Journal of Global Information Management
Volume 28 • Issue 2 • April-June 2020

Organisational-Level Assessment of Cloud Computing Adoption:
Evidence from the Australian SMEs

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ABSTRACT

Cloud Computing (CC) is an emerging technology that can potentially revolutionise the application and delivery of IT. There has been little research, however, into the adoption of CC in Small and Medium-Sized Enterprises (SMEs). The indicators show that CC has been adopted very slowly. There is also a significant research gap in the investigation of the adoption of this innovation in SMEs. This article explores how the adoption of CC in Australia is related to technological factors, risk factors, and environmental factors. The study provides useful insights that can be utilised practically by SMEs, policymakers, and cloud vendors.

KEYWORDS

Adoption, Australia, Cloud Computing, Decision Making In SMEs, Partial Least Squares Structural Equation Modelling (PLS-SEM), Small And Medium-Sized Enterprises (SMEs)

INTRODUCTION

The downturn in today's economy is calling for affordable IT resources, especially for Small and Medium-Sized Enterprises (SMEs), and cloud computing (CC) is one of the promising technologies that can enhance the productivity and performance of businesses (Aljabre, 2012). This is the reason for SMEs to use cloud computing technologies; in that, it can offer low assets investment, elasticity, scalable systems, and vigorous business models (ENISA, 2009). Additionally, CC can assist in creating new opportunities for organisations (Babcock, 2010). Cloud computing offers various benefits, such as reducing complexity, cutting cost, and enhancing business performance, to organisations (Kochut et al., 2011). Despite these advantages, evidence suggests that the acceptance of this technology among Australian SMEs is low and lags behind other OECD countries (Minifie, 2014; MYOB, 2012; OECD, 2013). SMEs are characterized by unique aspects that include limited technical knowledge (Barry & Milner, 2002), scarce resources (Raymond, 2001), and inefficient organizational planning

DOI: 10.4018/JGIM.2020040104

(Raymond, 2001). SMEs choose low-cost technological resources to cater for their needs (Saini, Khanna, & Kumar, 2012). For SMEs in particular, the cloud computing can play a vital role in reducing the technological gap with large enterprises and increase competition with these enterprises through reducing the capital constraints and lack of technical knowledge (Michael et al., 2013).

Australian SMEs are the skeleton of the economy because they constitute 99.75% of the business economy and recruit 70% of the country's workers (ABS, 2013). This sector is crucial for the development of the country's economy. Innovation in this area is essential for leveraging productivity, increasing competitiveness, and for creating new business opportunities. Technologies play a vital role in providing opportunities for the advancement of SMEs (Minifie, 2014). SMEs investment capability in Information & Communication Technologies (ICT) is lower than large organizations, and CC could provide SMEs with affordable access to technologies which, until now, have been monopolized by the large organizations (Michael et al., 2013). Access to CC can potentially leverage SMEs IT resources (Hadidi, 2010), and this can increase their competitiveness and give them access to new markets. Cloud computing can assist in delivering innovation in products, services, and processes that can increase Australian competitiveness. The rate of innovation in a small firm is less than in larger firms (ABS, 2013). Cloud computing still has some challenges; such as security, privacy, trust, availability, and lock-in (Daniel, Chen, Liu, Wang, & Wei, 2014). Data privacy and security have the potential to be compromised because of the location of data centers in different legislative sites (Sahandi, Alkhalil, & Opara-Martins, 2012). According to recent surveys, businesses worldwide still believe that security is one of the main barriers facing CC (SolarWinds, 2016).

Previous studies focused mainly on the CC notion, its services, its deployment models, and security concerns from a technological viewpoint. Few studies have investigated CC adoption empirically using primary qualitative data (Alshamaila, Papagiannidis, & Li, 2013; Carcary, Doherty, & Conway, 2013), quantitative data (Hsu, Ray, & Li-Hsieh, 2014; Low, Chen, & Wu, 2011; Oliveira, Thomas, & Espadanal, 2014), or mixed method (Trigueros-Preciado, Perez-Gonzalez, & Solana-Gonzalez, 2013). The Asia Cloud Computing Association found that Australia's adoption of CC is low compared to other countries in Asia (ACCA, 2012). Other studies suggest a number of different factors could be behind this drawback: security concerns, top management support, and compatibility (Osorio-Gallego, Londoño-Metaute, & López-Zapata, 2016; Qian, Baharudin, & Kanaan-Jebna, 2016). The findings of these studies were not identical because the contexts of these studies were different. As well, different studies focused on different scopes and dimensions. For the technological adoption perspective in general, the literature suggests that decision making regarding the acceptance of new technologies is a complex process and it can be influenced by various factors (Palacios-Marqués, Soto-Acosta, & Merigó, 2015).

This paper argues that CC adoption in the context of Australian SMEs not necessarily influenced by similar factors as other types of technologies or even with other CC adoption investigations in other contexts. This is particularly due to the multifaceted nature of CC operational model as it has been indicated in the literature (Oliveira et al., 2014; Qian et al., 2016). El-Gazzar (2014) called for further empirical studies in CC adoption. In Australia, there has still not been any comprehensive study attempting to reveal the reasons for this by understanding the perception of SMEs. Hence, this paper aims to fill this research void by exploring the determinants of CC adoption in SMEs. In particular, the research model of this paper is centered on two grounded theories: Technology-Organisation-Environmental framework (TOE) and Diffusion of Innovation Theory (DOI), literature review and a prior qualitative study (add cite). This paper used a quantitative analysis methodology. The research model was empirically examined on a stratified sampling of 203 firms throughout Australia. The study used Partial Least Squares Structural Equation Modelling (PLS-SEM) to generate a model that predicts the relationships between latent constructs. This paper facilitates the proposition of a new model, based on the operationalization of four key driving constructs (i.e., Technological Factors, Risk Factors, Organisational Factors, and Environmental Factors) that have not been identified or described before in the literature. This paper is justified because it provides a theoretical exploration of how

the adoption of CC in Australia is related to Technological Factors, Risk Factors, and Environmental Factors. The study also contributes with valuable insight to SMEs, cloud vendors, policymakers, and the emerging knowledge in CC adoption in the SMEs sector.

BACKGROUND

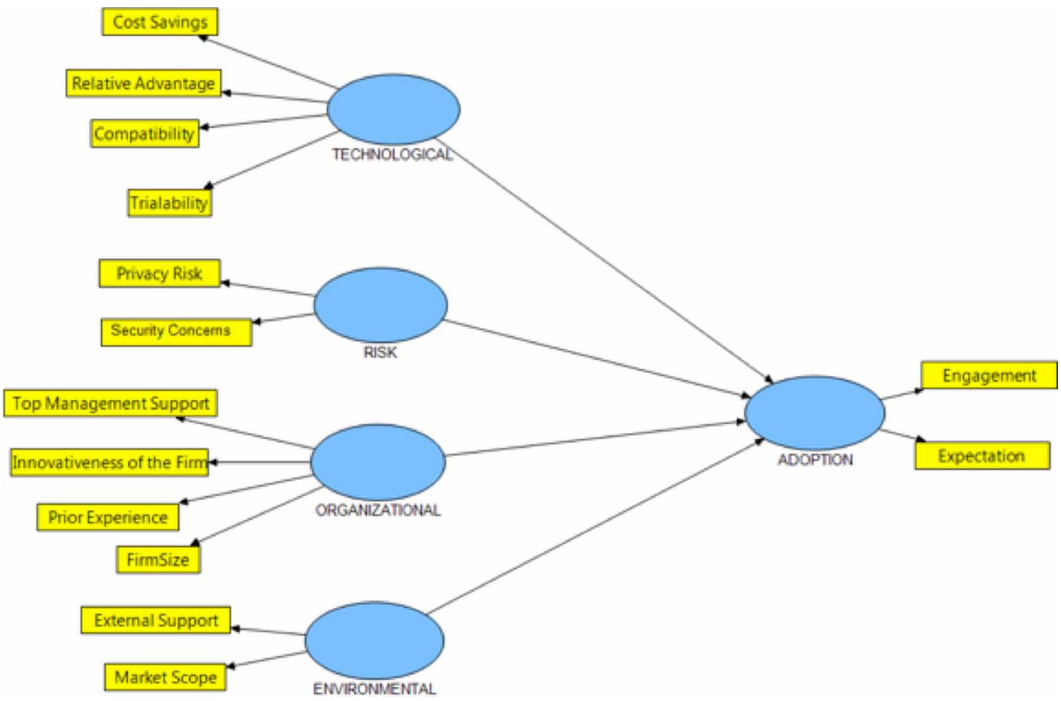
As mentioned earlier, this study is part of a larger research project, and the discussion of the selection justifications of the constructs and the theoretical foundation has been achieved in the first phase of the study (authors' citation). This paper presents a quantitative study that intends to validate the refined research model and the developed hypotheses. The technology acceptance model (TAM), another frequently used model, is an information systems theory that mainly models how users come to accept and use technology. However, perceived ease of use and perceived usefulness are two main constructs of TAM. It is not abundant and suitable enough for our study compared with the refined research model presented in Figure 1 which includes fourteen factors.

Prior Research in Cloud Computing Adoption by SMEs

Despite the benefits that CC can deliver, there are real challenges that hinder the pace of CC adoption in SMEs. Concerns exist regarding several issues such as cost savings, security issues, privacy issues, and integration with in-house systems. These are some of the known concerns from the literature. There may, however, be other unknown factors probably only specific to a certain type of economy, industry, and the kind of cloud services. Appendix A presents seminal studies on CC adoption.

From the technological perspective, the literature indicates the advantages realized by embracing new technologies are positive drivers to adoption of these innovations (Gangwar, Date, & Ramaswamy, 2015; Johnson, 2015). The same also was found with CC innovation adoption (Oliveira et al., 2014).

Figure 1. The research model



There is also contradictory results, for example, A. Lin and Chen (2012) study of CC adoption in high tech firms found that the perceived advantages of CC have no effect on the adoption of CC from an organizational perspective. It looks like there are some adverse outcomes. Additional studies will be useful to provide a better understanding. Other studies have stated the importance of the cost savings achieved by using advanced technologies (Oliveira & Martins, 2010; Sangle, 2011). Other scholars have emphasized the importance of compatibility as a driver in the spreading and acceptance of technologies (Cooper & Zmud, 1990; A. Lin & Chen, 2012; Low et al., 2011; Wang, Wang, & Yang, 2010; Wu, Cegielski, Hazen, & Hall, 2013). Researchers such as (Dwivedi, Papazafeiropoulo, Ramdani, Kawalek, & Lorenzo, 2009) have found that providing trial periods are essential for supporting the technologies.

From risk factors, prior studies in ICT (e.g., Osorio-Gallego et al., 2016) and CC perspectives (e.g., Catteddu & Hogben, 2009) revealed that the concerns of security and privacy are consequences caused by the introduction of new technologies.

From an organizational perspective, there are several factors which have been identified in prior studies as significant. These include top management support (H.-F. Lin & Lee, 2005; Wang et al., 2010), innovativeness of the firms (Ritchie & Brindley, 2005), firm size SMEs (Oliveira et al., 2014), and post IT experience (Plomp, Batenburg, & den Hertog, 2014). Conversely, other studies also saw the opposite in some of these factors (i.e. the organizational aspects are not important in the adoption decision) such as the study of Qian et al. (2016) which found that top management support is a driver for manufacturing firms but not the firms in the service sector. Oliveira and colleagues (2014) found that support from company management is significant with services firms but not manufacturing firms. It is apparent that this top management support has a reversing effect and there is a need for further investigation to reach a more concrete conclusion.

From the literature, it appears that CC is multifaceted in nature. Several factors can affect the decision to adopt this technology (El-Gazzar, 2014). Because of this, the study showed the applicability of TOE and DOI as the theoretical foundation of this kind of innovation as our previous study described it (author's citation). The two theories applied widely in ICT innovation (Thiesse, Staake, Schmitt, & Fleisch, 2011). Oliveira and Martins (2011) in their literature review about 'information technology adoption models at firm level' listed a number of theories that researchers applied in the literature, TOE, and DOI were among them. Oliveira et al. (2014) applied TOE and DOI on their assessment of CC adoption. Some scholars also extended the framework with additional factors and rejected some other original factors due to their insignificance to the context but the outcomes are not yet conclusive in the application of these frameworks in the paradigm of CC. From the literature review and our preliminary study, it looks like cloud adoption is largely driven by three aspects: technological factors, organizational factors, and environmental factors. After exploring the influence and importance of the factors in our earlier exploratory phase, we came out with new insights that led to the development of extra-dimensional factors and we call these risk factors. The risk factors included security concern and privacy risk due to geo-restrictions.

Cloud Computing Adoption in the Australian Perspective

The CC adoption paradigm is seldom investigated by the Australian SME's perspective. Surveying the literature we found only one relevant article discussed this topic. It is a recent article and it was published in the latest Australasia Journal of Information Systems, Volume 20 in 2016. The study focused on two factors which have an influence on the decision to adopt CC and they are cloud security and cloud privacy (Senarathna, Yeoh, Warren, & Salzman, 2016). The study used location as a control variable to assess if there is a difference between firms located in a regional or metropolitan area in the adoption of CC. They found that security, privacy, and location are not significant in the intention to adopt CC. According to Chutikulrungsee (2016), who did a post review of this paper, the new findings of security and privacy factors are interesting, but at the same time he suggested that they are 'curious' and 'unclear.' Because the results were indicating that "such well-documented

concerns overseas, are not evident in Australia, which is curious" and "what remains unclear is why the findings are contrary to those of the existing literature on CC adoption" (Chutikulrungsee, 2016, p. 1). This contradiction is the reason why Chutikulrungsee (2016, p. 1) suggested that future in-depth qualitative research needs to be conducted considering "the reasons behind these implications". For information, Chutikulrungsee 'post review' was published in the same journal. Without our prior knowledge about the existence of this study and coincidently our current study responded to most, if not all, of the concerns and recommendations suggested by (Chutikulrungsee, 2016).

The adoption of CC has not been explored enough in the context of Australian SMEs. Several reports have indicated that there is slow adoption of CC among Australian SMEs and it is behind other OECD countries. This includes a government report (e.g. Australian-Government, 2013) and leading professional organizations (e.g. Minifie, 2014). Adoption of CC can present new opportunities for Australian SMEs to gain access to affordable on-demand cutting-edge technologies. Understanding the current status of CC adoption within Australian SMEs is an essential investigation. This is the reason for this present research.

RESEARCH MODEL & HYPOTHESES DEVELOPMENT

The Hypothesis of the Technological Factors

The identified factors under this category are expected to have a positive effect on the acceptance of CC. Several studies have suggested the significance of the perceived advantages of the adoption of ICT innovations (Gangwar et al., 2015). Cloud computing is a tool that can help organizations in developing efficient business models (Chang, Bacigalupo, Wills, & Roure, 2010). Cloud computing technology is promising various benefits over providing scalable computing services to its clients (Leimeister, Böhm, Riedl, & Krcmar, 2010). This innovation reinvents the way the business is conducted, and how the products and services are delivered.

Cloud computing is a tool that can assist in lowering IT costs and reduce operational expenses. Perceived cost savings found to be essential in organizations adopting diverse technologies (Gupta, Seetharaman, & Raj, 2013). Gibson, Rondeau, Eveleigh, and Tan (2012) found that cost savings help in reducing capital expenses. The realized values will have a positive impact on adoption.

Compatibility is one of the factors in the DOI theory, and it was found to be significant in the adoption of IS in SMEs (Thong, 1999). Studies suggested that the compatibility factor of the computing technologies with the in-house technologies of the potential customers is an important aspect in the adoption of CC (Wang et al., 2010). Compatibility was a concern stated by nineteen IT professionals in Taiwan, as reported by (A. Lin & Chen, 2012). It was essential in manufacturing and retailing firms (Wu et al., 2013) and with high tech organizations (Low et al., 2011). There are other studies which have suggested that compatibility is not significant (Borgman, Bahli, Heier, & Schewski, 2013).

Trialability was identified as a significant driver with positive impact in various ICT studies such as enterprise systems in SMEs (Dwivedi et al., 2009), internet usage in teaching (Martins, Steil, & Todesco, 2004), and online technologies in education (Mohamad Hsbollah, Kamil, & Idris, 2009). The development of the NBN and the increase of global spending on CC are expected to influence the rate of CC in Australia. As CC is a promising technology for the enhancement of Australian SMEs' performance, we predict that:

H1: Technological factors will be positively related to the likelihood of CC adoption

The Hypothesis of the Risk Factors

Security issues are one of the concerns that have been widely reported in the literature (e.g., Catteddu & Hogben, 2009). Seethamraju (2015). The CC concept of delivering its services in a multi-tenancy model has the potential for increased security vulnerability (Schneiderman, 2011).

Data privacy and confidentiality were considered as possible risks in the acceptance of CC in various studies, because of fear and loss of control on the data stored on cloud vendors servers (e.g., Alkhater, Wills, & Walters, 2014; Catteddu & Hogben, 2009). The Australian Communication and Media Authority stated that the highest concern in CC among consumers is a lack of service security followed by a lack of trust in service providers (ACMA, 2014). These concerns imply that the unavailability of enough security and privacy will stop organizations from adopting CC. Hence, in this position, this paper predicts that:

H2: Risk factors will be negatively related to the likelihood of CC adoption

The Hypothesis of the Organisational Factors

Studies have shown the importance of various constructs under this dimension including top management support, innovativeness of the firms, firm size, and the firm's prior similar experience. Scholars suggested the vital role of the managerial support in the adoption of technological innovation, re-engineering of business processes, and change management (Wang et al., 2010).

Innovativeness and eagerness of the SMEs towards the experimentations of ICT innovation are valuable aspects of the migration to these technologies (Agarwal & Prasad, 1998; Ritchie & Brindley, 2005; Thong, 1999). The size of the firm can play an important role in the adoption. Some studies suggested the importance of this factor in SMEs (Oliveira et al., 2014). This factor was realized to be important in different aspects of SMEs such as high tech (Low et al., 2011) and manufacturing and services (Oliveira et al., 2014).

Previous ICT innovation adoption studies indicated the significance of organizations' experience in similar technologies in adoption (Plomp et al., 2014). Australia has a small contribution to global innovations (Daley, 2013) and innovativeness in the ways of delivering products and services through the using of CC could be a key to lifting the Australian lifestyle. Hence, we predict that:

H3: Organisational factors will be positively related to the likelihood of CC adoption.

The Hypothesis of the Environmental Factors

The two identified factors in this dimension are external computing support and market scope. The external computing support factor had a mixed finding in the literature. Some studies found it not to be important (Dwivedi et al., 2009) while other studies suggested the significance of this factor in the adoption process innovation (Gatignon & Robertson, 1989). In CC adoption we predict that this factor plays a major role in the adoption of cloud solutions.

Firms with horizontal business orientation and elevated diversification market scope tend to have a higher requirement for IT investment and are willing to accept new technologies (Zhu, Dong, Xu, & Kraemer, 2006). The real gross domestic product (GDP) growth of Australia is expected to drop in the coming years, and it is predicted to be 2.78% by 2020 from about 3% in 2017 (IMF, 2016). This could be a sign that Australian SMEs need to look for innovative tools for their businesses to remain competitive and deliver their products/services to new markets. For this reason, we predict that:

H4: Environmental factors will be positively related to the likelihood of CC adoption.

RESEARCH METHODOLOGY

In evaluating the hypotheses, a survey was conducted in Australia covering SMEs from different industries. A questionnaire was developed by a group of experienced people in the field of Information Systems. The constructs were operationalized using well-established literature that aided in ensuring

their validity. Careful consideration was given to the minor adjustment that was done to the instruments to capture the context of CC. The survey was managed using the Survey Monkey Audience tool to target and recruit SME decision makers in Australia. The recruitment resulted in 228 replies from potential respondents. Amongst the replies, only 203 SME managers provided valid answers to the questions.

Descriptive Analysis

The sample size was N = 203 respondents, with no missing values for any items. The descriptive statistics are summarised in Table 1.

Measurement Model Evaluation

The evaluation of the validity and reliability of the measurement model is satisfactory. The analysis results show that the construct validity (see Figure 2), convergent validity (see Table 2), discriminant validity (see Table 3), and internal consistency reliability (see Table 4)

In summary, a comprehensive set of diagnostic statistics, based on criteria recommended in the literature, were presented to validate the four second-order latent constructs using reflective indicators. These statistics confirmed that the multiple indicators used to operationalize each construct were highly correlated and covaried with each other: specifically (a) Strong construct validity (the factor loading coefficients (λ) for the indicators used to operationalize the reflective latent variables were greater than 0.5 ($\lambda = 0.526$ to 0.949); (b) High convergent validity (indicated by AVE > 0.5) (c) Good discriminant validity (because the cross loading coefficients for the indicators that were not specified to operationalize each latent variable were consistently weaker than the cross loading coefficients for the indicators that were specified to operationalize each latent variable); and (d) Good internal consistency reliability (all the composite reliability coefficients were > 0.7).

Structural Model Evaluation

The evaluation of the structural model was accomplished in three steps (1) test for multicollinearity; (2) significance of path coefficients; and (3) evaluation of effect size. Multicollinearity was analyzed

Table 1. Descriptive statistics (N = 203)

Variables	Min	Max	M	SD	Skew
Compatibility	1	7	4.37	1.25	-0.58
Cost Savings	1	7	4.32	1.19	-0.56
Engagement	1	5	2.46	1.55	0.54
Expectation	1	6	3.14	1.88	0.20
External Support	1	7	5.10	1.05	-0.19
Firm Size	1	3	1.84	0.88	0.32
Innovativeness of the Firm	1	7	4.21	1.35	-0.49
Market Scope	1	4	2.26	1.14	0.22
Prior Experience	1	7	4.11	1.33	-0.45
Privacy Risk	1	7	4.90	1.20	-0.09
Relative Advantage	1	7	4.41	1.15	-0.63
Security Concerns	1	7	4.75	1.18	-0.40
Top Management Support	1	7	3.66	1.34	-0.22
Trialability	1	7	4.28	1.26	-0.27

Figure 2. Results of construct validity

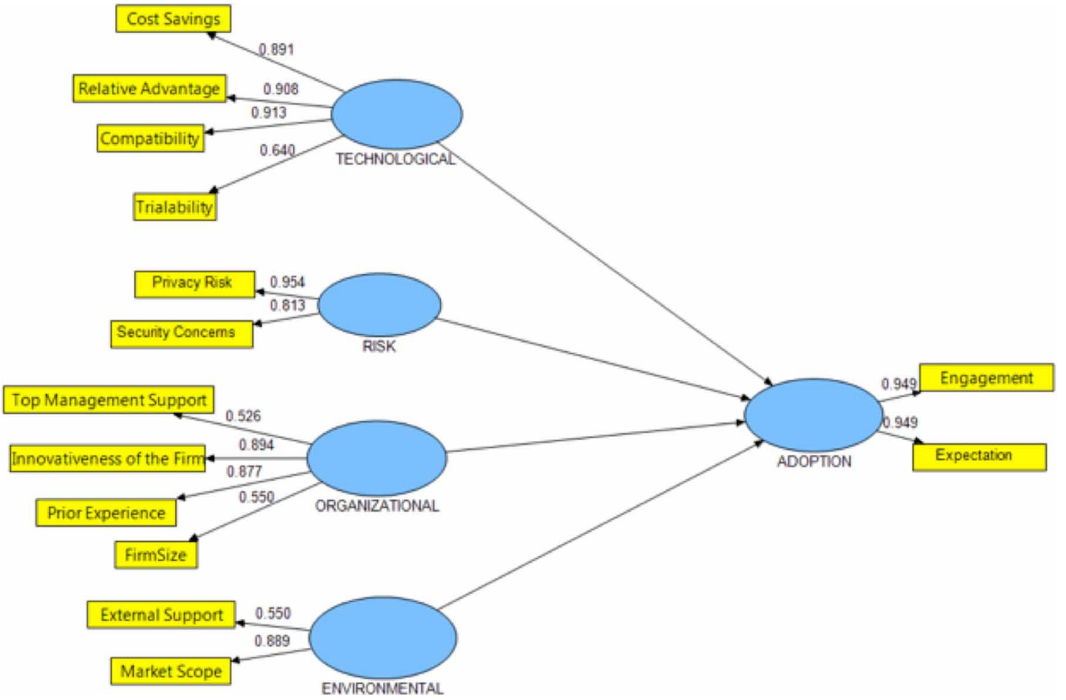


Table 2. Convergent validity

	AVE
Adoption	0.900942
Environmental	0.546321
Organisational	0.537271
Risk	0.784930
Technological	0.715465

using SPSS for all the indicators (see Table 5). All the tolerance values were > .2 and all the VIF values were < 5. Subsequently, using the criteria stated by Hair, Hult, Ringle, and Sarstedt (2014) the model was not risked by multicollinearity, and there was no need to merge or reject any of the indicators to eliminate or assess the correlations among the indicators.

The path coefficients (β) measuring the strengths of the predictive relationships between the four factors and Adoption (of Cloud Computing) are presented in Table 6. This table also presents the results of t-tests after bootstrapping to reveal the significance of each path coefficient. This table shows the testing results of the hypotheses.

The t-test statistics provided evidence to support three hypotheses at the 0.01 and 0.05 levels of significance: H1. Technological Factors are positive predictors of Adoption of CC; H2. Risk Factors are negative predictors of Adoption of Cloud Computing; and H4. Environmental Factors are positive predictors of Adoption of Cloud Computing. However, there was inadequate statistical evidence at the 0.1 significance level to support H3: Organisational Factors are positive predictors of Adoption of Cloud Computing. The strongest driver was Technological Factors (β = 0.333). Risk Factors (β =

Table 3. Cross loadings

	Adoption	Environ	Org	Risk	Tech
Compatibility	0.494189	0.21286	0.615006	-0.0292	**0.912875**
Cost Savings	0.380056	0.285098	0.510661	-0.08694	**0.890972**
Engagement	**0.949152**	0.247875	0.388339	-0.12783	0.433228
Expectation	**0.949207**	0.218622	0.379442	-0.11837	0.455538
External Support	0.123376	**0.550044**	0.11365	0.451684	0.234783
Firm Size	0.258149	0.199824	**0.550157**	-0.04797	0.256456
Innovativeness	0.367639	0.236934	**0.894286**	-0.06402	0.613352
Market Scope	0.224892	**0.888872**	0.249823	0.086089	0.216135
Prior Experience	0.353373	0.220438	**0.877497**	-0.06838	0.618483
Privacy Risk	-0.1406	0.255392	-0.109417	**0.953633**	-0.06513
Relative Advantage	0.431471	0.305905	0.601745	0.010347	**0.908335**
Security Concerns	-0.07262	0.251191	-0.017748	**0.812677**	0.075428
Management Support	0.127917	0.045291	**0.525989**	-0.10283	0.320721
Trialability	0.178937	0.167571	0.474112	0.102295	**0.640013**

Note: The bold value highlights represent the operationalized loadings for each latent variable

Table 4. Internal consistency reliability

	Composite Reliability
Adoption	0.947890
Environmental	0.695297
Organisational	0.814195
Risk	0.878833
Technological	0.908032

-0.156) and Environmental Factors ($\beta = 0.158$) were relative less strong determinants of Adoption. Organizational Factors ($\beta \approx 0$) was not found to be a significant predictor of CC adoption. The R^2 value was 0.269, implying that 26.9% of the variance in the Adoption of CC was explained by the model. Using the criteria of Ferguson (2009), this R^2 value indicates that the consequences of the analysis have practical implication in social science perspective, with "moderate" effect size.

DISCUSSION

The study provides useful insights for different stakeholders in Australia including SMEs, cloud vendors, technological consultation organizations, and policymakers. The study found that three contextual dimensions: technological, risk and environmental influence the decision in CC adoption. In contradiction with other studies, organizational factors were not considered to be critical in the decision to adopt CC.

Table 5. Test for multicollinearity between indicators

Indicator	Collinearity Statistics	
	Tolerance	VIF
Compatibility	.322	3.109
Cost Savings	.314	3.189
External Support	.656	1.526
Firm Size	.847	1.181
Innovativeness of the Firm	.316	3.161
Market Scope	.881	1.135
Prior Experience	.336	2.979
Privacy Risk	.517	1.936
Relative Advantage	.270	3.708
Security Concerns	.541	1.849
Top Management Support	.751	1.331
Trialability	.570	1.753

Table 6. Testing of hypotheses

Hypothesis	β	t
H1: Technological Factors are positive predictors of Adoption of Cloud Computing	0.333	4.513***
H2: Risk Factors are negative predictors of Adoption of Cloud Computing	-0.156	2.482**
H3: Organisational Factors are positive predictors of Adoption of Cloud Computing	0.133	1.773*
H4: Environmental Factors are positive predictors of Adoption of Cloud Computing	0.158	2.613**

Note: Significantly different from zero (***: $p < 0.01$; **: $p < 0.05$; *: $p < 0.1$.).

Theoretical Implications

This paper contributes to the growing knowledge in CC adoption literature by analyzing the determinants influencing the adoption and by highlighting the significant level of various factors. The study responded to the research gap about the investigation of the adoption of CC in SMEs considering the context of Australian organizations. This study deemed significant due to the fact that Australian SMEs sector constitutes 99.75% of the organizations in the country and employees 70% of the workforce (ABS, 2013). Also, because technologies are important in providing opportunities for the advancement of SMEs (Dibrell, Davis, & Craig, 2008). Furthermore, CC can play a vital role in reducing the gap and increase competition with larger enterprises through reducing the capital constraints and lack of technical knowledge (Michael et al., 2013) This study provided an empirical investigation of CC at the organizational level. The study highlights the key factors in the adoption of CC. This helps in increasing the awareness of decision-makers by showing the extent of the impact of the factors. A large number of previous studies were conceptual (e.g., Ghaffari, Delgosha, & Abdolvand, 2014), and few studies considered in applying various dimensions to investigate the adoption of CC. This study adopted a multi-perspective approach and responded to the call of (El-Gazzar, 2014) for further theoretical, methodological, and empirical research in exploring CC adoption.

This paper provides a theoretical exploration of how the adoption of CC in Australia is related to technological factors, risk factors, and environmental factors. Contrary to previous studies (e.g.,

Oliveira et al., 2014), findings show that organizational factors are not significant in the decision to adopt CC. The most influential factors were found to be technological factors, risk factors, and environmental factors, respectively. No study identified, described, or validated these four constructs (or dimensions) in the way that they were modeled in this paper. The exploratory nature of this research and the newly generated model underpins its originality.

This study also examined various industries and found that they have different motives for CC adoption. This suggests that industry type cannot be used as a control variable in CC adoption. The study thus demonstrates the need for further research in analyzing the determinants of CC at the industry level. Previous studies focused mainly on a specific industry such as high-tech industry (Low et al., 2011) and some on particular cloud services such as PaaS as presented by Seethamraju (2015) study. This study was broader in investigating different industries and various cloud services.

Practical Implications

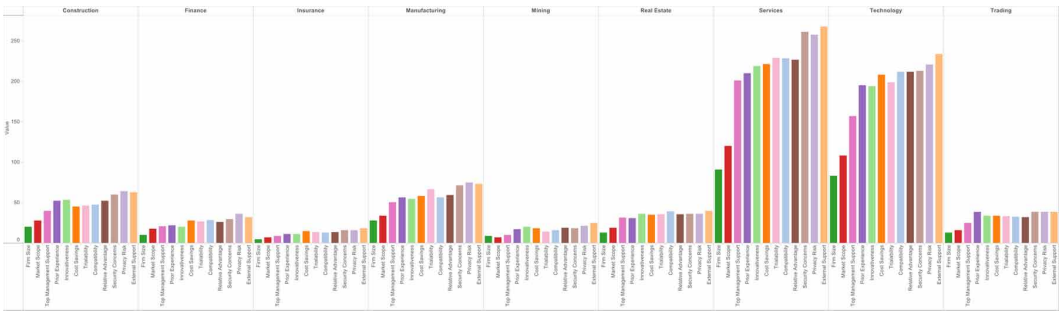
This study provides useful insights for cloud service providers, consultants, SMEs, and policymakers. These stakeholders can use the validated framework in aiding cloud adoption in SMEs. Figure 3 demonstrates the impact of the variables in various industries.

The study provides the SMEs decision makers with knowledge about CC. It is a roadmap that can help SMEs to minimize their risks in their decision in the migration to CC. It also gives SMEs the opportunity to value their position in CC from other firms and decide on their path forward. The findings are advantageous in appreciating CC and provide managers with a better position in their evaluation of cloud services.

This study helps cloud vendors in understanding why the adoption rate, solution types, and drivers are different from industry to industry. CSPs and other concerned organizations such as IT consultants can promote the drivers of cloud adoption and solve the issues that have been identified by this study such as security and privacy.

Policymakers should be able to design policies that encourage SMEs in embracing robust cloud solutions. They can make the necessary effort in making broadband and Internet speed accessible to everyone in the country and most importantly at an affordable rate. It is essential to differentiate the pricing policies of Internet connectivity and CC of this sector due to its lower characterized investment capabilities from the other economic sectors. It is also crucial for promoting and implementing a benchmark level of security and privacy for cloud services offered by local cloud vendors whenever possible.

Figure 3. The key findings by industries



CONCLUDING REMARKS

The authors acknowledge that this study has some limitations. One of the key limitations was in the focus of only Australian SMEs. Future research can consider in broadening this research to investigate the paradigm in other geographical environments and make a comparison of the findings. This research explored some of the pertinent factors but there is a prospect to widen the model further by investigating other facets. With the fast change in the market and the innovation, there is a need for longitudinal research to assess the stimulus of the new advancement of the technology and the market condition. This study used a single informant approach for data collection, with its advantages but there are also restraints of one-person reflection on a topic. Future studies could consider collecting responses from various people in an organization. The results of PLS-SEM do not confirm or explain why the identified factors are predictors of the adoption of CC. Because the model was derived from cross-sectional survey data, the results do not imply the existence of any cause and effect relationships. Future research will be necessary to support the results of this exploratory research.

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