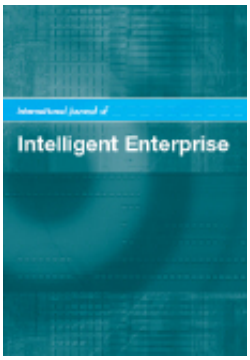
INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research



International Journal of Intelligent Enterprise

ISSN online: 1745-3240 - ISSN print: 1745-3232
https://www.inderscience.com/ijie

An innovative model on intention to adopt cloud-based ERP among SMEs

Aveek Basu, Sraboni Dutta, Rohini Jha

DOI: 10.1504/IJIE.2022.10047198

Article History:
Received: 07 July 2021
Accepted: 05 April 2022
Published online: 13 December 2023

Copyright © 2024 Inderscience Enterprises Ltd.

An innovative model on intention to adopt cloud-based ERP among SMEs

Aveek Basu*

Birla Institute of Technology,
Mesra, India
Email: aveekbasu@gmail.com
*Corresponding author

Sraboni Dutta

Department of Management,
J.D. Birla Institute,
Kolkata, India
Email: srabonidutta20@gmail.com
Email: dean@jdbimanagement.in

Rohini Jha

Department of Management,
Birla Institute of Technology,
Mesra, India
Email: rohinijha@bitmesra.ac.in

Abstract: Enterprise resource planning (ERP) is an integrated suite of business application which ensures end to end delivery of all operational processes effectively and efficiently. Cloud ERP has recently gained significant impetus with the advent of cloud technology and organisations are showing substantial interests due to various advantages. End user acceptance plays a significant role in successful implementation of ERP systems and is a key factor in cloud ERP adoption by SMEs. Several studies are performed on ERP models which are dealing with acceptance. However, each model has some limitations and the current research on Indian SMEs deals with a hybrid framework which considers vital constructs of established models. The research work strives to explore the predictors of cloud ERP adoption. The findings will provide guidelines to SMEs of developing economies planning to adopt cloud-based ERP and cloud vendors can ameliorate their business strategies as per adoption intricacies found in study.

Keywords: enterprise resource planning; cloud ERP; adoption intention; innovation; technology-organisation-environment; TOE; resistance; small and medium enterprises; SMEs.

Reference to this paper should be made as follows: Basu, A., Dutta, S. and Jha, R. (2024) 'An innovative model on intention to adopt cloud-based ERP among SMEs', *Int. J. Intelligent Enterprise*, Vol. 11, No. 1, pp.33–56.

Copyright © 2024 Inderscience Enterprises Ltd.

Biographical notes: Aveek Basu is having 18+ years experience in top IT industry and currently doing his PhD. Currently, his six Scopus indexed journals are published or accepted.

Sraboni Dutta is an MBA with an MPhil and PhD in Management. After three years in a managerial position with financial services and consultancy firms, she joined academics and has now completed 22 years in teaching, research, and training. She has undertaken extensive research in the fields of entrepreneurship, sustainable development and corporate finance. She has published research papers in many reputed international journals. She has conducted entrepreneurship development programs for women entrepreneurs. She is guiding a doctoral work in Entrepreneurship and Finance. Two scholars have been awarded their PhD under her guidance. She is currently working as the Dean in the Department of Management at J.D. Birla Institute, Kolkata, India.

Rohini Jha is an Assistant Professor in the Department of Management, BIT Mesra. She has several research works in her credit including publication in well known journals.

1 Introduction

In recent years, there has been considerable development in different economies on account of globalisation along with the technological advancement. The survival of a firm and its existence depends largely on the technological benefits that an enterprise can utilise. Organisations are facing steep challenges for cheaper, on demand and innovative products in current scenario and technology can provide a plethora of competitive advantages. The exponential growth of Internet has acted as a harbinger in providing diversified high quality products in affordable prices within short span.

Over the last few decades the enterprise resource planning or ERP has helped organisations in gaining competitive advantages and has acted as a prime mover in their advancement by facilitating in dynamic capabilities. ERP can be attributed as a management information system package that integrates multiple modules with common database and is capable in providing real-time disseminated data. In-spite of multiple advantages, the ERP implementation in small and medium enterprises (SMEs) is still is in its infancy due to certain disadvantages in terms of high upfront costs, behavioural intentions to use technology, lack of organisational support, etc. (Salim et al., 2015). With the advancement of cloud computing and its numerous cost advantages, the SMEs now-a-days are unwilling to implement ERP as it requires hefty investments.

Cloud computing has garnered phenomenal growth in the last few decades. Cloud computing can be defined as an ubiquitous, on-demand access to various computing resources based on pay as you use and service over internet. The COVID pandemic has accelerated the growing demand of cloud-based technologies in India.

The cloud-based ERP has been gaining foothold globally owning to the growth of cloud computing and the different benefits it provides. Organisations particularly the SMEs are benefitted as cloud-based ERPs offer lower upfront cost along with an array of competitive advantages (Duan et al., 2013). Numerous researches have established the benefits of cloud ERP over traditional ERP for SMEs due to cost advantages, rapid

implementation, scalability, etc. (Mozammel-Bin-Motalab and Al Mamun Shohag, 2011). Earlier studies had suggested that cloud ERP not only reduces the time of deployment (Arnesen, 2013) but also provides a significant lowering of costs and thus the SMEs will find huge advantage by implementing cloud ERP.

However the implementation of cloud ERP in Indian SMEs is still abysmally low as compared to developed economies. The COVID impact on Indian SMEs had taken a significant toll. The Indian Government with its flagship program of 'Atmanirvar Bharat' or self reliant India has embarked upon a slew of measures and allocated a significant portion of the financial budget towards revival of the SME sector. SMEs can take the advantage of cloud ERP and covert the challenges into numerous possibilities thus reaping benefits. Cloud ERP will aid SMEs to concentrate on their core business without maintaining their own IT department.

The ERP market off late has been witnessing a technological shift with big ERP companies vis. SAP, Oracle, etc. are embracing the cloud though they had been the leaders in On Premise ERP till date. Organisations productivity, manoeuvrability and sustenance will be greatly hampered if the decision makers and stake holders delay in considering the cloud ERP in their growth trajectory. The COVID situation with advisory of remote working has provided further importance of cloud ERP over traditional On Premise ERP. Gartner has predicted that a huge number of On Premise ERPs will be replaced by cloud ERP by 2021.

The current study analyses the various factors that contributes to the adoption of cloud ERPs by Indian SMEs. The important factors are determined in the research and integrated in the models like technology-organisation-environment (TOE), diffusion of innovation (DOI) and theory of innovation resistance (TIR) to provide a comprehensive model in getting insights on adoption of cloud-based ERP among Indian SMEs. Cloud ERP is one of the latest technological advances in complex ERP framework and hence there is ample chance of resistance inside an organisation during implementation. Thus the amalgamation of TIR with the TOE and DOI can provide the balance in the proposed model in the research.

The remainder of the study is organised as follows: Section 2 deals with literature review. Section 3 deals with the conceptualised hybrid model and details of the constructs chosen for models. Research model is discussed in Section 4. Section 5 deals with the results. Section 6 deals with the discussion on results and Section 7 concludes the paper.

2 Literature review

In 1990, Gartner Group coined the term ERP as a next generation of Manufacturing Resource Planning II (MRP II) which in turn has evolved from material requirement planning (MRP). ERPs are integrated module of software packages with single comprehensive database having the capability to process and disseminate data across the organisation and the data can be customised as per business requirements along with decision making. ERP became the de facto system in large organisations since 1990 replacing the existing outmoded legacy systems. Davenport has mentioned that ERP is the single most important technological development for corporate in 1990s as per the usage of technology is concerned. The last two decades has seen the burgeoning growth of ERP in enterprises on account of technological advances. Researchers have shown

keen interests in studies related to ERP adoption by large enterprises however there is dearth of studies related to the implementation of ERPs by SMEs. On Premise ERP implementation involves heavy capital expenses which pose a challenge for SMEs.

The advent of cloud computing in last couple of years has paved the way for development of cloud-based ERPs and software-as-a-service (Sedera et al., 2014). Cloud computing can be referred as an on demand, ubiquitous, scalable, pay as you use, easy to implement service using interconnected virtual computers over the internet (Annabel and Murugan, 2015). The lack of IT capabilities and infrastructures are addressed by cloud ERP vendors to facilitate the SMEs in ERP adoption (Salleh et al., 2012). Cloud ERPs have led to paradigm shift in the adoption of ERPs by SMEs. Researchers over the years have identified the various factors that influence cloud ERP adoption by SMEs like competitive environment, ICT infrastructure, administration, legal aspects; license (Carutasu and Carutasu, 2016). According to Cloud Security Alliance (CSA), cloud computing provides a myriad of benefits like scalability, flexibility and affordability which in turn helps the organisations in performing efficient data management facilitating the rapid increase in cloud technology (Aharony, 2015). Due to minimal initial investments and gradual implementation process, the SMEs get more business advantages and opportunities (Bildosola et al., 2015). Lal and Bhaaradwaj (2020) have discussed in detail on the factors like organisational mindset, reliability, ease of use and relative benefits that lead to organisations decision on adopting cloud computing.

The cloud ERPs help the SMEs to concentrate in their core business by lowering the IT related licensing, infrastructure and software upgrade costs (Saini et al., 2012). SMEs can leverage a large part of IT infrastructure from On Premise to cloud thus bringing more productivity, scalability and flexibility (Salleh et al., 2018). SaaS has propelled the SMEs in shifting the core applications and ERPs to cloud (Knorr et al., 2012). Traditional ERP large vendors like SAP, Oracle which has got a big market share in large enterprises are trying to venture into the SME sector using the cloud ERP models and competing with smaller vendors like Infor, Sage Group, Epicor, etc.. Mezghani (2014) cited that cloud-based ERPs are becoming a real substitute of on premise ERP and companies are more likely to take up cloud solutions.

In studies by Abdollahzadegan et al. (2013) the advantages and drawbacks of cloud ERP are discussed. The disadvantages like data security; absence of skilled man power has been discussed in research by Bellamy (2013). Key factors like business size, CEO vision, employee IT competence, and peer pressure are by Kinuthia (2014). In detailed research by Peng and Gala (2014) the advantages and challenges of cloud ERP adoption, system performance, ERP support costs, ERP agility, system upgrade benefits along with various challenges like vendor-lock-in, data privacy and security, integration, etc. has been discussed. Albar and Hoque (2017) identified the different factors affecting cloud-based ERP implementation in Saudi Arabia. Moh'd Anwer (2018) stressed upon the study of logistic factors related to cloud ERP adoption by SMEs in developing nations. Chang (2020) explored the various factors that expedites and pose challenges to SMEs while switching to cloud ERP from On Premise solution. However the usage of ERP in SME sector particularly in India had been low due to high cost of implementation, operational costs, maintenance, etc.

DOI has been developed by Rogers (1983) to determine how, why and at what pace new technology are adopted by an organisation. Rogers (1995) discussed on the five prominent factors like complexity, observation power, complexity, similarity and trialability influences organisation in adopting latest technology. Tornatzky and Klein

(1982) claimed that relative advantage is the determining factor in IT adoption rate. Premkumar (2003) stressed upon compatibility factor relevant to innovation adoption.

Tornatzky and Fleischer (1990) have developed the TOE Framework related to acceptance of technology. According to the framework the adoption of new technology has been examined on three different factors like technology, organisation and environment. Different research work has been done on cloud ERP acceptance based on TOE framework. TOE framework is not only applicable for large enterprises but studies conducted by Eze et al. (2013) point out that the same is applicable for SME sector as well. Eze et al. (2013) has applied TOE framework to determine the adoption of new technology based on innovation, external environment and organisations technology. Various factors like size of organisation, competitive pressure, support of top management, technical obstacles and readiness are discussed as important aspects in cloud ERP adoption based on TOE framework in research by Moh'd Anwer (2018). Albar and Hoque (2017) examined the intention of adopting cloud-based ERP based on TOE framework and determined that organisational culture is not much related to adoption but adoption has a strong co-relation with ICT skill, ICT infrastructure, competitive pressure, support of management and regulatory environment. In the research by Chang (2020) it is observed using the TOE framework that the adoption and switching over to cloud ERP depends on factors like industry pressure, financial benefits and quality of system whereas quality of information, government patronage has lesser significance.

The TIR has been developed in 1987 by Ram. Ram has stated that there is an initial defiance while adopting innovation. As per his observation, the longer the duration of resistance the lesser the degree of acceptance of a new technology. A formidable resistance will lead to the failure of innovation and adoption will perish. In different stages of innovation both resistance and adoption can coexist. According to Ram the key factors of innovation resistance are perceived risk and cognitive impairment. Claudy et al. (2015) found that the factors responsible in motivating the adoption of innovation are not much effective when compared with the various reasons of resistance and non-adoption of new technologies. In recent years, Ahn and Ahn (2020) studied on challenges to digital innovations, Kuo et al. (2017) worked on the organisational challenges in adopting technological advances. Benlian and Hess (2011) opined that IT executive consider security threat as the main drawback for cloud ERP adoption. Functional compatibility, concern on data security, customisation constraints and vendor dependency are critical impediment while adopting cloud-based ERP (Faasen et al., 2013). Kim (2018) described compatibility, comparative benefit and complexity are major factors related to resistance while embracing new technology. It is observed that behavioural resistance to innovation can provide valuable insights to researchers and academicians (Kaur et al., 2020; Talwar et al., 2020).

Innovations transform individual lives in multiple ways but pose certain challenges as well (Mani and Chouk, 2019). Nylén and Holmström (2015) described that although digitisation provides multitude of benefits but individuals find it difficult to take it up initially. The agile nature of digital technology has shortened the life span of current innovations thus creating a challenge in the minds of individuals due to frequent changes and thus generating resistance to innovations (Laukkanen, 2016). There is also a challenge of adverse attitude and defiance from individuals leading to deferred adoption or complete refusal if there happens a faster rate of DOI. The growth of firms and profits

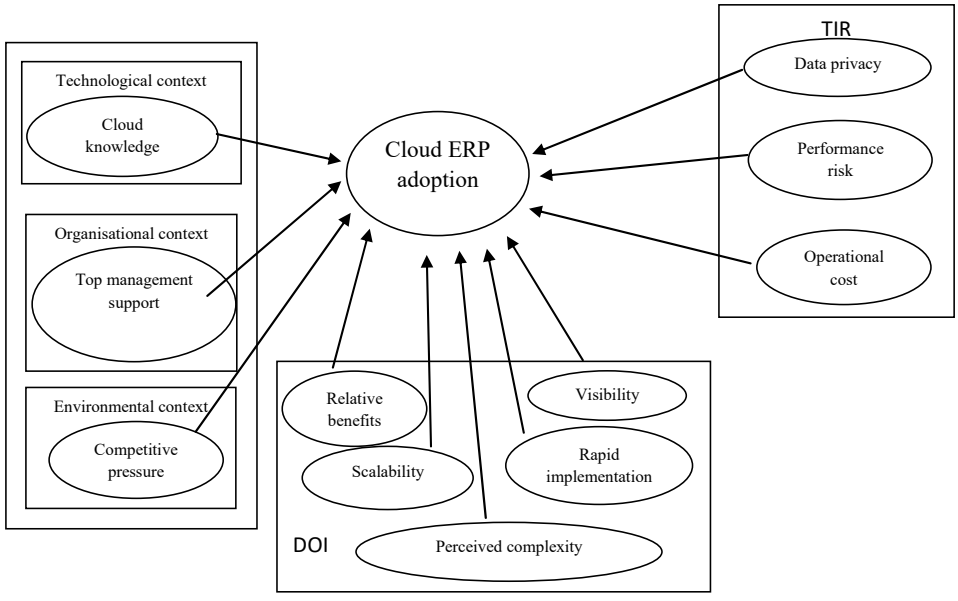
are hindered due to the dearth of knowledge on slow dispersion and delayed adoption of innovative technology (Jahanmir and Cavadas, 2018).

The challenges of vendor lock in and data security are found in studies by Peng and Gala (2014). Challenges like data security and privacy, configuration problems in cloud-based ERP, vendor lock in and customisation are the main barriers in adoption of cloud-based ERP as found in studies by Demi and Haddara (2018). Various obstacles like service-level agreement (SLA), security, performance risk, functionality constraints, ownership of data, integration and customisation challenges are posited by Elmonem et al. (2016).

3 Conceptual hybrid model

The hybrid model using the TOE, DOI and TIR are provided in Figure 1.

Figure 1 Conceptual model



3.1 Cloud technical knowledge

Cloud-based ERP needs proper IT knowledge considering cloud ERP is based on latest technology. ERP if implemented and utilised properly provides multiple benefits but lack of skill can be major hindrance in adopting cloud ERP package. In post COVID era the SMEs in India need to incorporate the latest technology and cloud-based ERP can help Indian SMEs gain competitive advantage. According to existing studies it has been found that technical knowledge has a positive impact in cloud ERP adoption.

Hypothesis 1 Cloud technical knowledge (CK) is considered as positively linked with cloud-based ERP adoption.

3.2 Organisational context: top management support

Various studies have discussed the role of organisations while adopting ERP package. Considering the Indian context the SMEs face challenges due to the lack of funds as ERP packages need huge amount of investment. Cloud ERP on the other hand requires less initial investment in terms of capital expenses and is a viable alternative to On Premise ERP. There are certain disadvantages linked to cloud ERP considering that it is still in its nascent stage in Indian context but with proper top management support the SMEs can adopt cloud ERP to remain competitive.

Hypothesis 2 (H2) Top management support (MS) is positively related to cloud ERP adoption.

3.3 Environmental context: competitive pressure

With Globalisation there has been a constant pressure to remain competitive and relevant in current business scenario which is undergoing tectonic shift in a short span. Competitive pressure among firms can be attributed as the prominent factor in cloud ERP adoption according to various researches. Successful business strategies can thrive if proper competitive advantages are identified and implemented beforehand. SME adopting ERP creates an aura of competitive pressure among the other industry players big and small and can help an enterprise gain significant impetus in gaining market advantage (Poston and Grabski, 2001). Thus competitive pressure contributes in a positive way in cloud ERP adoption.

Hypothesis 3 (H3) Competitive pressure (CP) is positively related to cloud ERP adoption (CI).

3.4 Innovation characteristics

An Enterprise advancement, transformation and rapid progress can propel if there exists innovation characteristics among the employees. Multiple researches in academic arena had tried to examine the forebears and consequences of adopting innovation characteristics in an organisation. In the study by Rogers (2003), innovation comprises of the different traits like low complexity, elevated relative advantage, observability, trialability, and compatibility. Considering cloud ERP forms the part of latest technological advancement, hence the innovative characteristics need to be analysed when an SME decides to adopt and implement cloud-based ERP from its existing legacy system. In the Indian SME context the following set of variables are analysed.

3.4.1 Relative benefits

Enterprises adopt cloud ERP systems considering the myriad of benefits it provides for an enterprise with diverse operations across modules and real-time updates it provides in a seamless manner. According to Rogers (2003), innovation activities in a firm can help in fostering the growth acceleration which will help the enterprise to gain market share. According to Tornatzky and Klein (1982) there has been a wide spread research on the relative benefits of different companies induced by innovation characteristics with the aid of IT applications. Low et al. (2011) research found competitive pressure, relative

benefits, size of enterprise, managerial support, peer pressure are important factors leading to cloud ERP adoptions. Premkumar and Roberts (1999) identified relative benefits, size of firm, management support, external and peer pressure effect significantly in cloud adoption. Thus it can be concluded that relative benefits contribute to a significant extent in cloud ERP adoption in different enterprises.

Hypothesis 4 (H4) Relative benefits (RB) is linked positively to cloud ERP adoption intention (CI).

3.4.2 Perceived complexity

The intention to adopt cloud-based ERP is hindered to certain extent with the complexity of the package leading to deceleration in embracing new technology. Large organisations require ERP as it can integrate different complex modules and provide real-time updates which can be managed by inhouse IT team or IT vendors (Weng and Hung, 2014). But in case of SMEs, there is not much complex activity in their core domain and cloud ERP is perceived at times to introduce complexity in the daily operations (Gupta et al., 2017). Cloud ERPs are less complex as compared to On Premise ERPs and for small SMEs with less budget can intend to adopt cloud ERP for numerous benefits (Salim et al., 2015). Accordingly as per different studies the hypothesis developed in following statement.

Hypothesis 5 (H5) Complexity (PC) is linked negatively to cloud ERP adoption intention (CI).

3.4.3 Scalability

Scalability is one of the most important characteristics in cloud computing. Scalability has helped cloud computing to gather the foothold in SME sector. Cloud ERP with the scalability property can promote the growth of an SME and thus it will have a positive impact in decision to adopt cloud ERP (Elbeltagi et al., 2013). Based on above studies the Hypothesis developed:

Hypothesis 6 (H6) Scalability (SC) is linked positively to cloud ERP adoption intention (CI).

3.4.4 Rapid implementation

Rapid implementation forms an important factor in the Innovation characteristics of cloud ERP software. The benefits of rapid implementation are visible in different cloud ERP research as the delay in implementation significantly affects the outcome. It not only provides obstacle in smooth running of the enterprise during the implementation phase but also from finance perspective it adds to overhead cost. SMEs need to Go Live in short-time and hence cloud ERP can significantly help enterprises by rapidly implementing cloud ERP. Thus SMEs are more intended to adopt cloud ERP considering the advantage of quick implementation. Based on various researches the hypothesis is state as:

Hypothesis 7 (H7) Rapid implementation (RI) is linked positively to cloud ERP adoption intention (CI).

3.4.5 Visibility

According to Rogers (2003), innovation creates an impact when it is visible to peer organisations. When the benefits of cloud ERP of an enterprise are visible to other SMEs then it influences other SMEs in adopting cloud-based ERP. Cloud ERP is gaining momentum in the market with new set of innovations and visibility forms a vital factor in its adoption. Accordingly the hypothesis is stated as:

Hypothesis 8 (H8) Visibility (VI) is linked positively to cloud ERP adoption intention (CI).

3.5 Innovative resistance characteristics

According to Ram (1987) any new technology can be adopted if organisation can overcome initial resistance. In the developing world context cloud-based ERP can act as a whole new innovation from end users perspective considering that the IT usage and Cloud computing is still in its infancy. Thus there will be fear from the existing employee's perspective. The resistance to implementation of cloud-based ERP from SME perspective can be of different types. After a through analysis the following set of variables are considered.

3.5.1 Innovative resistance: data privacy

The data security and privacy has been the major pain point related to cloud computing since its inception. Hence it is obvious that cloud ERP will have challenges related security related vulnerabilities. In ERP, data is shared among different modules across the industry and business units. Thus data privacy is extremely important while dealing with cloud ERP software. In case of data hosted in public cloud environment there is always a chance of outflow of data leading to data privacy threat (Peng and Gala, 2014). Enterprises should discuss with cloud vendors to ensure stringent data privacy guidelines are followed (Saa et al., 2017). The hypothesis for data privacy is stated as:

Hypothesis 9 (H9) Data privacy (DP) is linked negatively to cloud ERP adoption intention (CI).

3.5.2 Innovative resistance: performance risk

The enterprises and the cloud data centres are located in different regions which require a fast network connection. In India there is a dearth of proper internet connection along with chances of subsequent power failures are high. This can hamper the performance of an Enterprise in the long run. Implementation of cloud ERP is always challenging and firms look for a substantial return on investment. The performance risk can significantly impact the deliverables of an enterprise and thus it can create a negative impact during cloud ERP adoption.

Hypothesis 10 (H10) Performance risk (PR) is linked negatively to cloud ERP adoption intention (CI).

3.5.3 Innovative resistance: operational cost

Cloud-based ERP systems have significant advantage over traditional ERP systems particularly for SMEs where there is a initial challenge of capital expenses which is not the scenario for big companies. But different research studies have pointed out that in certain cases the operational costs increases for small enterprises as they do not have separate IT teams to work on the new cutting edge technologies. Any problem in the cloud ERP software or bug can have a cascading effect on the enterprise output leading to financial losses. The existing legacy systems also need to be supported along with the cloud ERP as there is in some cases an issue in integrating the load legacy systems with the cloud ERP leading to additional expenses.

Hypothesis 11 (H11) Operational cost (OC) is linked negatively to cloud ERP adoption intention (CI).

Table 1 Definition of constructs and variables

Construct	*Definition*	*References*
Technical knowledge	Knowledge of existing employees in SME to operate cloud ERP package.	Lin and Lin (2008)
Top management support	Degree of willingness among top management to implement cloud ERP to accelerate growth	Young and Jordan (2008)
Competitive pressure	Pressure perceived by firm from peers within the industry.	Oliveria and Martins (2010)
Relative benefits	The degree to which an innovation is perceived as being better than the idea it supersedes	Rogers (2003, p.257)
Perceived complexity	'The degree to which an innovation is perceived as difficult to understand and use'	Rogers (2003, p.257)
Scalability	The extent to which innovation can help in scaling up the infrastructure as and when required.	Appandairajan et al. (2012)
Rapid implementation	The extent to which cloud ERP can be implemented rapidly and in ready to use state in a SME.	Abd Elmonem et al. (2016)
Visibility	The degree to which the results of an innovation are visible to others	Farmbach et al. (1998)
Data privacy	The extent to which there is a possibility of security breach in an organisation.	Peng and Gala (2014)
Performance risk	The degree to which day to day regular operation can get hampered due to cloud ERP problem.	Lim et al. (2016)
Operational cost	The extent to which operational cost can increase due to cloud ERP integration failure.	Ali and Gurd (2020)
Cloud ERP adoption	The willingness of SME to adopt cloud-based ERP.	Small (2016)

4 Research methodology

A research methodology refers to the systematic approach applied in research to determine the reliability of the various parameters considered in research and validity of

the same. A research methodology tries to explain what items chosen in the research and why the items are considered. In the cloud ERP research using the hybrid model, a set of hypothesis are developed according to prior studies and relevant to the SME developing world scenario and a questionnaire was developed. This was validated and reliability analysis was done in subsequent sections using statistics.

4.1 Research design

The research design has been developed to examine the hypothesised relationships. The Constructs are considered after doing through research of existing papers. The model proposed in this paper is a hybrid model which encompasses three different techniques to ensure it covers the maximum possible parameters based on previous research. The variables like relative benefits, perceived complexity, top management support are derived from research done by Premkumar and Roberts (1999), visibility adopted from Kendall et al. (2001), technical knowledge from Lin and Lin (2008), competitive pressure from Elbeltagi et al. (2013), scalability from Appandairajan et al. (2012), data privacy from Peng and Gala (2014), performance risk from Lim et al. (2016), operational cost from Ali and Gurd (2020) intention to adopt from Small (2016). Each variable has been measured in five-point Likert scale.

4.2 Data collection

Data collection has been done mainly online over email and phone. The questionnaire consisted of three sections. Section 1 has information related to the concerned SME, Section 2 comprised of the demographic information of the individuals participating in the survey, and Section 3 included the questions for different constructs in the research model. A pilot study has been done with ten samples to establish the feasibility and final questionnaire modifications done based on the initial assessment. Approx. 587 SMEs were contacted and after several analysis approx. 400 samples were deemed fit for analysis. The chief executive officers and officials from IT divisions mainly participated in the survey as they are the key decision makers as far as cloud ERP adoption is concerned.

4.3 Measurement tools

Existing tools that has been applied in different research work is used in this research. The constructs and name of variables has been modified in tune with the questionnaire that is suitable for Indian SMEs. SPSS Version 28 has been used to validate the data and the results.

4.4 Bias concern

During the survey it was ensured that response bias and method bias which significantly hampers the authenticity of data were avoided. The responders were assured of anonymity which helped in getting accurate responses. The correlation matrix result was also analysed and the outcome also revealed there was no bias in the collected data.

Table 2 Descriptive feature of respondents

Descriptive features of respondent enterprises		*Frequency (Respondents 400)*	*Percentage (%)*
Annual revenue size	Less than 10–20 Cr	194	48.5
	20–35 Cr	135	33.75
	35–50 Cr	37	9.25
	Approx 50 Cr	21	5.25
	More than 100 Cr	13	3.25
Number of employees	Less than 200	210	52.5
	200~499	59	14.75
	500~999	59	14.75
	1,000~4,999	36	9
	5,000~9,999	19	4.75
	More than 10,000	17	4.25
ERP package	SAP	104	26
	Oracle	96	24
	MS Dynamic	86	21.5
	RAMCO	66	16.5
	ODOO	48	12
Industry	Manufacturing	173	43.25
	IT/communications/services	85	21.25
	Finance	48	12
	Distribution	42	10.5
	Construction	32	8
	Others	20	5

5 Results

The analysis of collected data has been done using Statistical Package for Social Science (SPSS) Version 28. Testing of the structural model is done using the R^2, β, p-value. The significance obtained from coefficients table indicate multiple paths are valid between the dependent variable which is intention to adopt cloud-based ERP and the independent constructs taken into account. The goodness of fit value obtained is 0.628045 which is the square root of product mean AVE and mean R^2. The minimum AVE value has been higher than 0.5 for every variable considered in the research.

$$\begin{aligned} \text{GoF} &= \text{square root of } \left(\text{product Mean AVE and mean } R^2\right) \\ &= \sqrt{0.57 * 0.692} \\ &= 0.628045 \end{aligned}$$

The goodness of fit recommended values are 0.10, 0.25 and 0.30 for small, medium and big effects on variables if the minimum AVE is greater than 0.5.

Reliability is one of the most important factors in study the scale validity and the quality of the construct measures can be assessed using the reliability analysis (Churchill, 1979). The reliability analysis has been executed using the Cronbach alpha (Cronbach, 1951). The values greater than 0.7 are consider suitable for the Reliability analysis (Nunnally, 1978). According to other research work from Churchill (1979) any value above 0.5 and 0.6 can also be considered reliable. In Table 3, we have the Cronbach alpha values greater than 0.817 which infer that the final constructs in the study are reliable. All the AVE values are above 0.5 and thus they are acceptable (Fornell and Larcker, 1981). The CR values are all above 0.7 indicated the data considered are valid as well.

Table 3 Scale reliability analysis

Construct scale	*Items*	*Cronbach*	*AVE*	*CR*
Cloud technical knowledge (CK)	5	0.904	0.512214	0.838552
Top management support (MS)	4	0.907	0.546231	0.824799
Competitive pressure (CP)	4	0.887	0.514224	0.7589
Relative benefits (RB)	5	0.877	0.589883	0.850014
Perceived complexity (PC)	5	0.791	0.664458	0.907841
Scalability (SC)	5	0.785	0.542226	0.712745
Rapid implementation (RI)	5	0.894	0.565898	0.842339
Visibility (VI)	4	0.817	0.588675	0.80515
Data privacy (DP)	5	0.919	0.722105	0.890516
Performance risk (PR)	5	0.815	0.506631	0.750147
Operational cost (OC)	5	0.891	0.535406	0.773884
Cloud adoption intention (CI)	5	0.822	0.633253	0.838173

Table 4 Regression analysis on cloud adoption intention and influencing variables

R	0.832
R square	0.692
Adjusted R square	0.674
Standard error	0.42248
Significance	< 0.001
N	400

Model summary

Model	*R*	*R square*	*Adjusted R square*	*Std. error of the estimate*	*Change statistics*		
					R square change	*f change*	*df1*
1	0.832	0.692	0.674	0.42248	0.692	38.362	11

Model summary

Change statistics	
df2	*Sig. F change*
188	<.001

Table 5 KMO Barlett's test

KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy.		0.737
Bartlett's test of sphericity	Approx. Chi-square	3,643.872
	Df	66
	Sig.	0.000

Table 6 Correlation between the research constructs

CK	*MS*	*CP*	*RB*	*PC*	*SC*	*RI*	*VI*	*DP*	*PR*	*OC*
0.628										
0.537	0.77									
0.218	0.56	0.683								
–0.189	0.45	0.562	0.726							
0.482	0.37	0.421	0.631	0.83						
0.526	0.66	0.466	0.488	–0.34	0.65					
0.421	0.54	0.503	0.332	–0.21	0.63	0.55				
–0.363	–0.21	–0.07	0.37	0.307	–0.51	–0.43	–0.606			
–0.414	–0.39	–0.13	–0.21	0.463	–0.55	–0.32	0.51	0.54		
–0.319	–0.19	–0.14	–0.24	0.409	–0.48	–0.29	–0.413	0.42	0.468	

Table 7 Regression test output

Coefficients[a]								
Model		*Unstandardised coefficients*		*Standardised coefficients*	*T*	*Sig.*	*Collinearity statistics*	
		B	*Std. error*	*Beta*			*Tolerance*	*VIF*
1	(Constant)	–1.664	0.404		–4.119	< 0.001		
	VAR00001	0.846	0.083	1.052	10.216	< 0.001	0.313	3.195
	VAR00002	0.495	0.070	0.600	7.116	< 0.001	0.466	2.145
	VAR00003	–0.563	0.082	–0.651	–6.841	< 0.001	0.366	2.731
	VAR00004	0.383	0.091	0.399	4.205	< 0.001	0.368	2.715
	VAR00005	0.033	0.052	0.043	0.627	0.535	0.706	1.416
	VAR00006	0.659	0.096	0.700	6.842	< 0.001	0.318	3.149
	VAR00007	–0.014	0.064	–0.014	–0.225	0.823	0.813	1.230
	VAR00008	–0.155	0.097	–0.145	–1.595	0.119	0.404	2.477
	VAR00009	–0.271	0.073	–0.385	–3.718	< 0.001	0.309	3.234
	VAR00010	0.450	0.062	0.714	7.283	< 0.001	0.345	2.896
	VAR00011	0.038	0.043	0.060	0.891	0.379	0.734	1.363

Note: [a]Dependent variable: VAR00012.

The relationship between the constructs is high as indicated by *R* (0.832) in Table 4. The R square value is 0.692 indicating that the intention of using cloud ERP is quite high to the tune of 69.2% and it is statistically significant.

The KMO Bartletts test has been analysed and a value of 0.737 indicates that the factor analysis will be useful for the data.

5.1 Hypothesis test

The relationship between the dependent variable and the independent variables are analysed using multiple regression analysis. The hypothesis has been verified using the multiple regression analysis as well. The paper has analysed the multicollinearity among the independent variables as in regression model it is assumed that there should not be collinearity among the independent variables. Existence of multicollinearity is verified using the variance inflation factor or VIF. The VIF values in Table 7 are below 10. Likewise the independent variables all have tolerance values more than 0.1 indicating that there is no existence of multicollinearity in the model.

The relationships between the dependent variable cloud adoption intention (CI) are examined against the independent variables. The Hypothesis 1 is supported similar to Hypothesis 2, 3, 4, 6, 9 and 10 considering their p values less than 0.05 and the other Hypothesis vis. 5,7,8 and 11 are not considered as the *p* values are higher.

Table 8 Hypothesis testing

Hypothesis	*Path coefficient*	*t value*	*p value*	*Comments*
H1	0.846	10.216	< 0.001	Supported
H2	0.495	7.116	< 0.001	Supported
H3	–0.563	–6.841	< 0.001	Supported
H4	0.383	4.205	< 0.001	Supported
H5	0.033	0.627	0.535	Not supported
H6	0.659	6.842	< 0.001	Supported
H7	–0.014	–0.225	0.823	Not supported
H8	–0.155	–1.595	0.119	Not supported
H9	–0.271	–3.718	< 0.001	Supported
H10	0.45	7.283	< 0.001	Supported
H11	0.038	0.891	0.397	Not supported

6 Discussion on the results

The research work has been done on the Indian SMEs in the COVID era when the government has embarked on the strategy of self-reliance and provide maximum assistance to SME sector. There have been various changes impacting the economic condition due to COVID and multiple internal changes taken up by the government in last few years. In the international arena there has been certain alteration and to ensure the Indian SME sector remains competitive it is high time the SMEs leverage cloud ERP benefits and look forward for adoption as it provides myriad of opportunities. The proposed model is a hybrid framework using the TOE, DOI and TIR models with the constructs considered suitable for Indian SMEs. The research work has tried to determine and establish the relationship between the significant properties of the above mentioned

models after through analysis on the existing research and experience gathered during survey. The study also reflects the relevant factors for cloud ERP adoption in Indian context.

The validity of the research results has been analysed and it is found valid and within the permissible limits. According to the final test results it is found that cloud technical knowledge, top management support, competitive pressure, relative benefits, scalability, data privacy and performance risk have significance influence in adoption of cloud ERP from existing Indian SME perspective whereas perceived complexity, rapid implementation, visibility and operational cost are not having much significance as per cloud ERP adoption is concerned. It should be noted that though the current research did not find certain parameters insignificant in Indian SME context but in certain cases these constructs have a role to play as well.

In the research it was also determined that cloud ERP technical knowledge has been prominent and highlighted every time during the course of survey and analysis. Cloud computing can be considered as one of the latest technological advantages which has helped the various small players to gain foothold in the competitive environment. The disruption during COVID times had wrecked havoc in every industry but the ubiquitous nature of Cloud has ensured the business continuity in different sectors and there by benefitting the economy to certain extent. Cloud ERP is comparatively new in the Indian Industry context but has huge potential as the SMEs with lack of initial capital can implement cloud ERP to gain competitive advantage. Technical knowledge among the employees or among the IT team members is highly recommended so that proper decision can be taken on the type of ERP to be chosen, vendor and also during day to day operation.

Performance risk can also greatly influence the intention to adopt cloud-based ERP. An organisation implements ERP and expects a return on investment on the same. Likewise it is expected that cloud ERP will enrich the performance of an organisation to a great extent. Employees who are not acquainted with the latest technology should be given proper training to accept the new technology else there are chances of performance risk in the overall output thus creating a big challenge in daily operation. Instead of enhancing the overall performance a failure in proper implementation or operation can pose as a significant challenge to SME.

Cloud ERP is in its nascent stage. Top management is an important factor in cloud ERP adoption. In any organisation the top management support plays a vital role in decision making. Without the support from top management a successful cloud ERP implementation is not possible. Top management should also have understanding of cloud ERP system as it's a new technology and proper decision from top management can reap huge benefits and a poor decision can create repercussion in long run.

One of the most important advantages of cloud ERP is the scalability property. It is observed that demand in different SMEs is not constant and it can vary from time to time. There can be huge demand for certain industries in festive season leading to a sudden spike in demand and during other times there might be a lean period when business activity has been less. During the COVID situation it is found that there has been change in demand from time to time in business due to spike in COVID cases and lockdown. Hence, cloud ERP can act effectively and can scale up and down as per demand.

Decision on adoption on cloud ERP is taken considering the plethora of benefits it brings to an SME post implementation. Likewise it is found that relative benefit forms an important parameter in the current research. Cloud ERP brings in various benefits

compared to existing legacy or On Premise ERP systems. With expansion of business and spike in demand during certain period, cloud ERP systems can help SMEs with various benefits.

Data privacy has been found having significant impact in decision making on cloud ERP adoption. In the recent years there have been multiple instances of data theft by various organisations and lack of proper cloud security can create havoc to an organisation after it has moved to cloud. Thus organisations should ensure that proper data privacy and security is implemented during the course of implementation and it is checked and updated on regular basis to ensure the firewall in the systems are robust enough the repel any intrusion or outside attack.

Finally competitive pressure has been found to influence the adoption of cloud ERP systems among Indian SMEs. In the recent past the Indian market is facing stiff competition from inside as well as from outside India. Lack of infrastructure can have debilitating effect in the SME growth trajectory and organisations will face challenge in delivering finish product early in the market which will ultimately reduce the market share and competitive advantage of a SME. Thus the peer pressure from similar industries can influence the decision on cloud ERP adoption.

6.1 Implication of the research

In the modern era with increasing competition, the Indian SMEs need to utilise the latest technology to reap competitive advantage. SMEs who are in a position to embrace cloud-based ERP can withstand any competition. ERP and in particular cloud-based ERP can provide multiple advantages ensuring seamless flow of information while integrating different modules and processes thereby reducing redundancy and connecting suppliers, customers, technical users. The current research deals with a hybrid framework consisting of TOE, DOI and TIR and explored the different constructs playing crucial role in adoption of cloud ERP systems in Indian SMEs. The outcomes of the research will guide the decision makers in the SMEs to consider adoption of cloud-based ERP and subsequent implementation. This will also enable to stakeholders to identify the influencing factors and give proper importance in the areas identified in our research.

During the COVID-19 era the influence of cloud-based services has attracted the attention of various industries and particularly the Indian government has embarked upon the policy of self reliant by assisting the SMEs. The Indian SMEs in order to sustain in competitive environment should utilise the benefits of cloud-based ERP. Although a tool might be effective in theory but if the acceptance in the organisational level is low then it will be difficult to succeed. In Indian SME context this study analysed the various factors related to adoption and actual use of the cloud-based ERP. The COVID-19 has impacted the economy and developing countries are yet to come out of the devastating impact due to lockdowns. Throughout the world numerous economic packages are announced to help the economy turn around. It is been observed that the countries less impacted by COVID can take advantage of the situation and can progress faster as compared to others. Not only the prevailing grim economic situation but the developing nations SMEs are finding major challenges due to ever increasing technological sophistication and the changes in IT superhighway. ERP systems with the aid of open innovations can usher in phenomenal transformation by integration various operations and modules across the supply chain of an organisation. Cloud ERP with numerous advantages can help an organisation to

overcome the various challenges and deliver the products faster to the market and gain competitive advantages. The conceptual framework developed in this research can help organisations in developing countries to excavate the predictors of cloud-based ERP and the actual use of the same. An organisation implements ERP and expects a return on investment on the same. Likewise it is expected that cloud ERP will enrich the performance of an organisation to a great extent. Employees who are not acquainted with the latest technology should be given proper training to accept the new technology else there are chances of performance risk in the overall output thus creating a big challenge in daily operation. Instead of enhancing the overall performance a failure in proper implementation or operation can pose as a significant challenge to SME. The growth of SMEs across sector will have a direct influence in India's overall economy and it will help India to focus on the 5 trillion dollar economy as was envisioned before the start of the pandemic. This will ensure several job creations leading to overall improvement of society. The labour cost in India is still one of the cheapest across the globe. Though China is still considered as the world manufacturing hub but post COVID it has been observed that global companies are trying to consider India as their new manufacturing centre and there has been a quantum jump in the electronics sector in 2021 financial year.

6.1.1 Theoretical implications

The theoretical implications of this research are discussed herewith. A thorough analysis had been done in determining the motivating factors linked to cloud-based ERP adoption among SMEs in India. An empirical study had been done after developing an integrated hybrid model to find the variables that leads to cloud ERP adoption in Indian SMEs. TOE has been considered as it covers the three basic and pertinent areas in an enterprise. In the technology perspective, the study considers cloud knowledge as critical variable along with top management support from organisation standpoint and competitive pressure variable in environmental challenges viewpoint. The TOE framework alone cannot take the innovation aspect into consideration but since cloud ERP is considered a latest technology hence the innovation factor is needed in SME context. DOI framework has been assimilated with TOE to cover the innovation aspects. From Indian SME perspective after thorough study of extant literature, the study considered relative benefits, scalability, perceived complexity, visibility and rapid implementation as the critical variables. According to human psychology and developing nation context it has been found that there is a stiff resistance from the employees when ever enterprises try to introduce a new technology. Thus the hybrid framework cannot be considered as a comprehensive one if the resistance attitude is not taken into consideration. The theory of innovative resistance has been considered along with the existing TOE and DOI to cater to the concept of resistance. Since the inception of cloud computing, the data security and privacy had been considered as a major challenge for enterprises. This along with performance risk and operational cost are the variables considered in the TIR framework where existing employees can point out the deficiencies in cloud-based ERP software and might pose challenge while considering cloud-based ERP implementation. The target population of survey questionnaire is equally important. This was given a high importance since cloud ERP is a niche technology hence a handful of employees in organisation particularly in the IT department in SMEs were considered along with the top level management resources.

6.1.2 Societal implication

SMEs are considered as a backbone of any nation and particularly for developing nation like India it has a vital role to play. In the pandemic environment, there were multiple employees who lost their livelihood due to closure of different organisations. Indian Government has been trying hard and earmarked a huge amount of investment in the SME sector to revive them. It has also been found that several electronics manufacturing industries have started operations in India after 2020 and in order to gain competitive advantage the cloud-based ERP will play a vital role. The automation and integration along with the advantage of plugging in artificial intelligence in optimisation will help the Indian SMEs and thus creating new jobs and in turn will help in turning around the economy to a large extent. The rules and regulations needs to be modified so that SMEs can consider adoption of cloud ERPs as they were unable to use On Premise ERP due to the huge cost involvement. In the studies, the perceived complexity, visibility and rapid implementation did not find relevance. It might be that the top management in IT division in the Indian Enterprises are acquainted with the cloud environment and they are not considering it as a new challenge. This confidence will ensure that all the existing employees in the organisation can have the requisite support of the peers post cloud ERP implementation and the new technology will be welcomed without much hiccups. This will in turn reduce the fear factor of new technology among the employees. Cloud ERP though is in nascent stage and an innovative technology but still an employee having basic understanding of ICT skills can deliver with basic training. The training to employees needs to be done before go live to ensure the employees are well aware of the execution steps. Training materials and steps of execution should be shared with every employee so that they can easily verify the steps when there is any issue during execution in live production environment. A separate sandbox and training system should be made available for the employee for practice before directly working in the Production environment to avoid any untoward incident due to lack of skill leading to business blocking and subsequent losses. In the current research the performance risk has been considered as an important factor along with data security. There are chances that initially the performance in cloud ERP immediately after Go Live might be below the expectation but with proper handholding from the ERP vendor or implementation partner during the hyper care period this can be taken care off effortlessly. Along the information highway the above points indicate an overall growth and maturity of society in the digital era leading to progress.

6.1.3 Managerial implications

In the era of intense competition, uninterrupted innovation is a need of hour to gain economical advantage. Enterprises with innovation mindset in a concerted endeavour ensure the former to survive any competition. The cloud ERP system has the capability in integrating all the various modules and processes that ensure seamless flow of information and information there by reducing redundancy and gaining customer satisfaction with timely delivery in the most cost effective way. The current study utilised all the possible variables using the hybrid model to determine the critical actors responsible in adoption of cloud ERP among SMES in a developing nation like India. In this pursuit, the research recommends pragmatic implications for organisations, managers and professionals. The findings of this study will facilitate enterprises and SMEs the

determine the influencing factors covering all relevant possible frameworks like innovation, resistance, technology, etc. The present findings will facilitate the policymakers, IT professionals and cloud ERP providers to understand the requirements from developing nation context. The cloud ERP vendors can gain useful insights from the study and can customise the cloud ERP based on the SME requirements to entice more and more customers who had earlier shied away from implementing ERP. Unlike earlier studies the present study considered important factors like rapid implementation, performance risk, scalability, etc. which are core factors of cloud technology. The top management support in the form of training and guidance during failure can help in building confidence among new employees and it will prepare them in facing any sort of new challenges post Go Live. Top level management should also ensure that there is proper hypercare support post Go Live and there should be parallel execution before full transition to the SMEs IT department. A digital innovative product like cloud ERP cannot succeed without the full support from top management. This had been evident from the study. A proper communication from top management to all employees before the implementation can provide assistance in smooth transition to a great extent. Unlike the moderators considered in UTAUT2 models the current hybrid model in its study did not consider age, gender and race in the hybrid framework and this might be considered in future research.

7 Conclusions

The research has been conducted in the Indian subcontinent during the COVID era. The variables chosen for the different models are according to the existing research and keeping in view of the prevalent scenario in Indian SME context. The results are formulated based on the questionnaire collected from Indian SMEs and in certain cases the constructs may not be significant for other countries. Indian government is trying to support the SME sector due to the losses incurred during COVID pandemic and the SMEs can utilise the funds in developing IT infrastructure and implement cloud ERP to remain competitive. The pandemic has proven that cloud-based systems have been beneficial as simple internet connection can help in operation from anywhere. Also it is proven that cloud ERP systems are cost effective compared to traditional ERP and thus SMEs can implement cloud ERP without much initial capital expenses. The research has analysed and determined the important aspects for cloud ERP implementation and can facilitate other similar developing economies and their SMEs in decision making while adopting cloud ERP. The research work will enable the SMEs in adoption decision on cloud ERP systems. The research framework will also throw light on the fact as why some SMEs adopt cloud-based ERPs and others are still procrastinating on adoption. The cloud ERP service providers should interact with SMEs and provide information on the various advantages and help in eradicating any sort of misinformation related to cloud ERP.

References

Abd Elmonem, M.A.A., Nasr, E.S. and Geith, M.H. (2016) 'Benefits and challenges of cloud ERP systems – a systematic literature review', *Future Computing and Informatics Journal*, Vol. 1, Nos. 1–2, pp.1–9.

Abdollahzadegan, A., Che Hussin, A.R., Moshfegh Gohary, M. and Amini, M. (2013) 'The organizational critical success factors for adopting cloud computing in SMEs', *Journal of Information Systems Research and Innovation (JISRI)*, Vol. 4, No. 1, pp.67–74.

Aharony, N. (2015) 'An exploratory study on factors affecting the adoption of cloud computing by information professionals', *The Electronic Library*.

Ahn, B. and Ahn, H. (2020) 'Factors affecting intention to adopt cloud-based ERP from a comprehensive approach', *Sustainability*, Vol. 12, No. 16, p.6426.

Albar, A.M. and Hoque, R. (2017) 'Factors affecting cloud ERP adoption in Saudi Arabia: an empirical study', *Inf. Dev.*, Vol. 35, pp.150–164.

Ali, I. and Gurd, B. (2020) 'Managing operational risks through knowledge sharing in food supply chains', *Knowledge and Process Management*, Vol. 27, No. 4, pp.322–331.

Annabel, L.S.P. and Murugan, K. (2015) 'Energy-efficient quorum-based MAC protocol for wireless sensor networks', *ETRI Journal*, Vol. 37, No. 3, pp.480–490.

Appandairajan, P., Khan, N.Z.A. and Madiajagan, M. (2012) 'ERP on cloud: implementation strategies and challenges', in *2012 International Conference on Cloud Computing Technologies, Applications and Management (ICCCTAM)*, IEEE, December, pp.56–59.

Arnesen, S. (2013) 'Is a cloud ERP solution right for you?', *Strategic Finance*, Vol. 94, No. 8, pp.45–51.

Benlian, A. and Hess, T. (2011) 'Opportunities and risks of software-as-a-service: findings from a survey of IT executives', *Decision Support Systems*, Vol. 52, No. 1, pp.232–246.

Bildosola, I., Río-Belver, R., Cilleruelo, E. and Garechana, G. (2015) 'Design and implementation of a cloud computing adoption decision tool: generating a cloud road', *PloS One*, Vol. 10, No. 7, p.e0134563.

Carutasu, N. and Carutasu, G. (2016) 'Cloud ERP implementation', *FAIMA Business & Management Journal*, Vol. 4, No. 1, p.31.

Chang, Y.W. (2020) 'What drives organizations to switch to cloud ERP systems? The impacts of enablers and inhibitors', *Journal of Enterprise Information Management*.

Churchill Jr., G.A. (1979) 'A paradigm for developing better measures of marketing constructs', *Journal of Marketing Research*, Vol. 16, No. 1, pp.64–73.

Claudy, M.C., Garcia, R. and O'Driscoll, A., 2015. Consumer resistance to innovation—a behavioral reasoning perspective. Journal of the Academy of Marketing Science, 43(4), pp.528-544. (F21)

Cronbach, L.J. (1951) 'Coefficient alpha and the internal structure of tests', *Psychometrika*, Vol. 16, No. 3, pp.297–334.

Demi, S. and Haddara, M. (2018) 'Do cloud ERP systems retire? An ERP lifecycle perspective', *Procedia Computer Science*, Vol. 138, pp.587–594.

Duan, J., Faker, P., Fesak, A. and Stuart, T. (2013) 'Benefits and drawbacks of cloud-based versus traditional ERP systems', *Proceedings of the 2012–2013 course on Advanced Resource Planning*.

Elbeltagi, I., Al Sharji, Y., Hardaker, G. and Elsetouhi, A. (2013) 'The role of the owner-manager in SMEs' adoption of information and communication technology in the United Arab Emirates', *Journal of Global Information Management (JGIM)*, Vol. 21, No. 2, pp.23–50.

Elmonem, M.A.A., Nasr, E.S., Geith, M.H. and Ali, M. (2016) 'Benefits and challenges of cloud ERP systems – a systematic literature review', *Futur. Comput. Inform. J.*

Eze, S.C., Awa, H.O., Okoye, J.C., Emecheta, B.C. and Anazodo, R.O. (2013) 'Determinant factors of information communication technology (ICT) adoption by government-owned universities in Nigeria: a qualitative approach', *Journal of Enterprise Information Management*.

Faasen, J., Seymour, L.F. and Schuler, J. (2013) 'SaaS ERP adoption intent: explaining the South African SME perspective', in *Enterprise Information Systems of the Future*, pp.35–47, Springer, Berlin, Heidelberg.

Fornell, C. and Larcker, D.F. (1981) 'Evaluating structural equation models with unobservable variables and measurement error', *Journal of Marketing Research*, Vol. 18, No. 1, pp.39–50.

Frambach, R.T., Barkema, H.G., Nooteboom, B. and Wedel, M. (1998) 'Adoption of a service innovation in the business market: an empirical test of supply-side variables', *Journal of Business Research*, Vol. 41, No. 2, pp.161–174.

Gupta, S., Misra, S.C., Singh, A., Kumar, V. and Kumar, U. (2017) 'Identification of challenges and their ranking in the implementation of cloud ERP: a comparative study for SMEs and large organizations', *International Journal of Quality & Reliability Management*.

Jahanmir, S.F. and Cavadas, J. (2018) 'Factors affecting late adoption of digital innovations', *Journal of Business Research*, Vol. 88, pp.337–343.

Kaur, P., Dhir, A., Singh, N., Sahu, G. and Almotairi, M. (2020) 'An innovation resistance theory perspective on mobile payment solutions', *Journal of Retailing and Consumer Services*, Vol. 55, p.102059.

Kendall, J.D., Tung, L.L., Chua, K.H., Ng, C.H.D. and Tan, S.M. (2001) 'Receptivity of Singapore's SMEs to electronic commerce adoption', *The Journal of Strategic Information Systems*, Vol. 10, No. 3, pp.223–242.

Kim, S.K. (2018) *The Effect of Consumers' Innovation Resistance to FinTech Service on Intention to Recommend*, Doctoral dissertation, Kangwon National University.

Kinuthia, J.N. (2014) *Technological, Organizational, and Environmental Factors Affecting the Adoption of Cloud Enterprise Resource Planning (ERP) Systems*, Eastern Michigan University.

Knorr, W., Lehsten, V. and Arneth, A. (2012) 'Determinants and predictability of global wildfire emissions', *Atmospheric Chemistry and Physics*, Vol. 12, No. 15, pp.6845–6861.

Kuo, C.M., Chen, L.C. and Tseng, C.Y. (2017) 'Investigating an innovative service with hospitality robots', *International Journal of Contemporary Hospitality Management*.

Lal, P. and Bharadwaj, S.S. (2020) 'Understanding the drivers of cloud-based service adoption and their impact on the organizational performance: an Indian perspective', *Journal of Global Information Management (JGIM)*, Vol. 28, No. 1, pp.56–85.

Laukkanen, T. (2016)'Consumer adoption versus rejection decisions in seemingly similar service innovations: the case of the Internet and mobile banking', *Journal of Business Research*, Vol. 69, No. 7, pp.2432–2439.

Lim, T.M., Lee, A.S.H. and Yap, M.K. (2016) 'User acceptance of SaaS ERP considering perceived risk, system performance and cost', in *Information Science and Applications (ICISA) 2016*, pp.53–63, Springer, Singapore.

Lin, H.F. and Lin, S.M. (2008) 'Determinants of e-business diffusion: a test of the technology diffusion perspective', *Technovation*, Vol. 28, No. 3, pp.135–145.

Low, C., Chen, Y. and Wu, M. (2011) 'Understanding the determinants of cloud computing adoption', *Industrial Management & Data Systems*.

Mani, Z. and Chouk, I. (2018) 'Consumer resistance to innovation in services: challenges and barriers in the internet of things era', *Journal of Product Innovation Management*, Vol. 35, No. 5, pp.780–807.

Mezghani, K. (2014) 'Switching toward Cloud ERP: a research model to explain intentions', *International Journal of Enterprise Information Systems*, Vol. 10, No. 3, pp.46–61.

Moh'd Anwer, A.S. (2018) 'Towards better understanding of determinants logistical factors in SMEs for cloud ERP adoption in developing economies', *Business Process Management Journal*.

Mozammel-Bin-Motalab, A. and Al Mamun Shohag, S. (2011) 'Cloud computing and the business consequences of ERP use', *International Journal of Computer Applications*, Vol. 28, No. 8, pp.31–37.

Nunnally, J.C. (1978) 'An overview of psychological measurement', *Clinical Diagnosis of Mental Disorders*, pp.97–146.

Nylén, D. and Holmström, J. (2015) 'Digital innovation strategy: a framework for diagnosing and improving digital product and service innovation', *Business Horizons*, Vol. 58, No. 1, pp.57–67.

Oliveira, T. and Martins, M.F. (2010) 'Understanding e-business adoption across industries in European countries', *Industrial Management & Data Systems*.

Peng, G.C.A. and Gala, C. (2014) 'Cloud ERP: a new dilemma to modern organisations?', *J. Comput. Inf. Syst.*, Vol. 54, pp.22–30.

Poston, R. and Grabski, S. (2001) 'Financial impacts of enterprise resource planning implementations', *International Journal of Accounting Information Systems*, Vol. 2, No. 4, pp.271–294.

Premkumar, G. (2003) 'A meta-analysis of research on information technology implementation in small business', *Journal of Organizational Computing and Electronic Commerce*, Vol. 13, No. 2, pp.91–121.

Premkumar, G. and Roberts, M. (1999) 'Adoption of new information technologies in rural small business', *OMEGA – International Journal of Management Science*, Vol. 27, No. 4, pp.467–484.

Ram, S. (1987) 'A model of innovation resistance', in Wallendorf, M. and Anderson, P. (Eds.): *NA – Advances in Consumer Research*, Vol. 14, pp. 208–212, Association for Consumer Research, Provo, UT, USA.

Rogers, E.M. (1983) *Diffusion of Innovations*, Free Press, New York, NY.

Rogers, E.M. (1995) *Diffusion of Innovations*, Free Press, New York, NY.

Rogers, E.M. (2003) *Diffusion of Innovations*, 5th ed., Free Press, New York, NY.

Saa, P., Moscoso-Zea, O., Costales, A.C. and Luján-Mora, S. (2017) 'Data security issues in cloud-based software-as-a-service ERP', in *2017 12th Iberian Conference on Information Systems and Technologies (CISTI)*, IEEE, June, pp.1–7.

Saini, I., Khanna, A. and Kumar, V. (2012) 'ERP systems: problems and solution with special reference to small and medium enterprises', *International Journal of Research in IT and Management*, Vol. 2, No. 2, pp.715–725.

Salim, S.A., Sedera, D., Sawang, S., Alarifi, A.H.E. and Atapattu, M. (2015) 'Moving from evaluation to trial: How do SMEs start adopting cloud ERP?', *Australasian Journal of Information Systems*, Vol. 19.

Salleh, N.A., Hussin, H., Suhaimi, M.A. and Ali, A.M. (2018) 'A systematic literature review of cloud computing adoption and impacts among small medium enterprises (SMEs)', in *2018 International Conference on Information and Communication Technology for the Muslim World (ICT4M)*, IEEE, July, pp.278–284.

Salleh, S.M., Teoh, S.Y. and Chan, C. (2012) 'Cloud Enterprise systems: a review of literature and its adoption', in *PACIS*, July, p.76.

Sedera, D., Lokuge, S., Salleh, N.A.M., Moghavvemi, S. and Palekar, S. (2016) 'Spoilt for choice: when user-system relationship becomes one-to-many', in *Proceedings of the 37th International Conference on Information Systems (ICIS 2016)*, Association for Information Systems (AIS), pp.1–12.

Small, R. (2016) 'Factors affecting the adoption of enterprise resource planning (ERP) on cloud among small and medium enterprises (SMES) in Penang, Malaysia', *Journal of Theoretical and Applied Information Technology*, Vol. 88, No. 3.

Talwar, S., Talwar, M., Kaur, P. and Dhir, A. (2020) 'Consumers' resistance to digital innovations: a systematic review and framework development', *Australasian Marketing Journal (AMJ)*, Vol. 28, No. 4, pp.286–299.

Tornatzky, L.G. and Fleischer, M (1990) *The Processes of Technological Innovation*, Lexington Books, MA.

Tornatzky, L.G. and Klein, K.J. (1982) 'Innovation characteristics and innovation adoption-implementation: a metaanalysis of findings', *IEEE Transactions on Engineering Management*, Vol. 1, No. 1, pp.28–45.

Weng, F. and Hung, M.C. (2014) 'Competition and challenge on adopting cloud ERP', *International Journal of Innovation, Management and Technology*, Vol. 5, No. 4, p.309.

Young, R. and Jordan, E. (2008) 'Top management support: Mantra or necessity?', *International Journal of Project Management*, Vol. 26, No. 7, pp.713–725.

Young, R. and Jordan, E. (2008) 'Top management support: mantra or necessity?', *International Journal of Project Management*, Vol. 26, No. 7, pp.713–725.

Yun, J.J., Yang, J. and Park, K. (2016) 'Open innovation to business model: new perspective to connect between technology and market', *Sci. Technol. Soc.*, Vol. 21, pp.324–348.

Yun, J.J., Zhao, X. and Hahm, S.D. (2018) 'Harnessing the value of open innovation: change in the moderating role of absorptive capability', *Knowl. Manag. Res. Pract.*, Vol. 16, pp.305–314.

Zhao, S., Sun, Y. and Xu, X. (2016) 'Research on open innovation performance: a review', *Inf. Technol. Manag.*, Vol. 17, pp.279–287.