



## Adoption of Cloud-based Accounting by SMEs: Revisiting the Benefits, Risks and Motivations: A New Zealand Context Exploratory Study

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### Abstract

Cloud-based accounting systems have existed for over a decade and have been adopted by many SMEs. The purpose of this paper is to revisit the benefits, risks and motivation for the adoption of cloud-based accounting systems by SMEs in a New Zealand setting. The starting point for the study was a model that was developed in the early days of cloud-based accounting systems that had a technical phase and a business phase.

Data was collected for this study through conducting interviews with participants who were experienced users of a cloud-based accounting system. These interviews included an exploration of the reasons for adopting a cloud-based accounting system, and the benefits and risks associated with using a cloud-based accounting system.

One of the key findings is the way in which security is not only perceived to be a risk of SMEs adopting cloud computing, but also a benefit. The findings will be of use to those advising SMEs on the adoption of cloud computing and will form the basis for a more extensive quantitative study.

**Keywords:** Cloud Computing; Accounting Software; SMEs

### Introduction

The concept of cloud computing has been identified as a major change in the way users store, access, and use information [6] in that data can be hosted in the “cloud” which has been described as being a “nebulous assemblage of computers and servers accessed via the internet” [24]. The adoption of cloud-based accounting systems has seen a number of benefits, risks and motivations for adoption.

Firstly, the saving comes from reduced costs from the service providers having to maintain only a single, centrally hosted, software [14]. This single software is then used by multiple subscribers, instead of the traditional way of supporting clients separately and individually [14]. The second saving comes from the clients themselves not having to spend a substantial cost

upfront for purchasing end user product of an industrial scale [14] as clients pay a much smaller subscription fee [14].

A study conducted in 2009 [26] identified a number of issues to be considered when SMEs are making a decision whether or not to adopt a cloud-based accounting system. This model included a business phase and a technical phase that are shown in figure 1 and figure 2 respectively.

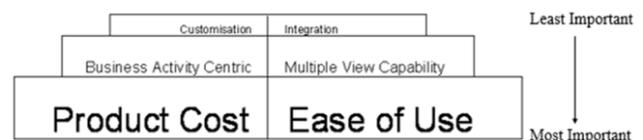


Figure 1: Business Phase of Original Model [26].

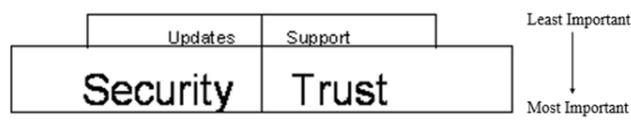


Figure 2: Technical Phase of Original Model [26].

The purpose of this paper is to present an analysis of the experiences of seven (7) small and medium sized enterprises (SMEs) that have adopted a cloud-based accounting system. This includes an exploration of the motivations for adopting a cloud-based accounting system, and the benefits and risks associated with using a cloud-based accounting system. The outcome of this is the development of a model that includes the motivations, benefits and risks associated with the adoption of cloud-based accounting systems by SMEs.

### Research question

**This paper seeks to answer the research question:**

“What are the most significant motivations, risks and benefits associated with SMEs adopting cloud-based accounting systems?”.

### Literature Review

The literature review that follows covers three (3) topics connected with the research question for this study: the motivations and factors relating to the adoption of cloud-based accounting systems; the benefits of adopting cloud-based accounting systems; and the risks associated with adopting cloud-based accounting systems.

### Motivations and factors relating to the adoption of cloud based accounting systems

An approach to the motivations and factors relating to innovations of which cloud-based accounting systems are one can be seen in the Diffusion of Innovation (DOI) theory [30]. The DOI theory proposes five attributes that explain the adoption of innovation in an organisation [30].

The DOI attributes set out [30] include relative advantage, compatibility, observability, complexity and trial-ability. Of these attributes the relative advantage attribute has relevance to this research in that adopters of cloud-based accounting may be

motivated by the potential benefits that exist. The compatibility attribute which relates to the degree to which an innovation can be assimilated into the existing business processes, practices, and value systems [30] has relevance when it comes to issues such as the ease of use, with this also relating to the complexity attribute which refers to the difficulty in using the innovation [30].

The trial-ability attribute is present in the context of this research as most providers of cloud-based accounting systems for SMEs allow for a free trial period which is consistent with the concept of the ease of experimenting with the innovation [30]. The observability attribute is also present in the context of this research as the use of cloud-based accounting by small businesses can enable external stakeholders, mainly in the form of chartered accountants and auditors to have access to the accounting records of the business. This is consistent with the concept of observability being visible to others [30].

A recently published study [21] cited the most common motivators for the adoption of cloud-based accounting included the relative advantages/perceived benefits/functionality of cloud computing [1,16,18], with the most common deterrent to adoption being security and privacy concerns [1,7,15,18-20,32].

### Benefits of adopting cloud based accounting systems

SMEs are increasingly realising that gaining fast access to the best business applications or boosting dramatically their infrastructure resources can be done by simply tapping into cloud computing, all at negligible cost to their operations [31]. Other benefits that are also easily recognised in the beginning are the elimination of the necessity to install and run the application on the computer hardware and the reduction on workload for maintenance, on-going operation, and support of the software [25]. In addition to cost savings, the ability to manage from anywhere at any time from any web-enabled devices also offers flexibility and greater control over time management [8].

Specifically, cloud computing offers five key advantages [23]. First, it lowers the cost of entry dramatically for smaller firms trying to benefit from compute-intensive business analytics previously available only to the biggest of firms. Second, it can provide access hardware resources almost immediately with no upfront capital investment for users. Third, it can lower IT barriers

to innovation. Fourth, it makes it easier for enterprises to scale their services according to client demand. Fifth, it makes new classes of applications possible and delivers previously not possible services like parallel batch processing and business analytics.

One study conducted in 2012 [13] found that the principal benefits of cloud computing have three aspects, with the first of these being the relative straightforwardness of deployment; the second being that of financial flexibility; and the third being that of progressively managed functionality.

In a recent study [21] one of the main benefits that was cited was that of authorised users being able to remotely access via an internet browser [4,5,10,17,28].

### Risks associated with adopting cloud based accounting systems

In a study conducted in 2013 [15], many micro businesses and SMEs were still unsure regarding cloud-based technologies and as a result, whether to follow the trend and adopt the technology.

Cloud-based systems may have been presented as the path to the future and touted as an inevitable progress but some still feel reserved about adopting cloud-based solutions for their companies, citing reasons of it being a disruptive technology, that is yet to achieve maturity, and with the lack of conformity to industry-specific standards. This brings with it a perception of high risks and hence, costs to the business [27]. Moreover, the lack of knowledge of cloud computing kept many companies in the dark as mentioned already, unable to discern its benefits, let alone its shortcomings, to see if it is suited for their organization [33].

Other concerns arise from what is dictated by its nature: it is the fact that cloud computing (which includes cloud-based accounting) is browser-based, where it serves as the interface between users and the software. Malicious attempts at compromising security no longer require a complete compromise of the system but merely a compromise on the browser alone, which in reality translates to attempts at identifying and exploiting web-related vulnerabilities [22]. Indeed, security has been cited as the top challenge preventing the adoption of cloud services model by 74% of IT executives and CIOs according to a 2009 IDC survey [9].

Furthermore, a great deal of trust has to be placed in the design of the system due to its internet dependency and this raises a

few concerns on the issues of authentication and access, data governance, and control. Authentication and control of access rely on encryption technologies that can be manipulated for impersonation to fool either the user or the provider's system, while data governance raises the concern over who has access to your data and where the data is stored (this is connected to regulation and law), which leads to the issue of who ultimately has control of the data and thus, responsibility over security and actions concerning the service [22].

A study published in 2020 [34] identified that there were four main categories of risk when it comes to cloud accounting with these relating to legal compliance; location of data, ownership of data; and financial statement reliability. With legal compliance, this was identified as being a major issue, particularly for professional accountants implying that this is not as significant issue for the owners and decision makers in SMEs. The issues of location of data connects with the issue of security identified in other studies specifically relating to SMEs [1,7,15,18-20,32], with the issue of ownership of data connecting to the issue of trust [22]. The issue of financial statement reliability has not been touched on in much of the literature relating to SMEs and as such falls outside the scope of this particular research.

A recent study [21] cited a number of risks associated with cloud-based accounting systems including that the safety and security of accounting records can be inferior, or in some case superior [10,17] and that there can be some risk of service delays and interruptions [4,10,17,28]. A recent study [21] summarised that there were four main areas of risk, with these being related to data, availability, vendor lock-in, and legal and tax issues.

### Research Methods

A literature review was conducted that examined the nature of cloud computing (including its use by SMEs, factors relevant to the adoption of cloud computing, and the benefits and risks of adopting cloud-based accounting systems.

Interviews were conducted with seven (7) adopters of cloud-based accounting systems who had all had at least three (3) years' experience in using accounting software with at least two (2) years of experience using a cloud-based accounting system. The interviewees were selected using a combination of judgement sampling and snowball sampling [29].

While the selection of participants was based predominantly on their experience of using one particular system (Xero), the nature of the questions asked were not specific to that system which increases the generalisability of the findings.

A qualitative approach was taken with a view to gaining a deeper understanding of the benefits and risks of using cloud-based accounting systems with this being consistent with interpretivism and constructivism [2].

In the first phase of the interviews the interviewees were asked to classify the 13 factors identified [12] as being one of important, not so important, and of least importance. The interviews were then asked to rank the 13 factors from 1 to 13 in order of importance. In the second phase the interviewees were asked a number of open ended questions covering the topics shown in table 1.

Initial perceptions of cloud-based accounting systems
Reasons for adopting cloud-based accounting systems
Risks considered before adopting cloud-based accounting systems
Other issues surrounding the adoption of cloud-based accounting systems

**Table 1:** Topics Covered in Open Ended Questions.

**Results**

This section presents the results of the interviews, commencing with the background of the interviewees, followed by the grouping and ranking of the factors identified in an earlier study [12], with this being followed by a summary of the responses to the open ended questions.

**Interviewee background**

A summary of the background of the interviewees is shown in table 2.

Currently in accounting roles	4 of 7
Currently in manager/director roles	3 of 7
Formal training in accounting	6 of 7
2-6 years of experience in using Xero	4 of 7
6 or more years of experience in using Xero	3 of 7

**Table 2:** Summary of Interviewees’ Background.

**Importance of factors identified**

Of the factors identified in the earlier study [12] and shown in table 1, five (5) were classified as important by at least five (5) of the seven (7) interviewees; three (3) were classified as being important by three (3) or four (4) of the interviewees; four (3) were classified as being important by one (1) or two (2) of the interviewees; with one (1) being classified as being important by none of the interviewees. These groups of factors are shown in table 3.

Group	Factor
Factors identified as being important by 5-7 interviewees	Performance Ease of Use Trust Link Availability
Factors identified as being important by 3-4 interviewees	Integration Security Customisation
Factors identified as being important by 1-2 interviewees	Update Ubiquity Ongoing cost Setup cost
Factors identified as being important by no interviewees	Support

**Table 3:** Interviews Classifying Importance of Factors.

**Ranking of factors identified**

Table 4 shows the average and standard deviation of the ranking of the factors with the factors having the highest ranking being shown first. The factors at the top of the table have the highest average ranking from the interviewees through to the factors at the bottom of the table having the lowest average ranking.

Cloud adoption factors	Average	Standard deviation
Performance	2.71	1.80
Ease of use	3.00	2.00
Trust	5.43	3.10
Link	5.57	2.99
Security	5.71	3.90
Availability	6.43	3.46
Customisation	7.00	3.27
Integration	7.14	2.34
Ubiquity	8.00	3.27
On-going cost	9.71	3.09
Update	9.86	3.02
Set-up cost	9.86	4.30
Support	10.57	1.99

**Table 4:** Summary of Ranking of Factors.

**Initial perceptions of cloud based accounting systems**

Table 5 shows a summary of the interviewee responses to the question about their initial perceptions of cloud-based accounting systems.

Concern that the provider may alter data
Preferred the more familiar web interface
Easier for accountants to get data from clients
Uncertainty as to what is the best product
How to access data backups
Returned to accounting as a direct consequence
User centric appeal
Some concerns about security

**Table 5:** Summary of Initial Perceptions Regarding Cloud Based Accounting Systems.

**Reasons for adopting cloud based accounting systems**

Table 6 shows a summary of the interviewee responses to the question about reasons for adopting cloud based accounting systems.

Competitive edge
Being able to work anywhere (even after a disaster)
Easy transition from other products
That is was a cloud-based product
The way of the future
At the time there were limited options
Support from accountant
Visibility of the data to more people
Ease of use

**Table 6:** Summary of Reasons for Adopting Cloud Based Accounting Systems.

**Risks considered before adopting cloud based accounting systems**

Table 7 shows a summary of the interviewee responses to the question about the risks that were considered before adopting cloud-based accounting systems. It was noted that three (3) of the seven (7) did not consider any risks prior to adoption.

Data security
The system being changed
Concern that accountants will spend time checking mistakes
Being able to work anywhere (even after a disaster)
Subscription model being more costly in the long run

**Table 7:** Summary of Risks Considered before Adopting Cloud Based Accounting Systems.

**Security as a potential benefit of adopting cloud based accounting systems**

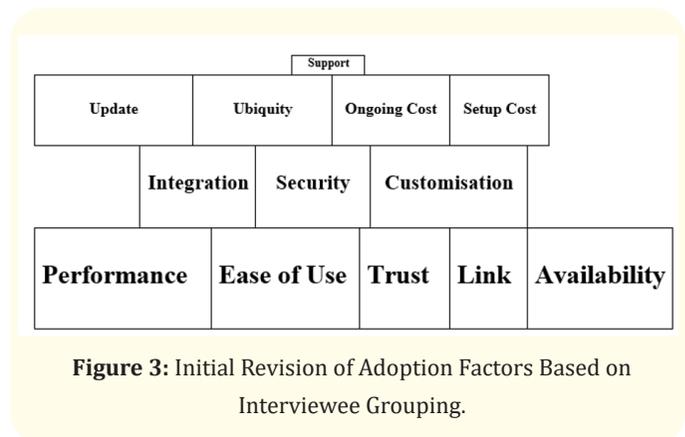
One interviewee made a comment that was backed up by a later interviewee that while security was an issue in could be a risk and it could be a benefit.

**Analysis**

This section presents an analysis of the results, firstly covering the level of importance of factors and the ranking of factors the earlier study [12], initial perceptions, reasons for adoption, risks considered prior to adoption, and security as a benefit.

**Initial revision of important factors in adoption**

Figure 3 shows an initial revision of the adoption factors based on the grouping that were made by the interviewees with the structure being similar to the model presented 2009 [26] that was reproduced in figure 1 and figure 2. This shows the factors that are of most importance being those in the larger blocks at the base of the model.

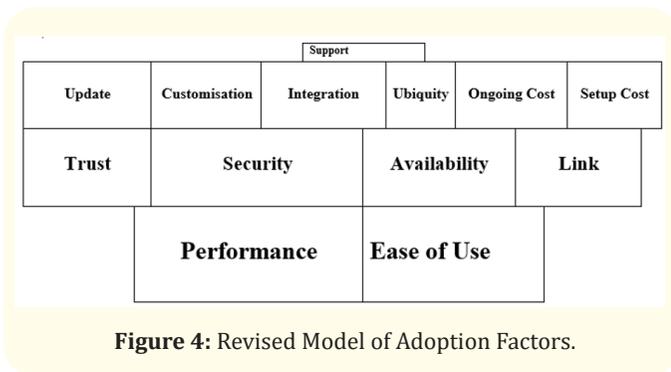


**Figure 3:** Initial Revision of Adoption Factors Based on Interviewee Grouping.

When this is compared with the model from 2009 [26] there are some aspects of similarity with ease of use and trust remaining at the base of the model. Performance, link and availability are new factors in the base of the model. Factors that were in the base of the original model that appear to be of lesser importance now are factors relating to cost, and factors related to security.

**Revised model of adoption factors**

Figure 4 shows an analysis of the ranking of adoption factors by the interviewees to produce a revised model for the important adoption factors with the structure being in the same style as figure 3.



**Figure 4:** Revised Model of Adoption Factors.

When the revised model (Figure 4) is compared with the initial revision (Figure 3) it is noted that performance and ease of use are the only factors in the base of both models, with trust, link and availability being in the base of figure 3 and in the second level of figure 4, and security being in the second level in both models.

The importance of the Performance factor in the base of the revised model (see figure 4) is consistent with the literature when it comes to service delays and interruptions [4,10,17,28]. The other factor in the base of the model is the Ease of Use factor with is also consistent with the literature [12,15].

Security being in the second level of the revised model (Figure 4) which still indicates a moderate level of importance is consistent with the literature [1,7,9,10,17-19,22,28,32].

The importance of the Link factor and the Availability factor in the revised model (Figure 4) is consistent with the literature regarding authorised users being able to remotely access the software remotely [4,5,10,17,28].

**Initial perceptions**

The initial perceptions in table 5 relate to the factors in the revised model (Figure 4) with trust being connected to the concern that the provider may alter data. Ease of use is connected to the preferring the more familiar web interface, being easier for accountants to get data from clients, and the user centric appear. Performance is related to the uncertainty as to which is the best product, how to access data backups and returning to accounting as a consequence. Security is related to the final perception of security concerns.

This analysis shows that the initial perceptions are consistent with factors in the two levels at the base of the model in figure 4, and is also consistent with the literature [4,10,12,15,17,28].

**Reasons for adoption**

The reasons for adoption in table 6 relate to the factors in figure 3 and figure 4 with ease of use being connected to the easy transition from other products which is consistent with the vendor lockdown issue identified [21], that it was a cloud-based product, that there were limited options available at the time, and the comment specifically mentioning ease of use [12,15]. Performance is connected to competitive edge, and the way of the future. Link is connected to the comment regarding the visibility of data to more people. Ubiquity is connected to the comment regarding the ability to work from anywhere. Support is connected to the comment regarding support from the accountant being important.

This analysis shows that five (5) of the seven (7) comments relate to factors in the two levels at the base of the model in Figure 4, with the other two being ubiquity (third level) and support (fourth level).

**Risks prior to adoption**

The risks considered prior to adoption in table 7 relate to the factors in figure 3 and figure 4 with security being connected to data security. Performance being connected to the system being changed. Ubiquity is connected to the comment about being able to work from anywhere. Ongoing cost is connected to the subscription model being more costly in the long run, and link being connected to the concern that accountants will spend time checking mistakes. It was also noted that three (3) of the interviewees did not mention any risks when asked directly about them.

This analysis shows that two (2) of the four (4) comments relate to a factors in the two levels at the base of the model in figure 4, with the other two being ubiquity and ongoing cost (both at the third level).

It was noted in the results section that three (3) of the seven (7) did not consider risks prior to the adoption with this being consistent with other research [33] which included that many were unable to identify the benefits of cloud-based accounting systems, let alone its shortcomings and risks.

**Security as a benefit**

The comment that security has the potential to be a benefit relates to a very small business may not have good IT security in place, and therefore be at risk from malware with data being stored in the cloud offering some protection from this. This comment is connected to the security factor in figure 4 and is in the second level of the model.

This particular concept has had little attention to date in the literature and potentially creates a new area for further research although the recently published study [21] mentioned that some have argued that risks, such as data security, may in fact be lower when data is stored in the cloud due to measures being taken by cloud service providers that would not be feasible for many other organisations [3,11,32].

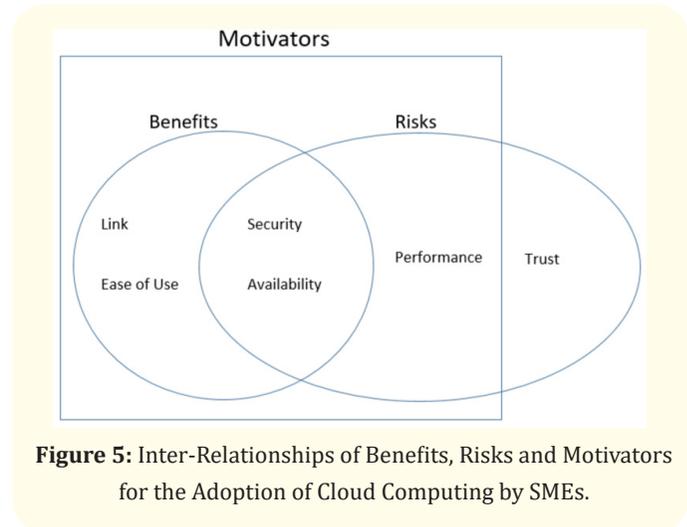
**Conclusions**

From the analysis, the six (6) most important factors from the revised model (Figure 4) are Trust, Security, Availability, Link, Performance and Ease of Use. When these are factors are looked at through a lens of motivators, benefits and risks, there are factors that appear as more than one of these as shown in table 8.

Factor	Motivator	Benefit	Risk
Trust			*
Security	*	*	*
Availability	*	*	*
Link	*	*	
Performance	*		*
Ease of Use	*	*	

**Table 8:** Most Important Adoption Factors Classified and Motivators, Benefits and Risks.

An analysis of table 8 shows that some of the motivators relate to benefits only (link and ease of use), others relate to risks only (performance), while other motivators relate to both benefits and risks (security and availability), while the risk of trust does not appear to be related to a motivating factor. This interaction between motivators, risks and benefits is reproduced in figure 5.



**Figure 5:** Inter-Relationships of Benefits, Risks and Motivators for the Adoption of Cloud Computing by SMEs.

This shows that the main motivators for the adoption of cloud-based accounting by SMEs are link; ease of use; security; availability; and performance, with the main benefits being link; ease of use; security; and availability, with the main risks being security; availability; performance and trust.

Of interest in this model is there are aspects of the security and availability factors that can lead to these being benefits and risks depending on the circumstances.

Performance and ease of use are the most significant factors in this model for an SME to adopt a cloud-based accounting system from the perspective of experienced users, and it is noted that issues surrounding cost, support and updates are not seen as being significant issues.

A limitation of this study is that it was based on the perceptions of seven (7) practitioners regarding their experience in adopting cloud-based accounting systems and as such may not be generalizable to all decisions makers when it comes to the adoption of cloud-based accounting systems in SMEs. The study does set out a proposed model for the inter-relationship of benefits, risks and motivators that can be tested in further research.

### Implications for further research

There are two (2) main implications for further research stemming from this study. The first relates to whether the organisational mind-set when it comes to IT security is related to organisational size, with the second relating to a need to test the model for the inter-relationships of benefits, risks and motivations that is presented in figure 5.

When it comes to the organisational mind-set for IT security being related to organisational size, the context to explore is that larger organisations have more resources (money and personnel) to put into IT security than smaller organisations, and that the mind-set of very small organisations may be more like that of an individual user – for many individuals little attention is paid to things like updating virus security. For these types of smaller organisations, putting trust in a cloud provider is better than doing nothing. This could be carried out by gathering data about the perceptions of individuals and the perceptions of decision makers on organisations of a variety of sizes.

To test the model for the inter-relationships of benefits, risks and motivations (Figure 5), a survey of a large number of decision makers in SMEs could be used to test the importance of the factors that are in this model, and the factors that were removed from the model that are in figure 3 and Figure 4.

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