Proposed Model of Adoption's Determinants of Cloud- Based Management Information Systems from Users Perspective

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نموذج مقترح لمحددات تبني نظم المعلومات الادارية المستند الى السحابة من منظور المستخدمين

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Abstract

Nowadays, organizations continue to grow larger and larger, not only in the number of employees, but in the number of departments and the type of employees. In such cases, cloud-based information systems are beneficial to organizations through their superior informational capabilities compared to traditional information systems, however, there are few academic studies that have dealt with the two systems together, and focus only on the technical aspects, and the determinants that affect the adoption of systems cloud management information is not checked from the user's perspective. In this study, we attempt to investigate the determinants of Cloud-MIS adoption by considering the framework of current state bias theory as a basis for giving guidance to cloud service providers on how to design their products in order to increase adoption and use . The study sample was represented by the employees working in the Technical Engineering College Mosul, sample size (100) employees and the data were analyzed using SMART PLS. The results showed that perceived risk was the most important factor regarding behavioral adoption determinants of Cloud-MIS use, followed by regret avoidance and inertia. Ultimately, this study recommends to researchers that the models used to measure adoption determinants can be combined to further explore the factors that have an impact on a cloud-based management information system .

Keywords: *Management Information System; Cloud Computing; Cloud based management information system; SQB.*

المستخلص :

في الوقت الحاضر، تستمر المنظمات في النمو بشكل أكبر وأكبر ، ليس فقط في عدد الموظفين ، ولكن في عدد الإدارات ونوع الموظفين. في مثل هذه الحالات ، تعتبر أنظمة المعلومات القائمة على الحوسبة السحابية مفيدة للمنظمات من خلال قدراتها المعلوماتية الفائقة مقارنة بأنظمة المعلومات التقليدية ، ومع ذلك، هناك القليل من الدراسات الأكاديمية التي تعاملت مع النظامين معًا، وتركز فقط على الجوانب الفنية، والمحددات التي تؤثر على اعتماد نظم معلومات الإدارة السحابية لم يتم فحصها من منظور المستخدم". في هذه الدراسة، نحاول التحقيق في محددات تبني نظم المعلومات الادارية المستند الى السحابة بالاستناد الى نظرية التحيز في الحالة الراهنة كأساس لإعطاء توجيهات لمقدمي الخدمات السحابية حول كيفية تصميم منتجاتهم من أجل زيادة الاعتماد والاستخدام. تمثلت عينة الدراسة بالموظفين العاملين في الكلية التقنية الهندسية الموصل وبلغ حجم العينة (100) موظف، وتم تحليل البيانات باستخدام Smart PLS . اظهرت النتائج أن المخاطر المتصورة هي العامل الأكثر أهمية فيما يتعلق بمحددات التبني السلوكي لاستخدام Cloud-MIS متبوعة بتجنب الندم والقصور الذاتي. في النهاية ، توصي هذه الدراسة الباحثين بإمكانية الجمع بين النماذج المستخدمة لقياس محددات التبني لاستكشاف المزيد من العوامل التي لها تأثير على نظام معلومات الإدارة القائم على السحابة.

الكلمات المفتاحية: نظم المعلومات الادارية، الحوسبة السحابية، نظم المعلومات الادارية القائم على السحابة، SQB .

1-Introduction

Background of study, management information systems are burgeoning into widely accepted modes of process management in several industries. It is of special consequence in projects of high complexity. Information systems provide an edge in the effective management of complex and multifaceted projects (Khalid *et al.*, 2018). Therefore, governmental organizations have witnessed a sudden upsurge in the use of management information systems and wide transformation in the sector of management information systems has been witnessed in recent times. The drastic changes in the environment of business development are attributed to the accuracy, safety of information, and cutting-edge technological parameters(Sultan, 2010). As a result, innovation in information technology has led to widespread adoption of cutting edge technologies of cloud computing for business management (Kanaan, Abumatar and Hussein, 2019). Businesses benefit greatly from the use of cloud-based technology owing to its sustained (Armbrust *et al.*, 2010). Use of cloud-based computing has been adapted into mainstream information systems. Technologies of operating systems, solutions for technological platforms, software applications, etc. are being used increasingly in businesses. Market dynamics of cloud computing have transformed in recent times depending on various models of value additions in cloud computing (Hoefer & Karagiannis, 2010). Cloud computing emerges from the perspectives of information technology. The purpose of cloud computing varies such as technology as well as business. Resources of information technology can be accessed from anywhere with ease, which provides an enhanced credibility to business management. In addition, users of IT procure a high functionality along with protecting the interest of the provider of cloud service. Therefore, to facilitate the orchestration of IT service provision through cloud-based platforms, it is essential to overcome several challenges. One primary challenge typically faced in cloud-based management information systems is load balancing (Navimipour and Soltani, 2016).Since it is crucial for optimal execution of allocated work, companies are increasingly adopting cloud based MIS into their business processes. Appropriate mechanisms need to be adapted for balancing of loads to avoid over or under loading events (Kanaan, Abumatar and Hussein, 2019).Several cloud technologies have emerged in recent times and are being used in the field of information technology and information systems(Mohamed, Al-Jaroodi and Eid, 2013). Solutions including peer-to-peer computing, expert cloud, social networks, are being used extensively in information systems (Kanaan, Abumatar and Hussein, 2019). Among these technology solutions, cloud computing has emerged as a prominent technology (Marston *et al.*, 2011). Cloud computing facilitates several on-demand advantages to users as it primarily includes a networking-based mode of operation. Hence, users are able to access and store large amounts of data, which is of specific advantage to companies with large volumes of process-related data .

Study problem, studies have not focused on examining the adoption's determinants of cloud-MIS users. **The research aimed** at "discovering the factors determinants the adoption of cloud-MIS in higher institutions in Iraq". “The status quo bias model was used in order to try to assess the perception of employees about the adoption's determinants . User resistance to the implementation of information systems has been a significant factor in the failure of new systems and thus needs to be understood and managed (Kim and Kankanhalli, 2009). the status quo bias theory seeks to explain people's

preference for maintaining their current status or situation (Samuelson and Zeckhauser, 1988).

Importance of study, this study examines the determinants of adoption cloud based management information in educational institution in Iraq", "which is the right place" for cloud-MIS. "In addition, intense domestic and international investment and economic growth as well as outdated infrastructure have paved the way for a digital revolution. This technology can help the state to increase the efficiency of the educational institution. This study explores the determinants of Cloud- based management information system adoption by users perspective. The study was divided as follows". Neglected areas" a review of the literature and its discussions, and clarification of the study model and its hypotheses". Moreover, the third part discusses the research methodology", "the results of the study are clarified and discussed in the fourth section. In the end, it presented the conclusions reached by the study and its limitations, in addition to presenting the future directions".

2-Review of literature

2-1- Management information system

Management information system (MIS) is defined as a set of procedures that enable collection, storage and processing of data to produce and communicate relevant information to all levels of management to provide support in performing various management related activities (Kanaan, Abumatar and Hussein, 2019,3). Management information systems (MIS) consist of three individual components that define its purpose. "Management" involves planning, implementation, monitoring and control of an entity or an organization, Information pertains to raw pieces of data that are used in a study. System involves the transforming block which converts raw data into decisive information or vice versa. Hence MIS can be defined as a process of planning, monitoring, and implementing a series of protocols to convert raw data in to structured information and vice versa. MIS involves the use of necessary protocols to general necessary and possibly intelligent business solutions that can be used by an entity for growth on profit (Singh, 2017) .

2-2-Cloud Computing

Cloud computing is not only a theoretical technology anymore. It is currently being used by a lot of people without even knowing that they do. Think of social media; Facebook being one of the largest and most widely used social media platform, also uses cloud computing (Pandey 2009). Cloud computing has been given numerous definitions since its advent. Basically, definitions started with the notion of an application service provision (ASP) that is an IT sourcing model for renting business applications over the Internet . This definition became wider as Internet-based IT service offerings comprised storage, hosting infrastructure, and network; thus, it is given the name net sourcing, to fit the variety of IT service offerings . HP defines cloud computing as "Everything as a Service" , while Microsoft perceives the value of cloud computing as "Cloud + Client," emphasizing the importance of the end user (Navimipour and Soltani, 2016) . T-Systems define cloud computing as "the renting of infrastructure and software, as well as bandwidths, under defined service conditions. These components should be able to be adjusted daily to the needs of the customer and offered with the utmost availability and security. Included in cloud computing are end-2-end service level agreements (SLAs) and use-dependent service invoices" (El-Gazzar, 2014,4).The cloud based applications include web hosting, social networking, large data storage, content delivery and real time data processing. They vary in

configuration, data management requirements and policies. Hence the cloud service provider faces a number of challenges. Leading players in the ICT industry along with a host of OEM companies consider cloud computing as a financial and business proposition which is not only technically feasible but will also play a important role in computer enabled business models in the near future (Ahmed and Abdullah, 2011).

2-3-Cloud based management information system

Management information systems through cloud-based platforms have emerged as a popular tool of data management among organizations (Repschlaeger *et al.*, 2012) . Due to an extended degree of efficiency provided by the cloud platform, the usage of cloud-based systems in management information systems has increased voluminously (Khalid *et al.*, 2018). Cloud-based computing systems render efficiency as well as facilitate the inclusion of various datasets that have compromised accessibility within normal systems (Bhardwaj, Jain and Jain, 2010) and it provide sustained orientation to service provision and management. Evaluation of cloud computing within information systems demonstrates higher efficiency and value addition. (Ercan, 2010)It has a potential ability to flexible access to data networks as cloud-based MIS systems are adept in handling the complex data-sets that are frequently used in company processes (Navimipour and Soltani, 2016). The main reasons for adoption of MIS based on cloud computing formulation include an overall reduction in costs to the company, increased efficiency of data management, regulation of data flow, and accuracy of handling of data. Organizational data management is complex on levels of workload balancing, and storage; therefore, discrepancies in both of these functional operations can result in data loss. Cloud computing possesses technological semblances to Enterprise Resource Planning (ERP), email, software such as MS Office, etc. However, it utilizes a ubiquitous resource bank. These resources are based on a platform that allows for data sharing (Ercan, 2010). Therefore, organizations prefer cloud-based systems as they allow cloud data sharing to business partners and other stakeholders of the concerned data bank. Businesses are potentially benefited from ubiquitous data resource access and sharing as they are involved in coordination between various concerned parties (Algrari, 2017) .

2-4- Architecture of Cloud-based management information system

Cloud-MIS has three modules, namely (i) data source module, (ii) data warehouse module and (iii) analysis module (Kayal, 2014).

2-4-1 Data source

Data source can be of two types (1) internal data source and (2) external data source. All the data regarding day the day to day operations, various organizational specific , employee related data (such as attendance, performance etc.) can be treated as internal data and they are stored in the internal database. Various other data such as , climate related information which might have as impact on the implementing organization, various government policies etc. can be treated as outside data, and they are stored in the external database in data source component (Kayal, 2014) .

2-4-2 Data warehouse

This component is the basis of cloud-MIS. Design and architecture of data warehouse depends upon the requirement of the implementing organization . Data warehouse is subject-oriented, that is, the data from data sources needs to be organized and stored by topic, to achieve this, the dirty, incomplete data from various data sources as well as from

various databases needs to through the pretreatment process before entering the data warehouse, this pretreatment process is called Extract-Transform-Load (ETL) process (Vijayalakshmi and Minu, 2022) .

2-4-3 Data Analysis Module

Data Analysis module acts as the backbone of the proposed system. It provides the interface by which users can interact with the system. This component has three sub modules (i) data analysis module and (ii) interface module and (iii) maintenance module. Data analysis module is composed of data mining component, OLAP component and data reporting component. Interface module is consists of HR module, production module, finance module, operation module, sales module and reporting module. HR module provides all analytical tool and interface for HR related activities. Production module provides tools for evaluation of production related information and interface for same (Kayal, 2014).

Operation module provides the users the interface to analysis all day to day activities of the implementing organization. Reporting module helps us to analyze and generated report for any department and for any activities Maintenance module is responsible for all administrative jobs of the cloud-MIS. It provides administrator of the system the interface to maintain the data warehouses and data bases, add or remove any users and to define their roles. Users can also change any analysis procedure using this module(Fielding, 2000). Fig 1 show this component .

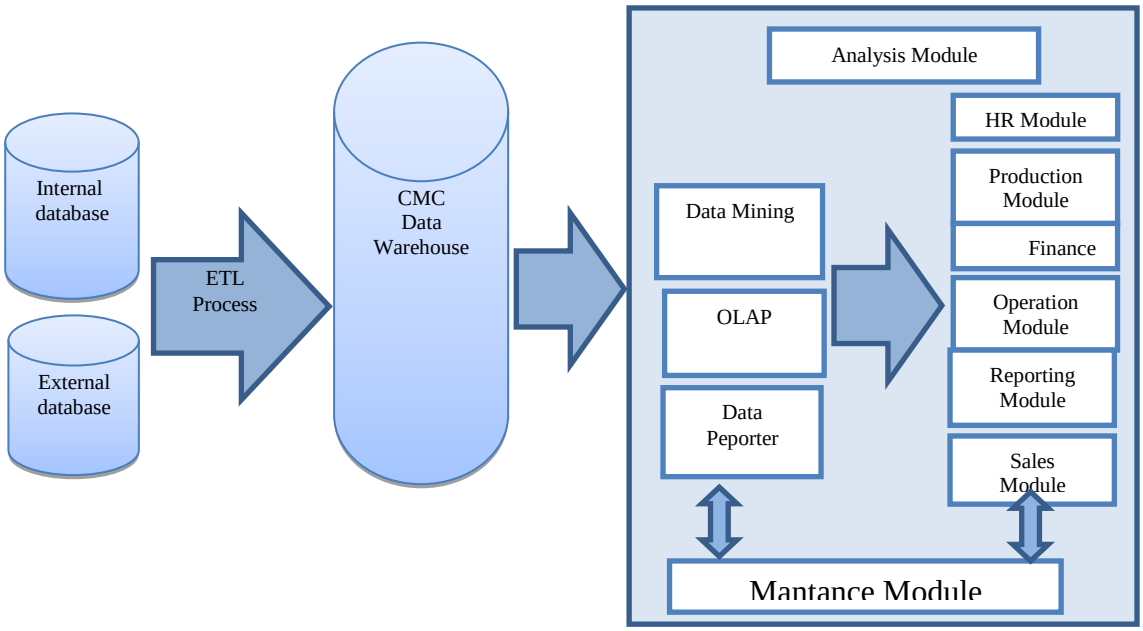

Figure1. Architecture cloud management information system

2-5- Status Quo Bias Theory (SQB)

User resistance to the implementation of information systems has been a significant factor in the failure of new systems and thus needs to be understood and managed (Kim and Kankanhalli, 2009). The status quo bias theory was developed by Samuelson and Zeckhauster (1988) to explain resistance to or rejection of technology use, they hypothesized that the more options in a choice set, the stronger the relative bias toward the

status quo, according to the status quo bias perspective, maintaining the status quo is a decision-bias; maker's the tendency is to remain idle or to retain one's current or previous decisions, which explains why people make decisions in disproportionate numbers to resume previous actions rather than pursue new ones (Samuelson and Zeckhauser, 1988).. By combining the literature on technology acceptance and resistance with the status quo bias perspective, it is possible to explain user resistance prior to implementing a new information system, the status quo bias theory seeks to explain people's preference for maintaining their current status or situation (Kim and Kankanhalli, 2009). According to (Hirschheim and Newman, 1988) user resistance to a system manifests itself in three distinct attitudes: aggression (in the form of system attack or destruction), projection (in the form of user attitudes that constantly blame the system for the difficulties they encounter while using the system), and avoidance (in the form of an attitude the user always avoids interacting or using the system). According to (Samuelson and Zeckhauser, 1988) described the SQB explanations in terms of three main categories:

a. psychological commitment stemming from misperceived value costs and regret avoidance.

b. cognitive misperceptions in the presence of inertia and perceived value.

c. rational decision-making in the presence of switching costs and perceived threat

2-6- Previous studies

The study and examination of cloud management information system adoption and the services provided through it has been the focus of attention of scientists and practitioners around the world, and this field has witnessed a growth in the literature related cloud management information system , Table 1 shows a number of studies that dealt with this topic.

Table 1. Previous studies

Ref	Title	Aim
(Bento and Bento, 2011)	Cloud Computing: A New Phase Information Technology Management	examines cloud computing in the context of other major changes in Information Technology .
(Kayal, 2014)	CMiS: A Cloud Computing Based Management Information System	a cloud computing based management information system called CMiS is proposed .
(Pinheiro, Aparicio and Costa, 2014)	Adoption of cloud computing systems	theoretical factors, which influence the acceptance of new information systems.
(Algrari, 2017)	The Impact of Cloud Based Information Systems on Organization's Performance	the cloud based information systems and discus the impact of these information systems on organization's performance.
(Singh, 2017)	Management Information Systems (MIS) in Cloud Computing: A Review	reviews the role of MIS in cloud computing and the impact it has globally.
(Khalid *et al.*, 2018)	Development of public sector information	find out the challenges that project managers have to face during the

	management systems: challenges and promising practices	development of public sector information management systems .
(Helmi, Farhan and Nasr, 2018)	A framework for integrating geospatial information systems and hybrid cloud computing	framework that integrates the Geospatial Information Systems with the Hybrid Cloud Computing .
(Kanaan, Abumatar and Hussein, 2019)	Cloud-Based Management Information System: A Systematic Review and Future Research Scope	evaluated management information system through cloud computing technology .

Based on the table above explain (Bento and Bento, 2011) this study dealt with the examines cloud computing in the context of other major changes in Information Technology (IT) and explores the revolutionary transformations and challenges it brings to IT management. The paper analyzes the IT pendulum of centralization and decentralization and discusses the managerial implications of the major components of cloud computing. Study (Kayal, 2014) a cloud computing based management information system called CMiS is proposed. A cloud computing based management information system reduces overhead of the implementing organization. Study (Pinheiro, Aparicio and Costa, 2014) presents the theoretical factors, which influence the acceptance of new information systems. The paper presents an empirical study conducted in a user dimension. this study concluded that perceived usefulness has a positive impact in the intention of using cloud computer systems. Study (Algrari, 2017) focuses the cloud based information systems and discus the impact of these information systems on organization's performance. Organizational productivity is one of the most widely used accounting performance indicator of evaluation of the information systems value, Among the financial market based measures, adopters of the performance-based approach towards determining IS value often utilize return on assets, performance measures have proven to be useful in identification of the business value of the information technology and information systems used in the organizations as they provide simple quantifiable indicators. (Singh, 2017) provided reviews the role of MIS in cloud computing and the impact it has globally. Study (Helmi, Farhan and Nasr, 2018) raises a framework that integrates the Geospatial Information Systems with the Hybrid Cloud Computing to let them work together and get greater powerful benefits via applying the concept of cloud computing to overcome the flaws related to the desktop GIS including the huge startup cost and the storage capacity and to provide the feature of location independence accessibility where the GIS can be accessed from anywhere and anytime. The hybrid cloud computing was picked to be integrated with the GIS to gain the elasticity and security of dealing with different types of data; private and public data.(Khalid *et al.*, 2018) study More and more governmental organizations are switching to information systems to enhance their operations and reduce cost but the development of these systems involves a lot of challenges. This paper aims to find out the challenges that project managers have to face during the development of such systems and the practices they can adopt to address these challenges . (Kanaan, Abumatar and Hussein, 2019) This study primarily focuses on the systematic review of several studies in the literature that have evaluated management information system through cloud computing technology. Therefore, through this research study, the applicability of cloud based MIS into the management processes is explored and highlighted . Based on the foregoing, we note that the studies focused on the

review of cloud-based management information systems, and also focused on the factors that have an impact on the adoption of cloud-based information systems, so the current study came to fill this gap by studying the factors discouraging the adoption of management information systems based on to the cloud.

3- Conceptual model And research hypotheses

This section explains the conceptual model of the study as well as reviewing the study hypotheses, as shown by the following divisions:"

3-1- Conceptual model

The design of the conceptual model of the study based on the SQB Theory because of its great potential to explore the factors that affect the determinants adoption of technology by the use . Figure 2 show the conceptual model.

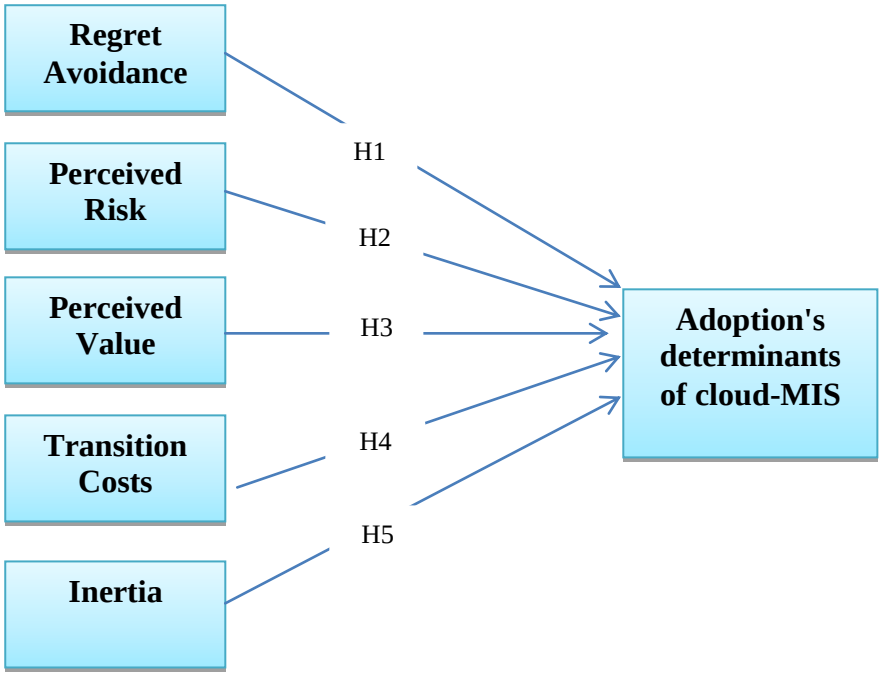

Figure. 2 Conceptual model for adoption's determinants of cloud-based management information system

3-2- Research hypotheses

3-2-1-Regret avoidance

Regret avoidance education, such as experience teachings, trains individuals to avoid painful events whenever possible (Samuelson and Zeckhauser, 1988), (Lee and Joshi, 2017). As Kahneman and Tversky (Hsieh and Lin, 2018) noted, people express greater remorse for negative outcomes caused by newly adopted technology than they do for equivalent outcomes caused by the status quo. Additionally, regret avoidance may increase the user's reluctance to adopt the new technology (Liao *et al.*, 2011). Hence, we propose the following hypothesis:

H1: Regret avoidance has a negative influence adoption's determinants of cloud-based management Information systems.

3-2-2-Perceived risk

The potential negative consequences of purchasing a new product or service have resulted in a well-established and critical concept in consumer behavior: perceived risk (Bauer, 1960). Risk perception is made up of two critical components: uncertainty (the possibility of adverse consequences) and losses (the seriousness of consequences)(Cox and Rich, 1964).In consumer behavior research, risk perception is a significant impediment to consumer decision-making (Chang and Tseng, 2013). While the acquisition, transmission, and storage of sensitive information required for consumer acceptance may expose consumers to security vulnerabilities and potential privacy violations, the absence of face-to-face interaction creates significant information asymmetry and uncertainty for consumers (Belanche, Casaló and Guinalíu, 2012). These factors contribute to the perception of internet-based services (for example) as riskier than traditional offline purchase behaviors, causing consumers to be more hesitant about the use and acceptance of internet-based services (Thakur and Srivastava, 2014). Hence, we propose the following hypothesis :

H2: Perceived risk has a negative influence adoption's determinants of cloud- based management Information systems.

3-2-3-Perceived value

Consumer behavior research has confirmed that consumers' perceptions of the value of a product (or service) are a significant predictor of consumer decision-making behavior (Jin, Lee and Lee, 2015). Given its significance, scholars have proposed numerous interpretations and definitions of the concept of perceived value from a variety of perspectives. According to (Wang *et al.*, 2019) defined perceived value from the monetary perspective as the difference between the highest price that a consumer is willing to pay for a product (or service) and the amount actually paid, he also described perceived value in terms of quality as the difference between the amount paid by a consumer for a product (or service) and its actual quality. According to social psychology, perceived value can be defined as the increased utility of one's social self-concept brought about by the purchase of a product (or service) of special significance(Sheth, Newman and Gross, 1991)(Sweeney and Soutar, 2001). Furthermore, from a benefits standpoint, the (Zeithaml, 1988,5) defined perceived value as the consumer's overall assessment of what is received (perceived benefits or gains) and what is given (perceived sacrifices or costs). Prior research has generally accepted Zeithaml's definition because it lays the groundwork for conceptualizing perceived value (Wong, 2014). Hence, we propose the following hypothesis :

H3: Perceived value has a negative influence adoption's determinants of cloud- based management Information systems.

3-2-4-Transition costs

Transition Costs are the expenses incurred during the process of acclimating to a new situation (Kim and Kankanhalli, 2009) (Inder and O'Brien, 2003). Previous research indicates some negative transitions, such as a loss of power or an increase in an effort (Joshi, 1991) (Lapointe and Rivard, 2005). Occasionally, as a result of a deficient system (Martinko, Zmud and Henry, 1996). Alternatively, user resistance can be attributed to changes in job nature/security necessitating the acquisition of new skills (Jiang, Muhanna and Klein, 2000). Hence, we propose the following hypothesis:

H4: Transition costs has a negative influence adoption's determinants of cloud-based management Information systems.

3-2-5-Inertia

refers to the proclivity of beliefs or sets of beliefs to persist after formation (Li, Liu and Liu, 2016). Inertia is also used in managerial and organizational sciences to refer to the frequently observed phenomenon in which managers fail to update and revise their understanding of a situation as it changes, a phenomenon that acts as a psychological impediment to organizational success (Tripsas and Gavetti, 2000). Inertia is defined in the context of information systems as user attachment to and persistence in using an incumbent system, despite the presence of superior alternatives or incentives to change (Polites and Karahanna, 2012). Hence, we propose the following hypothesis:

H5: Inertia has a negative influence adoption's determinants of cloud- based management Information systems.

4- Research methodology

In this study, population refers to employees in the Engineering Technical College mousl, which is composed of 147 employees according to the university website. A sample refers to a group that is selected from the population for representation .The sample for this study was picked randomly, as all respondents have an equal chance of being chosen due to the respondents' homogeneity (Maddox *et al.*, 2019). As a sample, the employees was picked (Cervantes- Reyes *et al.*, 2021). SEM analysis was performed to select a community sample consisting of (100) samples statistically, however, Through our analysis of past research on my issue, we discovered researchers that employed a community sample of (70-100) individuals (Efiloğlu Kurt, 2019). As a result, (100) samples were chosen for our investigation .

4-1-Research instrument

The data were collected by questionnaire survey. The questionnaire consists of two parts. Part A consists of demographics, such as age, gender, qualification and academic achievement . Meanwhile, part B consists of questions regarding the proposed factors of this study. The scale of five point likert was used with the range (1 for strongly disagree ,2 for disagree, 3 for neutral, 4 for agree , and 5 for strongly agree) , appendix 1 shows the sources that were used to prepare the questionnaire.

4-2- Data collection

The questionnaire was distributed in paper form to employees in. Further, the respondents were given approximately four weeks to fill in the questionnaires. Finally, questionnaire data were collected, used Structural Equation Modelling (SEM) to examine the relationships in the SQB model and to test hypotheses about the links between the model's variables. (SEM) is a statistical technique that employs a confirmatory (hypothesis testing) approach when analyzing the structure of data reflecting certain occurrences (Sharma, Shamkuwar and Singh, 2019). The majority of researchers employ (SEM) as a statistical tool for analyzing data (Tsourela and Nerantzaki, 2020),(AZEEZ and LAKULU, 2018). Additionally, the data were examined using the software Smart PLS .

5- Results

5-1- Demographics of respondents

Demographic data was obtained from employees at Technical Engineering College Mosul. In total, 100 respondents were engaged to answer the questionnaire items. Most of the respondents were between the ages of 30 and 40 (47% , 20%), in addition to the fact that the respondents consisted of 100 employees (85), of whom had a bachelor's degree (85%) .

5-2- Structural equation modelling analysis

Structural equation modeling was used to analyze the collected data. A two-step SEM analysis used, the first step is to evaluate the measurement model and the second step is to estimate the structural model. All combinations of the model factor were subjected to the measurement model analyzes and then the structural model analyzes were carried out .

5-3- Measurement model

To analyze the formative proposed research model, smart-PLS is used to measure latent variables with structural equation modeling (SEM) technique, and version 3.0 was used for testing hypotheses (Hair *et al.*, 2012). Table 2 shows the validity and reliability of the proposed research model with examine values of factor loading (CFA), the Cronbach alpha, average variance, and composite reliability of all latent variables. The construct has convergent validity if the value of an item is less than equal to 0.50 in factor loading (Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014), the values shown in Table 1 all are more than the standard value. The item values less than 0.50 were eliminated, one from absorptive capacity and one from dynamic capabilities. As per the "Rule of Thumb," 20% of the total number of items can be deleted for the appropriate the result (Hair, 2009). Figure II. As per established criteria for constructs values, AV >= 0.50 and CR >= 0.80, all below table values are in range and acceptable. Hair mentioned that if the indicator appears to be between forty and seventy, the indicator can not be deleted and it can be kept, if deleting it does not lead to an increase in a value AV from the value specified for it (Hair Jr *et al.*, 2014), (Hair Jr *et al.*, 2021) , figure 3:shows the Confirmatory factor Analysis .

Table 2. Confirmatory Factor Analysis

Constructs	Items	Loading	AVE	CR
Adoption determinants cloud-MIS	AD1	0.865	0.668	0.887
	AD2	0.887		
	AD3	0.911		
	AD4	0.543		
Inertia	IN1	0.739	0.760	0.896
	IN2	0837		
	IN3	0940		
	IN4	0.943		
Perceived Value	PEV1	0.533	0.59.6	0.850
	PEV2	0.924		
	PEV3	0.829		
	PEV4	0.824		
Perceived risk	PT1	0.784	0.519	0.563
	PT2	0.611		
	PT3	0.945		
	PT4	0.284		
	RA1	0.555	0.555	0.863

Regret Avoidance	RA2	0.895		
	RA3	0.878		
	RA4	0.684		
	RA5	0.761		
Transition Costs	TC1	0.660	0.648	0.880
	TC2	0.857		
	TC3	0.862		
	TC4	0.808		

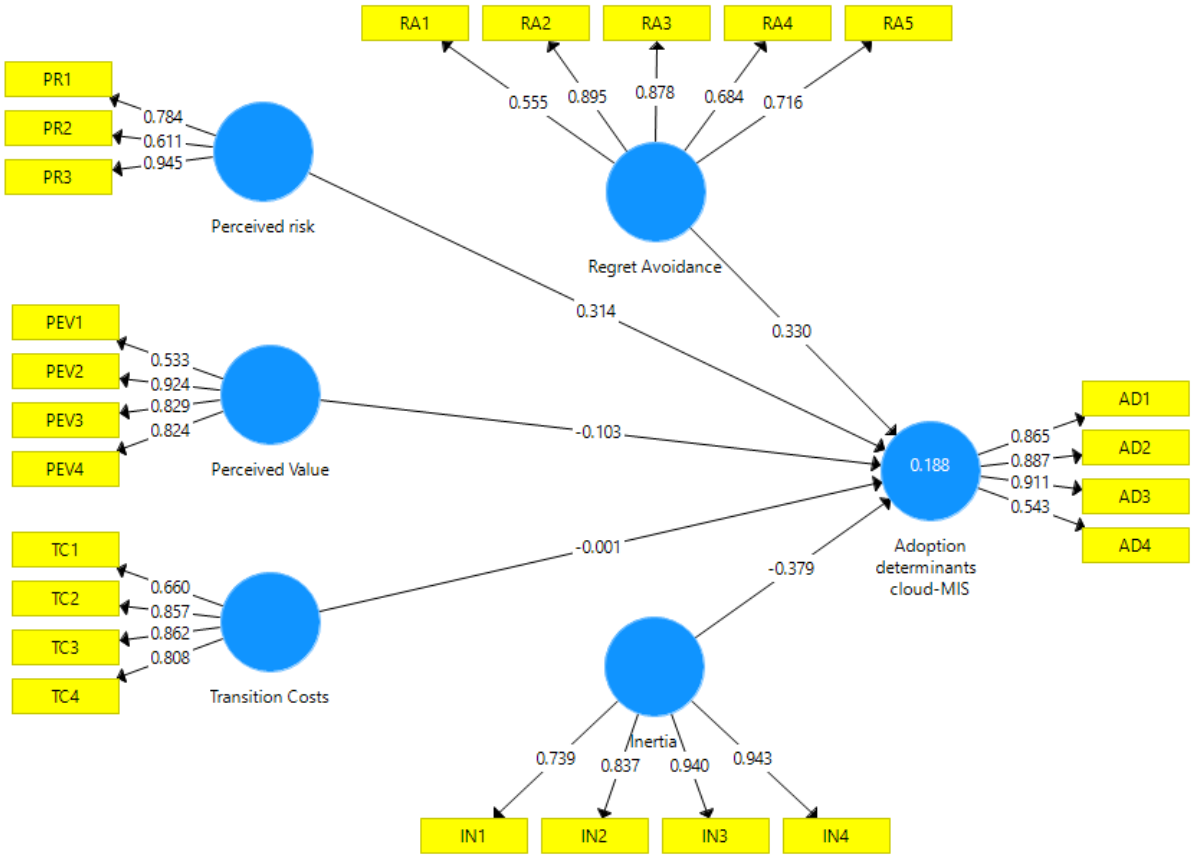

Figure 3. Confirmatory factor Analysis

To examine cross loading and measure discriminant validity the Fornell–Larcker criterion method is used Table 2 shows the Fornell–Larcker criterion approach is fit for current research model, according to the researchers "The AVE of each construct should higher than the construct's highest squared correlation with any other latent construct" (Henseler & Fassott, 2010) (p.145) . Thus, discriminant validity has no issue. Table 3 shoes discriminant validity.

Table 3. Discriminant Validity

	Adoption determinants cloud-MIs	Inertia	Perceived Value	Perceived risk	Regret Avoidance	Transition Costs
Adoption determinants cloud-MIs	0.817					
Inertia	-0.145	0.872				
Perceived Value	-0.142	0.155	0.772			
Perceived risk	0.509	-0.137	-0.143	0.600		
Regret Avoidance	0.100	0.632	0.031	0.083	0.752	
Transition Costs	-0.095	0.753	0.272	-0.094	0.576	0.805

5-4- Hypothesis testing

Structural Model

Table 4, supported hypothesis1 ($\beta = 0.149$; $t = 1.438$; $p < 0.04$), indicated positive and significant results of RA on AD cloud based management information system. Here, hypothesis 2 ($\beta = 0.054$; $t = 2.389$; $p < 0.017$), shows effect impact of PR on AD cloud based management information system. The hypothesis 5 ($\beta = 0.120$; $t = 1.920$ $p < 0.044$) shows negative for IN on AD cloud based management information system. While two hypotheses: H3 and H7 were rejected, the hypothesis 3 ($\beta = 0.043$; $t = 0.560$; $p < 0.575$) indicated positive of PV on AD cloud based management information system. Hypothesis 4 ($\beta = 0.407$; $t = 0.007$; $p < 0.995$) indicated positive of TC on AD cloud based management information system.. In Smart PLS, the relationships between constructs can be determined by examining their path coefficients and related t statistics via the bootstrapping procedure 28. From Table 6, it can be seen that(H1,H2,H5) of the structural model relationships are significant 29, confirming our various hypotheses about the construct relationships , figure 4: shows the Structural Modeling Path Modeling.

Table 4. Direct Effects

Hyp	Relation ship	(STDEV)	t-values	P Values	Decision
H1	RA → AD Cloud-MIS	0.229	1.438	0.04	Accepted
H2	PR→ AD Cloud-MIS	0.132	2.389	0.017	Accepted
H3	PV→ AD Cloud-MIS	0.183	0.560	0.575	Rejected
H4	TC→ AD Cloud-MIS	0.168	0.007	0.995	Rejected
H5	IN→ AD Cloud-MIS	0.197	1.920	0.044	Accepted

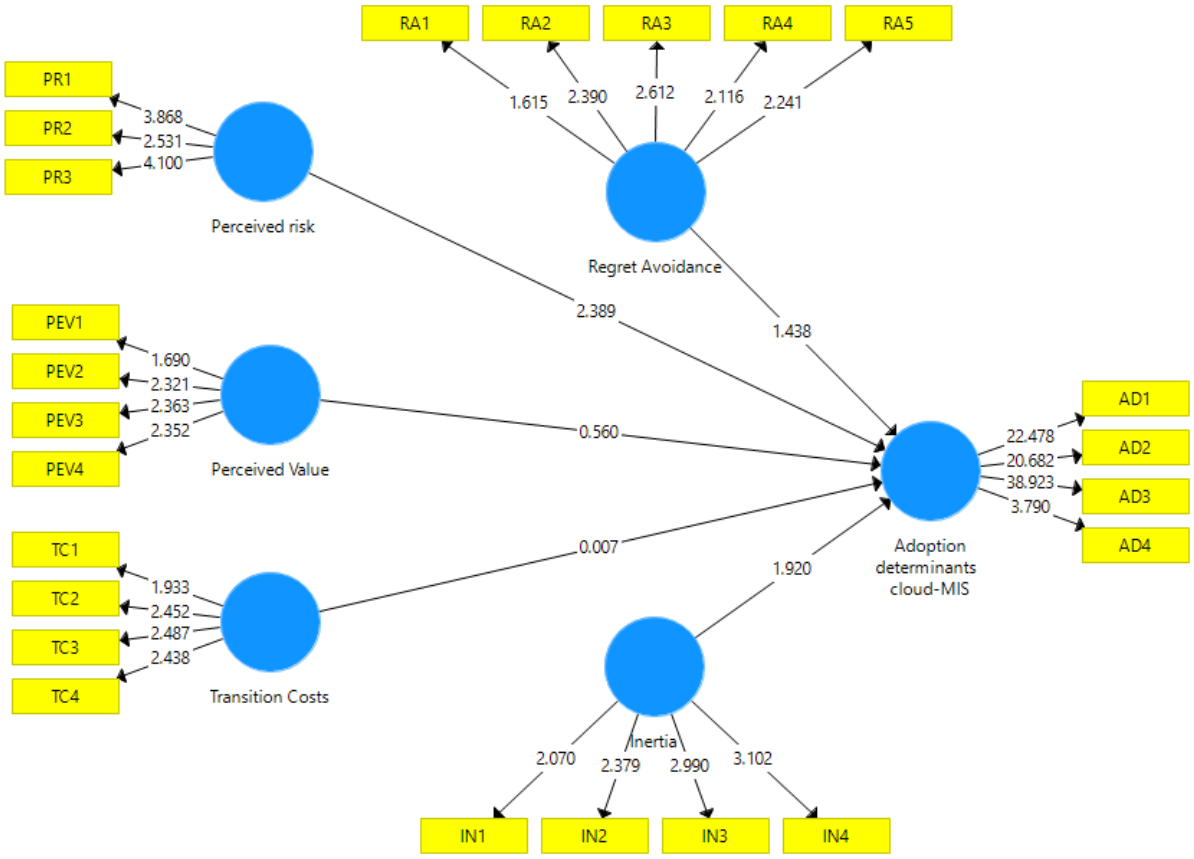

Figure 4: Structural Modeling Path Modeling

6- Discussion

"The statistical results proved that the proposed model of the study was able to reach an acceptable level of predictive power for all internal structures. In addition, the criteria related to the measurement model all achieved success in the validity and suitability of the model and the reliability of the construction. In the path analysis, it was found that the regret avoidance factor coefficient value of RA ($\beta = 0.149$; $t = 1.438$; $p < 0.04$) proved to be an important factor for user perspective of academic staff when adopting cloud based management information system. This result is in agreement with the study (Hsieh and Lin, 2018).The results confirmed the role of perceived risk in adoption's determinants , These results are in agreement with what has been validated by IS field studies associated with the role of perceived risk (Belanche, Casaló and Guinalíu, 2012). The results confirmed the role of Inertia in adoption's determinants of cloud- based management Information systems. These results are in agreement with what has been validated by IS field studies and cloud information system studies associated with the role of Inertia (Li, Liu and Liu, 2016). Results showed that the relationship is not significant between Perceived value on adoption's determinants the of cloud- based management Information systems. This result is in agreement with the study (Wong, 2014) . Results showed that the relationship is not significant between transition costs when adoption's determinants the of cloud- based management Information systems. This result clearly shows that academic staff are

concerned not about cost of cloud basd management information system. This result is in agreement with the study (Lapointe and Rivard, 2005)".

7- Contribution

"This study provided conceptual and realistic contributions. From a conceptual perspective, the model is developed and tested for cloud based management information system services. In addition, studies in the cloud based management information system are still in their early stages, and most of the previous studies have focused on technical aspects. However, this study examined the adoption's determinants of the cloud based management information system from a behavioral perspective. Moreover, In practice, the results of this study can be used by stakeholders or senior management in institutions to improve the use and acceptance of the cloud based management information system. Perceived risk, inertia and Regret Avoidance are the strongest and most important factors that have a direct impact on Adoption's determinants of cloud-MIS. Therefore, decision makers in educational institutions in Iraq must create the appropriate environment to help develop the cloud based management information system services. In addition, work to raise awareness about for cloud based management information system services, especially for employees. Finally, educational institutions should facilitate access to and support cloud based management information system service".

8- Recommendation

For future directions, previous studies related to cloud based management information system showed the use of the UTAUT model only. Hence, more academic studies are needed. After reviewing the literature, it was found that most studies used the TAM model of adoption, while the SQB model is still little used in studies. Therefore, the study recommends that SQB be published because it has more exploratory power compared to other models. Researchers can combine models used to measure adoption's determinants to explore more factors that have an impact on cloud based management information system. The participants in the current study were employees. Therefore, future studies should focus on non-academic personnel. In addition, this study was conducted for institutions of higher education. Therefore, the proposed model for business organizations can be tested in future studies .

8- Conclusion

"This study was completed at the Technical Engineering College Mosul. The aim was to discover the adoption's determinants of cloud- based management Information systems from users perspective . Moreover, the SQB model was used as a theoretical basis for measuring adoption's determinants. With the SEC as an independent factor, SQB factors, such as RA, PR, PV, TC, and IN, were considered to the adoption's determinants of cloud-based management Information systems. The respondents consist of professors. Data analysis using smart PLS. The results confirmed that PR has the highest level of impact on cloud based management information system for the adoption's determinants of cloud-based management Information systems. This factor was followed by RA and IN . This result was mainly due to the technological infrastructure, which was more important than the intent. Prerequisites for using cloud- based management Information systems services are Internet connectivity, networks and electricity supply. Although these prerequisites are available in Iraq, they require further improvements. Authorities and decision makers in

higher education institutions is to raise awareness about the benefits and ease of use cloud-based management Information systems".

References

[1] J. Gómez, J. F. Huete, O. Hoyos, L. Perez, and D. Grigori, "Interaction system based on internet of things as support for education," Procedia Comput. Sci., vol. 21, pp. 132–139, 2013.

[2] L. Gao and X. Bai, "A unified perspective on the factors influencing consumer acceptance of internet of things technology," Asia Pacific J. Mark. Logist., 2014.

[3] H. Bauer, M. Patel, and J. Veira, "The Internet of Things: Sizing up the opportunity," Retrieved from McKinsey http//www. mckinsey. com/insights/high_tech_telecoms_internet/the_internet_of_t hings_sizing_up_the_opportunity, 2014.

[4] S. Gul et al., "A survey on role of internet of things in education," Int. J. Comput. Sci. Netw. Secur., vol. 17, no. 5, pp. 159–165, 2017.

[5] H. S. Hashim and Z. A. Al-Sulami, "A model of factors influencing users' adoption of internet of things services: A Case Study of Iraqi Educational Institutions," in IOP Conference Series: Materials Science and Engineering, 2020, vol. 769, no. 1, p. 12006.

[6] C.-L. Hsu and J. C.-C. Lin, "An empirical examination of consumer adoption of Internet of Things services: Network externalities and concern for information privacy perspectives," Comput. Human Behav., vol. 62, pp. 516–527, 2016.

[7] J. Greenough, "The 'Internet of Things' will be the world's most massive device market and save companies billions of dollars," Bus. Insid., vol. 28, 2014.

[8] V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, "User acceptance of information technology: Toward a unified view," MIS Q., pp. 425–478, 2003.

[9] P. Jayashankar, S. Nilakanta, W. J. Johnston, P. Gill, and R. Burres, "IoT adoption in agriculture: the role of trust, perceived value and risk," J. Bus. Ind. Mark., 2018.

[10] W. Ben Arfi, I. Ben Nasr, T. Khvatova, and Y. Ben Zaied, "Understanding acceptance of eHealthcare by IoT natives and IoT immigrants: An integrated model of UTAUT, perceived risk, and financial cost," Technol. Forecast. Soc. Change, vol. 163, p. 120437, 2021.

[11] H. Aldowah, S. U. Rehman, S. Ghazal, and I. N. Umar, "Internet of Things in higher education: a study on future learning," in Journal of Physics: Conference Series, 2017, vol. 892, no. 1, p. 12017.

[12] A. M. Alalade, J. O. Ejemeyovwi, E. E. Ekong, and D. Adeyemo, "Internet of things as a tool for enhancement of education administration and delivery," International Journal of Mechanical Engineering and Technology, vol. 10, no. 5. pp. 48–62, 2019.

[13] D. D. Ramlowat and B. K. Pattanayak, Exploring the internet of things (IoT) in education: A review, vol. 863. Springer Singapore, 2019. doi: 10.1007/978-981-13-3338-5_23.

[14] A. M. Njeru, M. S. Omar, S. Yi, S. Paracha, and M. Wannous, "Using IoT technology to improve online education through data mining," in 2017 International Conference on Applied System Innovation (ICASI), 2017, pp. 515–518.

[15] N. Sharma, M. Shamkuwar, and I. Singh, "The history, present and future with IoT," in Internet of Things and Big Data Analytics for Smart Generation, Springer, 2019, pp. 27–51.
[16] H. Algozani and A. Aleryani, "The Impact of IoT on the Higher Education (Review Study)," Saba J. Inf. Technol. Netw. (SJITN)-ISSN 2312-4989, vol. 6, no. 2, 2018.
[17] S. S. Pai, "IOT Application in Education," Int. J. Adv. Res. Dev., vol. 2, no. 6, pp. 20–24, 2017.
[18] A. Majeed and M. Ali, "How Internet-of-Things (IoT) making the university campuses smart? QA higher education (QAHE) perspective," in 2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC), 2018, pp. 646–648.
[19] M. Bagheri and S. H. Movahed, "The effect of the Internet of Things (IoT) on education business model," in 2016 12th International Conference on Signal-Image Technology & Internet-Based Systems (SITIS), 2016, pp. 435–441.
[20] D. Rico-Bautista, Y. Medina-Cárdenas, and C. D. Guerrero, "Smart University: a Review from the educational and technological view of internet of things," in International Conference on Information Technology & Systems, 2019, pp. 427–440.
[21] N. Yahaya, N. H. Zakaria, and H. Mohamad Tahir, "An Investigation on the Factors that Influence Readiness of Internet of Things Adoption in Education Sector," 2018.
[22] M. Thibaud, H. Chi, W. Zhou, and S. Piramuthu, "Internet of Things (IoT) in high-risk Environment, Health and Safety (EHS) industries: A comprehensive review," Decis. Support Syst., vol. 108, pp. 79–95, 2018.
[23] G. Singh, L. Gaur, and R. Ramakrishnan, "Internet of Things—Technology adoption model in India," Pertanika J. Sci. Technol, vol. 25, no. 3, pp. 835–846, 2017.
[24] K. Patil, "Retail adoption of Internet of Things: Applying TAM model," in 2016 International conference on computing, analytics and security trends (CAST), 2016, pp. 404–409.
[25] J. SUNG and J. JO, "The influence of perceived risk and consumer innovativeness on intention to use of internet of things service.," J. Theor. Appl. Inf. Technol., vol. 96, no. 4, 2018.
[26] Y. S. Yuan and T. C. Cheah, "A study of internet of things enabled healthcare acceptance in Malaysia," J. Crit. Rev, vol. 7, pp. 25–32, 2020.
[27] A. B. Jaafreh, "The effect factors in the adoption of Internet of Things (IoT) technology in the SME in KSA: An empirical study," Int. Rev. Manag. Bus. Res., vol. 7, no. 1, pp. 135–148, 2018.
[28] A. Abushakra and D. Nikbin, "Extending the UTAUT2 model to understand the entrepreneur acceptance and adopting internet of things (IoT)," in International Conference on Knowledge Management in Organizations, 2019, pp. 339–347.
[29] H. S. Hashim and Z. Bin Hassan, "Factors that influence the users' adoption of cloud computing services at Iraqi Universities: an empirical study," Aust. J. Basic Appl. Sci., vol. 9, no. 27, pp. 379–390, 2015.

[30] J. Khalilzadeh, A. B. Ozturk, and A. Bilgihan, "Security-related factors in extended UTAUT model for NFC based mobile payment in the restaurant industry," Comput. Human Behav., vol. 70, pp. 460–474, 2017.
[31] M. Tsourela and D.-M. Nerantzaki, "An Internet of Things (IoT) Acceptance Model. Assessing Consumer's Behavior toward IoT Products and Applications," Futur. Internet, vol. 12, no. 11, p. 191, 2020.
[32] J. Kim and K. S.-S. Lee, "Conceptual model to predict Filipino teachers' adoption of ICT-based instruction in class: using the UTAUT model," Asia Pacific J. Educ., pp. 1–15, 2020.
[33] H. Shaikh, M. S. Khan, Z. A. Mahar, M. Anwar, A. Raza, and A. Shah, "A Conceptual Framework for Determining Acceptance of Internet of Things (IoT) in Higher Education Institutions of Pakistan," in 2019 International Conference on Information Science and Communication Technology (ICISCT), 2019, pp. 1–5.
[34] J.-M. Romero-Rodríguez, S. Alonso-García, J.-A. Marín-Marín, and G. Gómez-García, "Considerations on the Implications of the Internet of Things in Spanish Universities: The Usefulness Perceived by Professors," Futur. Internet, vol. 12, no. 8, p. 123, 2020.
[35] M. Sinaga, "Adoption of IoT at home in Indonesia." University of Twente, 2019.
[36] N. D. Azeez and M. M. Lakulu, "Review the success of the mobile government from the government perspective," Int. J. Humanit. Manag. Soc. Sci., vol. 2, no. 2, pp. 103–109, 2019.
[37] H. Shaikh, M. S. Khan, Z. A. Mahar, M. Anwar, A. Raza, and A. Shah, "A conceptual framework for determining acceptance of internet of things (IoT) in higher education institutions of Pakistan," 2019 Int. Conf. Inf. Sci. Commun. Technol. ICISCT 2019, pp. 1–5, 2019, doi: 10.1109/CISCT.2019.8777431.
[38] M. Kassab, J. DeFranco, and P. Laplante, "A systematic literature review on Internet of things in education: Benefits and challenges," J. Comput. Assist. Learn., vol. 36, no. 2, pp. 115–127, 2020.
[39] J.-S. Chou and I. G. A. N. Yutami, "Smart meter adoption and deployment strategy for residential buildings in Indonesia," Appl. Energy, vol. 128, pp. 336–349, 2014.
[40] D. Belanche, L. V Casaló, and C. Flavián, "Integrating trust and personal values into the Technology Acceptance Model: The case of e-government services adoption," Cuad. Econ. y Dir. la Empres., vol. 15, no. 4, pp. 192–204, 2012.
[41] C. Ennew and H. Sekhon, "Measuring trust in financial services: The trust index," Consum. Policy Rev., vol. 17, no. 2, p. 62, 2007.
[42] R. Yadav, S. K. Sharma, and A. Tarhini, "A multi-analytical approach to understand and predict the mobile commerce adoption," J. Enterp. Inf. Manag., 2016.
[43] I. Ajzen, "The theory of planned behavior," Organ. Behav. Hum. Decis. Process., vol. 50, no. 2, pp. 179–211, 1991.

[44] G. Saxl, L. Görtschacher, T. Ussmueller, and J. Grosinger, "Software-Defined RFID Readers: Wireless Reader Testbeds Exploiting Software-Defined Radios for Enhancements in UHF RFID Systems," IEEE Microw. Mag., vol. 22, no. 3, pp. 46–56, 2021.
[45] T. Maddox, "How IoT will drive the fourth industrial revolution. The Rise of Industrial IoT," ZDNET, 2019.
[46] S. P. Mathews and R. R. Gondkar, "Solution Integration Approach using IoT in Education System," Int. J. Comput. Trends Technol., vol. 45, no. 1, pp. 45–49, 2017, doi: 10.14445/22312803/ijctt-v45p109.
[47] M. Tsourela and D. M. Nerantzaki, "An internet of things (Iot) acceptance model. assessing consumer's behavior toward iot products and applications," Futur. Internet, vol. 12, no. 11, pp. 1–23, 2020, doi: 10.3390/fi12110191.
[48] N. D. AZEEZ and M. M. LAKULU, "EVALUATION FRAMEWORK OF MGOVERNMENT SERVICES SUCCESS IN MALAYSIA," J. Theor. Appl. Inf. Technol., vol. 96, no. 24, pp. 8194–8226, 2018.
[49] M. A. Al Mamun and M. R. Yuce, "Sensors and systems for wearable environmental monitoring toward IoT-enabled applications: A review," IEEE Sens. J., vol. 19, no. 18, pp. 7771–7788, 2019.
[50] Efiloğlu Kurt, Ö. (2019) 'Examining an e-learning system through the lens of the information systems success model: Empirical evidence from Italy', Education and Information Technologies, 24(2), pp. 1173–1184.
[51] Hair, J.F. (2009) 'Multivariate data analysis'.
[52] Hair, J.F. et al. (2012) 'An assessment of the use of partial least squares structural equation modeling in marketing research', Journal of the academy of marketing science, 40(3), pp. 414–433.
[53] Hair Jr, J.F. et al. (2014) 'Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research', European business review [Preprint].
[54] Hair Jr, J.F. et al. (2021) 'Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook'. Springer Nature.
[55] Lee, K. and Joshi, K. (2017) 'Examining the use of status quo bias perspective in IS research: need for re- conceptualizing and incorporating biases', Information Systems Journal, 27(6), pp. 733–752.

Appendix 1
The reference of the questionnaire

Dimensions	item	Ref
Regret Avoidance	RA1	(Samuelson and Zeckhauser, 1988), (Hsieh and Lin, 2018), (Liao *et al.*, 2011).
	RA2	
	RA3	
	RA4	
	RA5	
Perceived risk	PT1	(Chang and Tseng, 2013), (Belanche, Casaló and Guinalíu, 2012), (Thakur and Srivastava, 2014).
	PT2	
	PT3	
	PT4	
Perceived Value	PEV1	(Sweeney and Soutar, 2001) ,(Jin, Lee and Lee, 2015), (Wang *et al.*, 2019).
	PEV2	
	PEV3	
	PEV4	
Inertia	IN1	(Tripsas and Gavetti, 2000), (Polites and Karahanna, 2012), (Li, Liu and Liu, 2016).
	IN2	
	IN3	
	IN4	
Transition Costs	TC1	(Jiang, Muhanna and Klein, 2000), (Lapointe and Rivard, 2005),
	TC2	
	TC3	
	TC4	
	AD2	
	AD3	
	AD4	