Agreement.

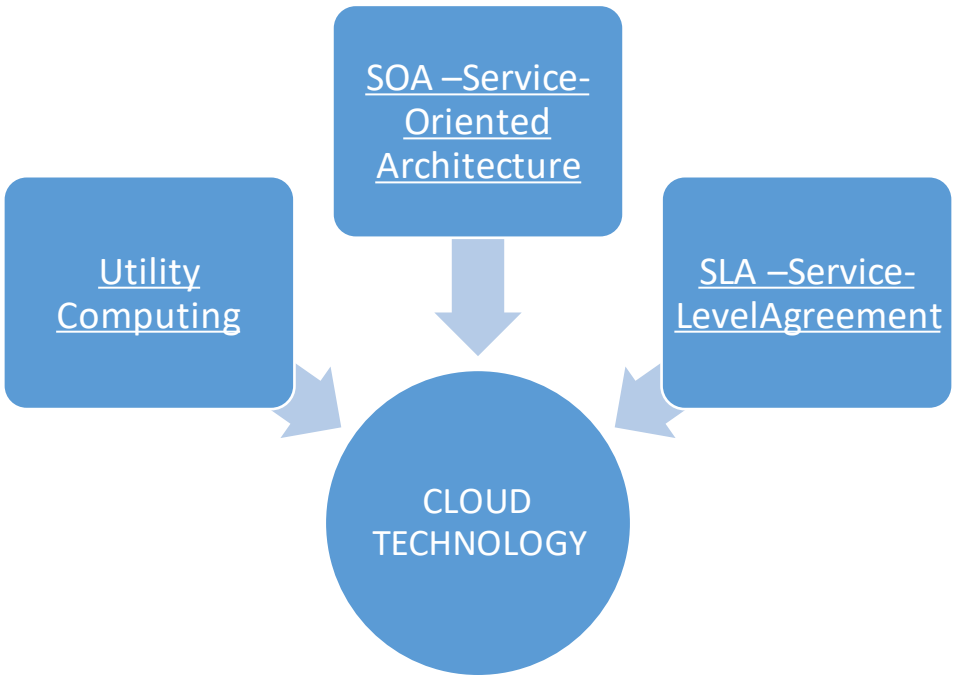


Fig 2: Central Idea of Cloud Technology
Source: Authors' Conceptualization, 2023.

Cloud is a term used as a metaphor for the wide area networks (like internet) or any such large networked environment (Sridhar, 2009). It came partly from the cloud-like symbol used to represent the complexities of the networks in the schematic diagrams. It represents all the complexities of the network which may include everything from cables, routers, servers, data centers and all such other devices. According to Suruchee and Raut (2014), cloud technology-based auditing and accounting services is finding use in various areas like web hosting, parallel batch processing, graphics rendering, financial modeling, web crawling, genomics analysis, etc. Cloud technology-based auditing and accounting services model consists of core characteristics such as on-demand network access, resource pooling, rapid elasticity, measured service, on-demand self-service, multi-tenancy; deployment models such as private cloud, public cloud, community cloud, hybrid cloud; service categories such as

Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), also Ethernet as a Service, IT as a Service have come up.

Cloud technology-based auditing and accounting services is determined with five features: It is service based, where interfaces enable automated services to the customer and technologies are tailored to the customer needs. Service feature is based on the service level and IT outcomes; Has scalability and elasticity enabling capacity scaling up and down with demands of the customer; It is shared, where services share a pool of resources, which allows use with maximum efficiency; resources can serve multiple needs for multiple consumers at the same time; It is metered by use, where services are tracked with usage metrics to enable multiple payment models, including different pricing plans and Use of internet technologies, such an internet identifiers, formats and protocols.

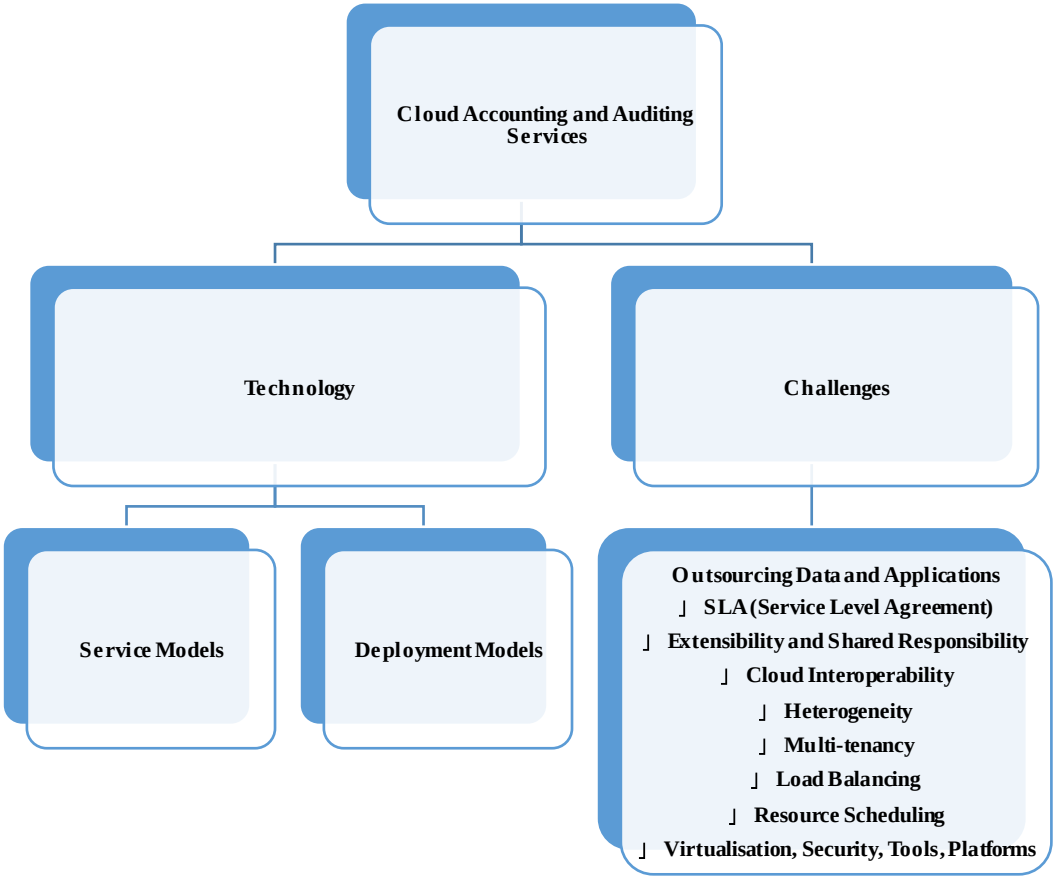


Fig 1: Conceptual Framework of Cloud Technology-Based Auditing and Accounting Services

Source: Authors' conceptualization, 2023.

1.1 The Purpose of the Study

The Purpose of this paper is to identifying the impact of Cloud Computing on the Elements of the Accounting and auditing Information System represented by: Establishment "Accounting Entity and internal controls.", Financial Operations, Documents, Accounting Books, Financial Reporting, Users, Procedures, Software, Physical Devices.

1.2 Why Cloud Technology-Based Auditing and Accounting Services

This is because of the these reasons: User Centric: The technology-based auditing and accounting services in cloud revolves around the user. It is the user who will give his requirements and according the services would be provided as per SLA; Task-Centric: In cloud, technology-based auditing and accounting services depends upon the users' requests called tasks; Powerful: Cloud technology-based auditing and accounting services is powerful because of its advantages over existing computing paradigms; Accessible: Cloud services are available all over the internet and are easily accessible; Intelligent: Cloud technology-based auditing and accounting services provide the user the services he want and he also pays what he uses. Unlike, convention computing, user pays only for using storage rather than for a memory, ram bandwidth too and Programmable: Cloud applications are build tailored according to the users' need (Ren *et al.*, 2012).

1.3 The Consequence of Cloud Technology-Based Auditing and Accounting Services

Technology-Based Auditing and Accounting Services gives the accountant and auditor instant and mobile access to clients' financial information. Although it is completely changing the way accountants work, the accounting profession is being polarized in respect of cloud technology and this categorizes the accountants and auditors broadly into one of the following three categories (Ristov *et al.*, 2019): Category 1: Some accountants are terrified by the cloud and security concerns and are doing everything to avoid it. This category therefore, apply the 'Ostrich strategy' of burying their head in the sand, which is not wise. Category 2: These accountants accept that cloud technology is here but are very concerned about its impact on profitability. The accountants and auditors see accounts as a commodity and if cloud Technology-Based Auditing and Accounting Services makes it easier to do the bookkeeping and produce accountants, then some clients will start to do the work themselves and others will expect lower prices resulting in less work and lower profits. Category 3: The third group is excited about cloud Technology-Based Auditing and Accounting Services and the opportunities it presents to accountants. They think that cloud accounting can dramatically improve their efficiency and/or profitability. Therefore, they have found a way to adapt to the change and are reaping rewards through greater efficiency and profitability.

2.0 Service Models of Cloud Technology-Based Auditing and Accounting Services

According to Kulkarni *et al.* (2012),there are different types of services are provides by cloud models like: Software as a Service(SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) which are deployed as public cloud, private cloud, community cloud and hybrid clouds. Software as a Service (SaaS) used for renting software and Platform as a Service (PaaS) used to rent computing infrastructure. The Storage as a Service (STaaS) is used to rent storage and Security as a Service (SeaaS) is used for cloud based security applications. Similarly, the Infrastructure as a Service (IaaS) is used to lease computing infrastructure.

1) Software as a Service (SaaS):- The capability provided to the consumer is to use the some applications which is running on a cloud infrastructure. The applications are accessible from many devices through an interface such as a web browser (e.g., web-based email). The consumer does not control the cloud infrastructure which includes network, and servers, all operating systems, and provides storages. Examples

of such systems include the following: Salesforce (http://salesforce.com); Facebook (http://www.facebook.com/) and Zynga farmwille game (http://www.farmville.com/).

2) Platform as a Service (PaaS):- PaaS provides all the resources that are required for implementation of applications and all services completely from the Internet. In this no downloading or installing is required of any software. The capability provided to the consumer is to deploy onto the cloud infrastructure .Consumer uses all the applications by using different programming languages and tools which are provide by the provider. Any consumer has not any control on cloud infrastructure including all networks, servers and operating systems, but has control over the applications which they deployed. Sample PaaS systems include the following: Google AppEngine (http://code.google.com/appengine/); Microsoft Azure (http://www.microsoft.com/windowsazure/) and Heroku (http://heroku.com/)

3) Infrastructure as a Service (IaaS):- The capability provided to the consumer is to access all the processing, storage, networks and other many fundamental computing resources . Accountants and auditors is able to deploy arbitrary software, which can include operating systems and applications (Stephen *et al.*, 2019). The accountants and auditors do not manage or control the underlying cloud infrastructure but has control over operating systems, storage ,deployed application ,and possibly limited control of select networking components. Examples of IaaS type systems include the following: Amazon EC2 (http://aws.amazon.com/ec2/); Eucalyptus project [41] (http://open.eucalyptus.com/) and Ubuntu Enterprise Cloud (http://www.ubuntu.com/cloud/)

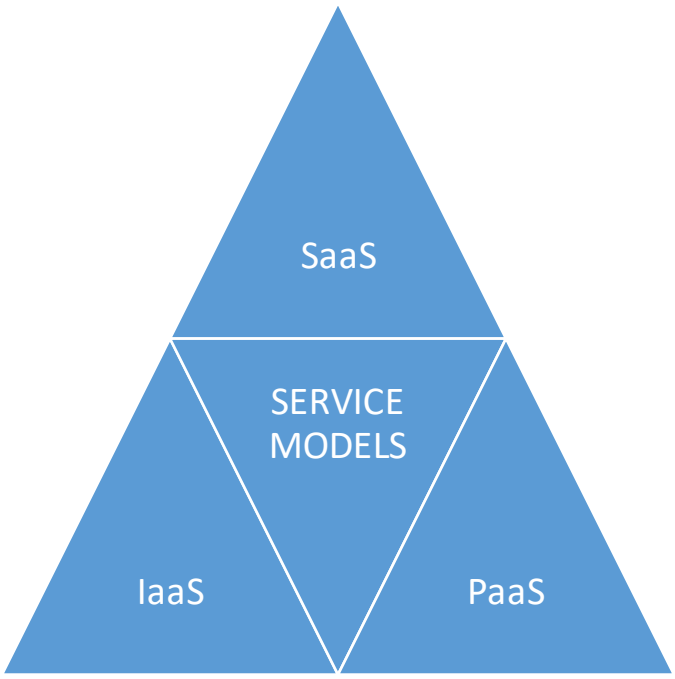


Fig 3: Service Models of Cloud Technology-Based Auditing and Accounting Services
Source: Authors' Compilation 2023

Fig 4: Service Models of Cloud Technology-Based Auditing and Accounting Services
Source: Authors' Compilation 2023

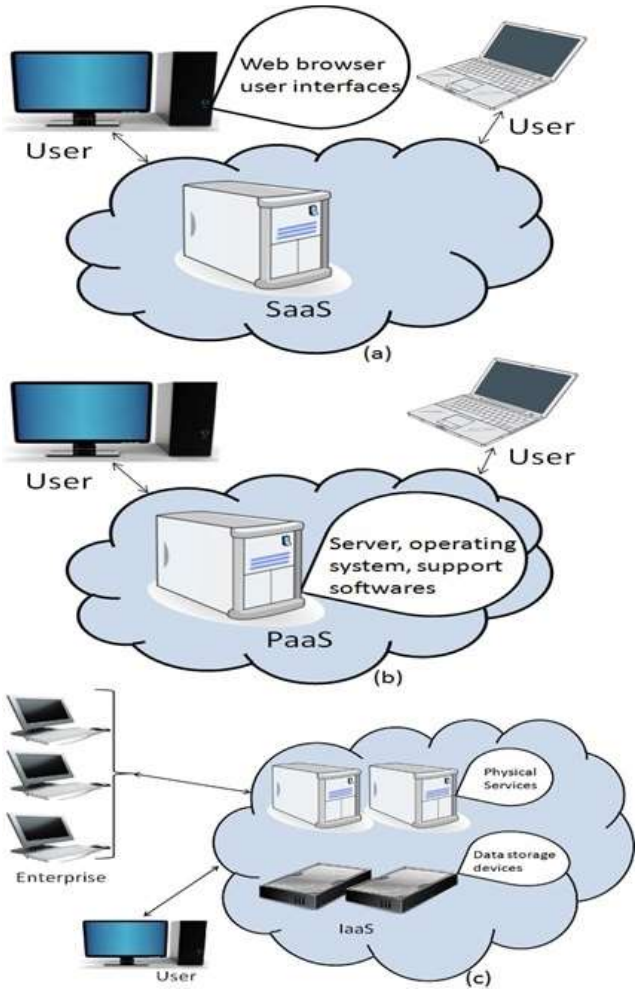


Fig. 5. Service model of Cloud: (a) Software as a service (SaaS), (b) Platform as a Service (PaaS), and (c) Infrastructure as a service (IaaS).
Source: Authors' Compilation 2023

2.1 Deployment Models of Cloud Technology-Based Auditing and Accounting Services

Depending on infrastructure ownership, there are four deployment models of cloud technology-based auditing and accounting services (Subashini & Kavita, 2011): (1) Public Cloud: - Public cloud allows users to access the cloud publicly. It is access by interfaces using internet browsers. Users pay only for that time duration in which they use the service, i.e., pay-per-use. (2) Private Cloud: A private clouds operation is with in an organization's internal enterprise data center. (3) Hybrid Cloud: It is a combination of public cloud and private cloud. It provide more secure way to control all data and applications. It allows the party to access information over the internet. It allows the organization to serve its needs in the private cloud and if some occasional need occurs it asks the public cloud for some computing resources. (4) Community Cloud:- When cloud infrastructure construct by many organizations jointly, such cloud model is called as a community cloud. The cloud infrastructure could be hosted by a third-party provider or within one of the organizations in the community.

2.2 Classification of Technology-Based Auditing and Accounting Services

The layering of clouds focuses on the construction and structure of the cloud, but not all clouds of the same construction are used for the same purpose. Traditional operating systems can be divided into desktop operating systems, host operating systems, server operating systems, and mobile operating systems. Cloud platforms can also be divided into many different types. Cloud classification is mainly based on the cloud's operating mode and service mode. The former category is concerned with who owns the cloud platform, who is operating the cloud platform, and who can use the cloud platform. From this perspective, clouds can be divided into public clouds, private clouds (or dedicated clouds), community clouds, hybrid clouds, and industry clouds. The latter classification is based on the service model of cloud computing, and the cloud can be divided into three layers: IaaS, PaaS, and SaaS.

2.3 Myths Associated with Cloud Technology-Based Auditing and Accounting Services

There are some myths regarding cloud technology possessed by the users along with the real scenario which may be summarized as: Myth One: The cloud is just the latest tech fad; Myth Two: Small businesses don't do cloud computing; Myth Three: Cloud technology-based auditing and accounting services is too expensive for my small business; Myth Four: My financial data isn't secure in the cloud and Myth Five: If I transition to the cloud, I'll lose control over my data.

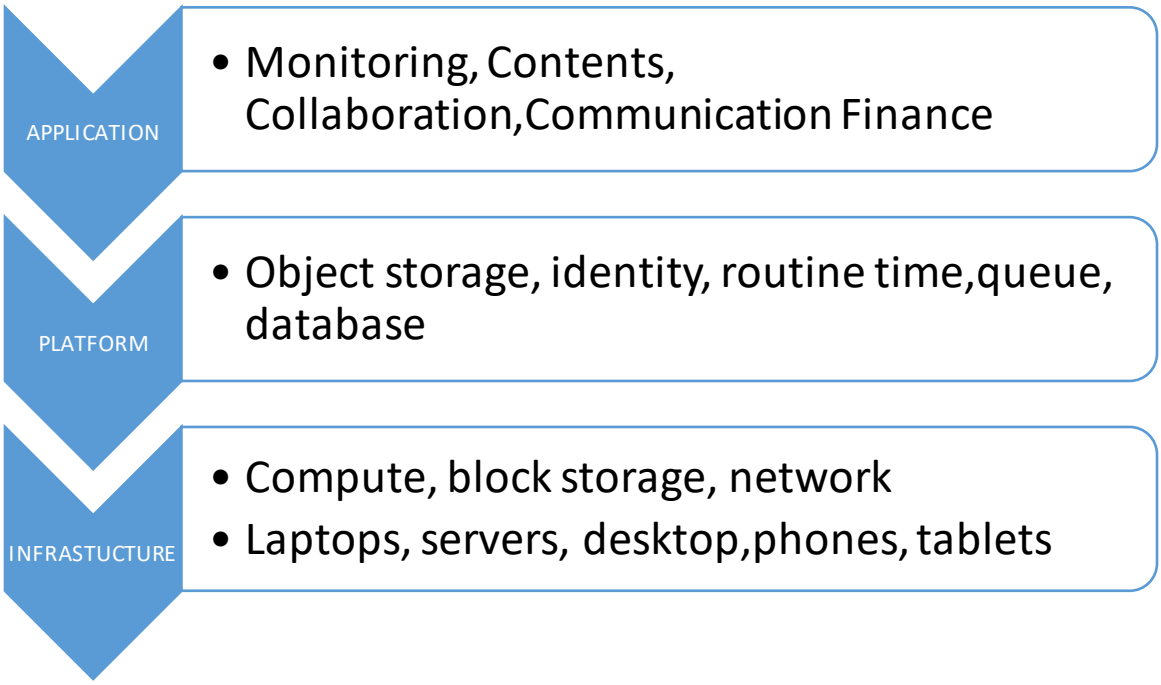


Fig 6: Service Models of Cloud Technology-Based Auditing and Accounting Services
Source: Authors' Compilation 2023

Cloud infrastructure is an umbrella that covers both the software and the hardware necessary to provide 24/7 pay-as-you-go service. The software (applications) are delivered as services to users in a software-as-a-service (SaaS) model via the web. The hardware and system software (cloud) are used to run applications that user access and use online (Birje *et al.*, 2017).

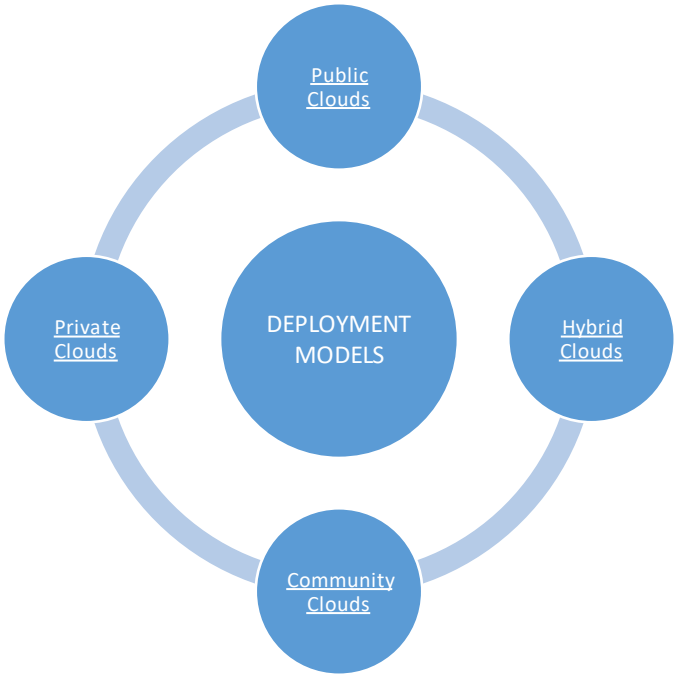
Public Clouds: The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services. Public cloud services are sold on demand, typically by the minute or hour. Customers only pay for the CPU, storage, or bandwidth they consume (Kulkarni *et al.*, 2012). It is a cost-effective way to deploy IT solutions, especially for small or medium sized businesses. Google Apps is a prominent example of a public cloud that is used by many organizations of all sizes. Leading public cloud providers include Amazon Web Services (AWS), Microsoft Azure, IBM SoftLayer, and Google Compute Engine (Das *et al.*, 2019).

Private Clouds: The cloud infrastructure offers many of the benefits of a public cloud technology-based auditing and accounting services environment and it is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise. Private clouds provide greater control over the cloud infrastructure, and are often suitable for larger installations (Alam, 2018).

Hybrid Clouds: It is a composition of a public and private cloud models with orchestration and automation between the two. A Public cloud is used for non-critical information and bursting workloads that must scale on demand, while mission-critical workloads or sensitive data and applications are kept within private clouds under the control of the organization. Hybrid cloud technology-based auditing and accounting services strategy enables users to capitalize on the

flexibility of the cloud while still realizing value from traditional infrastructure (Laghari *et al.*, 2018).

Community Clouds: The cloud infrastructure is a shared cloud technology-based auditing and accounting services environment that is available to a limited set of organizations or employees (such as banks or heads of trading firms). The members of the community generally share similar security, privacy, performance, and compliance requirements (Alam, 2018).



Deployment Models of Cloud Technology-Based Auditing and Accounting ServicesSource: Authors' Compilation 2023

There are five common features illustrated at different domain as follows: On-demand services, Wide network accessibility, Resource pooling, Quality of service and Prompt scalability.

The current era has strongly affected the storm of cloud applications. There are several possible reasons for such a shift of resources from physical to virtualization. The social network has altered the fundamentalist approach of IT resources. Quality of service (QoS), Internet of Things (IoT) and E-commerce are the few renowned technological terms that emerge as the state of the art fields of advancement (Wang *et al.*, 2010).

3.0 Issues and Challenges of Cloud Technology-Based Auditing and Accounting Services

According to Banker & Johnston (2006), the traditional accounting information systems are designed to be capable of obtaining internal and external cost and market information, necessary to support strategic decision making, planning, and control. However, Christauskas & Miseviciene (2002) posit that traditional accounting methods prove to be of little support to businesses considering their inefficiency and inadequacy for modern day accounting requirements. Furthermore, Shah *et al.*, (2011) observes that traditional management accounting to systems is inadequate in fulfilling the requirements of modern-day accounting. In the same

manner, they contend that the focus of the system is similarly combined, too one-sided to be relevant for managers who plan, control and make decisions. Thus, it is imperative for managements to replace existing accounting information systems with new technologies in line with new demands so as to effect a paradigm shift in data processing and storage. Access to accounting software and data through an internet browser are involved in cloud accounting. The software is provided on a subscription basis and the data are stored on a remote server. The traditional accounting system includes the installation on either a workstation or local server and the purchase of software thus differs from cloud accounting (Jansen & Grance, 2011). The cloud accounting applications and data are controlled through user login access as opposed to the physical location of the data files. In cloud accounting, the sharing of data is easier when compared to the physical movement of data from one computer site to another which happens in traditional accounting.

Mugyenyi (2018) explored on the reception of Cloud Computing Services by Commercial Banks in Uganda for Sustainable Development. The analysis discovered that over the previous 20 years, business banks in Uganda have been steadily growing in terms of the number of branches, their sizes, and their operating activities. High operational costs associated with the purchase and maintenance of IT infrastructure have been brought on by this expansion, which has also necessitated larger rooms to accommodate them. Helpless information storage and the board are also frequently present. Results showed that, when adopted, cloud computing offers the greatest and most cutting-edge solution for solving the problems identified in business banks in this study.

Kumar *et al.* (2019) researched Cloud Computing Adoption in Organizations. The review of prior material on distributed computing has been done in order to identify its key components and how they were operationalized. The three settings—innovation, association, and condition-recommended by the Technology Organization-Environment (TOE) approach are used by the scientists to order the factors affecting distributed computing reception. The results of the analysis showed that these factors have different effects on different research, and that many of these investigations have operationalized the adoption of distributed computing or the double factor rather than actually using the innovation.

Al-zoubi (2017) conducted a study on An Exploration of Risks in Using Cloud Accounting Information Systems in Australia. The research study used a multi-theoretical approach, specifically transaction cost economics (TCE) and Technology-Organisation Environment (TOE) framework to explore user experience of risks in cloud accounting and user perceptions of possible measures to mitigate those risks. Findings accounting, it not only entails risks similar to those associated with general cloud computing services (such as email and file sharing), but also introduces risks of a stronger magnitude in a number of areas. These include regulatory compliance, data ownership and location, and the reliability of financial statements.

Livera (2017) carried out a study on Cloud Based Accounting: The Perspective of Accounting Professionals of Sri Lanka did a hypothetical audit of cloud bookkeeping. One of the major IT develo
pments in the last ten years, according to the analysis, has been the creation of accounting software that uses cloud technology. This has enhanced accounting as a whole. Similar to how other business divisions have adapted to distribute computing systems, bookkeeping has done so as well. This enables it to provide partners with crucial and precise data as well as a continuous assessment of the company's performance. Although cloud bookkeeping is

becoming more and more popular over time, many business owners and professionals are there are some issues and challenges that its recently encountered with are: Load Balancing, Huge Energy Consumption by Cloud data centers, security and privacy of users' data, reliability and availability of cloud services, resource management, Service Level Agreement (SLA) issue, interoperability and portability, scalability and elasticity, virtualization etc. These issues and challenges motivate researchers to explore further and develop new policies and algorithms to address them.

There are numerous challenges in applying cloud internet-based auditing and accounting services technology in a way that would allow for its significant and rapid growth. The biggest challenges for rapid adoption of technology are lack of resources/expertise, security and compliance. As more organizations are placing more workloads in the cloud, the need for expertise has grown. Training of IT and development staff will be critical in helping address this challenge. Although data centers do take strong security measures, concerns about the cloud's security remain. Security/data control is the most often cited issue with migration to the cloud. There are broad span of concerns in cloud computing security including network security, data security, compliance, governance, and more. Ristov *et al.* (2019) surveyed the state of the art in cloud security and concluded that the top three major security problems facing enterprises in cloud adaptation are legal issues, compliance and loss of control over data (Ristov *et al.*, 2019). Other studies identified top cloud security threats as listed as follows: Trusting vendor's security model; Customer inability to respond to audit findings; Obtaining support for investigations; Loss of physical control; Data dispersal and international privacy laws; Exposure of data to foreign government; Quality of service guarantees; Trusting vendor's security model; Customer inability to respond to audit findings; Obtaining support for investigations; Loss of physical control; Data dispersal and international privacy laws; Exposure of data to foreign government and Quality of service guarantees

3.1 Cloud Technology-Based Auditing and Accounting Services Security

Cloud technology-based auditing and accounting services services may encounter seven major information security issues: Unscrupulous people using cloud technology-based auditing and accounting services technology to engage in unscrupulous resource services; User operations Interface and cloud technology-based auditing and accounting services with information security concerns; Insiders interested parties, the use of illegal ways to get the cloud client's resource content; Cloud data sharing may cause resource sharing error or interference situation; When the data are all concentrated in the cloud resources platform, may lead to data leakage problems and Cloud client account and password authentication information was intentional tampering.

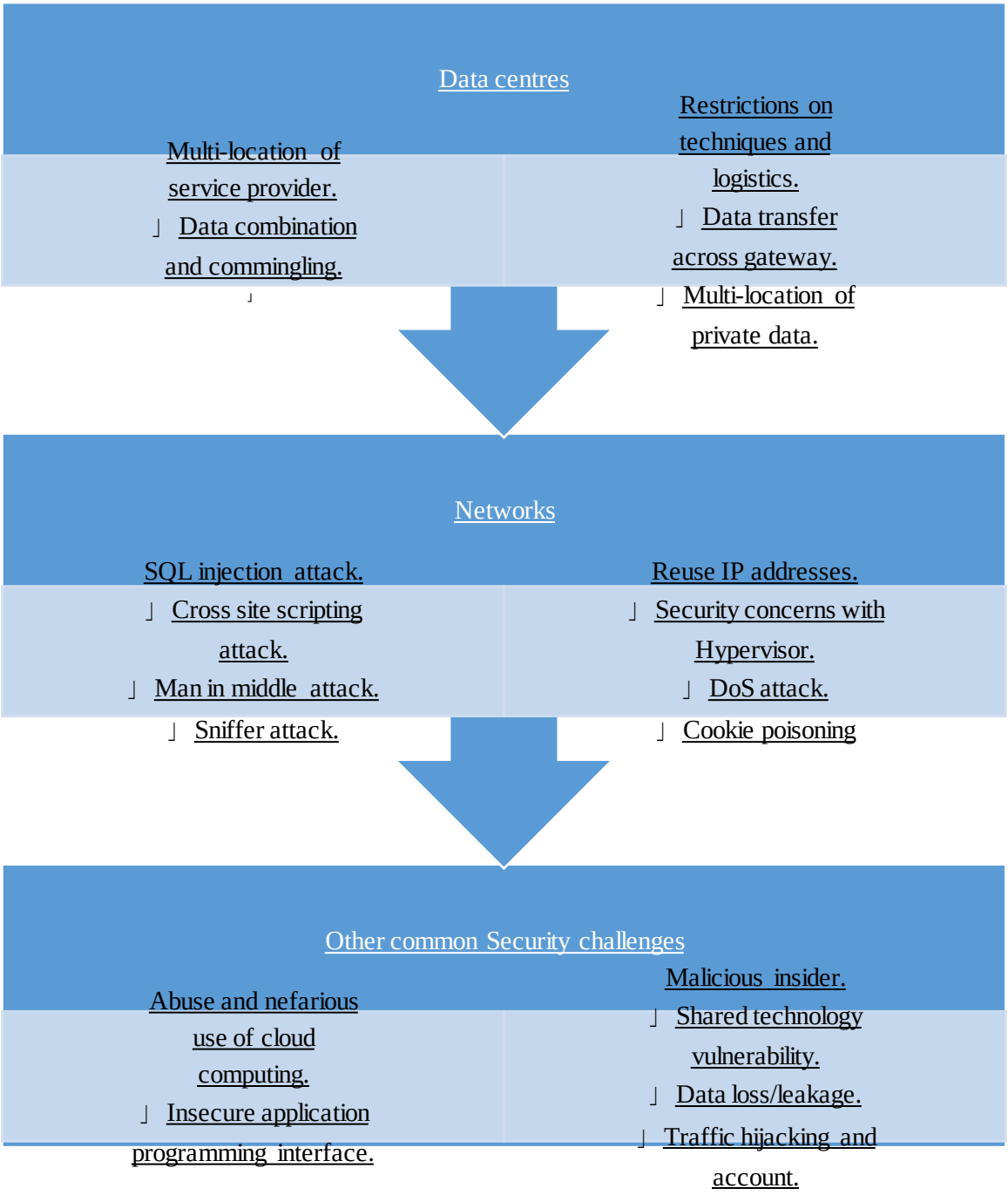
Few security threats in cloud technology-based auditing and accounting services are discussing as follows. Insecure Interface: Application interface lying on the same cloud from different customers used and multiple interfaces are provided in the same environment; Unauthorized Access: Authorization access standards are not followed and may attract authorized persons to misuse the data. Once access allowed on the cloud, data application may not be assumed reliable. Data Leakage: Leakage may occur due to insufficient measures; data is placed at cloud service providers premises and may not reject the certainty of leakage of data. Malicious Attack: Malicious attacker may be insider or outsider, trustee user have access particularly; Sensitive Information: Through various loop holes sensitive data my may not be used as

software/application as earlier and Reliability: Customers' confidential data is hosted at a remote site at the cloud service provider this again depends on cloud service (Tahmina, 2017).

Information security threats, in addition to man-made attacks, include information system attacks and internal staff operations. There are three steps in protection measures that must be paid special attention to: (1) to strengthen the security protection and setting of hardware and software. (2) To enhance the information system security monitoring and internal operation auditing mechanism. (3) Timely adjustment of information system settings and data backup. After the cloud technology-based auditing and accounting services was put forward, the network attacker also continued to devote himself to attacking the virtual machine. For the self-protection of cloud technology-based auditing and accounting services, the following information security recommendations were made: (1) Do not trust the network is a guarantee always safe and secure. (2) Login information on the Internet too detailed, easy to leak personal privacy issues. (3) Whether the data will affect the normal work affairs when the data is placed on the cloud platform.

In the cloud technology-based auditing and accounting services environment, the data reside on the cloud while the user has minimal or no control and may face severe threats to maintain the security measures. This is one of the powerful reasons for the susceptibility of the cloud data, which often affected due to vulnerability or penetration. The most common security issues are data authenticity, data accessibility, data controllability. There are few common security and privacy issues specifically running cloud applications such as data security and authenticity issues, application security issues, virtualization security issues.

There are several issues related to cloud technology-based auditing and accounting services, but the most common is network security problems. In the cloud, data reside at a different location and it must flow through a tunnel-like internet or intranet, there should be a sound network or hardware devices that protect the data from leakages or theft. An updated scanning application should be installed to monitor to check and verify the flow of packets



When we save our data or run our software into others hard disk using others (central processing unit (CPU) appears to be very risky (Takabi *et al.*, 2010). Organisation's data and software face serious risk of security issues like data loss, phishing, botnet etc. Some security concerns are given below: Security concern 1: Control on physical security is lost in cloud technology-based auditing and accounting services because resources are shared with other companies and no one knows where the resources are run. Security Concern 2: Laws are violated by the

company which increase the risk of data seizure by the foreign government. Security Concern 3: There is storage incompatibility between different cloud services vendors when the user wants to shift from one cloud to another type of cloud (Google cloud is incompatible with Microsoft cloud) and Security concern 4:There is no common standard to ensure the data integrity till now. Cloud technology-based auditing and accounting services research tends to the difficulties of meeting the necessities of cutting edge private, open and cross breed cloud technology-based auditing and accounting services structures, additionally the difficulties of enabling applications and advancement stages to exploit the advantages of cloud technology-based auditing and accounting services (Vahid & Seyed, 2012). The examination on cloud technology-based auditing and accounting services is still at a beginning time. Many existing issues have not been completely tended to, while new difficulties continue rising up out of industry applications. A portion of the testing research issues in cloud technology-based auditing and accounting services are as follows: Access Controls , Multi-tenancy ,Data Encryption, Platform Management, Reliability& Availability of Service , Cloud Data Management & Security, Service Level Agreements (SLA's), Migration of virtual Machines, Common Cloud Standards, Interoperability, Server, Consolidation and Energy Management (Iqbal *et al.*, 2016).

3.2 Public Technology-Based Auditing and Accounting Services

The popularity and rapid growth of cloud storage services to impart information to others has prompted an uncertainty in the integrity of data in cloud storage, as data stored in the cloud can easily be lost or undermined because of the inescapable hardware/software failures and human errors (Ren *et al.*, 2012). There numerous traditional approach for checking data correctness. The conventional approaches are able to successfully check the correctness of cloud data. However, the efficiency of using this traditional approach on cloud data is in doubt, as it is required to retrieve the entire data from the cloud, and then verify data integrity by checking the correctness of signatures of the entire data (Boyang *et al.*, 2014). The mechanism that efficiently perform integrity checking without downloading the entire data from the cloud is referred to as public auditing (Wang *et al.*, 2010).

3.3 Reasons for Using Cloud Auditing and Accounting Services

There are a number of reasons that influence a company to use cloud services. These are:

1. Maintaining Focus on the Business: Businesses are realizing that running an IT department is not their core competency, they are better lawyers, doctors or plumbers. Buying cloud services, either in the form of a single application or their entire datacenter is often more cost effective, more reliable and lets them reallocate their limited resources to growing their business.
2. Business Agility: Businesses with significant technology investments can find themselves unable to take advantage of shifts in the market or respond to competitive pressures because the capital, people or time are not available in the measure needed to react. Cloud services remove these barriers, allowing businesses to continually adapt their technology needs to their business without the costs that would normally have to be considered with an onsite datacenter.
3. Reduced Capital Expenditures: Large capital investments can be minimized or eliminated altogether in favor of small monthly payments. Capital can be protected as keeping capital and operational expenses to a minimum can be very important to small and medium businesses alike.

4. Scale: Businesses that have peak seasons or different seasonal staffing demands can benefit from cloud services by letting them temporarily dial up more capacity for the seasonal business peaks, without purchasing the hardware or software that would otherwise go unused during the slower times of the year.

5. Access from Anywhere: Being able to do business without borders is one of the major benefits of cloud services. Access to the applications and data is available to authorized users anywhere there is Internet access.

6. Staffing Efficiency: Cloud services can help maintain an efficient technology staff, outsourcing key technical specializations or technology staff as it makes sense for the business.

Cloud technology-based auditing and accounting services brought changes to auditing procedures. As the focus is on information governance, IT management, network, data, contingency and encryption controls, auditors should have the appropriate knowledge of these areas and (as cloud technology-based auditing and accounting services depends on web services) they should also have at least a basic understanding of Organization for the Advancement of Structured Information Standards (OASIS) Web Services Security Standards (Ren *et al.*, 2017). Ren *et al.* (2017) defines the main components of risks as follows: greater dependency on third parties; increased risk in aggregated data centres; increased reliance on independent assurance processes; increased complexity of compliance with laws and regulations; reliance on the internet as the primary conduit to the enterprise's data; security issues with a public environment; location across international boundaries; legal issues relating to differing laws in hosting countries may put data at risk.

Auditors need to develop audit objectives, which cover key areas, such an identity and data management, data protection, associated technological risks, operational processes, policies, procedures, roles and responsibilities (Sahli *et al.*, 2017).

3.4 Advantage of Cloud Technology-Based Auditing and Accounting Services

Growth of Cloud technology-based auditing and accounting services is huge with respect to personal and business uses. Cloud users can access the online resources. There are some benefits of cloud computing: Scalability: Scalability is the capability of a system to handle the growing amount of task in an elegant manner and its ability to enhance total throughput when resources are added. Resources can be hardware, servers and storage (Mohammadi & Mohammadi, 2014). The user can increase or decrease the resources according to their requirement without buying the resources; Mobility: Mobility means users can operate the applications from anywhere, anytime over the internet. Cloud computing supports the mobility; Low Infrastructure Costs: Cloud computing supports the pay-per-use model and helps an organization to pay for the resources they need, no need to pay for the resources that are available in the cloud; Reduce capital costs: We don't require spending money on hardware/software and Enhance accessibility: Data can be accessed anytime, anywhere through the internet (Alam, 2018).

Thus, the cloud technology-based auditing and accounting services offers many benefits in the form of elasticity, availability, increased storage, reduce cost and expandability on-demand but there are some limitations in cloud technology-based auditing and accounting services that are: Requires a constant Internet connection: Cloud computing is dependence on network

connectivity. It is impossible if you cannot connect to the Internet and Slow speed of Interment: Uploading and downloading of huge documents may take a long time.

The implementation and innovation of any technology is to meet the application needs of a certain group of people. Cloud computing is not an exception. It gradually penetrates into all areas of people's life and production, bringing convenience and benefits to people. The advantages of cloud computing are as follows:

1. Cut costs: Through cloud computing, companies can minimize or completely cut initial investment because they do not need to build data centers or build software/hardware platforms on their own, nor do they need to hire professionals for development, operation, and maintenance. It is usually much cheaper to use cloud computing services than to purchase software/hardware to build the required system.
2. Data can be accessed instantly anytime, anywhere "Cloud" brings greater flexibility and mobility. Using the cloud, companies can instantly access their accounts through any device anytime, anywhere; data can be stored, downloaded, restored, or processed easily, saving a lot of time and effort.
3. Improve adaptability and flexibly expand it needs: In most cases, the capacity of the IT system does not match the needs of the enterprise. If an enterprise configures IT equipment according to the peak demand, it will be idle at ordinary times, resulting in a waste of investment. If an enterprise configures IT equipment according to average demand, it will not be enough during peak demand. However, with cloud services, companies can have more flexible choices and can increase, decrease, or release the resources they apply for at any time.
4. Unified platform: Companies may be running different types of platforms and devices at the same time. In the cloud service platform, the application and the hardware platform are not directly related, thereby eliminating the need for multiple versions of the same application.

4.0 Conclusion and Recommendations

Accountants and auditors will use increasingly sophisticated and smart technologies to enhance their traditional ways of working, and these technologies might even replace the traditional approach. Smart software systems (including cloud technology-based auditing and accounting services) will support the trend toward outsourcing services and greater use of social media via smart technology will improve collaboration, disclosure, engagement with stakeholders and broader communities. Social media (including Facebook, Twitter, and Google search) will reveal more data than any corporate assurance report and stakeholders will use tools to interpret "Big Data".

The technology is not a new concept for many sectors like banks, automobile, retail, health care, education, and logistics. Cloud technology-based accounting and auditing services are also widely used as major enablers for the manufacturing industry. The technology has the potential to transform the traditional manufacturing model, help it with product innovation, and create effective factory networks with collaboration. Various deployment models of cloud technology-based auditing and accounting services makes the adoption easy for any of these sectors. The technology is credited with increasing competitiveness through cost reduction, greater flexibility, elasticity, and optimal resource utilization (Iqbal *et al.*, 2020).

The nature of the impact of cloud computing on the accounting information system when applied is as follows: Reducing the size of the enterprise in terms of the building and the offices because they allow property anywhere without management commitment to a specific location. This is the reason why they allow employees and stakeholders access to applications through computers and cellular devices from anywhere, provided the Internet access; improving operational performance in terms of: Facilitating the completion of operations in terms of processing and reporting and Timeliness and accurate accounting operations accuracy in accounting process.

Cloud technology-based auditing and accounting services is a major development in IT and has a huge potential in delivering real business benefits to companies. This study concluded that cloud technology-based auditing and accounting services introduces challenges and new possibilities in many aspects of Internet architecture, protocols, services, and applications. The technology will affect many people in the organization and has significant impact on IT investment and costs. Furthermore, this study identified security as the main stumbling block for wider cloud adoption. As discussed in this paper, cloud technology-based auditing and accounting services and systems are also major targets for cyber attackers. These vulnerabilities point to the importance of protecting cloud platforms, infrastructures, hosted applications, and information data, and create demand for much higher-level cloud security management and centralized management of security in cloud environments. Other primary concerns of IT managers are compatibility of the cloud with companies' policy, IS development environment, and business needs. Implemented properly, the technology has the real potential to enable accuracy, reliability, service enhancement, and cost reduction. The challenge for IT experts today is to understand the role of cloud technology-based auditing and accounting services and to develop strategies that exploit its potential. They should complete the prerequisites (the three phases of cloud service adoption strategy) before making the technology decisions required for successful, service-centered cloud technology-based auditing and accounting services strategies. Accountants and auditors should ensure internal controls towards improving reliability, accelerating agility, increasing compliance and improving data privacy.

The cloud computing is a Win-Win strategy for the service provider and the service consumer. We summarize the advantages as below: Satisfy business requirements on demandby resizing the resource occupied by application to fulfill the changing the customer requirements. Lower cost and energy-saving. By making use of low cost PC, customerized low power consuming hardware and server virtualization, both capital expenditure (CAPEX) and Operating expenses (OPEX) are decreased. Improve the efficiency of resource management through dynamic resource scheduling. However there are also some major challenges to be studied. Privacy and security. Customer has concerns on their privacy and data security than traditional hosting service. The continuity of service. It refers to the factors that may negatively affected the continuity of cloud computing such as internet problems, power cut-off, service disruption and system bugs.

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