

# Cloud Computing Adoption Factors and Processes for Enterprises

## *A Systematic Literature Review*

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**Keywords:** Cloud Computing, Adoption, Implementation, Integration, Evaluation, IT Governance, Decision, Cost, Security, Regulations, Enterprise.

**Abstract:** Cloud computing (CC) has received an increasing interest from enterprises since its inception. With its innovative Information Technology (IT) services delivery model, CC could add technical and strategic business values to enterprises. However, it poses highly concerning, internal and external, issues. This paper presents a systematic literature review to explore cloud computing adoption processes in the context of enterprise users and the factors that affect these processes. This is achieved by reviewing 37 articles published about CC adoption. Using the grounded theory approach, articles are classified into eight main categories: internal, external, evaluation, proof of concept, adoption decision, implementation and integration, IT governance, and confirmation. This is concluded in two abstract categories: CC adoption factors and CC adoption processes whereas the former affect the latter. The results of this review indicate that there are serious issues need to be tackled before enterprises decide to adopt CC. Based on the findings of this review, the paper provides future Information Systems (IS) research directions toward the previously under-investigated areas regarding the phenomenon. This involved the call for further theoretical and in-depth empirical contributions to the area of CC adoption by enterprises.

## 1 INTRODUCTION

CC is receiving a notable interest from enterprise users nowadays. It could revolutionize the way enterprises acquire and manage their needs from computing resources efficiently and cost-effectively. Thus, enterprises are able to focus on their core business activities; consequently, productivity is increased (Garrison et al. 2012). The adoption of CC is growing rapidly due to the scalability, flexibility, agility, and simplicity it offers to enterprises (Parakala and Udhas, 2011); (Herhalt and Cochrane, 2012); (Venters and Whitley, 2012). A recent survey by (RightScale, 2013) on the adoption rates of CC by enterprises reported that 77% of large enterprises are adopting CC while 73% of small and medium enterprises (SMEs) are adopting CC. CC is defined by the National Institute of Standards and Technology (NIST) as “a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service

provider interaction” (Hogan et al. 2011, p.14). Cloud service providers offer three different service models depending on the enterprise’s requirements (i.e., Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), and/or Infrastructure-as-a-Service (IaaS)). CC service models share five common essential characteristics of CC (i.e., on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service). CC services can be deployed in one or combination of the four deployment models (i.e., public, private, community, or hybrid) (Mell and Grance, 2011). A recent survey reported that 61% of enterprises are currently using public clouds while 38% are using private clouds and 29% are using hybrid clouds (RightScale, 2013).

In spite of its appealing benefits for enterprises, CC arouses serious technical, economic, ethical, legal, and managerial issues (Marston et al., 2011); (Venters and Whitley, 2012). This review is important for two reasons. First, it complements the previous literature that focused more on technical issues of CC with less attention to business issues regarding the adoption of CC (Yang and Tate, 2012). Second, it systematically offers detailed

perspectives on CC adoption factors and processes as CC has unique attributes that involve not only technical and managerial aspects, but its use also needs to comply with legal issues (Heiser and Nicolett, 2008). Further, there is a lack of in-depth studies about issues related to CC adoption process in the context of enterprise users (Yang and Tate 2012); (Timmermans et al., 2010).

The purpose of this paper is to systematically review the extant literature in IS research with an attempt to answer these two questions: what are the processes of adopting CC by enterprises? And what are the factors that affect these processes? Therewith, the under-investigated issues are identified and future IS research pathways are proposed accordingly. This review is important for two reasons.

The remainder of this paper is organized as follows: Section 2 presents the methodology followed for conducting the systematic literature search process and classification schemes adopted. Section 3 presents the findings from the review. Implications for future IS research are discussed in Section 4. Conclusions of this review are presented in Section 5.

## 2 RESEARCH METHOD

This paper aims at conducting a systematic literature review method to represent the current state of IS research regarding CC adoption issues in the context of enterprise users. This literature review process is following the fundamental guidelines for conducting an effective literature review by (Webster and Watson, 2002); (Levy and Ellis, 2006); (vom Brocke et al., 2009). This literature review process is done within boundaries (Webster and Watson 2002). The contextual boundary is within the scope of CC adoption by enterprise users, as there are significant issues need to be addressed before enterprises start using clouds (Marston et al., 2011). The temporal boundary of this review covers the published articles in all previous years until August 2013.

### 2.1 Literature Search Process

Literature search process of this review involved querying seven quality scholarly literature databases (AISEL, IEEE Xplore, ScienceDirect, EBSCOhost, ProQuest, Wiley online library, and ACM digital library). These databases provide access to IS leading journals and high quality peer-reviewed IS conferences (Levy and Ellis, 2006). The search

criterion was limited to articles' titles to ensure the relevance of the articles. The phrases used for searching all the seven databases are 'cloud computing' and 'adopt\*'. This initially resulted in 69 articles.

The practical screen involved, manually, reading the abstract of the articles to decide their relevance to the research question raised by this review. Further, the filtering criteria involved the exclusion of recurring articles, research-in-progress articles, articles that are not written in English, periodical articles published by news websites, and trade journals and magazines. These exclusion criteria are defined to delimit the sample of articles so that the literature review becomes practically manageable (Okoli and Schabram, 2010). Eventually, this resulted in 37 articles ready for the classification.

### 2.2 Classification Scheme

The reviewed articles are classified according to the research methods to identify how adequately the adoption of CC is researched. Research methods used in the reviewed articles are lab experiment, field inquiry, Delphi study, interviews, descriptive research, case study, and survey. Some articles were labelled under 'conceptual paper', as they did not have a methodology section and providing some concepts or adopting theories without an empirical testing.

This review sought to develop a classification scheme to better gain insights from the preceding academic contributions to the area of CC adoption. Classification of the 37 articles according to cloud adoption issues involved using bottom-up Grounded Theory (GT) approach (Glaser and Strauss, 1967). GT approach is said to be valuable for conducting a rigorous literature review (Wolfswinkel et al., 2011), "instead of force-fitting the data to an a priori theory" (Rich 2012, p.3).

The classification process involved a close reading of the articles. Then, the open coding is utilized to and resulted in labelling 28 concepts. Next, the axial coding is applied and resulted in grouping the 28 subcategories into eight corresponding categories (i.e., internal, external, evaluation, proof of concept, adoption decision, implementation and integration, IT governance, and confirmation). Then, selective coding was applied to integrate the eight main categories and resulted in two abstract categories: cloud adoption factors (i.e., internal and external) and cloud adoption processes (i.e., evaluation, proof of concept, adoption decision, implementation and integration, IT governance, and

confirmation) whereas the former influence the latter (see Figure 1). To avoid a coarse analysis, these factors and processes are elaborated in more details in this review.

### 3 FINDINGS

The mapping of articles to the grounded classification scheme and research methods is demonstrated in Table 1.

**CC Adoption Factors.** Comprise internal and external factors that have impact on CC adoption processes.

**External Factors.** This comprises factors related to the outside social environment in which the enterprise operates, and by which its CC adoption is influenced. The adoption of CC is, arguably, surrounded by different levels of environmental and inter-organizational uncertainties (Cegielski et al., 2012). There is a wide emphasize on the importance of government regulations at the national and international levels (Espadanal and Oliveira, 2012); (Nuseibeh, 2011); (Nkhoma et al., 2013). In spite of their role to facilitate the CC adoption securely, the lack of government regulations can hinder enterprises from adopting the cloud (Nkhoma et al., 2013); (Luoma and Nyberg, 2011). Some regulations, such as Sarbanes-Oxley Act (SOX) for corporate accounting data and Health Insurance Portability and Accountability Act (HIPAA), have been enacted before CC being increasingly adopted and they might not be sufficient to facilitate its adoption (Kim et al., 2009). However, some countries started to enact laws specific to CC such as cloud first policy in the USA and cloud computing strategy by the Australian government (Bhat, 2013). The inconsistency of international government regulations is a further concern. Some countries tend to restrict enterprises to store their data in cloud infrastructure only if it is within the borders (Jensen et al., 2011). For instance, the EU's privacy laws prohibit the exchange of personal information outside the users' jurisdiction (McGeogh and Donnellan 2013). This because of cloud providers running outside their home country must comply with the host country's regulations and government surveillance which is difficult for enterprises to cope (Abokhodair et al., 2012); (Bhat, 2013). In line with this, standards are also cited to be an important factor for dealing with enterprises' concerns about security and interoperability of cloud solutions (Nuseibeh, 2011); (McGeogh and Donnellan, 2013).

Although they are still missing in the puzzle of CC picture for enterprises (Bhat, 2013); (Lin and Chen, 2012); (Nkhoma et al., 2013), some efforts to develop security standards took place. For instance, Cloud Security Alliance (CSA)'s document Security Guidance for Critical Areas of Focus in Cloud Computing for managing CC risks (McGeogh and Donnellan, 2013). Eventually, cloud providers would have to comply with government regulations and industrial standards to gain liability, reputation, and trustworthiness among their potential and present enterprise users (Bhat, 2013).

Cloud providers are required to be transparent in explaining information to enterprises about possible benefits and risks from adopting CC (Dargha, 2012). Cloud providers build their reputation by their experience in managing enterprises' needs and concerns in a responsible manner (Jensen et al., 2011); (Malladi and Krishnan, 2012); (Nuseibeh, 2011). This is enabled by delivering the promised benefits from CC to enterprises and protecting their data from potential threats including fate sharing in case the cloud provider went out of business (Iyer et al., 2013); (Nuseibeh, 2011). Further, cloud providers' demonstration of successful business cases and models is likely to enable CC adoption decision (Lin and Chen, 2012); (Alshamaila and Papagiannidis, 2013). Cloud providers might trigger a major concern to if they outsource some of their services to another service provider (Nuseibeh, 2011). Observing business partners perceiving benefits from using CC is proved to be an important motive towards its adoption (Low et al., 2011); (Lin and Chen, 2012). Business partners' request, with power, the enterprise to adopt CC to keep on collaboration with them (Cegielski et al., 2012). Additionally, competitors play an effective role in incentivizing enterprises to adopt CC for gaining market visibility, operation efficiency, and new business opportunities (Espadanal and Oliveira, 2012); (Borgman et al., 2013), especially when the enterprise operates in a high-tech rapidly changing industry (Low et al., 2011); (Alshamaila and Papagiannidis, 2013). However, competitors pressure may not be relevant to SMEs as they are concerned about other CC adoption issues (Alshamaila and Papagiannidis, 2013).

**Internal Factors.** This comprises the enterprise's internal characteristics and capabilities that affect its CC adoption process. The enterprise's willingness to invest in and use CC both financially and organizationally is claimed to be an important indicator for the adoption of CC (Espadanal and Oliveira, 2012); (Rath et al., 2012). This depends on

the role of the top management's IT knowledge and capability of providing the suitable organizational climate for adopting CC (Bharadwaj and Lal, 2012); (Borgman et al., 2013; Alshamaila and Papagiannidis, 2013). Top management activities involve: (1) understanding of CC and its architecture, service models, and strategic values (Luoma and Nyberg, 2011); (Espadanal and Oliveira, 2012); (Misra and Mondal, 2011). (2) identifying enterprise's business needs and aligning IT decisions with business strategies (McGeogh and Donnellan, 2013); (Subramanian, 2012). (3) evaluating the readiness of the existing IT infrastructure, IT knowledge and skills of the human resources, available resources, and culture (Luoma and Nyberg, 2011); (Borgman et al., 2013); (Espadanal and Oliveira, 2012). (4) holding the steering wheel towards CC adoption (i.e., decide adoption strategy, govern integration and implementation, and evaluate cloud services after use) with the guidance of external regulatory and professional bodies (Morgan and Conboy, 2013); (McGeogh and Donnellan, 2013). Additionally, firm size is an important factor to CC adoption (Espadanal and Oliveira, 2012); (Borgman et al., 2013); (Low et al., 2011). A survey study conducted in Taiwan indicated that large enterprises are likely to adopt CC (Low et al. 2011). Contrarily, a survey study in India indicated that SMEs can benefit the most (Rath et al., 2012). Large enterprises are claimed to have sufficient resources to afford on-premise solutions (Borgman et al., 2013). Enterprises need to further ensure compliance of CC solutions with the internal (i.e., corporate policies) and external (i.e., regulations and standards) constraints (Morgan and Conboy, 2013); (McGeogh and Donnellan, 2013); (Borgman et al., 2013).

is said to be a crucial factor affecting CC adoption; as they may be involved in strategic IT decisions, their understanding of CC is very important (Borgman et al., 2013); (Low et al., 2011); (Espadanal and Oliveira, 2012). Likewise, IT employees would have to adjust their skills and be aware of CC benefits and risks and how to deal with the risks instead of being overprotective (Morgan and Conboy, 2013). Another factor affecting CC adoption decision is the enterprise's prior experience and familiarity with similar technologies such as virtualization (Alshamaila and Papagiannidis, 2013).

CC Adoption Processes. Are processes that enterprises normally follow to adopt CC along with responsibilities and challenges faced in each process.

Evaluation. Prior to CC adoption, the top management is responsible for evaluating the enterprise's suitability for adopting CC as well as the suitability of CC for the enterprise (Misra and Mondal, 2011); (Lin and Chen, 2012). This includes: (1) evaluating costs and benefits associated with CC such as profitability, comparing the revenue generated from the firm's IT resources with the revenue expected from CC, ROI, cost of migration and integration, and cost of implementation (Misra and Mondal, 2011; (Celine) Hoe et al., 2012). (2) evaluating the impact of CC on people and business processes (McGeogh and Donnellan 2013). (3) evaluating the internal readiness of the enterprise, existing IT infrastructure and IT human resources, for adopting CC (Low et al., 2011). (4) selecting the cloud service provider based on cloud provider's capability to provide a robust security controls, enterprise's understanding of issues related to the control over the data, the type of service model needed, and the perceived cloud provider's honesty, reputation, and sustainability (Onwudebelu and Chukuka, 2012); (Bharadwaj and Lal, 2012).

Proof of Concept. Trying cloud services prior to the actual adoption to evaluate its applicability for the enterprise is likely to convince the enterprise to adopt CC (Lin and Chen, 2012). Trialability proved to have a positive impact on the adoption of CC (Alshamaila and Papagiannidis, 2013). There is a wide agreement on the significant influence of perceived benefits and risks on the adoption of cloud services (Alshamaila and Papagiannidis 2013); (Iyer et al., 2013). A survey study reported that the management's perception of security, cost-effectiveness, and IT compliance are likely to have a significant impact on the decision to adopt CC (Opala and Rahman, 2013). CC brings plenty of benefits that are relatively convincing for enterprises

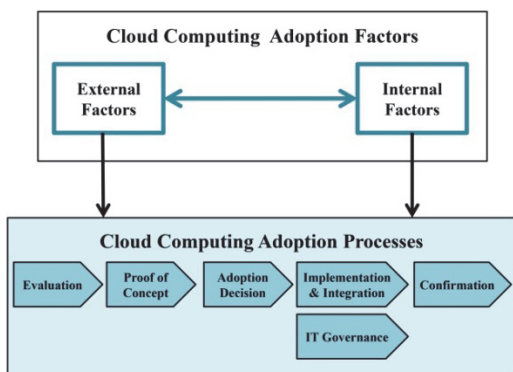


Figure 1: Cloud Computing Adoption Factors and Processes.

Further, the cloud/IT skills of non-IT employees

to adopt it (i.e., cost savings, agility, flexibility, ease of use, scalability, facilitating collaboration between business partners, less operational effort on Chief Information Officers (CIOs), and increased productivity) (Borgman et al., 2013); (Malladi and Krishnan, 2012); (Nkhoma et al., 2013); (Lin and Chen, 2012). With all these appealing benefits, yet some SMEs are still negative to adopt CC services (Alshamaila and Papagiannidis, 2013). They are concerned about various types of risks (Jensen et al., 2011); (Nkhoma et al., 2013); (Lin and Chen, 2012); (Iyer et al., 2013): (a) policy and organizational risks: this covers the risk of vendor and data lock-in. (b) technical risks: this includes loss of data, downtime, and cyber-attacks. (c) Legal risks: this includes data protection regulations and licensing issues. (d) Non-technical risks: this refers to the misuse of cloud services and natural disasters.

According to a survey study in India on four sectors (SMEs, education, banking, hospital) showed that vendor risk was dominating among SMEs and education sectors, while security risk was dominating among banking and hospital sectors (Iyer et al., 2013). Regarding performance risks, moving a huge amount of data to cloud servers takes a long time, and when moving further in the adoption, this will require increasing bandwidth and connectivity which is costly (Morgan and Conboy, 2013).

**Adoption Decision.** When deciding to adopt CC services, the top management is involved in: (1) evaluating core business requirements and competencies (Subramanian, 2012). (2) determining what data and applications should move to the cloud (i.e., critical vs. non-critical data and applications) (Kim et al., 2009); (Misra and Mondal, 2011); (Kantarcioğlu et al., 2011). (3) evaluating the strategic value of CC such as agility by delivering strong coordination IT capabilities, process management maturity, and reduced operational burden on CIOs so they can focus on strategic activities (Malladi and Krishnan, 2012). (4) planning for implementation of CC systems; the managerial time required to plan and implement cloud solutions was not problematic (Rath et al., 2012), while the problem was the planning for implementation of specific deployment models that suite the current applications (Dargha, 2012). (5) selecting the right service model based on the enterprise's needs (Bamiah et al., 2012); (Onwudebelu and Chukuka, 2012). (6) selecting deployment models based on the sensitivity of the applications; if the applications are determined to be core, then they should be deployed on a private cloud, and if the applications are

determined to be non-core, then they should be deployed on a public cloud (Dargha, 2012). Another study suggests the core applications should not be deployed on the cloud at all (Kim et al. 2009). (7) negotiating cloud service contract and SLA with the cloud provider based on the sensitivity of the data (Misra and Mondal, 2011), and reaching an agreement on data ownership, data confidentiality, risk management, contract terms and termination effect, location of the data, and guarantee of service availability (Tsai et al., 2010); (Onwudebelu and Chukuka, 2012).

**Implementation and Integration.** Compared to on-premise approach, cloud systems can be implemented and running in 24 hours instead of six months (Morgan and Conboy, 2013). Thus, implementation of cloud systems is not problematic for enterprises, while integrating cloud systems with the enterprise's existing IT infrastructure can negatively impact their adoption of CC (Morgan and Conboy, 2013). Further, the use of cloud system by IT staff is straightforward, while it is challenging for the non-IT staff. This can be attributed to the degree of complexity of cloud systems in terms of the ease of understanding, use, and implementation or integration of cloud services. Although CC proved to be easy to understand and use, it arouses integration complexity issues (Borgman et al., 2013). Complexity is claimed to be a barrier to the adoption of CC (Lin and Chen, 2012); (Espadanal and Oliveira, 2012); (Low et al., 2011); (Borgman et al., 2013). Integration problems emerge from the less standardized interoperability between cloud systems and the existing IT infrastructure which triggers integration cost (Borgman et al., 2013). Incompatibility of cloud solutions with existing IT infrastructure can be a barrier to the adoption of CC (Low et al., 2011).

**IT Governance.** The loss of IT governance within the enterprise appeared to be a major concern because the data and applications are under the control of the cloud provider (Onwudebelu and Chukuka, 2012); (McGeogh and Donnellan, 2013). Enterprises are advised to conduct audit trail meetings with the cloud provider to ensure risk free implementation of cloud solutions that complies with regulations, standards, and enterprise policies (Morgan and Conboy, 2013). This is enabled by the top management through IT governance structures (i.e., federal or centralized) and processes (i.e., request, prioritize, fund, monitor, enforce, and realign) (Borgman et al., 2013). Contrarily, IT governance processes in highly regulated industries will decelerate the adoption of CC (Borgman et al.,

2013). Likewise, IT governance processes might hinder the adoption if the integration of cloud solutions with the existing infrastructure appeared to be difficult (Borgman et al., 2013).

Despite the massive advancements in securing the cloud, yet these security solutions are not tested extensively (Misra and Mondal, 2011). This matter could be dissolved by IT governance initiatives to ensure that enterprise policies, security standards, and legal requirements are met (Borgman et al., 2013; Morgan and Conboy, 2013). IT governance is attained by identifying responsibilities, for instance, “the cloud provider is responsible for the security of the hypervisor and below, while the customer’s responsibility begins at the operating system level and above” (McGeogh and Donnellan, 2013, p.4). While in some cases, data security at the level of PaaS and IaaS service models is a shared responsibility between the cloud service provider and the adopting enterprise (Bamiah et al., 2012). Furthermore, pursuing traceability and auditability are cited to have impact on CC adoption (Morgan and Conboy, 2013). Cloud providers are required to provide traceable access controls to govern (i.e., who can access what object under which conditions) that can be validated, by top management, for its conformity to internal and external constraints (Morgan and Conboy, 2013). These controls are used to ensure data integrity and confidentiality (Onwudebelu and Chukuka, 2012); (Morgan and Conboy, 2013).

In regard with risk management during the planning for CC implementation, a study suggests that the enterprise should consider evaluating the risk of storage damage, data loss, and network security (Tsai et al., 2010). For instance, the enterprise would maintain an on-site backup of the data moved to the cloud (Kim et al., 2009). Eventually, securing enterprise’s information from potential risks is more than processes, technical solutions, and people; it is an enterprise wide security strategy to orchestrate these various elements (Opala and Rahman, 2013).

Confirmation. Only one study proposed a model for implementation and confirmation stages in adopting CC (Dargha, 2012). This study suggests the evaluation of cloud services based on the perceived attributes from using cloud services (i.e., relative advantage, complexity, compatibility, and trialability) to decide whether to continue on using cloud services or not.

## 4 DISCUSSION AND FUTURE RESEARCH AVENUES

This article sought to review the current state of IS research regarding CC adoption in the context of enterprise users. The review involved classifying the extant literature into CC adoption factors and processes that emerged from the reviewed articles along with research methods employed. This review shows that no IS journal articles found yet contributing to this research area. While few IS conference articles appeared to contribute to the understanding of CC adoption. On the other hand, articles from other disciplinary journal and conference outlets were dominant in investigating the phenomenon.

Table 1 indicates a lack of in-depth field and case studies regarding CC adoption processes compared to the CC adoption factors, while the quantitative (i.e., surveys) studies and conceptual articles are dominating. However, the majority of these theoretical attempts have not been tested yet. For instance, a study proposed, theoretically, a CC adoption assessment model that considers criteria for selecting the cloud service provider but this model has not been tested empirically yet (Nasir and Niazi, 2011). Hence, further qualitative research needs to be undertaken to explore further issues and test empirically the previous theoretical developments regarding this area. Consequently, this triggers questions on the IS research round table: Why enterprises adopt CC in spite of its potential risks? Or reversely, why enterprises do not adopt CC in spite of its potential benefits? These questions need to be investigated thoroughly using multiple qualitative case studies in different contexts (i.e., countries and industries) to better understand CC adoption factors and processes. Noteworthy, all the reviewed articles study cloud adoption issues in a list-like broad perspective. Therefore, there is a need for interpretive case studies to investigate each of the issues found from this review (Walsham, 1995).

Obviously, Table 1 shows that CC adoption processes received less attention from IS researchers in terms of exploring the challenges faced in each process and how enterprises cope with these challenges for risk free adoption of cloud services. Further, there is a conflict regarding the relationship between the firm’s size and the likelihood to adopt CC which needs more in-depth studies to address this conflict. Further, CC is recognized as a cost reduction solution, however, this cost reduction may not be significant particularly in SMEs sector as reported by a survey study conducted in India (Iyer

Table 1: Mapping of articles to classification scheme and research methods.

Classification Scheme		Research Methods																				
		Lab Experiment	Field Study	Case Study	Delphi Study	Survey	Interviews	Conceptual Paper	Literature Review													
Cloud Computing Adoption Processes	Cloud Computing Adoption Factors	Confirmation																				
		IT Governance	(Tsu et al. 2010)		(Megeogh & Donnellan 2013), (Morgan & Conboy 2013)					(Opala & Rahman 2013)		(Borgman et al. 2013)		(Owudebelu & Chukuka 2012), (Mitra & Mondal 2011), (Kim et al. 2009)								
		Implementation & Integration			(Morgan & Conboy 2013)				(Lin & Chen 2012), (Low et al. 2011)		(Borgman et al. 2013)		(Espadanal & Oliveira 2012)									
		Adoption Decision	(Tsu et al. 2010)						(Malladi & Krishnan 2012), (Rath et al. 2012), (Luo 2013)				(Subramanian 2012), (Kim et al. 2009), (Mitra & Mondal 2011), (Kantarcioğlu et al. 2011), (Dargha 2012), (Owudebelu & Chukuka 2012), (Jensen et al. 2011)									
		Proof of Concept	(Tsu et al. 2010)		(Abshamaila & Papagannidis 2013), (Bharadwaj & Lal 2012), (Morgan & Conboy 2013), (Saeed & Iahad 2013)				(Lin & Chen 2012), (Iyer et al. 2013), (Opala & Rahman 2013), (Malladi & Krishnan 2012), (Nikhoma et al. 2013), (Lin & Chen 2012), (Gupta et al. 2013), (Rawal 2011), (Luo 2013), (Stankov et al. 2012)		(Borgman et al. 2013)		(Subramanian 2012), (Nuseibeh 2011), (Owudebelu & Chukuka 2012), (Jensen et al. 2011), (Chang et al. 2013)									
		Evaluation	(Abshodair et al. 2012)		(Megeogh & Donnellan 2013), (Bharadwaj & Lal 2012)				(Lin & Chen 2012), (Low et al. 2011)					(Mitra & Mondal 2011), (Céline Hoo et al. 2012), (Owudebelu & Chukuka 2012), (Dargha 2012), (Kantarcioğlu et al. 2011), (Nasir & Nazri 2011)								
		Internal		(Abshodair et al. 2012)	(Abshamaila & Papagannidis 2013), (Bharadwaj & Lal 2012), (Megeogh & Donnellan 2013), (Morgan & Conboy 2013), (Saeed & Iahad 2013)		(Laoma & Nyberg 2011)		(Rath et al. 2012), (Rawal 2011), (Low et al. 2011), (Yang et al. 2012)		(Borgman et al. 2013), (Yang et al. 2012)			(Espadanal & Oliveira 2012), (Nuseibeh 2011), (Kim et al. 2009), (Blair 2013), (Jensen et al. 2011), (Subramanian 2012), (Chang et al. 2013)								
		External		(Abshodair et al. 2012)	(Megeogh & Donnellan 2013), (Abshamaila & Papagannidis 2013), (Saeed & Iahad 2013)				(Cegielski et al. 2012), (Laoma & Nyberg 2011)						(Espadanal & Oliveira 2012), (Nuseibeh 2011), (Kim et al. 2009), (Blair 2013), (Jensen et al. 2011), (Dargha 2012), (Chang et al. 2013)							

et al., 2013). Likewise, when the enterprise maintains an on-premise backup, this adds to the

cost as well (Kim et al., 2009). Moreover, there is a need for further exploring the impact of IT

governance processes throughout the implementation process. There still plentiful legal, ethical and inter-organizational or institutional issues need to be investigated regarding improvements of laws and standards. It would be insightful to investigate internal readiness and selection of cloud provider issues in the context of SMEs and/or large enterprises.

Further, if CC helps enterprises reduce IT-related costs, then how significant will be this cost reduction? Further studies should explore the impact of vendor and cloud solutions compatibility, trialability, and observability on the adoption of cloud services. Trust issues are not addressed extensively in the reviewed articles although it is claimed to be important for a successful adoption of CC (Garrison et al., 2012). In spite of its appealing merits it brings to enterprises (i.e., cost savings, flexibility, efficiency, agility and so forth), CC puts enterprises in a decisive choice between on-premise and on-demand approaches. In this regard, the Delphi method would provide insights for IT managers about what are the most important issues, and their priorities, that shall be considered when deciding to adopt cloud solutions (Dalkey, 1972). Another issue to consider, if CC releases enterprises from managing the IT infrastructure so they can focus on their core business activities, then what data and applications should be moved to the cloud and what should remain in-house? Delphi studies can be appropriate for providing recommendations for practice regarding internal preparation, service model selection, and contract negotiation issues. Finally, this review advocates the need for conducting longitudinal studies to assess the impact of CC implementation on both technical and managerial capabilities of the enterprise (i.e., integration with existing IT infrastructure, planning, risk management, and IT governance) as well as the impact of the confirmation process on the organizational innovation.

## 5 CONCLUSION

This paper sought to conduct a systematic review of the extant literature regarding issues related to CC adoption process in the context of enterprise users. This involved exploring the under-investigated issues and the contributions of IS research regarding the phenomenon. The classification of reviewed articles, findings, and implications for future IS research is achieved according to research methods and CC adoption factors and processes that emerged

from the utilized grounded theory approach. Yet, plentiful legal, ethical, and technical, and managerial issues waiting for IS researchers to explore. Thus, the paper suggested a future IS research agenda based on the discussed findings. This article is not free of limitations; it sought to review only academic articles from seven literature databases leaving white papers, magazine articles, other scholarly literature databases, and articles from forward and backward search which would help capturing more issues about CC adoption by enterprises. The search criteria might be limited as some articles discuss CC adoption entitled with different words (i.e., utility computing or application service provision) that may not have been included in the search results of this review.

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