SINET: *Ethiop. J. Sci.*, 45(3):296-308, 2022 ISSN: 0379–2897 (PRINT)

eISSN: 2520–7997

Date: received: June 22, 2022; Date revised: October 24, 2022; Date accepted: October 27, 2022
DOI: https://dx.doi.org/10.4314/sinet.v45i3.5

Factors affecting cloud-based enterprise resource planning software adoption in Ethiopia

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ABSTRACT: Enterprise Resource Planning (ERP) are integrated software solutions that transform organizations' internal processes, provide collaboration with partners, external applications and information systems. Extant literature reveals that organizations are showing interest to transit from an on-premise ERP to the new cloud-based ERP solutions due to their extra benefits. There are few recent initiatives in Ethiopia to adopt cloud-based ERP but challenges faced in the course of the adoption are not explored. Using the technology-organization-environment, diffusion of innovation, and the model of innovation resistance frameworks as lenses, this research aims at identifying factors contributing to the adoption of cloud-based ERP in the Ethiopian context. A quantitative approach is adopted and survey was conducted using a self-administered online questionnaire using Google's online form to gather data from employees of Ethiopian Shipping and Logistics Services Enterprise. Out of 295 questionnaires distributed, 152 valid questionnaires were collected and considered for the data analysis. The proposed model was tested using a partial least square with the help of the Smart PLS software. The proposed model explained 58.5 % of the variance in cloud-based ERP adoption factors. The empirical analysis indicated that Relative advantage, Trust, IT Skill, and External pressure had a significant influence on the adoption of cloud-based ERP in Ethiopia whereas Organizational Culture, Observability, and Trialability had no significant impact on the adoption of cloud ERP service. The study provides a comprehensive understanding of the factors which affect the adoption of cloud-based ERP technology in Ethiopia.

Keywords/phrases: **Cloud-based ERP, Critical Success Factors, Enterprise Resource Planning, Technology Adoption**

INTRODUCTION

Information technologies and systems typically mature and undergo commoditization as new streams of technologies emerge. The concept of cloud computing is said to be relatively new and an emerging paradigm. Kim *et al.* (2009) argued that cloud computing is not an entirely new concept, noting that it is similar to the network computing and grid computing concepts of the 1990s. Following this, a number of researchers conjectured that the existence of cloud computing is due to the convergence of earlier technologies such as virtualization, cluster computing, grid computing, broadband marketing, and large-scale datacentres centralized at a low-cost location (Salleh *et al.*,2012; Maschal, 2017).

Cloud computing is an unconventional IT model to host and share both software and hardware assets over the Internet. It approves businesses to practice a group of IT resources and applications as services essentially through the web, without substantially holding these computing assets within themselves (Salum and Rozan, 2015; Priyadarshinee *et al.*, 2017). The Internet is a network of networks, which provides software/hardware infrastructure to establish and maintain connectivity of computers around the world, while Cloud Computing is a novel technology that delivers many types of resources over the Internet. Therefore, Cloud Computing could be identified as a technology that uses the Internet as the communication medium to deliver its services (Wang *et al.*, 2010; Priyadarshinee *et al.*, 2017).

Since the adoption of Cloud Services is still at a premature stage, it becomes increasingly important to understand the nature of each type of cloud computing service category i.e Software as a service (SaaS), Platform as a service (PaaS), and Infrastructure as a service (IaaS) in order for organizations to fully benefit from them (Salleh *et al.*, 2012; Berhe, 2018).

ERP systems are defined as complete and packaged software solutions that seek to integrate processes and functions into a holistic view of the business from a single IT and information architecture (Costa *et al.,* 2016; Klaus *et al*., 2000; Demeke, 2014). They are designed to provide, at least in theory, seamless integration of processes across functional areas with improved workflow, standardization of various

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business practices, and access to real-time up-to-date data (Lutovac and Manojlov, 2012; Rajnoha *et al.,* 2014). Traditional ERP systems host an organization's functional requirements and are required to access the organization's information and communication technology (ICT) infrastructure. These traditional systems, however, become rather inconvenient for acquiring information when accessed remotely; in this case, they show less reliability and flexibility because the information system is not in real-time (Tongsuksai *et al.,* 2019; Assefa, 2022). They have often been considered too clunky, expensive, and complex for most organizations, which require on-premise deployment implying that ERP resources (data, module applications, and database servers) are hosted internally and maintained by client organizations (Ahmed *et al*., 2020).

Cloud-ERP is emerging as a new trend in the ERP market as opposed to on-premise ERP systems; this is due to cloud- ERP having the advantages of economies of scale gained from shared resources (Gashaw, 2017; Haddaraa and Constantinib, 2017). The advent of cloud computing provided opportunities for creating new business for organizations through technology that provides collaboration and communication in an enhanced way by delivering cloud-based ERP. Furthermore, it continues to dominate Information and Communication Technology (ICT) strategies globally through the provision of remote access to computing resources via the internet, and provides up-to-date IT resources and a pay-per-use transaction model instead of an upfront investment (Dahiru and Abubakar, 2017;Demi & Haddara, 2018). It is estimated that the cost of using cloud ERP is 15% lower than the traditional ERP and that implementation time decreases by 50% to 70% (Albarand Hoque, 2017). Furthermore, cloud computing reduces the cost of entry for small companies and businesses in developing countries. By adopting cloud solutions, small companies can use expensive business analytic software, which requires a high level of IT infrastructure to enhance their business at a relatively low cost, while this kind of application was available only for large companies or enterprises previously (Hitt *et al*., 2002; Priyadarshinee *et al*., 2017). Although Cloud Computing has a number of advantages for enterprises, recent literature shows that the adoption of cloud ERP in developing countries like Ethiopia is still in its infancy stage (Woldegebreal, 2018; Ahn & Ahn 2020). Hence, this research is aimed at answering the question: What are the key factors that affect cloud ERP adoption in Ethiopia? To that end, the Ethiopian Shipping and Logistics Services Enterprise (ESLSE)is considered as a study case. ESLSE is selected as a case company because it has recently implemented an Oracle cloud ERP solution successfully and the system is in operation. Cloud-based ERP adoption is at infant stage in the Ethiopian context and thus not easy to find organizations that adopted the new solution.

Accordingly, the rest of this paper is organized as follows: in the next section, materials and methods are discussed with a focus on the research model, research hypotheses, and research methods applied. The subsequent section presents the results and discussion. Finally, the implications of the research along with the conclusion.

MATERIALS AND METHODS

Research Model

Several models and theories have been proposed to study the adoption of new technology. This study has customized and adopted a research model by Ahn & Ahn (2020) and added two new constructs: External pressure and Trust. The adopted model employed a comprehensive analysis of the Technology-Organization-Environment (TOE), Diffusion of Innovation (DOI), and Model of Innovation Resistance (MIR) frameworks. The model enables addressing the resistance and innovative characteristics of the technology adoption. The variables of the research model (see Figure 1) include Cloud-Based ERP Skill (ICT Skill) from the technology context, organizational culture from the organization context, relative advantage, trialability and observability from the innovation context, external pressure from the environmental context, and trust from the resistance context.

The research model illustrated in Figure 1 empirically examines the impact of TOE, innovation, and resistance characteristics on cloud-based ERP adoption intention.

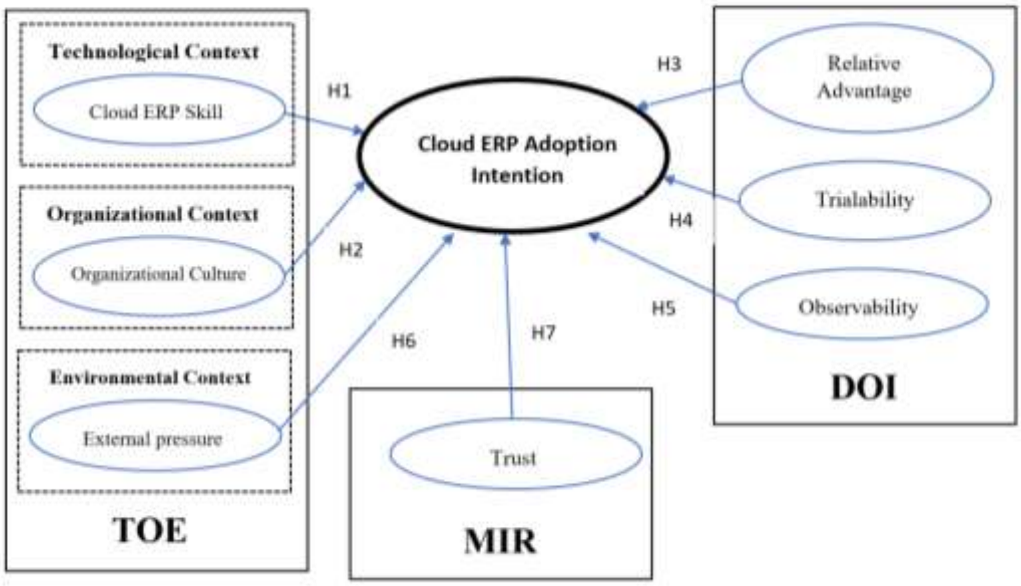

Figure 1: Research Model (*Adapted from Ahn & Ahn (2020)*)

Research Hypothesis

Cloud-Based ERP Skill (ICT Skill)

Lutovac and Manojlov (2012) found that if an organization's employees lack certain ICT skills, they would be distressed and eventually lose motivation, investing more time and energy in the adoption of ERP solutions. Accordingly, it is hypothesized that cloud-based ERP skill positively impacts cloud-based ERP adoption intention (Ahn & Ahn, 2020).

***H1:** Cloud-based ERP skill (ITS) is positively (+) related to the adoption of cloud-based ERP (CAD).*

Organizational Culture

One of the most critical challenges faced by firms in ensuring the success of ERP is that of organizational culture (Mohammad, 2017). The negative culture of the company evidenced by unfavorable beliefs, attitudes, assumptions, norms, values, and behavioral patterns of its employees hinders their behavioral intention toward ERP adoption (Senarathna, 2016). Whereas Cultural attributes such as collaboration, consensus, and cooperation are essential ingredients to achieve successful adoption of an ERP system (Mohammad, 2017).

***H2:** Organizational Culture (ORC) is positively (+) related to the adoption of cloud-based ERP (CAD).*

Relative Advantage

Rogers (1983) defines relative advantage as the degree to which an innovation is perceived as being better than the idea it supersedes. It is related to the degree to which a new product is superior to an existing one, and is considered a major determinant of the rate of adoption of a new product or solution. This clearly shows the link between innovation and value creation. Value creation can be achieved by reducing costs, improving business knowledge, creating new and appropriate services, etc. Moreover, innovations that are perceived by individuals as possessing greater relative advantage display a more rapid rate of adoption (Roger, 2003; Alhajaj, 2018). Accordingly, this study hypothesizes the following:

***H3:** Relative advantage (RAD) is positively (+) related to the adoption of cloud-based ERP (CAD).*

Trialability

Trialability refers to whether the innovation can be tried out for a limited time period before an actual outlaying of the particular innovation. Trialability reduces the perceived risk of purchasing (an unsuitable) new innovation and the adoption rates will rise substantially. Therefore, when it comes to exploring new innovations, trialability is more significant for early adopters and innovators (Rogers 1995). Thus, the following hypothesis is put forth:

***H4:** Trialability (TRI) is positively (+) related to the adoption of cloud-based ERP (CAD).*

Observability

Observability is defined as the degree to which the results of an innovation are visible to others (Rogers, 2003). The innovation's observability, as seen by members of any social system, pertains to the rate of adoption. The study by Alhajaj (2018) has found that organizations that are well aware of ERP system's use in their industry a had relatively faster rate of adoption.

H5: *Observability (OBS) is positively (+) related to the adoption of cloud-based ERP (CAD).*

External Pressure

Wang and Lo (2016) noted that the external pressure that influences the success of an organization in adopting new technologies includes government entities, customers, and service providers. There is a positive relationship between external pressures, such as regulatory pressure, and the success of adopting cloud computing for organization services (Jeyaraj *et al.*, 2006; Elbeltagi et al., 2013). When the external pressure is elevating, the chance of organizations adopting new technologies is very high. Thus, the previous empirical findings lead us to hypothesize the following:

H6: *External pressure (EXP) is positively (+) related to the adoption of cloud-based ERP (CAD).*

Trust

Trust is a critical success factor for adopting cloud computing. For instance, for governmental organizations to adopt new technology needs system security, a TOE framework technology element, and trust must exist among users, service providers, and consultants based on goodwill, contractual agreements, and competency. For managers to make an informed decision, the relationship between organizations and service providers should be built based on trust (Estifanos, 2020). Thus, the following hypothesis is put forth:

H7: *Trust (TRU) is positively (+) related to the adoption of cloud-based ERP (CAD).*

Research Method

A quantitative approach is adopted and survey was conducted using a self-administered online questionnaire using Google's online form to gather data from employees of Ethiopian Shipping and Logistics Services Enterprise (ESLSE). To ascertain whether TOE, innovative and resistance characteristics are influential in a user's adoption of cloud-based ERP service, structural equation modelling technique is used.

The first section of the Questionnaire contains four items. Respondents were asked to choose their level of education, work location of in the enterprise, experience with ERP systems, and the module/application they are currently using. This way it is tried to ensure that respondents possessed sufficient experience and proper knowledge to answer related question. In the second section, respondents were asked to evaluate the factors under technology-organization-environment, diffusion of innovation, and the model of innovation resistance frameworks through 56 close-ended questionnaire items. The variables and the corresponding item measurements of the survey questionnaire are mainly adopted from (Ahn & Ahn, 2020) for cloud-based ERP adoption. ESLSE is selected for the study because it has recently implemented Cloud-based Oracle ERP system. In addition, the population of the study are cloud ERP service users of the enterprise, and their detail was accessed from the system users list at specified study time. Out of 295 questionnaires that were distributed to users through google Forms, 152 valid questionnaires were collected and used for data analysis. Descriptive analysis was conducted to analyze the demographic data of respondents using SPSS version 20. Structural Equation Modelling (SEM) using Partial Least Squares (PLS) version 2.0 was used for path coefficient modelling due to its capability of testing the effects of several interaction items.

DATA ANALYSIS AND RESULTS

The questionnaire used was adopted from prior relevant studies, thus it has content validity. In order to verify the reliability of the questionnaire, Composite reliability (CR) was used.

Reliability Test

Reliability refers to the stability of the measuring instrument used and its consistency over time. It is the ability to measure instruments to give similar results when applied at different times (Whiston, 2012). Reliability was examined using composite reliability (CR) or Cronbach's alpha for each construct of this study. In the other expression reliability test tells whether data derived from one sample of a population would also be derived from another sample of the same population, if the same techniques and instruments were employed again (Surucu & Maslakci, 2020). Composite reliabilities in our measurement model ranged from 0.848 to 0.946 (see Table 1). In this case, the scores are above the recommended cut-off of 0.70 (Fornell and Larcker 1981; Nunnally and Bernstein1994), so high levels of internal consistency reliability have been demonstrated among all reflective latent variables.

Table 1. Composite Reliability.

Construct	Composite Reliability
Cloud-based ERP Adoption	0.946
External Pressure	0.941
ICT Skill	0.851
Observability	0.848
Organizational Culture	0.851
Relative Advantage	0.928
Trialability	0.867
Trust	0.863

Validity Test

Validity refers to whether the measuring instrument measures the behaviour or quality it is intended to measure and is a measure of how well the measuring instrument performs its function (Anastasi and Urbina, 1997). In order to determine the validity of the measuring instrument, different types of validity have been suggested in the literature (Oluwatayo, 2012). Construct validity comprises two elements namely, convergent validity and discriminant validity. Convergent validity states that the expressions related to the variables are related to each other and the factors they create, and this means that the measuring instrument designed to measure particular construct measures this intended construct correctly (Oluwatayo, 2012). Convergent validity requires a factor loading greater than 0.70 and an AVE not less than 0.50 (Fornell and Larcker, 1981).

Discriminant validity

Discriminant validity is utilized to ensure whether the observed variables used in the measurement model measure the latent variable. It defines that the manifest variable in any construct is distinct from other constructs in the path model (Hussain, 2018). Cross-loadings and Fornell and Larcker criterion were used to evaluate and determine the discriminant validity.

Table 2. Summary for Reflective Outer Loadings.

Construct	Indicator	Outer Loadings
Cloud-based ERP Adoption	CAD1 <- CAD	0.925
	CAD2 <- CAD	0.936
	CAD3 <- CAD	0.910
ICT Skill	ITS1 <- ITS	0.826
	ITS2 <- ITS	0.832
	ITS3 <- ITS	0.768
Organizational Culture	ORC1 <- ORC	0.705
	ORC2 <- ORC	0.729
	ORC3 <- ORC	0.806
	ORC4 <- ORC	0.826
Relative Advantage	RAD1 <- RAD	0.929
	RAD2 <- RAD	0.939
	RAD3 <- RAD	0.787
	RAD4 <- RAD	0.832
Trialability	TRI2 <- TRI	0.758
	TRI4 <- TRI	0.828
	TRI5 <- TRI	0.893
Observability	OBS1 <- OBS	0.970
	OBS2 <- OBS	0.733
Trust	TRU2 <- TRU	0.892
	TRU3 <- TRU	0.734
	TRU4 <- TRU	0.838
External Pressure	EXP3 <- EXP	0.935
	EXP4 <- EXP	0.950

Table 3. Factor structure matrix of loadings and cross-loadings.

Indicators	CAD	EXP	ITS	OBS	ORC	RAD	TRI	TRU
CAD1	**0.925**	0.230	0.187	0.214	0.226	0.632	0.129	0.574
CAD2	**0.936**	0.294	0.101	0.239	0.293	0.619	0.133	0.553
CAD3	**0.911**	0.226	0.132	0.238	0.261	0.541	0.092	0.515
EXP3	0.239	**0.935**	-0.006	0.237	0.012	0.148	0.192	0.299
EXP4	0.270	**0.950**	-0.032	0.300	0.000	0.107	0.180	0.318
ITS1	0.110	-0.165	**0.826**	0.205	0.384	0.196	0.332	0.244
ITS2	0.147	0.034	**0.833**	0.039	0.412	0.179	0.282	0.242
ITS3	0.103	0.069	**0.768**	0.165	0.328	0.247	0.384	0.251
OBS1	0.272	0.258	0.117	**0.970**	0.366	0.221	0.286	0.241
OBS2	0.097	0.267	0.208	**0.733**	0.252	0.150	0.266	0.067
ORC1	0.176	-0.087	0.496	0.152	**0.705**	0.224	0.324	0.160
ORC2	0.224	-0.044	0.408	0.282	**0.729**	0.358	0.256	0.280
ORC3	0.243	0.098	0.288	0.345	**0.806**	0.232	0.252	0.165
ORC4	0.213	0.025	0.279	0.330	**0.826**	0.251	0.266	0.199
RAD1	0.614	0.149	0.243	0.258	0.383	**0.929**	0.297	0.343
RAD2	0.624	0.108	0.234	0.237	0.280	**0.939**	0.277	0.351
RAD3	0.450	0.120	0.224	0.094	0.234	**0.787**	0.217	0.315
RAD4	0.557	0.092	0.178	0.164	0.309	**0.832**	0.164	0.304
TRI2	0.102	0.152	0.416	0.321	0.322	0.259	**0.758**	0.090
TRI4	0.071	0.187	0.231	0.259	0.304	0.108	**0.828**	0.137
TRI5	0.131	0.161	0.327	0.206	0.265	0.273	**0.893**	0.134
TRU2	0.562	0.294	0.248	0.196	0.164	0.384	0.138	**0.892**
TRU3	0.372	0.266	0.226	0.158	0.134	0.208	0.147	**0.735**
TRU4	0.508	0.255	0.274	0.177	0.342	0.310	0.080	**0.838**

i. Cross-loading of all observed variables were more than the inter-correlations of the construct of all the other observed variables in the model (Tables 2 and 3). Therefore, these findings confirmed the cross-loadings assessment standards and provided acceptable validation for the discriminant validity of the measurement model.

ii. Fornell and Larcker (1981) criterion test of the model where the squared correlations were compared with the correlations from other latent constructs. Table 4 shows that all of the correlations were smaller relative to the squared root of average variance exerted along the diagonals, implying satisfactory discriminant validity. This proved that the observed variables in every construct indicated the given latent variable confirming the discriminant validity of the model.

Table 4. AVEs, Square rooted AVEs and Correlation of latent variables

	AVE	CAD	EXP	ITS	OBS	ORC	RAD	TRI	TRU
CAD	0.854	**0.924**							
EXP	0.888	0.271	**0.942**						
ITS	0.655	0.151	-0.021	**0.809**					
OBS	0.739	0.249	0.287	0.155	**0.860**				
ORC	0.590	0.281	0.006	0.468	0.370	**0.768**			
RAD	0.764	0.648	0.134	0.251	0.223	0.348	**0.874**		
TRI	0.686	0.129	0.197	0.402	0.309	0.352	0.276	**0.828**	
TRU	0.679	0.593	0.328	0.302	0.216	0.263	0.375	0.144	**0.824**

Structural Model and Hypotheses Test

It is confirmed above that the measurement model was valid and reliable. The next step was to measure the Inner Structural Model outcomes. This incorporated observing the model's predictive relevancy and the relationships between the constructs. The Path coefficient (β value), coefficient of determination (R^2), Effect size (f^2), Predictive relevance (Q^2) and T-statistic values are the key standards for evaluating the inner structural model (Fornell & Larcker, 1981).

To determine statistical significance a complete bootstrapping was carried out in Smart PLS for collected sample data of 152. The bootstrap used 152 cases and 5000 subsamples. Concerning values for the estimated path coefficients of variables, item loadings of each measurement item, and the coefficient of determination (R^2) of the other variable, all of the coefficients are significant at the 5% significance level providing strong support for the hypothesized relationships. Based on the above parameter, the results of the model analysis are presented in Figures 2 and 3 as well as Table 5 below.

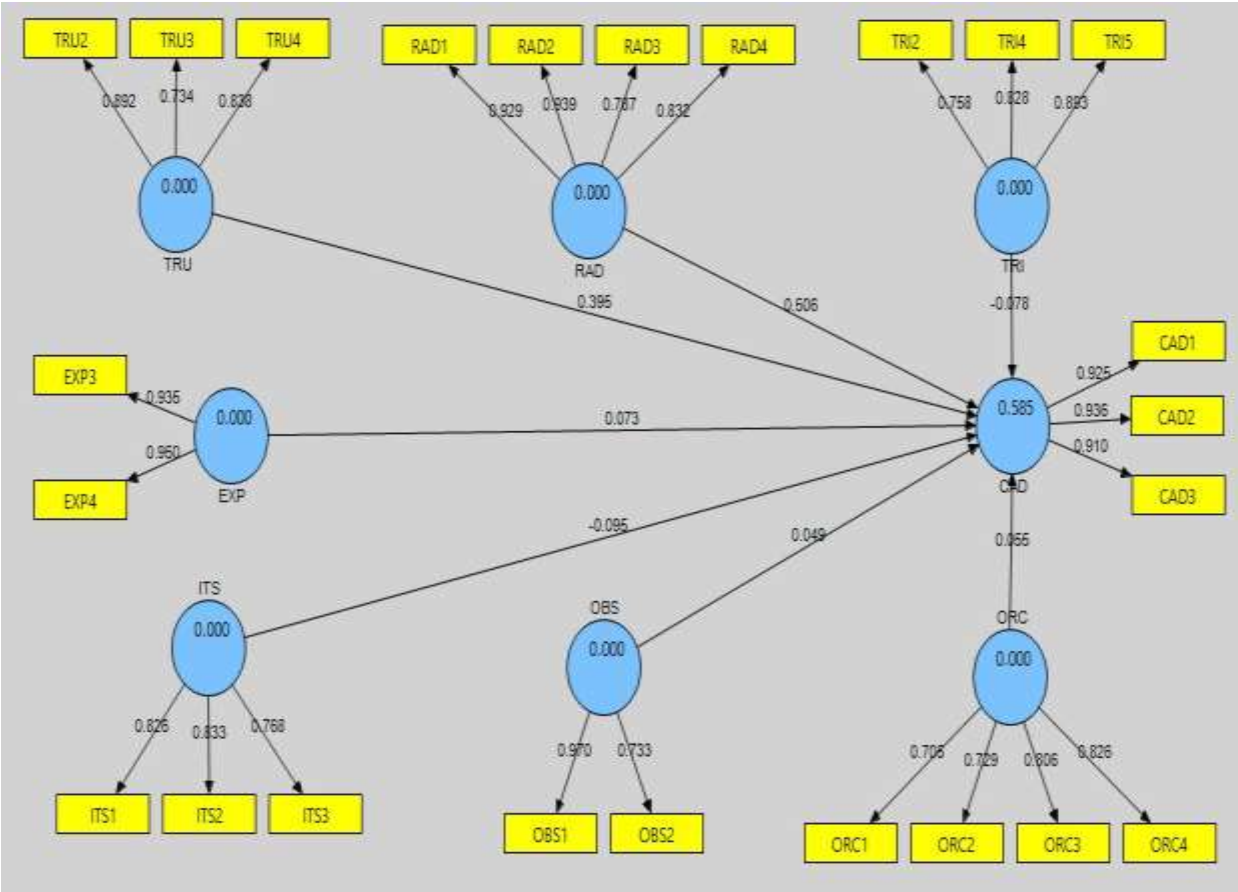

Figure 2. Combined Structural and Measurement Models

Table 5. Path coefficient and T-statistics

Hypothesis	Constructs	Path Coefficient	Sample Mean (M)	T Statistics (|O/STDE V|)	P Values	Status
H1	ITS->CAD	0.095	0.095	2.0662	0.014	**Supported**
H2	ORC->CAD	0.055	0.055	1.1806	0.440	Not Supported
H3	RAD->CAD	0.506	0.506	9.5946	0.000	**Supported**
H4	TRI->CAD	0.078	0.078	1.6761	0.453	Not Supported
H5	OBS->CAD	0.049	0.049	1.2181	0.353	Not Supported
H6	EXP->CAD	0.073	0.073	1.9971	0.042	**Supported**
H7	TRU->CAD	0.395	0.395	7.9734	0.000	**Supported**

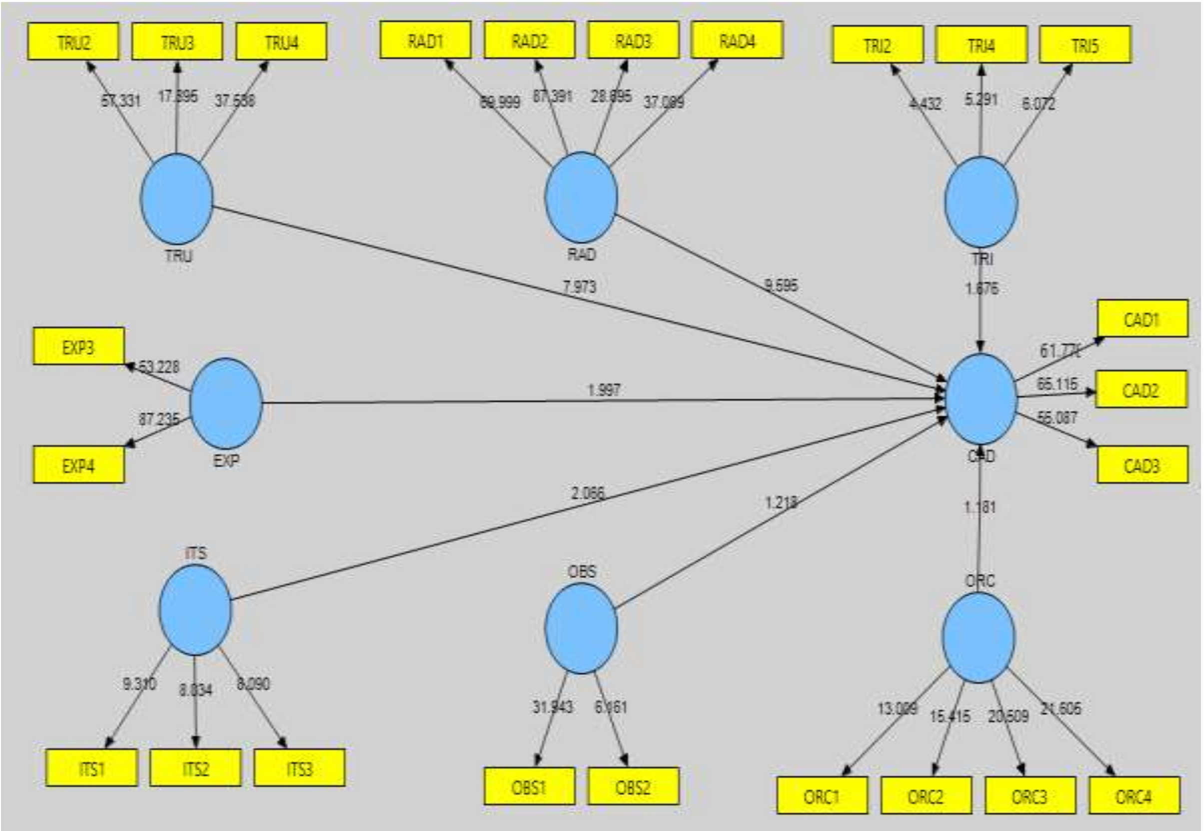

Figure 3. Models T statistics and bootstrapping result.

Measuring the Effect Size (f^2)

The f^2 is the degree of impact of each exogenous latent construct on the endogenous latent construct. When an independent construct is deleted from the path model, it changes the value of the coefficient of determination (R^2) and defines whether the removed latent exogenous construct has a significant influence on the value of the latent endogenous construct. The f^2 values were 0.35 (strong effect), 0.15 (moderate effect), and 0.02 (weak effect) (Cohen, 1998). Table 6 shows the f^2 from the SEM calculations. As shown in Table 6 below, the effect size for relative advantage, IT skill, trialability, trust, external pressure, organizational culture and observability on the adoption of Cloud based ERP system were 0.475, 0.301, 0.268, 0.265, 0.257, 0.240 and 0.194, respectively. Hence, according to Cohen's (1998) recommendation, the $f2$ of all seven exogenous latent constructs on the cloud ERP adoption had a strong and moderate effect on the value of R^2. Furthermore, all the seven independent latent constructs in this study participated relatively to the greater R^2 value (58.5%) in the dependent variable.

Table 6. Effect Size.

Exogenous Latent Variables	Effect Size $f2$	Total Effect
Relative Advantage	0.475	Strong
IT Skill Trust	0.301	Moderate
Trialability	0.268	Moderate
Trust	0.265	Moderate
External Pressure	0.257	Moderate
Organizational Culture	0.240	Moderate
Observability	0.194	Moderate

Predictive Relevance of the Model (Q^2)

Predictive relevance (Q^2) statistics are used to measure the quality of the PLS path model, which is calculated using blindfolding procedures (Hussain *et.al.,* 2018), and cross-validated redundancy was performed. The Q^2 criterion recommends that the conceptual model can predict the endogenous latent constructs. In the SEM, the Q^2 values measured must be greater than zero for a particular endogenous latent construct. As a rule of thumb, Q^2 values higher than 0, 0.25 and 0.50 depict small, medium and large predictive relevance of the PLS-path model. Similar to the f^2 effect sizes, it is possible to compute and interpret the Q^2 effect sizes. From Figure 4, it shows that the Q^2 values for this study model was equal to 0.441, which was higher than the threshold limit, and supports that the path model's predictive relevance was adequate for the endogenous construct.

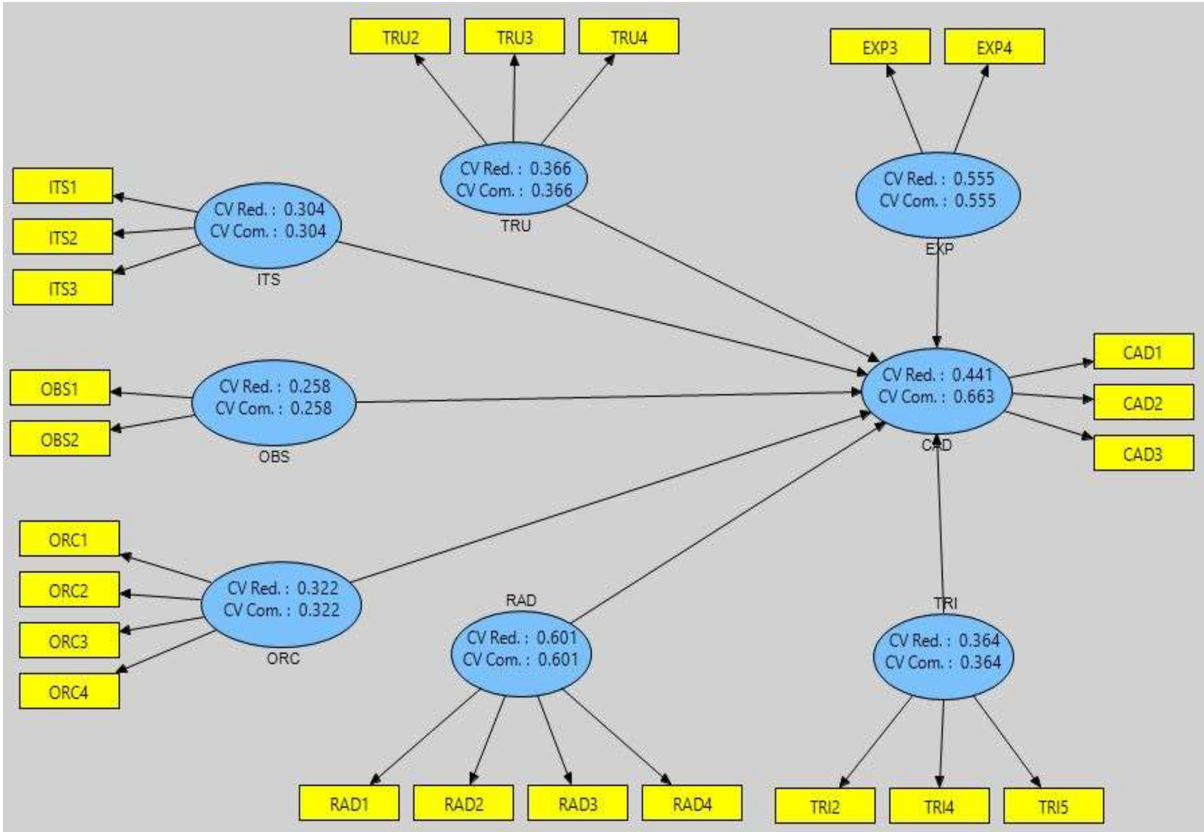

Figure 4. Predictive relevance of the model.

Path coefficient assessment

T-values again justify the significance of relations: only relations possessing significant correlation should be taken into account (Hair *et al.*, 2013; Hair *et al.,* 2014). This study sets a limit to significance at 5%, thus, only relations exceeding 1.96 in t-values are considered significant. As indicated in Table 5 above, the adoption of users to accept and use cloud-based ERP was impacted by relative advantage (p=0, or t=9.5946), trust (p=0, or t=7.9734), IT skill (p=0.014, or t=2.0662) and external pressure (p=0.042, or t=1.9971). These variables jointly explain 58.5% of the variance in cloud ERP adoption or acceptance (R^2=0.585, coefficient of determination). This is an indication of the good explanatory power of the model for actual adoption. The results show that cloud-based ERP adoption is predicted by relative advantage, trust, IT skill, and external pressure, whereas organizational culture, trial ability, and observability with a t-value less than 1.96 are not influencing the adoption or acceptance of cloud-based ERP by the users.

DISCUSSION

In this study, the inner path model was 0.585 for the cloud ERP adoption last endogenous latent construct. This indicates that the seven independent constructs substantially explain 58.5% of the variance in the quality, meaning that about 58.5% of the change in the cloud ERP adoption or acceptance for use was due to seven latent constructs in the model. According to Henseler *et al.* (2009), and Hair *et al.* (2013), an R^2 value of 0.75 is considered substantial, an R^2 value of 0.50 is regarded as moderate, and an R^2 value of 0.26 is considered as weak. Hence, the R^2 value in this study was in the substantial range.

Empirical results of the study revealed that the relative advantage, IT skill, external pressure, and trust had a significant effect ($P<0.05$) on cloud-based ERP adoption, while trialability, organizational culture, and observability had no significant influence ($P>0.05$) on the adoption of cloud-based ERP. Since cloud-based ERP is an emerging technology in the Ethiopian context, ICT skill was considered to be an important variable in the adoption of cloud-based ERP, accordingly the empirical result of the analysis confirmed as it is statistically significant. Therefore, ICT Skill (H1) is found supported. As for resistance characteristics, the trust construct is found statistically valid; and organization and innovative characteristics of organizational culture, observability, and trialability are found insignificant.

Organizational culture refers to the beliefs, attitudes, assumptions, norms, values, and behavioural patterns of employees in the organization which either hindered or fostered their behavioural intention towards the cloud-ERP adoption. The empirical evidence of the study indicates that organizational culture has been verified not to influence (β =0.055, T < 1.96) to adopt cloud- ERP services, thereby not supporting Hypothesis H2. The obtained result is consistent with the findings of Venkatesh et al. (2003) and Venkatesh et al. (2012). The result indicates that employees of ESLSE are found influenced by the norms and values of the enterprise in the cloud ERP adoption.

This study revealed that relative advantage was identified to be very important, and it shows that users have faith that an enterprise's effectiveness and efficiency can be improved through the adoption of cloud-based ERP. It has to be confirmed that cloud ERP system can provide complete and timely information for decision making. In addition to cost reduction contribution, this study revealed that as cloud-based ERP vendor's assertion has get acceptance and cloud-based ERP has an advantage of quick responsiveness and flexibility to address businesses expansion and pay as much as they use. The obtained result is consistent with the findings of Ahn & Ahn (2020) which highlighted that relative advantage influenced the chief executive officers and key IT stakeholders on the cloud-based ERP adoption intention. Thus, H3 is supported because the cloud ERP adoption is fostered by users' evolution of effectiveness and efficiency of cloud-based ERP.

Trialability refers to whether the cloud ERP system can be tried out for a limited time period before an actual outlaying of the Cloud ERP service. It was hypothesized to have a significant positive effect on employees' toward cloud-based ERP adoption. From the empirical evidence shown above, trialability has been verified that this was not important factor among the innovation factors to influence (β = 0.078, T < 1.96) employees' adoption of cloud-based ERP service. The result indicates that employees are not influenced by the process playback sessions (business process demos) held before the oracle cloud ERP system went go-live and the provision of a trial environment for exercise. Thus, H4 is not supported.

Observability is defined as the degree to which the results of the oracle cloud ERP system is visible to others. It was hypothesized to have a significant positive effect on Oracle's Cloud-based ERP adoption (H5). But results in this study suggested that observability is not influencing (β=0.049, P<1.96), the adoption behavior of employees, thereby not supporting Hypothesis H5. The results obtained indicate that employees were exposed to the system and its benefits.

External pressure from stakeholders such as government entities, customers, and service providers influence the success of an organization in adopting new technologies. External Pressure was hypothesized to have a significant positive effect on cloud ERP adoption (H6). The empirical evidence of the study has indicated that pressure from various stakeholders has no effects on ESLSE employees to adopt cloud ERP service with a path coefficient of 0.073 and a P value > 0.042 (or t-value >1.96). Thus, it is stand to support the H6. This suggests that the effect of External parties' pressure on ESLSE cloud ERP adoption is statistically significant. Therefore, H6 is accepted.

Since trust is identified as an important factor in the adoption of cloud-based ERP, it is important to build trust and form an agreement with the cloud service provider. Leadership support and follow-up are important to overcome distrust from users and foster confidence to accept the system to use. The role of government is also important in forming policy and enhancing telecom infrastructure since cloud-based ERP is fully dependent on internet availability. Any concern over the quality of internet service will decrease the availability of the system which increases distrust of the system by users. This finding aligns with the findings of Estifanos (2020). Thus, H7 is supported.

CONCLUSION

This study aimed at exploring factors that affect cloud-based ERP adoption in Ethiopia, in the case of Ethiopian Shipping and Logistics Services Enterprise. The study mainly focused on the effects of the following factors or constructs on the adoption of cloud-based ERP: Cloud ERP Skill, Organizational culture, Relative advantage, Trialability, Observability, Trust, and External Pressure.

Technology-organization-environment, diffusion of innovation, and the model of innovation resistance frameworks were used as theoretical base. The study was conducted based on the data gathered from employees of Ethiopian Shipping and Logistics Services Enterprise that is using the Oracle cloud ERP system at the head office, branch offices, on board of enterprises' vessels, and Djibouti office. The survey was conducted using a self-administered questionnaire. Out of 295 questionnaires that have been distributed to customers, 152 valid questionnaires were collected and used for data analysis. The proposed research model was tested using a partial least square with the help of the Smart PLS software. The proposed model explained 58.5% of the variance in Cloud ERP adoption.

The empirical analysis results revealed that Relative advantage was found to be the most significant factor in positively influencing cloud-based ERP adoption, followed by trust, IT skill, and External pressure. This result suggests that for the adoption of cloud-based ERP, users should perceive it as better innovation than the current system they are using and understand how it can facilitate better communication, save money and time, and lead to the efficient synchronization of new applications of business ideas. To fully accept and use cloud-based ERP, users should develop a lot of trust in the cloud service vendor. Clients, however, raised concerns about trusting vendors with their mission-critical software solutions. Therefore, the vendor should ensure through service level agreement (SLA) that clients/users data will be kept securely. Cloud ERP users should believe that cloud-based ERP is easy to understand and use, and they could be more skillful at using it. Therefore, it can be concluded that cloud-based ERP will be adopted and potential benefits utilized when its cost-effectiveness is understood and trust is developed.

Conversely, organizational culture, trialability, and observability are found to be insignificant to influence the adoption of cloud ERP. Hence, to adopt a cloud-based ERP, the influence of organizational culture, trialability, and observability were found negligible. Overall, the outcome of this study is indeed helpful to organizations planning to up-take cloud-based ERP services.

IMPLICATIONS OF THE STUDY

Cloud ERP technology is changing rapidly and has enjoyed fast growth worldwide (AlBar and Hoque, 2017; Ahn and Ahn, 2020). So, this study is only a milestone in a long journey, not a final conclusion. Hence, implications for theory and practice are presented as follows.

Theoretical Implication

This study attempted to identify the significant relationship between innovation characteristics, innovation resistance and technological, organizational, and environmental frameworks; and acceptance of cloud-based ERP adoption. The study has investigated the factors that influence the adoption of cloud-based ERP in Ethiopian shipping and logistics services enterprises. The effect of factors, such as relative advantage, trust, IT skill, and external pressure toward cloud-based ERP adoption is an important topic that should be considered further in the future. The results also provide further support for the utility of the DOI, MIR, and TOE in technology adoption such as cloud-based ERP adoption.

Practical Implication

The findings of this study will facilitate the adoption of cloud-based ERP adoption in both public and private organizations in Ethiopia. This study identified the determinants of cloud-based ERP adoption in Ethiopia, which will help build awareness regarding the adoption of cloud ERP by the owners and investors in different sectors. This study will also help the organization leaders identify the factors that will facilitate cloud-based ERP adoption, as well as threats therein. The findings can also give cloud-based ERP vendors insight into the factors that influence cloud ERP adoption. Cloud ERP vendors can use the result of this study to support decision-making and marketing. Thus, this study provides necessary support for policymakers, vendors, and the government in the adoption of cloud-based ERP in the Ethiopian context.

LIMITATIONS AND SUGGESTION FOR FUTURE RESEARCH

Limitations of the Research

ERP adoption in general and cloud-based ERP adoption in particular, is at an early stage in the Ethiopian context. So, it was not easy to find companies that adopted cloud-based ERP solutions and the study focused only on one case company. In addition, questionnaire returns from study participants were 152 out of 295 despite the effort made to increase the response rate. The main reason for the relatively low response rate was that the data was collected during the first COVID-19 outbreak and it was a big challenge to get more responses online despite our close follow-up. The study data was collected from employees of the enterprise located at different branches from April 1 to April 15, 2021.

Suggestions for Future Research

The study was conducted to explore factors that influence the adoption of cloud-based ERP systems. As such, there is still room for further investigation into the adoption of cloud ERP services. From the result obtained from the analysis of the structural model, the research model demonstrates an explanation power or coefficient of determination: R2 value of 58.5% (see chapter 4-the data analysis and presentation part of this research). The unexplained 41.5% of the overall research model indicates that some important factors influencing the adoption of cloud-based ERP may have been ignored in the research. Thus, searching for additional new variables may improve the accuracy relating to the expected acceptance of cloud ERP services in further studies. Future research can also look into other factors and examine how they can explain the impact of cloud ERP adoption, and extend this research to different public and private enterprises in the country.

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