Critical factors that affecting adoption of e-learning based on cloud computing for Iraqi higher education organizations

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> *Abstract*---Cloud computing-based e-learning is one of the most popular techniques discovered to promote traditional instruction by software applications and a virtual learning environment. There are many factors that could be regarded in a company's effort to implement or embrace new technology initiatives. As in the literature, many scientists and researchers have particularly explored the factors that influence the adoption of cloud computing along with e-learning issues based on cloud computing that are derived from standards models such as Technology-Organization-Environment (TOE) framework and Technology Acceptance Model (TAM). The aim of the study is to identify critical factors that impact the adoption of cloud computing-based e-learning for Iraqi higher education organizations. Indeed, we identified the 14 critical factors that affect cloud computing uptake for e-learning system in higher education organizations such as compatibility, complexity, cost saving, security and privacy, integrity, and etc. This research examines the ideas and literature used to examine adoption of cloud computing to define future variables that may influence the adoption of cloud computing.

Introduction

Cloud computing has become a significant facilitator for electronic education systems, e-learning environments and mobile application learning(Mathivanan et al., 2021). Institutions utilize either of distinct cloud computing designs. First, schools developed their own cloud infrastructure or private cloud settings(Doelitzscher et al., 2011). Second, higher education institutions created consortia with other organizations to build prototypes, community clouds or hybrid cloud. The shared cloud infrastructure of universities is a primary concern for governments. Third, higher education institutions pay for cloud computing services from third party or government, those institutions also propose research models to explore acceptance of cloud computing indication variables by schools and educational institutions, and show the significance of cloud computing in higher education organizations (Deng et al., 2015). There is a probability to control risks associated with cloud computing systems(Ali A. Abdulsaeed , M.A. Burhanuddina, 2017). However, they have also given sufficient research to develop a test to determine the variables connected with universities and schools adopting cloud computing. Finally, the aim of the study is to identify critical factors that affecting adoption of cloud computing-based e-learning within the context of Iraqi higher education institutions.

Research Background

The promotion of conventional medium of instruction into virtual learning environments and software applications is referred to as e-learning. According to (Ercan, 2010), e-learning involves various forms of multimedia support empowered by sophisticated service applications that utilize emerging telecommunication technologies that grants users of either educational process sides a reliable electronic platform for educational purposes. Furthermore, cloud computing systems, whether stand-alone or network based learning utilizing wither local or global networks such as the Internet where many e-learning systems underlie. Cloud computing systems is one of the most common buzzwords used in the IT globe.

Some main variables affect the acceptance of cloud computing-based e-learning. The first job is to create a sound knowledge of the obstacles, difficulties and variables connected with cloud computing implementation of e-learning. Second, to better comprehend the issue, a conceptual model is required through which the ministry can readily embrace e-learning through cloud computing across the republic if higher education is required. In addition, the ministry of higher education would be more probable to embrace cloud-based e-learning using appropriate conceptual framework suggested in research. Through this framework, the probable technological, organizational and environmental problems influencing its implementation will be explained and refined(Al-Azawei et al., 2016). From the outcomes of this study, further study on e-learning based

on cloud computing and its latest methods can be created. In short, this research is important for many purposes: First, it enables Iraqi universities to comprehend the variables that affect this technology. Second, it discusses the divide that remains in practical research in the Iraqi education organizations. Third, it provides a step-by-step path for using cloud computing for e-learning in government organizations. Fourthly, access to the Iraqi education organizations was given to this study in order to collect the information needed for this study It's excellent recognized as the most important difficult research problems; access to such public organizations, particularly military entities, is not simple. Fifthly, this research is also crucial because it will contribute to current expertise in this sector, particularly in emerging nations such as Iraq, which has a very unique culture.

E-Learning background

E-learning is an IT-based education that involves various formats and hybrid techniques such as the Internet, software, digital media, CD-ROMs, and other E-online training tools(Maxwell, 2012). Major historical software developments in technological and educational methods to teaching started to emerge in the 1970s (Sun et al., 2014). During this era, consideration has started to create the technological, architectural elements of hardware and software characteristics in a reliability and stabilization setting for e-learning as well as e-learning systems. Once the network computers were prepared to reproduce the performance of e-learning using CD-ROMs and were stripped of any traditional credit and teaching system constraints, this allowed society as a whole to achieve higher access to teaching (Abu-Shanab, 2014). Experts were willing to use CD-ROMs and DVD-ROMs for e-learning material that offered self-service instruction and autonomous asynchronous learning without the immediate communication between a trainer and a learner (Kumar and Gulla, 2011). Initially, e-learning started as a computer-based (CBT) training technique by using portable storage devices across campus network, then progressed towards an internet-based e-learning technique by enhancing Internet use (Shim et al., 2011). By the 1980s, computer-based training was used in their academic framework by only a few universities (Kasraie and Kasraie, 2010). The idea of e-learning as a school paradigm, however, expanded beyond traditional boundaries and helped to revolutionize learning (Cheawjindakarn et al., 2012). The use of universal resource locators (URLs) in the 1990s allowed access to resources worldwide through the implementation of the web technology (Yusuf and Al-Banawi, 2013). With the advent of the Internet, and worldwide access via URLS, a web-based training age has appeared that enables universities to use the Internet as a feasible e-learning instrument for their education (Yusuf and Al-Banawi, 2013).

E-learning advantages

E-learning provides some of the primary benefits that organizations can eliminate significant costs such as training pay, travel expenses, loss of staff hours, catering and training equipment and the price of training equipment (Park and Kim, 2014). The other benefits include removing geographical barriers, enabling staff to schedule their time, making it more adaptable to their teaching, customizing teaching training and establishing a platform for self-learning (Ali et

al., 2014). They asserted that the technical abilities of trainers and staff, the accessibility of IT assets, job plans for staff, and the advantages of moment and expense savings could have an effect on organizational practice. Matt and Jones stressed that while businesses could save time and expenses by adopting new techniques, many did not know whether open-source applications, new techniques or data sharing were accessible. Anthony Longo's research addressed how distinct Web 2.0 e-learning techniques could promote instructional projects, improve efficiency, and enhance the competitive benefit of a company(Longo, 2018).

Cloud computing

Cloud computing is a new terminology that has gained a lot of concern from organizations and individuals from distinct fields over the past few decades (Prince, 2011). Cloud computing has now created a new network environment and alternatives to create a network learning platform for schools and universities, instructional resource inclusion, and digital campus layout. Create a multimedia cloud leadership scheme in the present hardware and software environment (Hao, 2016). To avoid software project failure, we must combine risk management approaches with quantitative, intelligent procedures in a software development project. (El Yamami et al., 2017). On the other side, cloud computing has appeared and become commonly famous as a comprehensive technology for cost-effective resource accessibility and has continued to accomplish essential efficiency gains in the analysis of such large-scale information in both the private and public sectors (Doheir et al., 2018). Cloud-related computing is usually developed in one of two respects, whether it is a cloud-related government cloud application (SaaS) or a personal cloud-related infrastructure (Johnston et al., 2016). Cloud computing is a modern approach for creating an essential alternative in today's educational system adopted by different educational institutions under minisrty of higher education and scientific research in Kurdistan enabling them to access various application platforms easily and economically (Ahmed et al., 2017).

Cloud e-learning

E-learning system alters teaching and learning methods. There are various application packages that function as a tool for the planned organization and management of different study courses in a planned manner (Salam, 2015). With the help of modern educational technologies, this platform teaches students. The invention and application of cloud computing systems in the computer and networking field has really increased speed, ease, accuracy and changed the way social communications, activities and interactions are conducted (Salam, 2015). China is currently facing several barriers in adopting cloud computing, namely: Absence of standards; inadequate educational data; and disregard for economic and environmental effects (Duan, 2016). Cloud computing also could enhance business way and IT work by providing rapid start-up, versatility, scalability, and cost-effectiveness.

Although cloud computing provides compelling advantages and cost-effective IT hosting and extension possibilities, new hazards and opportunities are added

(Carroll et al., 2011). With the growth of the e-Government in latest years in order to limit government authority and discourage occupational conduct from corruption, many national and global regions are investigating the institution of CRPS (Corruption Risks Prevention System), In many ways, electronic monitoring mechanisms have played positive roles in regulating power exercise and preventing power corruption in central administration styles in different domains such as banking, private and public sectors (Su and Dan, 2013). Electronic learning or e-learning is a learning method that uses the web as a medium of transferring knowledge to learners. E-learning systems are widely used in various teaching sectors, including universities, businesses, educational organizations, and even in lesser-level training schools. Educators and students are the key actors interested in e-learning programs. In terms of efficient media delivery time, students may reap significant benefits from an e-learning environment, timely feedback and real time communication among tutors and their students. Therefore, e-learning providers can gain more from utilizing the cloud computing framework, as this ready-made platform meets all their needs (Kassim et al., 2017). Improvements and expansion in learning tools have been forced by advances in information technology (IT). E-learning does not appear to be progressing at the same rate as IT(Ewuzie and Usoro, 2012). Cloud computing provides more versatility to play with new technologies and applications. Cloud Computing's low cost makes it an attractive candidate in the education sector across many countries. Cloud computing allows school infrastructures to be distributed cost and energy effectively. This utilizes the server capabilities to change the allocation depending on demand, all invisible to teachers and students (Sanjay P. Gupta, 2013). Academic institutions benefit from cloud computing because it provides a low-cost option for their researchers, teachers, and students. In addition, many of these browser-based programs may also be accessed through mobile devices, as long as internet connectivity is available, making this arrangement even more advantageous (Murugan et al., 2016).

Factors that Affecting of Adoption e-learning based on Cloud Computing for Iraqi higher education organizations

As literature, there are many variables that could be regarded in a company's effort to implement or embrace new technology initiatives. As in the literature, many scientists and researchers have explored the variables influencing the adoption of cloud computing in particular and within the e-learning issues based on cloud computing and have various thoughts, results and conclusions. In an effort to explore these variables and decide which of them genuinely affects the adoption of cloud computing in Iraqi e-learning, the investigator walked through various problems linked to e-learning. Many organizations and companies faced the network issues using the resource-wide network (Mahalakshmi, 2017). While the use of cloud computing in public administration or in the e-government system has many benefits, many issues and difficulties still need to be resolved. (Almunawar, 2015). This research examines the ideas and literature used by SMEs investigate the potentials of this technology to define future variables expected to impact its adoption. In the upcoming sections, we introduce the variables that will be regarded in technological, environmental, organizational and other variables for studies.

Technological factors

Organizational innovations are subject to technological considerations. Cloud computing adoption has also been driven by perceived benefits, which have been judged as the expected benefits of technological advancement by other experts (Oliveira and Martins, 2010a). Data processing is made easier by the cloud's customizability, as well as its ability to be accessed at any time and from anywhere (Lee et al., 2016). To put it another way, with cloud computing, organizations no longer have to worry about installing and maintaining their information systems because the cloud computing vendor is taking care of that for them.

Relative advantage

The determinant 'relative advantage' is the confidence of guaranteed results quality assistants and savings in moment and energy, cost reduction or other means (Masum et al., 2017). By embracing a new approach in the sector of IS, comparative benefit can be regarded a significant marker for accepting the new innovation. According to Rogers (1983), the relative advantage "is the degree to which a technological variable is regarded as providing greater benefit to businesses". Moore and Benbasat (1991) also explained that relative benefit concept in their way by connecting it to the PU in the TAM template by saying that there are many differences with assumed usefulness PU in the TAM template when a business is about to create it (Moore and Benbasat, 1991). If any organization perceives a strong comparative benefit over the new development, the probability of adopting such innovation is enhanced. An organization can gain many advantages in implementing cloud computing because cloud computing offers a variety of advantages such as ease of use, facilities (software & hardware) in addition to cost decreases in many ways. Therefore, the perceived expectation of relative advantage (including the above factors) through the application of cloud computing technology is expected to have a positive impact on the organization that will decide on this application. Relative advantage, however, has been recognized as the degree to which an organization is considered superior to the notion it supersedes (Nan et al., 2008). The determinant " relative advantage " is the trust of high-performing employees, as well as time and energy saves, price reductions, and other methods (Masum et al., 2017).

Compatibility

Compatibility will have a beneficial effect on cloud computing application. If the technology is considered more hard to use, implementation would be less likely (Leguina, 2015). In the event of the affordable and private organizations, prevalent real-world approach requires the IT compliance examination as the foundations given and recognized. Guarantees are assured to create efficient use of e-learning system, interconnectivity and interoperability in the education system (Chen, 2011). Keeping up to date with latest developments and being at the height of high technology on the reality that it provides critical social insurance and educational demands, especially in poorly fitted education circumstances, such as in Iraq. According to this, and what follows are the situations of a mismatch between facts on the ground, failure to study the balance of e-learning in Iraqi education sections, arising in a poor fit between the e-learning assessment system

and end-client requirements with respect to university and education prerequisites. Therefore, the current study thinks that the effect of consistency is a significant factor for the government of Iraq. The obvious ease of use also comes with consistency. If the organizations believe that applying the cloud system is effortless because it is compatible with its own methods, cloud computing would be improved (Pross, 2016).

Complexity

Parisot said new approaches must be simple to use and understand (Parisot, 1995). With the application of the new technology, ease of use and user-friendly environment caused an increase rate with its adoption (Sahin, 2006). Rogers (2003) said it would be less likely to adopt entrepreneurship if it is considered more difficult and referred the degree to which an idea is considered to be difficult to grasp and apply as complexity (Rogers, 2003). Complexity is regarded an significant variable in the selection of adopting a new technology (Harindranath et al., 2008) and in the probability of adoption, this is adverse variable. It was not concluded that the nature of e-HRM highly impacted e-HRM admission selection. One reasonable explanation is that exercising with other organizational systems can decrease the obvious trouble of e-HRM (Masum et al., 2017).

Cost saving

Cloud computing is gradually maturing over the past decade. Multiple study has been carried out on resource distribution and work planning. However, the system utilization is affordable for customers. The reason behind is that applications for assets handled together with jobs are always submitted manually. As a result, an effective resource management system should be carefully developed to maximize the utilization of system resources in the cloud while reducing user expenses (Xu and Li, 2016). Cloud computing has emerged as a global technology for cost-effective energy accessibility and has attained significant performance increases in analyzing such large-scale data in both the private and public sectors (Doheir et al., 2018). Businesses can also earn hardware cost gains from the SaaS model as the business does not incur additional hardware execution costs ; the only bandwidth expenditures are concentrated on the time and number of clients (Sakharkar et al., 2017). Investment regeneration from bought new machinery (hardware, software and staff salaries) for better information transmission has systematically impacted the healthcare organizations. Both varying and fixed expenses have increased dramatically, leading in increased responsibility for healthcare organizations. Traditional communication and computing methods have led in further inefficiencies and disruptions in work processes due to long distances and large quantities of data (Doheir et al., 2018).

Cloud providers may charge an upload or download premium. Although in the future there may be a reduction in the workload for data movement, at first the labor costs will increase. Companies usually need to increase their quantity of staff to help with the additional workload of the movement. There is also an rise in the amount of data companies and the length of time they need to keep records (Farah, 2015). On the other hand, cloud clients purchase their computing funds

rather than purchasing or borrowing tools that may not be fully used on all times. When cloud system is used to meet the information technology requirements of an organization, physical space requirements and service expenditures are no longer traditionally linked to the maintenance of a dedicated data center environment (LLP et al., 2012). Cloud computing is a flourishing technology that most financial organizations see as a cost-effective strategy to IT management (Alemu and Omer, 2014). All cloud services, however, include the fundamental component identified as an infrastructure-recognized scheme (IaaS). Clouds appreciate cost-effectiveness while increasing productivity (Sule, 2011).

Security and Privacy

This is a major issue among many higher education organizations (Alwi and Fan, 2010). Cloud computing calls for the application of a third party that is the service provider, making it hard to maintain data privacy and security. "Cloud Security" is a major technology application of "cloud" technology emerging after "cloud computing" "cloud storage" referring to cloud computing business model of application based on security software, hardware, clients, organizations, security cloud platform jointly. Cloud computing calls for a third party to be applied as service provider, rendering data privacy and security hard to maintain (Wang, 2016). It puts together parallel processing, grid computing, unidentified judgement of virus conducts and other emerging technologies and concepts. Based on the ongoing growth of cloud computing, cloud technology, customer data security, customer personal information protection, remote data storage and cloud computing platform sustainability and many other security and cloud computing legislative issues immediately linked to the cloud computing company through customer recognition and then became the most impressive cloud computing company (Wang, 2016). There should be some safety once the client shows information to the cloud that entry to that information is only inadequate for the approved entry. Another danger that could pose a future danger to cloud information is inappropriate access to client delicate information by cloud employees (Ghosh et al., 2016). Cloud computing is an open system composed up of quantities of servers and clients. The cloud scheme will allocate computing and storage funds dynamically and elastically depending on the scale of use and the amount of data.(Yang et al., 2012).

Integrity

Organizations need the security systems of the data integrity for their cloud system services. In addition, integrity is one of the five goals that should be met to ensure the security of the customer's e-learning based on cloud service. To maintain data of integrity and user privacy, data encryption and painting alternatives are suggested. Encryption is the main way to maintain consistency, but it is highly costly for cloud suppliers and therefore not always used (Pross, 2016). Cloud computing data must be shielded against unlawful cloud behavior such as unexpected and unwanted changes or deletion (integrity). Cloud integrity relates to being secured against unlawful deletion, alteration, theft. Maintaining the intactness of any information during operations such as transition, retrieval or retention is data integrity in easy words. Deletion, alteration may be deliberate or involuntary (Yadav and Doke, 2016). Cloud service suppliers should use

processes to guarantee information truthfulness by securing data security and being willing to say what occurred to a collection of information and at what stage. The customer should be conscious of the source and the security processes established by the information supplier (Ghosh et al., 2016). Cloud integrity relates to protection against unlawful deletion, alteration, theft. Maintaining the intactness of any information during operations such as transition, retrieval or retention is data integrity in easy words. Deletion, alteration may be deliberate or involuntary (Yadav and Doke, 2016).

Organizational factors

Context of the organization refers to the complexity, nature and volume of slack resources available within an organization, or other internal aspects of the organization. The organizational factors covered in our analysis are technological readiness, top management support, and quality system and services are some of the key challenges of implementing innovation. This is because the ability of the top management to authorize appropriate financial expenditure, human capital, and technical skills is critical to facilitating the adoption.

Technology readiness

It observed that technology readiness in an organization refers to IT human resources and infrastructure that affect the decision to embrace cutting-edge technologies (Oliveira and Martins, 2010b). Together with the TOE framework, many past studies indicate that an organization with a strong technological infrastructure level, or sometimes called IT skills, is more probable to embrace new technology. Technological infrastructure is the embedded network methods and company applications that formed a foundation for cloud computing implementation (Low et al., 2011). Technology readiness within an organization to determine whether or not an organization has sufficient IT staff to assist with day-to-day activities, facilities and disasters, maintenance and upgrades (Low et al., 2011). There is a connection between the prior technological understanding of the customer and the user's acceptance conduct that could have a positive effect on the implementation choice (Rogers, 2003). Because of all of the above, it could be assumed that previous presence of IT human resource with expertise would take a part in the e-government policy choice on cloud computing. However, when debating cloud computing, governments with smaller IT capacities are regarded to be inclined to embrace Cloud computing is the polar opposite of previous research (Hofmann, P. and Woods, 2010).

Top Management Support

Support for top leadership can affect cloud computing. Top management allocates the resources demanded for cloud technology adoption. If the adopt certain platforms that are not yet completed. Managers should also redirect resources to other efforts that they support rather than dying from inaction (Cartano, 2016). If the IT manager is risk averse or content with the present state of affairs, he probably won't promote the concept (Oliveira et al., 2014). Innovation murderers are regarded to resist and oppose the concept by top leadership. Top management assistance relates to management's stance towards the appropriate technology

and the amount of implementation assistance. Support for top leadership is one of the most critical variables in encouraging a positive climate and in providing the funds needed to adopt new techniques (Low et al., 2011). Top leadership promotes the implementation method by sending signals about the significance of cloud system to institution employees. Adopting new technology innovation, such as cloud computing, necessitates a leadership change to reshape they way of business and match the institution's structure with the cloud computing implementation route. Therefore, the Iraqi government system requires political governance and sound administration to encourage more innovative staff. Management support: Managing various areas such as resource management and service management is one of the functionalities expected to be provided by a cloud product. They separated the processing of funds into virtual machines, virtual storage and network applications (Arianyan et al., 2016).

Quality System and Services

Efficiency and performance problems are major issues related to the services provider's system and services. The standard of service has deteriorated and scheme efficiency within the quality unit (Pross, 2016). Service quality performs a significant part in making cloud computing more accurate and adaptable. Knowing the anticipated parameters of the QoS factors is a main consideration in ensuring the quality of service is preserved (Upadhyaya and Ahuja, 2017). Concerns elements of the scheme such as usability, efficiency, reaction time, accessibility and adaptability. For example, a cloud provider could have distinct methods of accessing cloud storage, e.g. through portable apps or other creative characteristics. This is a critical aspect for any business. Given the impersonal nature of cloud computing service performance, it is especially important for end users and their faith in the cloud system provider.

Environment factors

The environment consists of factors in which the firm works is referred to as the environmental context. The environmental conditions may be the limitations or the enablers for the adoption of innovation. Researchers have suggested that the strength from intense competition within the industry of the organization is considered an important determinant of the adoption of innovation.

Regulation and Reputation

There are issues in the cloud computing society about jurisdiction, data protection, reasonable information procedures and global data exchange that affect primarily organizations that handle delicate data (Strowd and Lewis, 2010). Reputation is what is usually said or thought about the personality or standing of a person or thing. Related to confidence in the sector of cloud computing reputation, but the two characteristics are distinct. Reputation is "the aggregate view of a society towards that organization" The customer may do a specific feature and subsequently reject having performed it. For instance, an illegal action is conducted by a person who lacks the capacity to track illegal activities in a scheme and systems (Mahalakshmi, 2017). However, safety is a key issue for many cloud computing clients who create utility decisions based on reputation for

confidentiality, honesty and resilience, and safety facilities provided by a supplier, more so than in traditional settings (Khan et al., 2012; Sahlaoui et al., 2021; Abd et al., 2022; Ali et al., 2022)

Trust for cloud e-learning

Trusted cloud computing has become a significant problem in literature. It is a hotspot of security studies organizations to integrate reliable computing sytem technology into the cloud environments and provide safe cloud service. It can mitigate the security issues in cloud computing system. Users can verify the safety of equipment and the confidentiality of virtual machines for the trusted cloud computing platform (Wang, 2016).

Trading partner pressure

This is yet additional complication that affects the decision to adopt the firm. Vendors or other collaborators who may support cloud computing are putting pressure on you. As a result, an entity's adoption of this technology may be aided. (Alkhater et al., 2014). Pressure from upstream and downstream business associates who perform commercial transactions with an entity (Senyo et al., 2016).

Pan and Jang (2008) stated that trade partner competitiveness is a crucial predictor of information technology innovation uptake. As a result, educational partners highly determine the successful application of e-learning (governments, NGOs, and other agencies). These partners encourage the introduction of e-learning in their educational organisations. This means that if the university's external environment, such as its culture, nation, and agencies, are well-versed in the benefits of adopting e-learning and how to utilize and embrace it, the institution will have no option but to prioritize e-learning implementation. Furthermore, the existence of adequate e-learning professionals in the immediate vicinity raises the likelihood of e-learning deployment. As a result, educational partners were included as a factor for e-learning uptake in the research.

Usability factors

According to (Oqail Ahmad and Zaman Khan, 2015), cloud computing is an easy-to-use technology and can be used anywhere (Oqail Ahmad and Zaman Khan, 2015). On the other side, the TAM model, a commonly recognized model that researched the effective forecast of new technology implementation had a couple of primary constructs, presumed ease of use and perceived usefulness as instruments into predict success, and explain the intention of customers to embrace new systems (Gangwar et al., 2015). Alsanea (2015) said that because cloud computing has the capacity to provide simple access to IT assets for tiny and medium-sized companies, it has been commonly embraced within them (Alsanea, 2015). Cloud computing is simple to maintain, a whole group of experts willing to submit maintenance for the services and/or apps supplied by the cloud service supplier, and users will need no additional effort to address this issue (Wahsh and Dhillon, 2015).

Perceived ease of use

The perceived ease of use is simply defined as how easy the user believes he can utilize a system's service. Because practice is a finite resource, customers are more willing to embrace an application that is deemed easier to use than another application. People may consider the system is too difficult to use even if they believe the technology is valuable. As a result, they think that the benefits of utilizing technology are exceeded by the work necessary to use it (Pross, 2016). User friendliness demonstrates how simple the option in an interactive model can be handled by the customer. The more user-friendly a service is, the more appealing it is for customers (Arianyan et al., 2016). All safety elements should be as effective and functional as necessary, not least to decrease the danger of being circumvented (Fabian et al., 2014). Most quality models have described usability as an important factor leading to improved brand acceptability, increased customer fulfillment, improved item efficiency, and also financially beneficial businesses. Usability is also the greatest consideration that balances both the technical and human elements of a software product, which is a significant element in software development process performance definition. A usability threat consists of risk variables that could affect the usability of a software product, thus leading to adverse customer feelings and creating a probable software product crash (Doheir et al., 2018). The system will make it easy to handle versatile measuring scheme with autonomous data management and can be monitored by remote collection and control commands using "cloud" system computing (Hanifah et al., 2016). A model capable of creating cloud-based apps with reusability by retrieving parts from the cloud element repository using pattern matching algorithms and multiple recovery techniques (Yadav and Doke, 2016; Ali, Elameer, et al., 2021; Ali, Mshali, et al., 2021; Ali et al., 2022; Jaber, Abd, et al., 2022; Jaber, Alameri, et al., 2022).

Perceived usefulness

Perceived usefulness is defined as the expected benefits a user expects to gain via exploiting a particular system. According to the idea, the system must give some meaning. In a broad spectrum of previous research, perceived usefulness was used as a predictor of buying desire (Pross, 2016). In this case cloud computing, the significance of a system lies in multiple ways, including instructiveness and enabling duties(Pross, 2016). In the cloud computing business, security is defined as the degree to which cloud computing is considered to be safer than previous computer paradigms. Security has been identified as one of the major issues with cloud computing in previous research(Sharma and Kakkar, 2016). Security concerns have an impact on the system's secrecy, honesty, and availability. Accessibility is affected by system security(Kim and Yoon, 2013).

Conclusions

The adoption of cloud-based e-learning is influenced by a few key factors. The first job is to create a sound knowledge of the obstacles, difficulties and variables connected with cloud computing implementation of e-learning. Second, to better comprehend the issue, a conceptual model is required through which the ministry can readily embrace e-learning through cloud computing across the republic if

higher education is required. e-learning based on cloud computing is one of the most popular techniques discovered to promote traditional instruction by software applications and a virtual learning environment. There are many factors that could be regarded in a company's effort to implement or embrace new technology initiatives. As in the literature, many scientists and researchers have explored the factors influencing the adoption of cloud technology in particular and within the e-learning issues based on cloud technology that derived from (TOE) and (TAM). The aim of the study is to identify critical factors that affecting adoption of cloud computing-based e-learning for Iraqi higher education organizations. Indeed, we identified the 14 Compatibility, complexity, cost savings, security and privacy, integrity, and other variables impact the use of cloud computing for e-learning in higher education companies. This study analyses the concepts and literature utilized to look at the usage of cloud computing in order to identify future characteristics that may impact cloud computing adoption.

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