Cloud Computing Adoption Models in Organizations: A Survey

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ABSTRACT

An organization's ability to implement innovations that provide it with a competitive edge and improve efficacy, reduce expenses, and raise the calibre of its business operations determines its competitiveness. With the advent of cloud computing (CC), the distribution of information technology (IT) resources and services has experienced a paradigm shift. The cloud computing adoption model is a logical set of stages built to ease the transition from today's traditional application delivery model to tomorrow's use of cloud computing it is an advanced approach for technologies of adoption of cloud which enables benefits to be realized incrementally. The Technology Acceptance Model (TAM) is an effective adoption hypothesis that has been applied in a lot of research studies in the IT industry. The model considers the reason for which a person uses a system or application, and it suggests that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) serve as the primary drivers of IT adoption. TAM has demonstrated excellent adoption, use, and reproduction over time; nevertheless, the model did not provide crucial information on the user's assumption to solely PU and PEOU. This constraint made it necessary to integrate or expand the model with other IT acceptance models. The Technology Organization Environment (TOE) framework puts forth a general list of adoption considerations for technology. Three contexts are examined under the TOE framework: technology, organization, and environment. While the meaning of the TOE system is also seen as clarifying technology adoption, TAM and its comprehensive forms have a high ability to clarify the reception of innovation. Combining these two models results in a newly designed and innovative redesign that advances and encourages more comprehensive, informative, and foresighted focal points of IT adoption by elevating the TAM and TOE models. Hence, the individual implementation or combination of the two models which harmonize the different components have been proposed by researchers. This paper presents a review of theories of cloud computing adoption and also discusses the challenges and possible solutions.

Keywords: Cloud Computing, Cloud computing adoption, TAM, TOE.

INTRODUCTION

Cloud computing is the on-demand accessibility of computer system resources, particularly data storage and computing power, without direct active management by the user [1]. Large clouds often have functions distributed over multiple locations, each of which is a data centre [2]. *Cloud computing is defined as the use of hosted services, such as data storage, servers, databases, networking and software over the Internet [3].* Instead of storing files on a storage device or hard drive, a user can save them on the cloud, making it possible to access the files from anywhere, as long as they have access to the web [4]. The services hosted

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on the cloud can be broadly divided into infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and software-as-a-service (SaaS) [5]. Based on the model deployment, the cloud can also be classified as a public, private, or hybrid cloud (Tavbulatova, Zhigalov, YuKuznetsova & Patrusova, 2020).

Since the commencement of cloud computing, the world has experienced an explosion of cloud-based applications and services in IT, which continue to expand [7]. Cloud computing gives your business more flexibility, with cloud computing technology, a quick scaling of resources and storage up to meet business demands without having to invest in physical infrastructure can be achieved [8]. Organizations or companies don't need to pay for or build the infrastructure required to support their highest load levels. Irrespective of the category [9], the goal of cloud computing is to provide easy, scalable access to computing resources and IT services [10].

Cloud computing can be categorized into forms based on the deployment model or the type of service [11]. Based on the specific deployment model, the technology can be classified as a public, private, and hybrid cloud [12]. At the same time, it can be classified as infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and software-as-a-service (SaaS) based on the service the cloud model provides [13]. Cloud infrastructure involves the hardware and software components required for the proper deployment of a cloud computing model [14]. An organization's ability to implement innovations that provide it with a competitive edge and improve efficacy, reduce expenses, and raise the calibre of its business operations determines its competitiveness [15]. With the advent of cloud computing the distribution of IT resources and services has experienced a standard model advancement [16].

With the increase of digital revolution, cloud computing adoption has been a major element for businesses or organizations looking to remain viable in today's market. Cloud adoption is the process of using cloud technologies to improve the way business transactions are being conducted. It can involve moving your entire business to the cloud or simply using cloud-based tools to supplement your existing infrastructure. The cloud has become increasingly popular in recent years as more and more businesses adopt cloud-based solutions. There are many reasons to consider adopting cloud technologies. The most common benefits include improved efficiency, flexibility, and scalability. In addition, the pay-as-you-go model of many cloud services can save you money on upfront costs and help you better manage your resources. There are a few different ways to approach cloud adoption. An organization may choose to move its entire infrastructure to the cloud or use a hybrid approach that combines on-premises and cloud-based solutions. You can also choose to use only certain types of clouds, such as private, public, or hybrid. The best approach for your business will depend on your specific needs and goals.

Cloud computing is an attractive proposition to companies due to its numerous anticipated or projected benefits. However, its perceived risks and challenges may discourage adoption [17]. This trade-off that exists between benefits and risks produces a problem on whether or how to approach cloud adoption. A model that postulates some factors driving or influencing the adoption decision of individuals or organizations, e.g. as used in the context of the adoption of a particular technology. Much research has been done around the empirical testing and validation of models proposed by various researchers

This paper presents an overview of cloud computing technology and the architecture of cloud computing innovation adoption models was mentioned in section 2. The challenges and proffer solutions for the adoption of cloud computing are in sections 3 and 4 correspondingly. Section 5 gives the conclusion.

LITERATURE REVIEW

Cloud Computing

This is an application-based software and infrastructure that retail outlets information on the technique of

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service, retrieving through the use of the internet or online platform [18][i]. A client's frontlets have access to admission to data stored in the cloud using an internet browser or cloud computing software. Also, cloud computing can be referred to as turning the computing power of CPU, RAM, Network Speeds, and Storage OS software in a company over a neighbourhood instead of bodily having the computing property at the customer location. Cloud computing is online-based computing in which a shared pool of resources is accessible over a wide network [19]. These resources can be provided or released with the lowest management efforts and service provider interaction. Cloud computing remains one of the trending technologies of the present time and is giving a new shape to all organizations by providing on-demand virtualized services/resources. Beginning from small to medium and medium to large, every organization employs cloud computing services for storing information and accessing it from anywhere and anytime only with the aid of the internet. Scalability, security, transparency and intelligent monitoring are some of the greatest important restraints that every cloud infrastructure should witness. The present study on other significant constraints is allowing cloud computing systems to establish new features and approaches with a great competence of giving more advanced cloud solutions.

Architecture of Cloud Computing

Cloud architecture refers to how various cloud technology components, such as hardware, virtual resources, software capabilities, and virtual network systems interact and connect to create cloud computing environments. Cloud architecture is classified into two parts; front end and back-end cloud architecture [20]

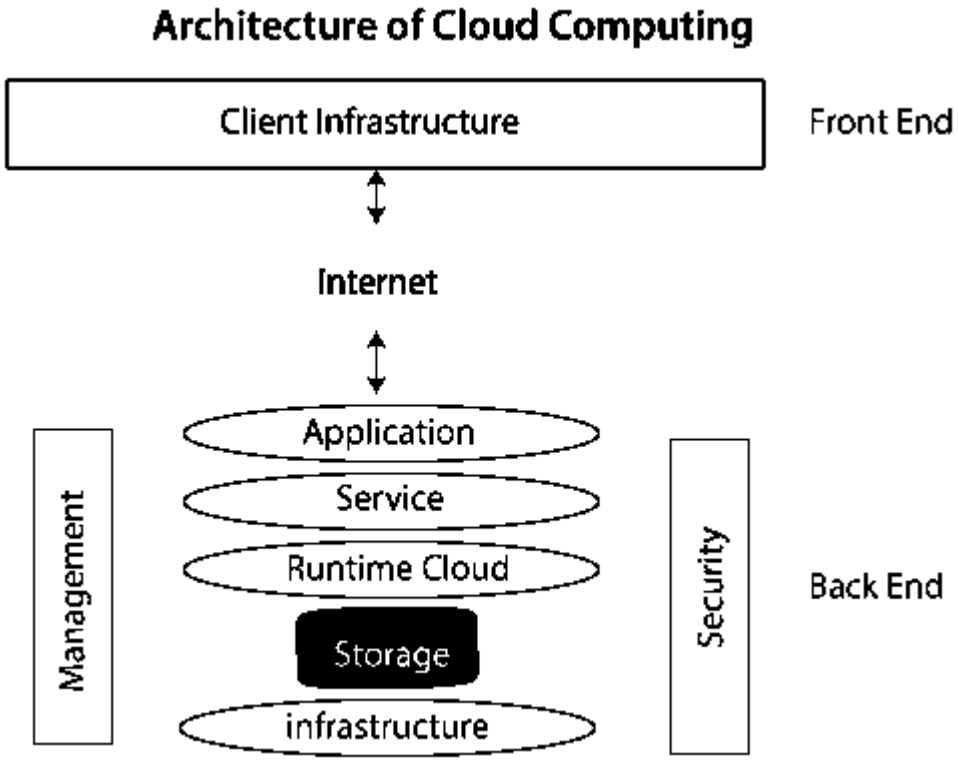

Figure 1: Cloud Computing Architecture [21]

Frontend of the Cloud Architecture

The front end is used by the client. It contains client-side interfaces and applications that are required to access the cloud computing platforms [22]. The front end includes web servers (including Chrome, Firefox, Internet Explorer, etc.), thin & fat clients, tablets, and mobile devices. Client Infrastructure is a part of the frontend component. It contains the applications and user interfaces that are required to access the cloud

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platform. It provides end users with a graphical user interface to interact with the cloud or via which they can get their jobs done.

Back End of the Cloud Architecture

The back end is employed by the service provider and also manages all the resources that are required to provide cloud computing services [23]. It includes a huge amount of data storage, security mechanisms, virtual machines, deploying models, servers, and traffic control mechanisms. It's in charge of keeping track of all the programs that execute the application on the front end. The resources are important for cloud computing services handled by the back-end. It has many information repositories, different security services, servers, different models for deployment, and traffic control methods.

Related Work

The adoption of cloud computing in universities using combined theories of technology organization and environment as well as diffusion of innovation was analysed [24]. The study examined twelve variables and their impact on the level and pace of adoption. These factors include relative advantage, compatibility, complexity, security, privacy, management support, innovativeness, technology readiness, the size of the institution, reliability, competitive pressure, and regulations. The findings produced a model and insights for the decision-making process of higher education institutions regarding cloud computing adoption and informed policy development related to the implementation and management of cloud-based systems in the education sector.

[25] conducted a systematic review of the factors influencing organizational decisions concerning the acceptance of cloud-based technologies using the technology-organization-environment (TOE) framework. The work analyzed, combined, and classified these factors and showed that much of the literature has emphasized the technical aspects of technology adoption, such as cloud security. It further revealed factors like top management support, relative advantage, cloud complexity, and competitive pressure are the most critical factors affecting organizational attitude toward cloud technology adoption.

[26] explained an integrated framework based on the 'Technology Organization Environment (TOE) framework' and 'Diffusion of Innovation (DoI) theory'. The study used the noteworthy actors and sub-factors which are pertinent to the adoption of cloud computing in the Ethiopian Higher Education (EHE) sector. The technology literature in this was based on technology adoption frameworks and theories which were studied to identify a set of factors and sub-factors relevant to cloud computing adoption. It resulted in conceptualizing an integrated TOE–DoI framework for cloud computing adoption in higher education at the university in Ethiopia and in developing its reliable measures. Accordingly, a quantitative study was achieved with a questionnaire survey comprising 500 respondents in connection with four factors (technological, organizational, environmental and socio-cultural). Consequently, cloud computing adoption in Ethiopia was established using factors and concepts adopted from the study. It confirmed that the TOE–DoI approach to higher education in Ethiopia is authenticated. Thus, the four factors' reliability statistics validated with Cronbach's alpha a = 0.739, 0.712, 0.761,0.841, and Cronbach's alpha 'a' based on standard items a = 0.740, 0.713, 0.762 and 0.842 for technology, organizational, environmental, and socio-cultural factors. This indicates that scaling the four aspects therein suggests profound evidence to determine a cloud computing adoption in EHE with TOE–DoI integration.

A systematic review was used to explore the adoption factors studied in previous empirical settings (Ogunlolu & Rajanen, 2019). The review found 41 primary studies and yielded a hierarchical cloud adoption model. The discovered factors are in line with the Technology Organization Environment framework and with the diffusion of innovation model, but new insights into the dimensions relevant to cloud adoption emerged from the literature. For example, system availability and reliability, cost-

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effectiveness, privacy and security, top management support, and market pressure are among the factors affecting adoption. Suggestions and future work are discussed.

Identification of the factors that affect the adoption of cloud computing was conducted by [27]. The study classified these factors into four domains, namely technological, organizational, environmental and individual domains; and lastly, validated the selected factors using semi-structured interviews with IT experts. Based on the validation session with the IT experts, the factors were ranked based on their applicability and suitability in Yemeni's higher education environments and thirteen factors were obtained. These factors are adopted from the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Technology-Organization-Environment (TOE) framework and Diffusion of Innovation (DOI) theory. A conceptual framework was designed applying these factors to find the significant factors that influence cloud computing adoption in HEIs in Yemen. It was believed that by having a better understanding of the factors that affect the cloud computing adoption in HEIs in Yemen, the accountable parties such as the government agencies, HEIs management and staff will be more prepared to ensure the successful adoption of cloud computing in their HEIs and ultimately help Yemen to improve its higher education delivery to its people.

CLOUD COMPUTING ADOPTION (CCA)

Cloud adoption is the process of moving traditional on grounds of computing services or facilities to cloud-based or remote infrastructure [27]. In most cases, it's a steady and complex approach to certify no downtime for the organization. A cloud adoption procedure or plan is an iterative project plan that enables a company to change from conventional IT methods to modern and agile approaches. Cloud computing adoption involves organizations' readiness on multiple dimensions including Governance, Process Analysis and Improvement, Application Rationalization and Modernization, and Hardware and Software Standardization. Readiness in turn determines how far organizations can go in their cloud programs with key milestones being Proof of Concepts, Infrastructure Service, Virtual Desktop, Platform Service and Enterprise Software as Service. Readiness and Milestones inform us about the multiple stages in cloud adoption. Largely, cloud computing adoption has been analyzed from two contexts, namely developed and developing contexts [28]. Additionally, cloud computing adoption from the perspective of developed countries might be different from the perspective of developing countries. Therefore, there is a need to investigate determinants of cloud computing adoption across different organizations as well as from a developing country perspective.

Frameworks and Theories for Cloud Computing Adoption

Frame for cloud adoption is a set of best practices, tools, and guidance that enables organizations to start with cloud computing technologies [29]. Moving to the cloud is challenging due to legacy technologies, complex application interdependencies, existing infrastructure bottlenecks, plus knowledge and skill gaps. The cloud adoption framework helps organizations locate and mitigate risks, manage costs, and ensure compliance as they move their workloads to the cloud [30]. It also guides how to optimize governance and security in the cloud for improved efficiency. The cloud adoption framework allows businesses to quickly benefit from the scalability and flexibility of cloud-based infrastructure. Several cloud computing frameworks have been employed in the past, these include TAM, DOU, TOE and TRE.

Technology Organization Environment (TOE) Framework

Technology Organization Environment (TOE) theory is a theoretical framework that was developed in the field of information systems to describe how the adoption and use of new technologies are influenced by various factors, including the characteristics of the technology itself, the organizational context in which it is used, and the external environment in which the organization operates [31]. The framework has been widely

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used in research on technology adoption and implementation in organizations, and it has proven to be a valuable tool for understanding the complex interplay between technology, organization, and environment. The TOE framework was built by Tornatzky and Fleischer in 1990. It identifies three aspects of an enterprise's context that influence the process by which it adopts and implements a technological innovation [32]: technological context, organizational context, and environmental context. The technology context mentions different factors connected to the tools, software, IT infrastructure and so on that can affect individual's or organizations' application for cloud computing. The category of organizational considers the ability of a firm to have access to expertise in the usage of several resources to support the application of firm information systems. Environmental components include various industrial factors such as market factors, competitors, and vendors' support, directly or indirectly affecting the operation of enterprises. These are external environmental factors that affect the business's decision to implement new technology.

The framework of TOE has been employed by many researchers to explore issues that affect SME cloud computing applications [33]. One of the predominant strengths of the TOE framework is that it gives a holistic view of technology adoption and implementation. Rather than looking solely at the technology itself or the organizational context, the framework identifies that internal and external factors are crucial in shaping technology adoption and use. This enables researchers to take a more nuanced method of studying technology adoption, and it helps organizations to better understand the complex interplay of factors that affect their technology decisions. Another strength of the TOE framework is its flexibility. The framework can be applied to a wide range of technologies and organizational contexts, making it a valuable instrument for researchers and practitioners in a variety of fields. Additionally, the framework can be adapted to different techniques in research including qualitative and quantitative techniques [34]. Nevertheless, there are also some problems in the TOE framework. One constraint is that it may be overly broad and general, making it difficult to apply in specific contexts. Additionally, the framework may not fully capture the complexity of technology adoption and implementation, particularly in rapidly changing environments where external factors can have an important impact on technology decisions.

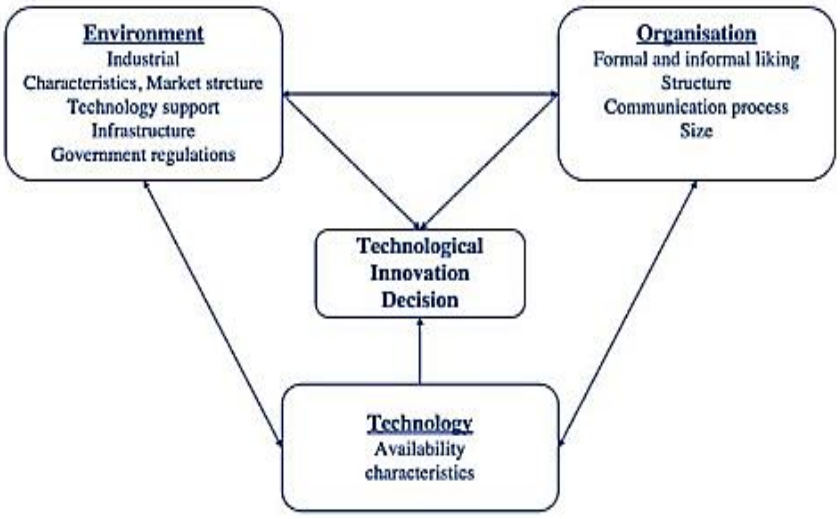

Figure 3: TOE Framework [35]

Diffusion of Innovation (DOI) Theory or Framework

Diffusion of innovations is a theory that seeks to explain how, why, and at what rate new ideas and technology spread (Call &, Herber, 2022). This is one of the first social science theories developed by

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Everett Roger in 1962 [37]. He argues that diffusion is the process by which an innovation is communicated through certain channels over time among the participants in a social system. The origins of the diffusion of innovations theory are varied and span multiple disciplines. The result of this diffusion is that people, as part of a social system, adopt a new idea, behaviour or product. Adoption means that a person does something inversely than what they had formerly (i.e., buying or using a new product, obtaining and performing a new behaviour and so on.) [38]. The key to adoption is that the person must perceive the idea, behaviour or product as new or innovative. It is through this that diffusion is conceivable. DOI is a common model used in many studies related to Information Systems (IS). The innovation model is applied in enterprises following five steps, knowledge, persuasion, decision, confirmation and implementation [39]. The choice of applying for an invention includes three factors. Firstly, the individual factor defines leadership attitude towards the application of new technology. Secondly, the organizational element means the internal aspects consisting of coordination, support among employees in the enterprise, concentration, and complexity when applying new technology. This theory has been applied effectively in various fields including public health, criminal justice, social work, marketing communication, and agriculture [40]. In public health, DOI Theory is used to hasten the adoption of significant public health programs that classically aim to transform the behaviour of a social system. For example, an intervention to address a public health problem is built and the intervention is promoted to people in a social system with the goal of adoption (based on Diffusion of Innovation Theory). The most successful adoption of a public health program results from understanding the target population and the factors influencing their rate of adoption. The key elements in diffusion research is shown in Table 1.

Table 1: Key Elements in Diffusion Research

S/N	Element	Definition
1	Innovation	Innovation is a broad category, relative to the current knowledge of the analyzed unit. Any idea, practice, or object that is perceived as new by an individual or other unit of adoption could be considered an innovation available for study.
2	Adopters	Adopters are the minimal unit of analysis. In most studies, adopters are individuals, but can also be organizations (businesses, schools, hospitals, etc.), clusters within social networks, or countries.
3	Communication channels	Diffusion, by definition, takes place among people or organizations. Communication channels allow the transfer of information from one unit to the other. Communication patterns or capabilities must be established between parties as a minimum for diffusion to occur.
4	Time	The passage of time is necessary for innovations to be adopted; they are rarely adopted instantaneously. In fact, in the Ryan and Gross (1943) study on hybrid corn adoption, adoption occurred over more than ten years, and most farmers only dedicated a fraction of their fields to the new corn in the first years after adoption
5	Social system	The social system is the combination of external influences (mass media, surfactants, organizational or governmental mandates) and internal influences (strong and weak social relationships, distance from opinion leaders). There are many roles in a social system, and their combination represents the total influence on a potential adopter

Technology Acceptance Model (TAM) Framework

TAM is a revision of the Theory of Reasoned Action (TRA) in the area of Information Systems (IS) [41]. This has been one of the most influential models of technology acceptance, with two primary factors

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influencing an individual's intention to use new technology: perceived ease of use and perceived usefulness. The primary objective of TAM was to shed light on the processes underpinning the acceptance of technology, to predict the behaviour of and provide a theoretical explanation for the successful implementation of technology [42]. The practical objective of TAM was to inform practitioners about measures that they might

take before the implementation of systems. The Technology Acceptance Model has been one of the most influential models of technology acceptance, with two primary factors influencing an individual's intention to use new technology: perceived ease of use and perceived usefulness [43]. The key feature of this model is its emphasis on the perceptions of the potential user, that is while the creator of a given technology product may believe the product is useful and user-friendly, it will not be accepted by its potential users unless the users share those beliefs. An older adult who perceives digital games as too difficult to play or a waste of time will be unlikely to want to adopt this technology, while an older adult who perceives digital games as providing needed mental stimulation and as easy to learn will be more likely to want to learn how to use digital games. While TAM has been criticized on several grounds, it serves as a useful general framework and is consistent with many investigations into the factors that influence older adults' intention to use new technology. Figure 2 shows the schematic diagram of TAM.

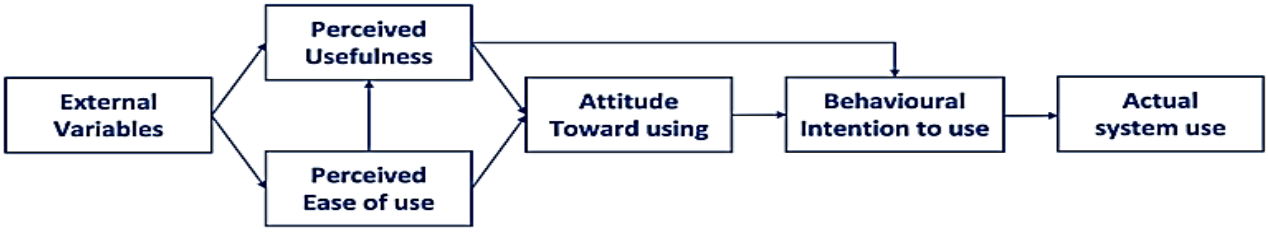

Figure 2: TAM Framework [35]

Theory of Reasoned Action (TRA)

Developed by Martin Fishbein and Icek Ajzen in 1967, the theory was derived from previous research in social psychology, persuasion models, and attitude theories [44]. Fishbein's theories suggested a relationship between attitude and behaviours (the A–B relationship). However, critics estimated that attitude theories were not proving to be good indicators of human behaviour. The TRA was later revised and expanded by the two theorists in the following decades to overcome any discrepancies in the A–B relationship with the theory of planned behaviour (TPB) and reasoned action approach (RAA) [44]. The theory is also used in communication discourse as a theory of understanding. The theory of reasoned action aims to explain the relationship between attitudes and behaviours within human action [45]. It is mainly used to predict how individuals will behave based on their pre-existing attitudes and behavioural intentions. An individual's decision to engage in a particular behaviour is based on the outcomes the individual expects will come as a result of performing the behaviour.

The main purpose of the TRA is to understand an individual's voluntary behaviour by examining the underlying basic motivation to act (Vignesh Karthik, 2017). TRA states that a person's intention to perform a behaviour is the main predictor of whether or not they perform that behaviour. Additionally, the normative component (i.e. social norms surrounding the act) also contributes to whether or not the person will perform the behaviour. According to the theory, the intention to perform a certain behaviour precedes the actual behaviour [47]. This intention is known as behavioural intention and comes as a result of a belief that performing the behaviour will lead to a specific outcome. Behavioural intention is important to the theory because these intentions "are determined by attitudes to behaviours and subjective norms [48]. TRA suggests that stronger intentions lead to increased effort to perform the behaviour, which also increases the

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likelihood for the behaviour to be performed.

CHALLENGES OF CLOUD COMPUTING ADOPTION

When looking at the power business to rapid growth, scale workloads to meet real-time needs, looking for high availability, productivity, and cost-effectiveness, in that case, cloud computing is the approach to introduce. Occasionally, the migration challenges are more compared to the benefits of migrating to the cloud environment. The following are challenges in cloud migration and how to overcome them with careful planning, selection, design, and use of tools and partners.

Data Sovereignty Regulations

Data sovereignty is a legal concept defining jurisdiction over data. Specifically, sovereignty establishes the principle that any data collected or stored within a country is subject to its laws and regulations. It refers to the idea that data such as intellectual property, financial data, or personal information collected or stored in a particular geographic location, such as a specific country or the European Union (EU), should be subject to the laws of that location. Data stored in cloud computing services may be under the jurisdiction of more than one country's laws. Different legal requirements regarding data security, privacy, and breach notification could occur, depending on where the data is being hosted or who is controlling it. Data sovereignty helps organizations improve their security posture by reducing the exposure of sensitive information to external threats. Local data storage allows tighter control over access, encryption, and security measures. Adhering to data sovereignty and data localization requirements does not have to mean standing up new data centres or curtailing your expansion plans. With the right strategy, you can securely store and process data in each of the countries where you are doing business and still access that data centrally for analytics and decision-making without adding excessive costs or complexity.

Vendor lock-in

In public cloud services, vendor lock-in is a situation where you depend on a single cloud provider for a specific service (or a bunch of them). You can't easily move to a different vendor in the future without experiencing issues such as high costs, legal constraints, or technical incompatibilities. Vendor lock-in is when someone is essentially forced to continue using a product or service regardless of quality because switching away from that product or service is not practical. his can be a major problem, as it can limit the customer's choices and make it more difficult to get the best possible value for its money. Implementation of a multi-cloud strategy can be an effective way to avoid vendor lock-in. This involves using multiple cloud service providers for different services or spreading your resources across them. However, this approach requires careful management to avoid complexity. When choosing a vendor, it is important to have an exit strategy in place in the event things with the provider go south. This means having a clear plan for how you will switch vendors if necessary, and ensuring the transition is as smooth as possible. Having an exit plan ready at the beginning guarantees you are not tied to one vendor

Existing Data Centre Investments

Data centre investments in existence can be a double-edged sword for cloud adoption. On the one hand, having already invested significantly in a data centre, companies are reluctant to move to the cloud. On the other hand, it's exactly the cost of existing data centres that push so many companies towards the cloud. Wherever you stand, the key benefits of cloud computing are long-term. Most businesses do not see significant savings in the short term, rather the benefits emerge as a capital expenditure-based business model is replaced with an operational expenditure-based one (CapEx vs OpEx). The elimination of CapEx costs means that cloud computing is cheaper in the long run. To take advantage of this, many companies have phased cloud migrations, where the oldest parts of their data centres are migrated to the cloud first, to

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avoid the heavy costs of replacing them. Whilst this might look good on paper, caution should be exercised here, as the oldest parts of a business are often the hardest to move to the cloud. While phased migrations are a great way to overcome this adoption challenge, companies must be careful to ensure that the servers they start with are relatively straightforward and can provide high benefits. This can help ensure that the cloud journey keeps moving forward, and isn't slowed down during implementation. Companies need to first run automated discovery solutions and review application dependencies as part of a full cloud readiness assessment of the discovered applications.

Skills Gaps

The rapid adoption of cloud computing across industries has created a significant gap in the availability of qualified cloud experts to meet this demand. It will not come as a surprise that the shortage of skilled IT professionals is a predominant problem when it comes to cloud adoption. So what are the implications for organizations? One of the most pressing challenges to cloud adoption is a skills gap. How can a company move to the cloud if it doesn't have the right people to make it happen? Ever since its inception, Cloud Computing has proven highly beneficial to businesses looking for flexibility in their operations. Cloud services offer impressive scalability, agility, cost-effectiveness, and wide accessibility. The demand for the cloud is at an all-time high, with businesses planning to migrate their applications and data from on-premises data centres to the cloud.

Security Issue of Cloud Adoption

IT experts consider security to be a major challenge to cloud adoption. We find that the perception of reduced security is the biggest challenge. The reality is that public cloud service providers invest far more in their security than any individual company or government department ever could. A move to the cloud doesn't decrease security but it increases it. Most security threats in cloud computing are connected to cloud data security. Most concerns are related to the data that consumers upload to the cloud. Whether it be because of a lack of visibility into data, an inability to regulate data, or data theft.

Cloud security is a paramount concern for organizations. Without skilled professionals who understand the intricacies of cloud architecture, data protection, and compliance regulations, companies are more susceptible to breaches, data loss, and non-compliance issues.

SUMMARY AND DISCUSSSION

In cloud computing, different frameworks or theories such as TAM, TOE, DOI and TRA have been applied by researcehrs. TAM is a powerful adoption theory in the IT sector and has been used by numerous research studies. The model looks at an individual's goal when utilizing a system or application and recommend PU and PEOU as the central reason for IT adoption. Over the years TAM has shown great acceptance, utilization, and reproduction but the model failed to give essential data on the user's assumption to only PU and PEOU. Based on this limitation it was necessary for the model by expanding or integrating with other IT acceptance models. The TOE framework proposed a generic set of factors of technology adoption. The TOE framework looks at three contexts namely Technology, Organization, and Environmental. TAM and its all-encompassing forms have a high ability to clarify the innovation reception while the meaning of the TOE system is likewise perceived in clarifying technology adoption. The marriage of these two models brings a new and unique developed redesign that takes TAM and TOE models to a more extensive level to advance and encourage improved informative and prescient focal points of IT adoption. The TAM and TOE framework can be used separately or as a hybrid depending on the situation at hand. In future it important to harmonize the so many factors of the models that have been suggested and used in literature.

CONCLUSION

This study employed a literature review to identify and summarize the factors which affect cloud computing adoption in organizations to increase understanding of cloud computing adoption. The literature review indicated that the technological factors are the most important for decision makers. These show abilities of cloud computing to meet the business needs in terms of information systems and data availability and reliability, savings of cost, privacy and security, complexity, and compatibility. Business alignment, relative advantage, and innovation characteristics are broad factors that also reveal the fit between business and technology. On the other hand, organizational and environmental factors reflect the conditions of the organization and the external environment's forces that affect the cloud computing adoption. Many of the reviewed studies proposed various adoption models based on existing frameworks and theories. These models varied in their scope and focus, also the work mention various methods in which cloud computing adoption challenges can be reduced.

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