

Records in the Cloud (RiC)

User Survey Report

Records in the Cloud (RiC) Project
University of British Columbia

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Executive Summary

In order to understand the current state of cloud computing from the users' perspective, the Records in the Cloud (RiC) project conducted an online survey. The survey was conducted in April 2013; 353 responses were collected, with a considerable proportion of responses coming from information and records managers. This report details the major findings of the survey.

Major findings

- **Cloud computing use has increased greatly in recent years, and many potential users are considering moving to the cloud.** The survey reveals that 57% of respondents are currently using cloud computing, and the majority have adopted cloud computing in the last three years. Among potential users, 38% are currently considering cloud services.
- **Both current and potential users are motivated by the potential to reduce costs by adopting cloud computing, but some respondents' comments reveal that this benefit may not be easy to obtain.** Roughly half of both current users (54%) and potential users (58%) selected "*reduce cost*" as their primary motivation for adopting cloud computing. However, some survey respondents commented, "costs are considerably higher than local storage".
- **Only a small portion of cloud computing users utilized Service Level Agreements (SLA) and related measures to protect themselves from potential risks.** Among those involved in the decision-making process, only 35% of respondents identified that their organizations have negotiated a Service Level Agreement (SLA) when procuring a cloud-computing service.
- **Approximately one third have encountered issues in using cloud computing.** Thirty-six percent of all current users indicate that their organizations have experienced issues in the course of cloud computing use.
- **Issues surrounding cloud computing are not limited to the technology, but also include organization management, human behavior, regulation, and records management.** Current users' comments revealed that they experienced a number of non-technology issues with cloud computing, including lack of control of employees' cloud computing use, lack of internal regulations on cloud computing use, implementation difficulties, and lack of transparency of providers' service.
- **Security risk continues to be the paramount factor impeding cloud computing adoption.** Fifty-six percent of those not considering using cloud computing expressed their concern with cloud security; this is followed by concerns about "*legal implications*", "*loss of control of data*", and "*privacy risk*".

- **Divergent cloud computing use patterns can be discerned among current users and potential users.** Current and potential users tend to choose different deployment and service models, with current users choosing public cloud options and potential users gravitating towards the private cloud.

Acknowledgements

The survey is part of the Records in the Cloud (RiC) project. It was conducted by the Cloud User Group, which included Weimei Pan, Joy Rowe, and Georgia Barlaoura. We gratefully acknowledge the many contributions from project members and the invaluable suggestions from volunteers in the pilot test of the survey.

1. Records in the Cloud (RiC) Project

Records In the Cloud (RIC) (2012-2016)¹ is a 4-year, international research collaboration, between the University of British Columbia (UBC) School of Library, Archival and Information Studies, the Faculty of Law, and the Sauder School of Business; the University of Washington School of Information; the University of North Carolina at Chapel Hill School of Information and Library Science; the Mid-Sweden University Department of Information Technology and Media; the University of Applied Sciences of Western Switzerland School of Business Administration; and the Cloud Security Alliance. It is supported by a Social Sciences and Humanities Research Council of Canada (SSHRC) Insight Grant.

The objectives of this project are as follows,

- To identify and examine in depth the management, operational, legal, and technical issues surrounding the storage and management of records in the cloud;
- To determine what policies and procedures a provider should have in place for fully implementing the records/archives management regime of the organization outsourcing the records, for responding promptly to its needs, and for detecting, identifying, analyzing and responding to incidents; and
- To develop guidelines to assist organizations in assessing the risks and benefits of outsourcing records/archives storage and processing to a cloud provider, for writing contractual agreements, certifications and attestations, and for the integration of outsourcing with the organization's records management and information governance programs.

¹ To read more about the project, visit <http://www.recordsinthecloud.org>

2. Methodology

The research on cloud computing use began with a literature review. During this stage of the research, we identified many examples of satisfied cloud users. Most of these cases are successful implementations of cloud applications presented by cloud services providers. Empirical studies of cloud computing from the users' perspective were limited. Thus, in order to gain a comprehensive view, the project conducted a survey of cloud computing use.

In order to get a clearer view of the terms, the extent of technical details, and the general character of the questions we could include, a number of revisions and testing stages were carried out in developing the questionnaire. Through the comments gathered from the pilot respondents, we learned that the breadth and depth of knowledge about cloud computing may vary significantly among users. Our challenge was to contact as many types of cloud users as possible, and we revised our terminology and questions to make the survey accessible.

The final questionnaire is composed of thirty-four questions aiming to elicit basic information related to the views of current, past, and potential users of cloud computing. The areas covered by the questionnaire include motivations and concerns about moving to cloud, deployment model and service models used, issues encountered in using cloud computing, and Service Level Agreements (SLA) issues, etc. Additional questions were included to ensure that the responses would reflect organizational-level understanding of cloud computing rather than individual understanding or impressions. Both closed- and open-ended questions were designed to invite respondents to share their experiences with us².

The questionnaire was launched the 11th of April 2013 through an on-line survey service. It was open for approximately one month. The survey invitation and link were posted to archival, library and records management listservs with international scope, as well as to various legal, IT and cloud security listservs primarily in North America, including, but not limited to, Arcan-I, Archives & Archivists (A&A) List digest, Records Management listserv, ICA, IFLA (International Federation of Library Association). In addition to using the listservs, we circulated the survey via social media networks such as LinkedIn, Facebook and Twitter. Both listservs and social media networks received one email when the survey was opened and a reminder email when the survey deadline approached.

In total, there were 353 respondents with a completion rate of 50%. Respondents are distributed among 52 countries with the majority from North America. These responses will serve as the basis of this report's analysis. The response rate was comparable to or higher than other cloud computing surveys³ conducted between 2009 and 2012.

² The questionnaire can be found in Appendix A.

³ The "Storing Information in the Cloud" survey conducted by the ARA/Aberystwyth University received 41 complete responses. The "An SME perspective on cloud computing" survey by ENISA collected 74 answers. The 2012 Cloud Computing Market Maturity Study Results conducted by ISACA, CSA attracted 252 respondents in total. The "Flying Blind in the Cloud--- The State of Information Governance" conducted by Ponemon Institute LLC has received 637 answers.

3. Findings

In line with the survey design that aimed to gather responses from past, current, and potential users of cloud computing, the analysis is also structured according to different types of users. This allows us to formulate both a separate understanding of each type of user, as well as an integrated overview of current cloud computing use.

Respondent Demographics

Typical respondents of the survey are information and records specialists from organizations with more than 500 employees in the government or education sectors (Figure 1-3). Over half (49%) of respondents worked for organizations that employed more than 500 people, while a quarter (24%) worked in an organization of less than 100 employees. Information and records management (IRM) professionals are well represented in the survey by records managers (26%), archivists (22%), and various IRM job titles in the “other” category (34%). Two-thirds of the respondents worked in either the government sector (30%) or the education sector (36%), with only single-digit representation of the other nine sectors.

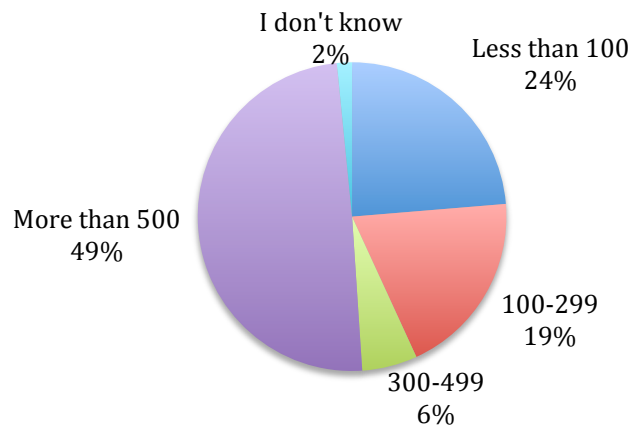


Figure 1 How many employees does your organization have?

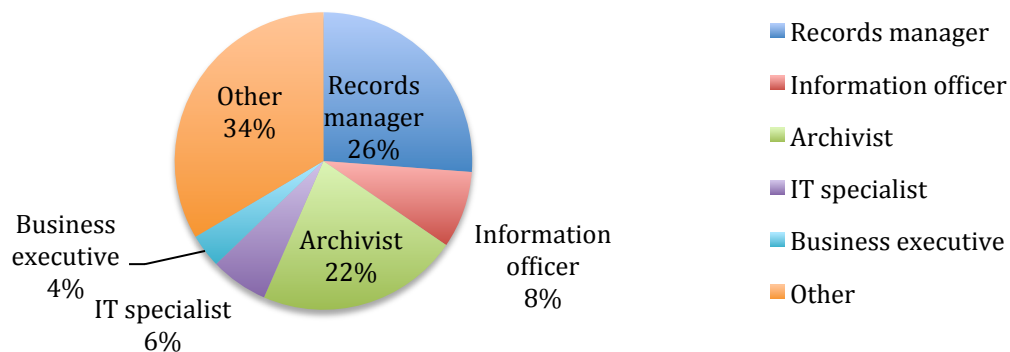


Figure 2 What title best describes your role in your organization?

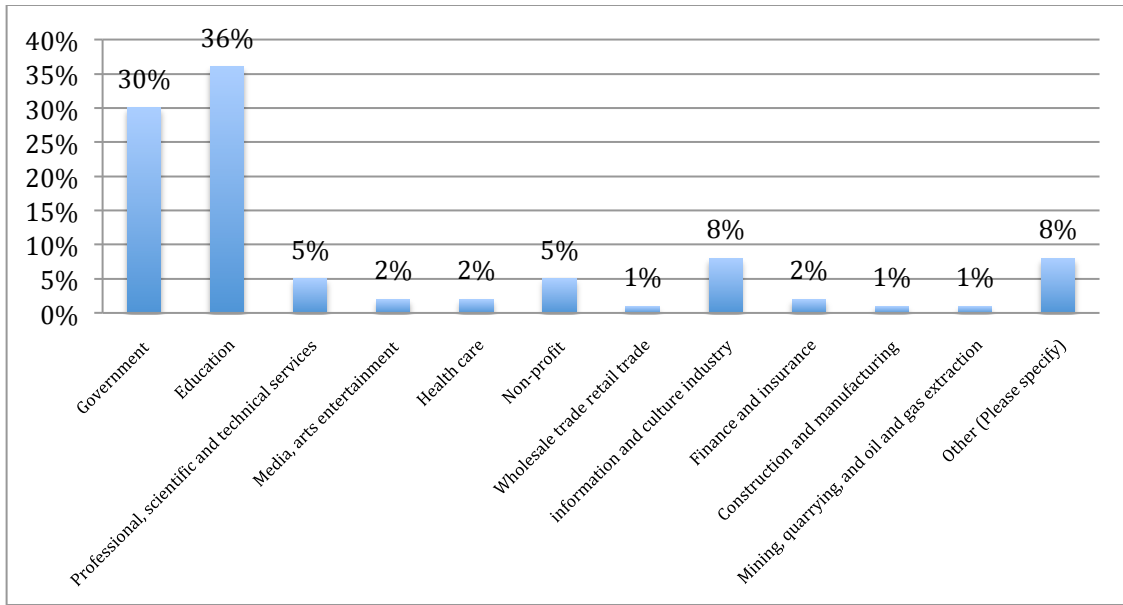


Figure 3 Which industry best describes your organization?

3.1 Past Users

(1) While still in its primary stage of growth, cloud computing has already lost users.

One respondent identified that his/her organization used cloud computing in the past but does not use it any longer. Although the respondent did provide details about the situation, including that the cloud service previously used had been on the public cloud, there were too few past users to generalize or draw conclusions. It may be that most past users self-selected out of the survey and were among the people who chose not to proceed with the survey after reading the survey description and consent form on the first page.

3.2 Current Users

(1) Cloud computing use has increased greatly in recent years, and many potential users are considering moving to the cloud

Over half of respondents (57%) can be classified as current users (Figure 4). Approximately one third of current users (35%) responded that they had moved into the cloud one year ago, which has corresponded to the accelerated growth of cloud computing in recent years. In total, 74% have at least one year of experience with cloud computing (Figure 5). This suggests that organizations represented by the survey respondents have a moderate understanding of cloud computing.




Response	Chart	Percentage	Count
Yes		57%	154
No		33%	90
Not anymore		0%	1
I don't know		9%	25
Total Responses			270

Figure 4 Does your organization use cloud computing?

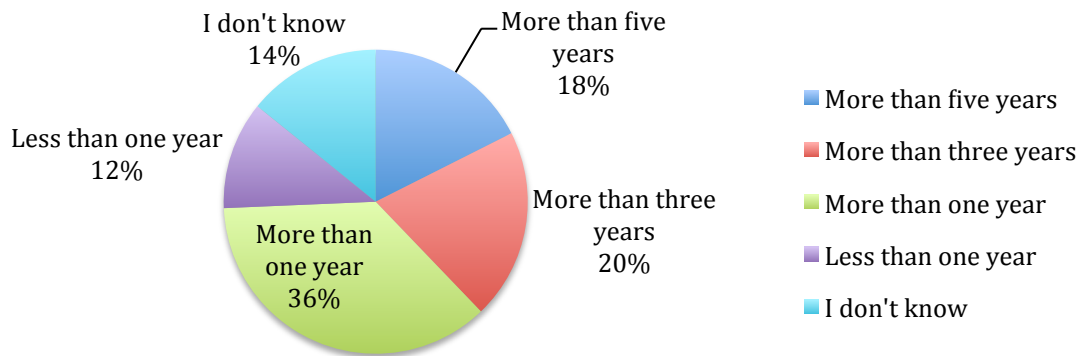


Figure 5 How long has your organization been using cloud computing?

(2) There is no significant disparity among the adoption of different cloud deployment models except community or industry-specific cloud, which has the least adopters. In contrast, Software as a Service (SaaS) is by far the most widely adopted type of cloud service.

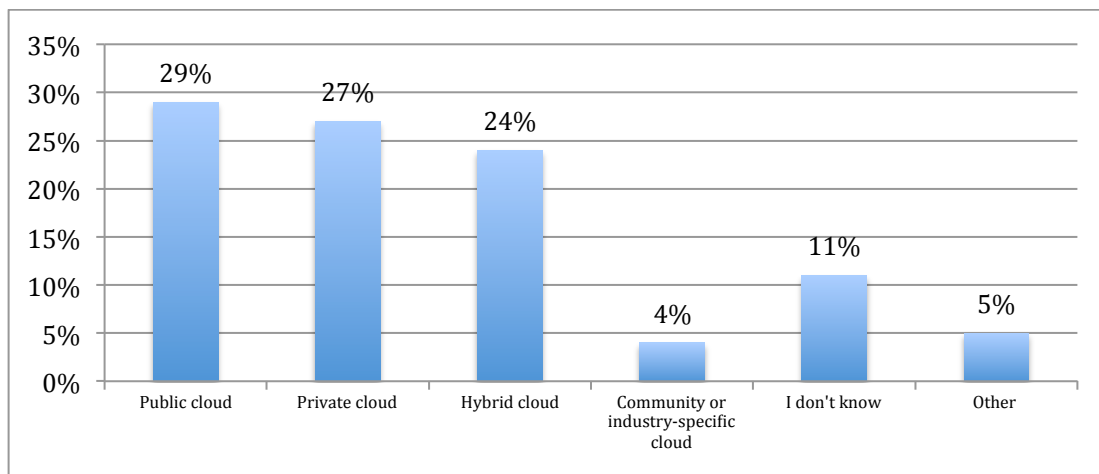


Figure 6 What kind of cloud service model is your organization using?

Among current users, there is a roughly equal distribution of organizations using public (29%), private (27%), and hybrid (24%) models. In contrast, adoption of the community or industry-specific model is markedly lower (4%)(Figure 6). One possible explanation for the situation of community or industry-specific model may be that its development will hinge on not only the development of cloud computing per se, but the consensus and acceptance of one specific group who will cooperate to utilize this model.

Software as a Service (SaaS) is notably the most widely adopted cloud service (52%), with Infrastructure as a Service (IaaS) coming next with a large gap (22%)(Figure 7). The popularity of SaaS is likely associated with its flexibility and ease-of-deployment without the intervention of IT department; another reason may be that SaaS is probably the most developed service among these three. This result is consistent with ISACA and CSA's finding that SaaS is already in the earliest stage of growth level, while IaaS and PaaS are still positioned at the infancy level (ISACA, CSA, 2012).

The popularity of (Infrastructure as a Service) IaaS in relation to (Platform as a Service) PaaS can be explained by its connection with storage capacity, which is perceived as among the most popular motivations for cloud computing adoption.

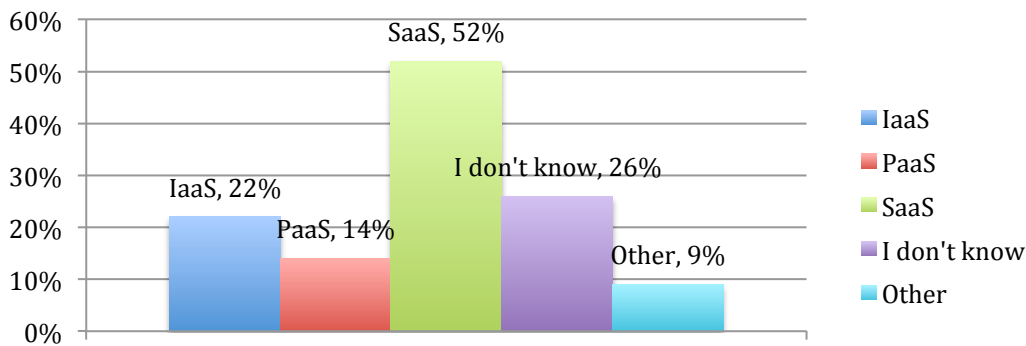


Figure 7 What kind of cloud service is your organization using?

(3) “Reduce cost” and “increase collaboration” are equally favored motivations for adopting cloud computing, though respondents’ comments uncover that the benefit of “reduce cost” may not be easy to obtain.

Current users most frequently chose the cloud benefits of “reduce cost” (54%) and “increase collaboration” (54%) when asked about their reasons for using cloud computing. The latter implies cloud computing’s transformative potential on the way organizations operate.

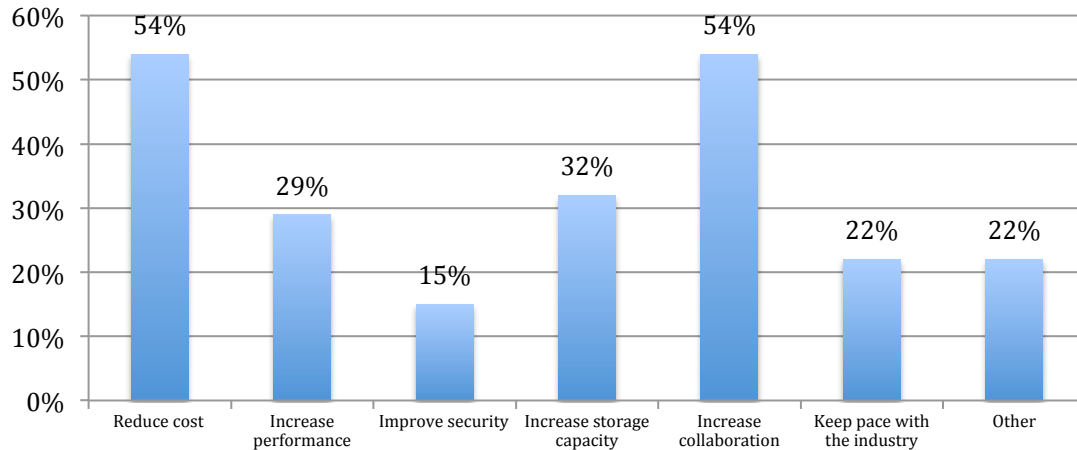


Figure 8 What are the primary reasons your organization uses cloud computing? (Select all that apply)

It is claimed that the benefit of “reduce cost” is realized through the way that IT service is provisioned through cloud computing, e.g. replacing “capital investment” with “operational investment” (Armbrust, Michael, et al. 2010). Other features that are closely associated with this benefit include virtualization, scalability, and elasticity. There is little research elaborating cloud costs savings claims with empirical evidence, particularly when taking into account the costs of records management. The ambiguity around the pricing structure may lead to some users underestimate the cost, and therefore make decisions without the full information. Respondents’ comments reflected this phenomenon:

“[I]nitial underestimation on costs of storage+compute of larger (terabyte-range) data.”
“Costs are considerably higher than local storage; delays in ingesting content to our cloud-based DAMS.”

“Increase collaboration” has implied the change of business work practice and business operation model. Nearly a quarter of respondents (22%) chose to offer their own reasons for using cloud services rather than select from the pre-defined list, and their reasons are revealing. Users noted that they used cloud computing to “allow telework”, “ability to share personal storage [among] many devices”, “access to files from multiple computers”, “increase employee sharing”, and “staff mobility”. Further business transformation is expected to derive from these small changes. For records management, the increasing use of cloud computing for work suggests that more and more records will be generated directly in the cloud, whose underlying infrastructure most users do not have ownership.

Current users infrequently selected “improve security” (15%) as a primary motivation for using cloud computing. The low ranking of “improve security” may refute the assertion that cloud computing will provide a much more secure environment compared with in-house infrastructures; at least survey responses indicate that users are not motivated such claims. Certainly, cloud computing providers have more expertise on security, and they could optimally utilize the investment on security. This indicates that, on the one hand, cloud providers may need to think carefully when attempting to market the security benefit of their service, and, on the other hand, cloud security should be an area where providers may need to concentrate more of their effort to address users’ concerns.

In addition to the above drivers, the open-text comments have uncovered the following reasons for taking on cloud computing,

- 1) **Organizations have a lack of in-house expertise or capacity.**
- 2) **Cloud adoption is mandated by obligations, or by superior organizations.**
- 3) **Cloud services were implemented without executive approval, without justification.**

Organizations may choose cloud computing because of a lack of in-house expertise or capacity, and this is consistent with the claimed benefits and provision model of cloud computing. It is expected that this benefit will attract great interest from Small and Medium Enterprises (SME), as they either cannot afford the great capital investment for an in-house information infrastructure or the Return of Investment (RoI) is low. By implementing cloud services instead of building in-house infrastructure, organizations hope to greatly stimulate innovation, as the cost for experimenting new products will decrease significantly in relation to the costs of the cloud technology used to enable them.

If the above motivations are rooted in the perceived benefits of cloud computing, the last two are associated with organizational-administrative context. Respondents indicated that cloud adoption was mandated by obligations or by a superior organization. In contrast with other users, users are simply being forced into the cloud.

Finally, respondents indicated in open-text responses that cloud computing services were implemented without executive approval or without justification. This is an emerging phenomenon with the advancement of information technology (ENISA, 2009). The increasing flexibility and ease-of-adoption of information technology, together with the increasing autonomy of employees, implies that organizations' control on information technology use may reduce considerably. It is easier and easier for employees or line-of-business managers to bypass IT departments on their purchase of information technology. This will no doubt bring great implications for both information technology governance and records management.

(4) Only a small portion of cloud computing users have utilized Service Level Agreements (SLA) to protect themselves from potential risks.

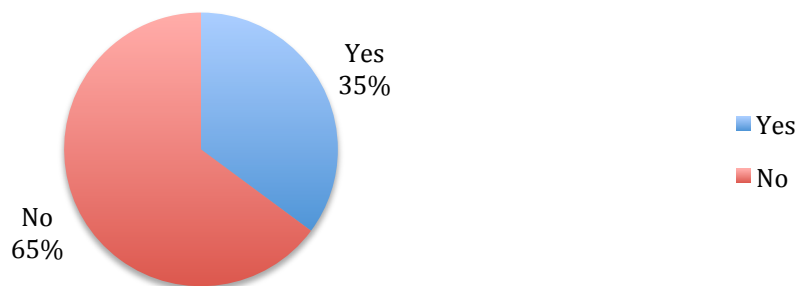


Figure 9 Did your organization negotiate a service-level agreement rather than accepting the provider's standard agreement?

Answers to the question about Service Level Agreements (SLA) present an intriguing picture. Among those who have been involved their organizations' selection of cloud service, only about one third (35%) identified that their organizations have negotiated a Service Level Agreement (SLA). The rest (65%) admitted that they didn't negotiate a Service Level Agreement (SLA).

A Service Level Agreement (SLA) is one of the tools to clarify an organization's expectations for service providers in terms of the quality of service provided, to identify the liability for situations like service breakdown, and to reduce potential risks. However, the survey results reflect that cloud-computing users are far from mature on cloud computing management in terms of understanding the nature of cloud computing, deploying appropriate measures to guarantee service quality, and protecting themselves from potential risks.

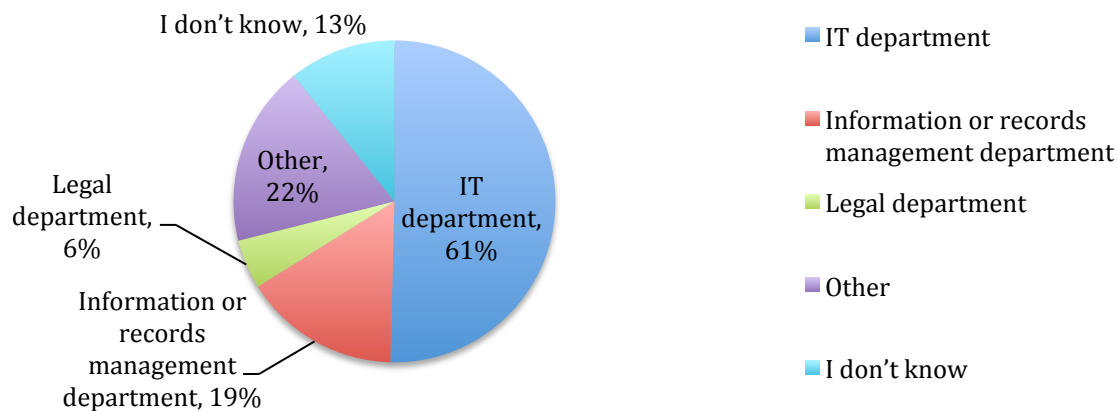


Figure 10 Which department(s) in your organization manages the relationship with your cloud service provider(s)? (Select all that apply)

According to Nicholas G. Carr, when computing becomes commodity, it will become essential to competition, but inconsequential to strategy. To use electricity as an example, while electricity breakdown will bring severe loss to business, enterprises cannot exploit strategy advantages from it. Accordingly, it is expected that users should take a defensive strategy rather than offensive strategy with cloud computing (Carr, 2003), which justifies the high place of risk management on the business agenda. It is unclear whether strategy advantages can no longer be derived from cloud computing, but certainly risk mitigation will be crucial to cloud computing introduction and management (Carr, 2003).

Risk management involves the assessment of potential risks from different perspectives; therefore, all interested parties should be involved in this process. Nevertheless, the survey reveals that IT departments continue to dominate the management of cloud computing, though the graph (Figure 10) has shown the tendency of other parties' participation.

(5) To effectively address the issues surrounding cloud computing, there must be a clear and coherent understanding of related issues.

For those who did negotiate a Service Level Agreement (SLA), Figure 11 illustrates the issues that they believe are important. "Ownership of data and metadata" was the most frequently selected issue (93%), followed closely by "appropriateness of technology and results" (87%) and "backup

and recovery” (87%). This emphasis on security indicates the demand for assurance that service providers have in place robust security measures to protect their data. The high ranking of security is in line with other cloud computing surveys (KMPG, 2012). However, there is no unified understanding about cloud computing security. Of particular concern are the need to understand what comprises cloud security and what the cloud security implications are for records management.⁴

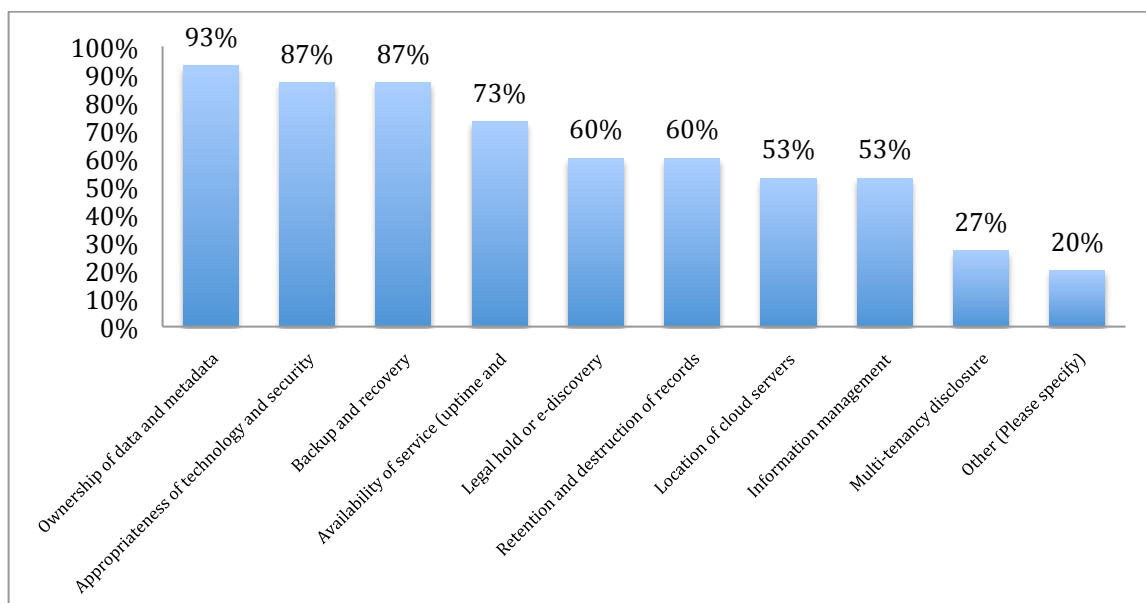


Figure 11 When your organization negotiated a service-level agreement with the cloud service provider, which issues were important to your organization? (Select all that apply)

The other parameters that users consider important could be categorized into the following groups: data can be found (*legal hold or e-discovery*) (87%), data can be received (*availability of service*)(73%), and data can be deleted as required (*retention and destruction of records*)(60%). These concerns are largely information and records management issues (access, availability, retention and disposition). Taken together, users’ concerns encompass security, technical issues, and IRM topics.

(6) Approximately one third have encountered issues in using cloud computing, with “access issues” being the most widely experienced.

Approximately one third of current users have experienced issues in using cloud computing (36%)(Figure 12). “Access issues” were the most frequently experienced (34%). The second most experienced issue is “information and records management (IRM)” (26%)(Figure 13). Users reported a range of other issues, but many respondents did not know the nature of the issues experienced by their organizations (34%, “I don’t know”).

⁴ For instance, KMPG has categorized several issues of cloud computing as security related: data loss and privacy risks, risk of intellectual property theft, legal and regulatory compliance, and system availability and business continuity risks (KMPG, 2013).

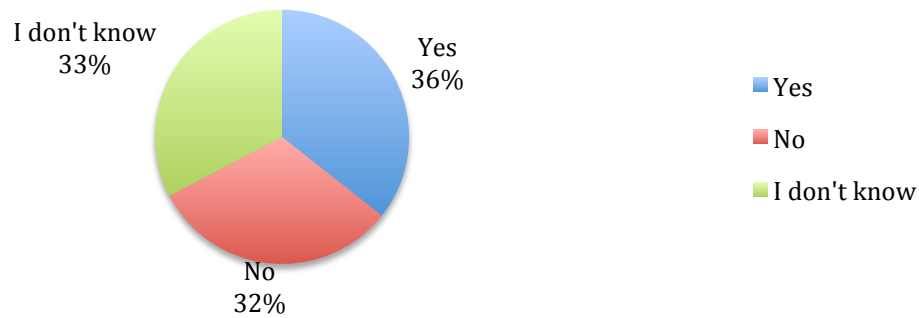


Figure 12 Has your organization experienced any issues with cloud computing?

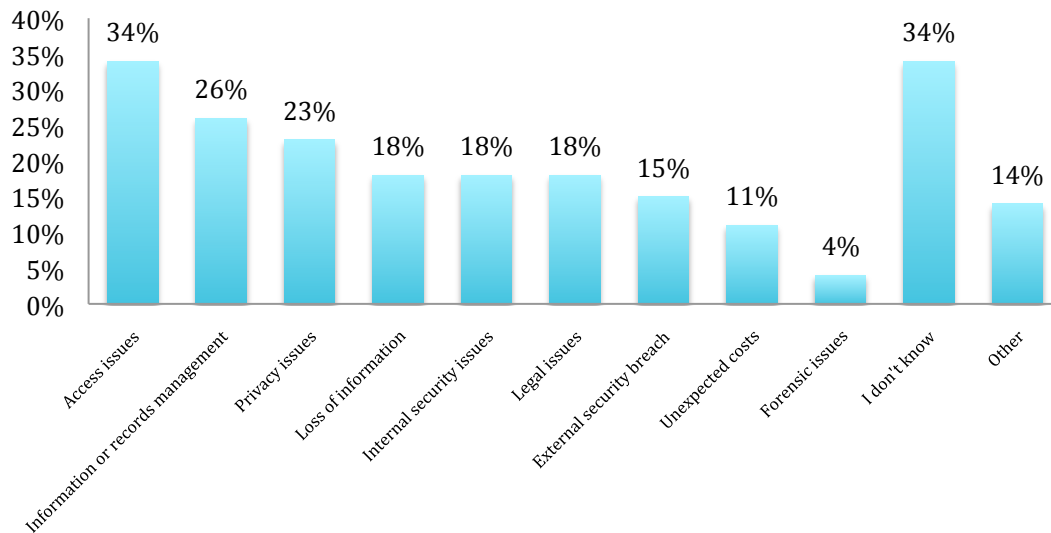


Figure 13 Which of the following issues has your organization experienced using cloud computing? (Select all that apply)

For those who have experienced issues in using cloud computing, the following figure (Figure 14) has illustrated the portion of those, who have had their issue resolved (32%) in relation to those still unresolved (25%). It is noteworthy that a considerable amount of users are still struggling with issues with their cloud computing solution.

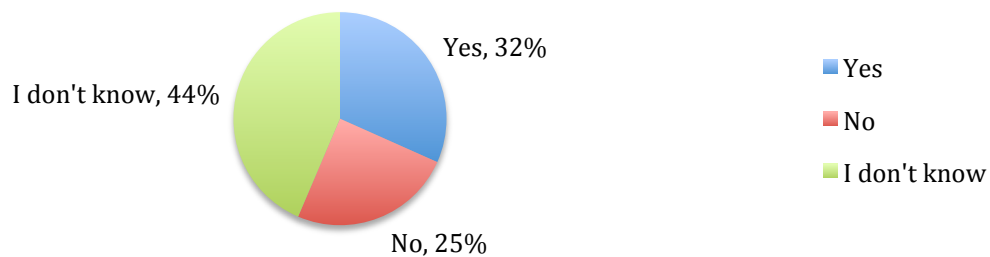


Figure 14 Were the issues your organization experienced resolved?

(7) Issues surrounding cloud computing are not limited to the technology per se, but also include organization management, human behavior, regulation, and records management.

In addition to the above quantitative data, the survey also collected many open-text comments, which complement the above data and allow us to get an in-depth understanding of cloud computing use. Because these stories are qualitative data, qualitative analysis method has been employed to code, cluster, and categorize these data. Consequently, several themes have emerged.

1) There is a lack of internal regulation on the use of cloud computing in organizations (particularly the free cloud computing services).

Ease-of-use characteristics of cloud-computing services can make it easy for individuals or departments to bypass IT departments and executives on cloud computing procurement decisions, particularly in case of Software as a Service (SaaS). This can diminish the authority of IT department and may also expose organizations to unknown risks. Internal policies and guidelines may be required to regulate cloud-computing use and information technology governance in organizations may need to consider cloud computing. The following are excerpts from respondents' comments on this point:

"So far, we have been able to avoid the indiscriminate use of free tools like Google Docs and similars, but the pressure is increasing."

"[It is] difficult to control individual users of public cloud services. "

"[We] can track usage but [it is] difficult to say no without providing official services."

"Many of our faculty and staff use Gmail, Dropbox, etc. We have endeavored to make them aware of the privacy implications."

2) Service providers fail to be transparent about their service.

Users are concerned about a lack of transparency in some cloud computing services, which would help users to evaluate and compare different cloud computing services. The information that cloud providers should uncover includes, but is not limited to, where the server is located, if there are sub-contractors, what are the security measures, with whom user's information is stored in the same server, and if there is security screening for providers' employees who may have access to users' data. However, few service providers are able to be transparent in these aspects, nor do they publicize these aspects in a language that common users could understand. The following excerpts have reflected this argument:

"One has to be careful - for example, a proposed video conferencing service has a default setting of automatically publishing everything to You Tube."

"[T]rouble with transparency in legal documents."

"[S]ometimes [there is a] lack of understanding on vendors' parts about key values and needs of our library."

3) Users have experienced technical difficulties in cloud computing use.

Partly due to cloud computing marketing, users tend to have high expectations about the ease-of-use of cloud computing compared with in-house information technology infrastructure. Certainly, some users find cloud computing is not easy as they expected.

"[For] two years in a row we've tried all kinds of trouble shooting to no avail. The virtual (cloud) lab is far from the physical lab where the software is available on the physical machine."

"Gmail has been difficult for some employees to learn."

"Accessing our data in the cloud is sometimes problematic due to the variability of speed of our [connection] to the [I]nternet."

4) The absence of concern for records management can be recognized in cloud computing management (e.g. failure to consult records manager when making policy about cloud computing).

To identify and manage the related risks, all interested parties should be involved in the process; this is particularly important for information and records manager, as the majority of cloud computing risks are closely associated with information and records management (see 3.2(6) for discussion of issues encountered by current cloud users). However, survey respondents' comments suggest that there is lack of concern for records management:

"There is a conflict between Google's continued improvement on communications/collaboration tools, and maintaining a stable environment for work, records keeping, etc. This has presented some challenges (for example, the shift from Google Docs to Google Drive)".

"Sometimes legal obligations to use platforms in the Cloud haven't been careful with the control user regulation or the record preservation. In fact, it doesn't exist policies of record management in the Cloud."

"Saddest thing is that IT don't communicate with IM and Archives about cloud computing."

5) Positive associations can be found between due diligence and cloud computing risk mitigation.

User comments uncovered that those who exercise due diligence on cloud computing introduction and management will encounter less issues; in contrast, those who failed to do this tend to experience more issues.

"We have an applications team that reviews new applications available ... We review from a legal, RM, security and IT perspective. We have been able to control what applications are available to the enterprise."

"We have not been using it long and have not experienced any issues that I am aware of at this time. Our contract language addresses potential issues with cloud computing which we hope will ward off some of the potential issues listed above."

"We still suffer some kind of malfunctioning, probably due to a lack of specific agreement about levels of service."

“Organization contracting for SaaS without being aware of privacy issues or required [contractual] protections.”

6) Users worry about loss of control.

Several respondents expressed concerns about “loss of control”, either for data or for employees’ behavior.

“We review from a legal, RM, security and IT perspective. We have been able to control what applications are available to the enterprise.”

“Sometimes legal obligations to use platforms in the Cloud haven’t been careful with the control user regulation or the record preservation.”

“[There is a] lack of control on the system, centrally managed.”

“[It is] difficult to control individual users of public cloud services.”

(8) Overall, current users chose the middle value to express their satisfaction with cloud computing.

Survey respondents were asked to indicate their level of satisfaction with cloud computing, where “1” denoted the lowest level of satisfaction and “5” denoted the highest level of satisfaction. The majority falls under middle choice with a slight tendency toward higher-level satisfaction. However, almost a third of respondents were not able to report whether their organizations was satisfied or not (27%) (Figure 15). Nevertheless, the positive tendency can be recognized, which is encouraging for cloud computing development.

One possible reason for the middle level of satisfaction may be that users tend to hold exploratory and experimental attitude in the primary stage of cloud computing use; hence, they would move little mission critical application into cloud. This will certainly prevent them from getting crucial benefits.

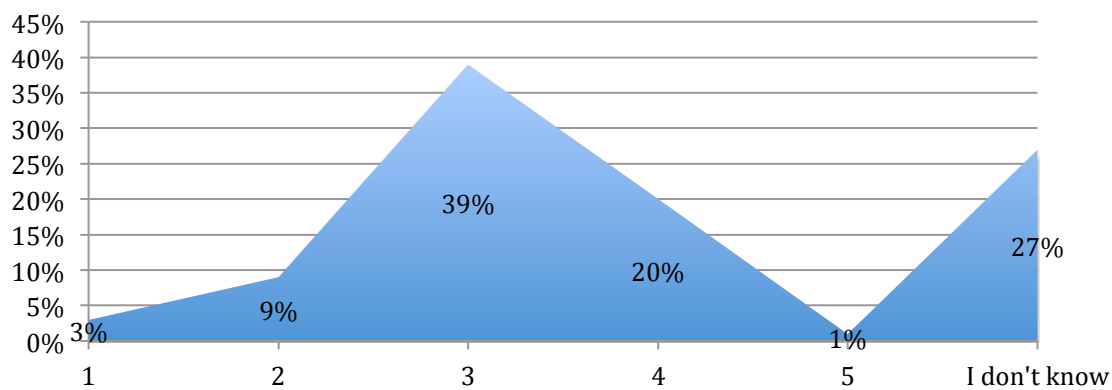


Figure 15 To what degree is your organization satisfied with cloud computing?

3.3 Potential Users

One third of respondents (33%) do not currently use cloud computing (Figure 4). We identify this group as potential users. Many of this group are actively considering adopting cloud computing (38%), while others are either not currently considering it (23%) or are unable to say whether their organization is investigating cloud services for the future (29%)(Figure 16). We call this entire group “potential users” in recognition of their potential to adopt cloud services in the future.

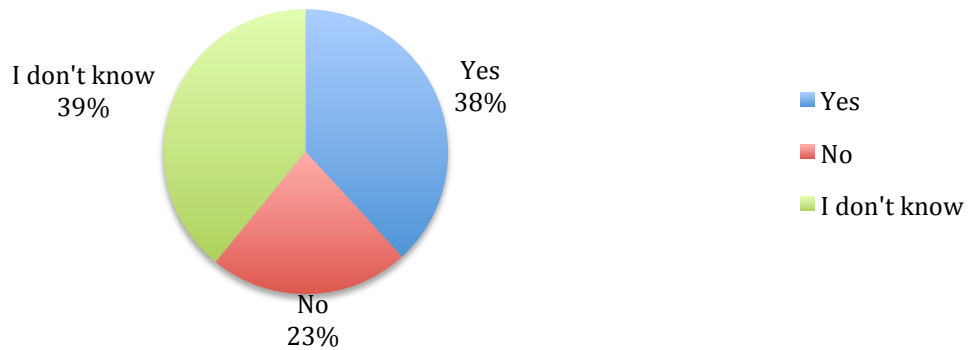


Figure 16Has your organization considered using cloud computing?

For this section, while identification of a profile of potential users is the primary goal, comparison between potential users and current users will also be carried out to shed light on cloud computing use.

(1) “Reduce cost” is consistently chosen as the primary motivation for cloud computing between both current users and potential users; compared with current users, potential users have higher expectation on cloud computing’s potential for business transformation.

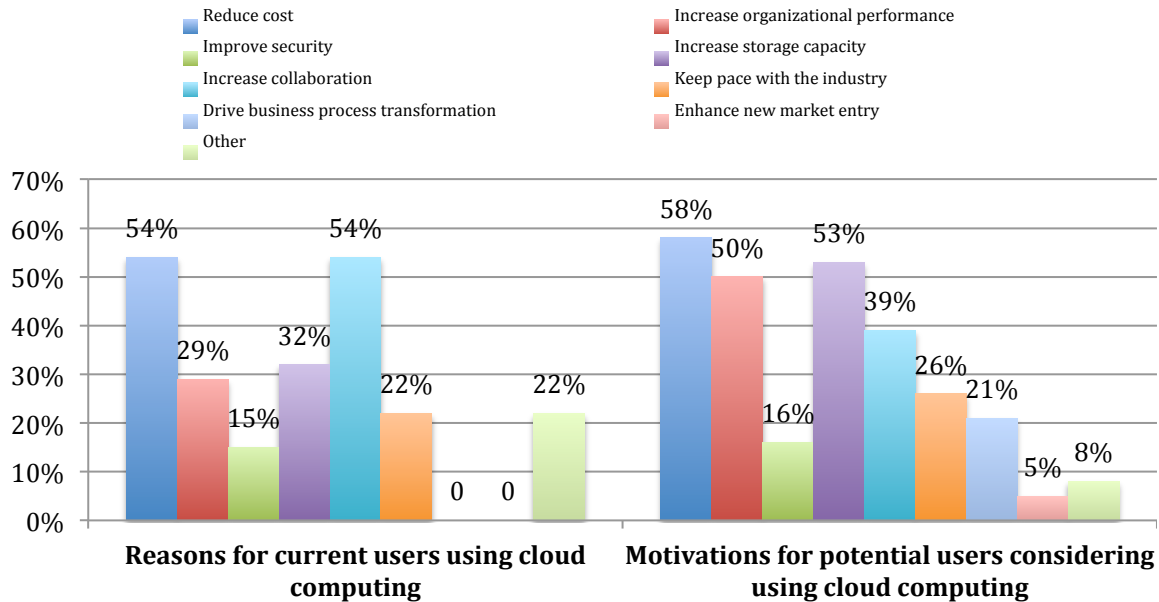


Figure 17 Comparison of reasons for using cloud computing between current users and those considering using it

The above figure (Figure 17) illustrates the comparison between current users' and potential users' motivations for adopting cloud service. It is noteworthy that “*reduce cost*” is consistently the most frequently chosen reason for cloud computing adoption (54% and 58%). While “*increase storage capacity*” holds a moderate popularity between current users, it is voted as the second most popular motivation (53%) for cloud computing use among potential users. In addition, compared with current users, it appears that potential users have higher expectation on cloud computing's influence on “*increasing organizational performance*”(50%). This is also reflected by the moderate acceptance of business transformative potential, such as cloud adopters desiring to “*increase organizational performance*”, “*drive business process transformation*”, and “*enhance new market entry*”.

(2) Potential users and current users prefer different cloud service deployment models.

With respect to cloud service model, current users and potential users show markedly different preferences (Figure 18). Potential users far prefer the private cloud (50 %), but this is a less favored choice among current users (27 %). While public cloud is the most frequently adopted model among current users (29 %), it is remarkably unpopular among potential users (12 %). Current users equally chose public, private, or hybrid models, but for potential users do not show such balance – they overwhelmingly are interested in the private cloud model (50 %). Consistently, for both current users and potential users, community or industry-specific cloud is the least frequently used model.

One possible reason for this contrast between current users and potential users may be ascribed to the fact that potential users tend to be more cautious on cloud computing service; they are more concerned about the embedded risks, and are therefore more prudent on cloud computing decisions. This also explains their preference for the private cloud, which may provide a relatively safer environment, and their uncertainty with public cloud, which may be associated with higher risk

probability (Convery & Ferguson-Boucher, 2010).

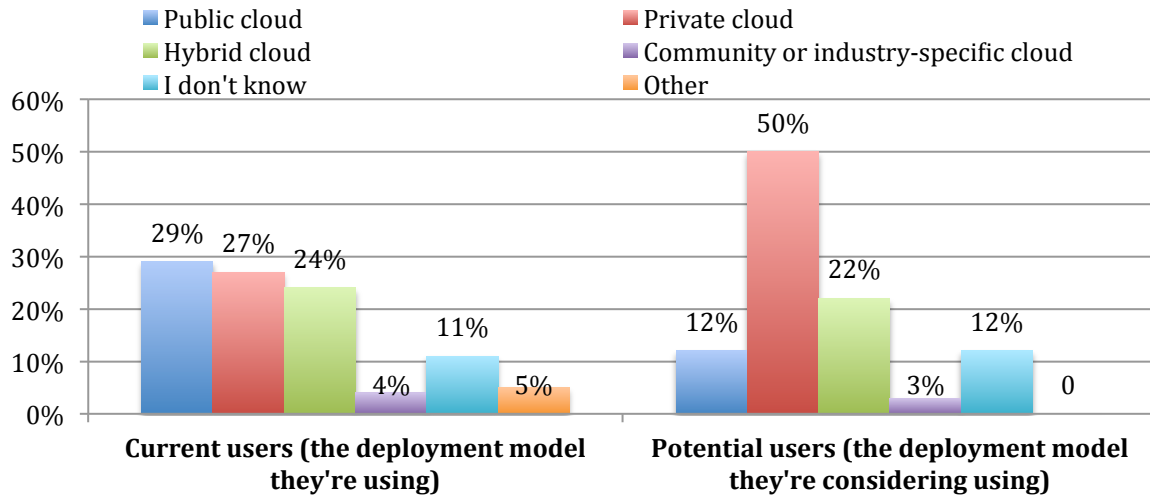


Figure 18 Comparison of deployment models favored between current users and potential users

In regards to service models favored by current users and potential users, it appears that SaaS is consistently the most popular choice (Figure 19). 52% of current users and 65% of potential users select or would select SaaS (Figure 19). This may be explained by the fact that this is the most developed service among the three; also is also much easier to adopt (ENISA, 2009; ISACA, CSA, 2012).

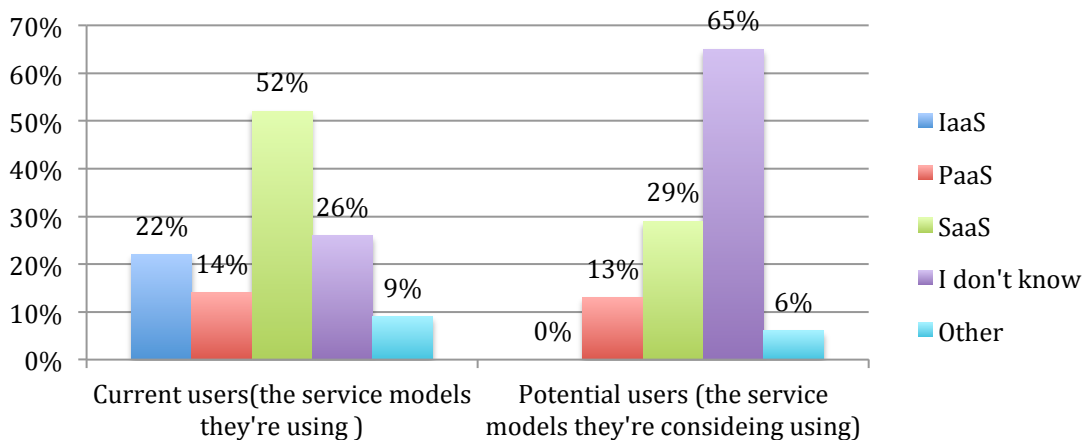


Figure 19 Comparison of service models favored between current users and potential users

(3) “Security risk” continues to be the concern in cloud computing adoption.

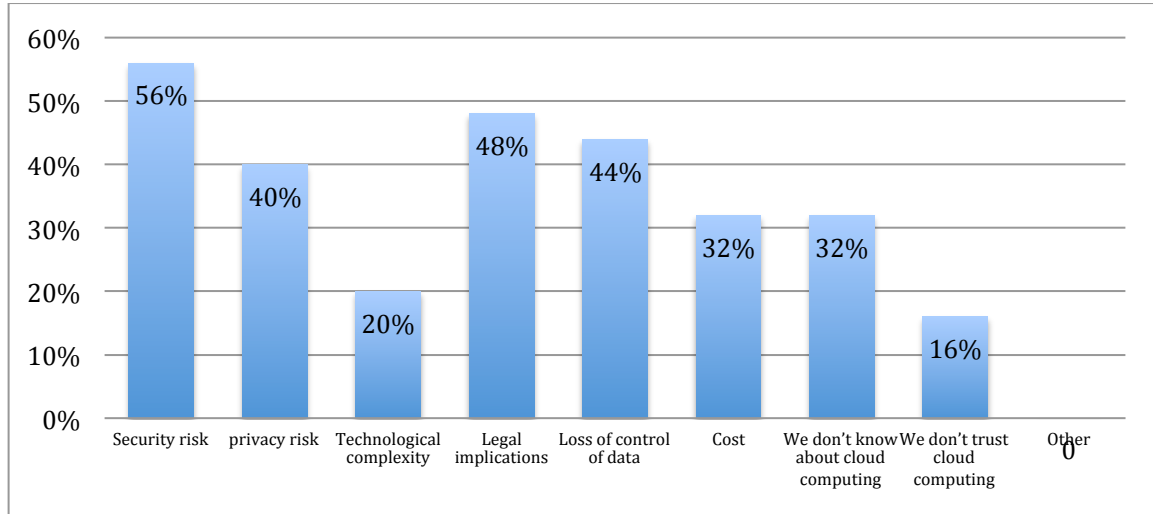


Figure 20 Why is your organization not considering cloud computing (Select all that apply)

For those who are not considering using cloud computing, the reasons they reveal are illustrated in the above figure (Figure 20). More than half of the respondents (56%) who are not considering cloud services in the future note that “*security risk*” is a concern for them and note it as a factor that has prevented them from embracing cloud computing. Non-users also cite “*legal implications*” (48%) as a factor in why their organization is not considering the cloud, implying the potential conflict between existing laws and the provision model of cloud computing. Respondents are also concerned about “*loss of control of data*” (44%), perhaps indicating a lack of confidence about information and records management (IRM) in cloud environment. There are still some respondents (32%) admitting that they don’t know about cloud computing.

Analysis of concerns impeding potential users from adopting cloud computing suggests several research possibilities that cloud computing providers may want to focus on: 1) continuing with the endeavor to improve cloud security; 2) collaborating with related research and authorities to regulate the soft-environment, which will facilitate cloud computing development; 3) collaborating with information and records managers to deploy sound information and records management policies and measures, assuring users with the quality of their information in the cloud; 4) being transparent about cloud service and providing empirical evidence proving the achievement of benefits.

4. Conclusion

Generally, the survey data collected has allowed us to identify and compare cloud computing users' respective characteristics. It is on this basis that we can formulate a comprehensive understanding of the current state of cloud computing use from the perspective of the current and potential user.

Among current users of cloud computing services, the dominant reasons for embracing of cloud computing relate to the driving force of most information technology advancement---reducing cost (Yates, 1993). The most popular services these pioneers adopt are the public cloud model and SaaS. Once economical benefits have been achieved, the next goal enterprises are striving for will be strategic advantage. However, our survey reveals that even the low-level, initial benefits may not be easy to obtain, with some respondents complaining about underestimated costs and unforeseen technical difficulties. These disappointments with cost benefit are compounded by unhappy experiences, for almost one third have encountered issues in the course of cloud computing use. The issues they experienced range widely from access to privacy. In addition to these issues originating from cloud computing per se, some comments have revealed the management issues revolving around cloud computing use inside the organization.

Potential users have a cautious attitude toward cloud computing. For those considering moving to cloud, "reduce cost" is consistently cited as the most popular driving force for this decision. Compared to current users, it is noteworthy that potential users have higher expectations on cloud computing's positive influence on organizational performance. In contrast with current users, potential users tend to overwhelmingly favor the private cloud, in contrast with current users who show no strong preference for any cloud model. This is consistent with the cautious attitude of potential users, as private cloud means more control and a more secure environment compared with the public cloud. The community and industry-specific cloud is consistently unpopular among both current users and potential users, perhaps due to the relatively immature stage of its development in relation to other cloud models. For all users, including those who have chosen against moving to cloud, security is still perceived as the paramount factor.

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Appendix A

Cloud User Survey⁵

Cloud computing is the accessing of shared data and IT services (i.e. computing) over a network (i.e. the cloud). The term "cloud" is a metaphor for the Internet, where it is possible to create a virtual computing infrastructure replacing in whole or in part that internal to an organization.

Research Study Description and Consent Disclosure

This questionnaire is part of a project called Records in the Cloud (RiC) that seeks to identify and examine in depth the management, operational, legal, and technical issues surrounding the storage and management of records created, managed, and stored in the cloud; to determine what policies and procedures a provider should have in place for fully implementing the records/archives management regime of the organization outsourcing the records, for responding promptly to its needs, and for detecting, identifying, analyzing and responding to incidents; and to develop guidelines to assist organizations in assessing the risks and benefits of outsourcing records/archives storage and processing to a cloud provider, for writing contractual agreements, certifications and attestations, and for the integration of outsourcing with the organization's records management and information governance programs.

Confidentiality: Your personal information will be kept confidential, and no personally identifiable information will be used in any publication or presentation resulting from the research. All survey information will be stored securely.

Potential risk: There are no known risks or potential risks from participating in this survey.

Affiliation: This study is affiliated with the University of British Columbia (UBC) through the School of Library, Archival and Information Studies.

Contact for information about the study: If you have any questions or wish to receive further information with respect to this study, please contact the Principal Investigator of RiC, Luciana Duranti at 604-822-2587 or luciana.duranti@ubc.ca. If you have any concerns about your rights as a research subject and/or your experiences while participating in this study, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598 or, if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598. Your participation in this survey is entirely voluntary. (This consent form was last updated on April 05, 2013. Version 3).

Please indicate your consent by selecting below.

- ☐ I consent to participate in this research study.
- ☐ I do not consent to participate in this research study.

To what degree can you represent your organization's view of cloud computing?

(1 = Lowest, 5 = Highest)

- ☐ 1

⁵ Please note that not all respondents were presented with all questions. For example, potential users were not asked if they had been involved in cloud computing decision-making, nor were current users asked service provider their organization is considering using.

- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5

Does your organization use cloud computing?

(Some examples of cloud computing include organizational use of Dropbox, Microsoft Office 365 and Amazon EC2.) Cloud computing is the accessing of shared data and IT services (i.e. computing) over a network (i.e. the cloud). The term "cloud" is a metaphor for the Internet, where it is possible to create a virtual computing infrastructure replacing in whole or in part that internal to an organization.

- ☐ Yes
- ☐ No
- ☐ Not anymore
- ☐ I don't know

Has your organization considered using cloud computing?

- ☐ Yes
- ☐ No
- ☐ I don't know

What are your organization's motivations for considering cloud computing? (Select all that apply)

- ☐ Reduce cost
- ☐ Increase organizational performance
- ☐ Improve security
- ☐ Increase storage capacity
- ☐ Increase collaboration
- ☐ Keep pace with the industry
- ☐ Drive business process transformation
- ☐ Enhance new market entry
- ☐ Other (Please specify) _____

Why is your organization not considering cloud computing? (Select all that apply)

- ☐ Security risk
- ☐ Privacy risk
- ☐ Technological complexity

- ☐ Legal implications
- ☐ Loss of control of data
- ☐ Cost
- ☐ We don't know about cloud computing
- ☐ We don't trust cloud computing
- ☐ Other (Please specify) _____

Why did your organization stop using cloud computing? (Select all that apply)

- ☐ Legal issues
- ☐ Unexpected costs
- ☐ Internal security issues
- ☐ External security breach
- ☐ Privacy issues
- ☐ Loss of information
- ☐ Information or records management (RIM) issues
- ☐ Access issues
- ☐ Forensic issues
- ☐ I don't know
- ☐ Other (Please specify) _____

How long has your organization been using cloud computing?

- ☐ More than five years
- ☐ More than three years
- ☐ More than one year
- ☐ Less than one year
- ☐ I don't know
- ☐ Other (Please specify) _____

What kind of cloud service model is your organization considering?

A public cloud is made available to the general public or a large industry group that shares the same needs, and is normally owned by an organization in the business of selling cloud services. A private cloud is operated by a specific organization for its use alone. A hybrid cloud contains more than one of the above types of cloud service models. A community cloud is an infrastructure shared by several organizations that supports the specific community to which they belong and its specific needs.

- ☐ Public cloud
- ☐ Private cloud
- ☐ Hybrid cloud
- ☐ Community or industry-specific cloud
- ☐ I don't know
- ☐ Other (Please specify) _____

What kind of cloud service is your organization considering? (Select all that apply)

- ☐ IaaS (Infrastructure as a Service), such as Amazon EC2, Rackspace Cloud, ReadySpace Cloud Services, SAVVIS, Terremark, NaviSite, and Linode
- ☐ PaaS (Platform as a Service), such as Force.com, EngineYard, Mendix, OpenShift, Google App Engine, Windows Azure Cloud Services and OrangeScape
- ☐ SaaS (Software as a Service), such as Google Apps, Microsoft Office 365, Onlive, GT Nexus, Marketo, and TradeCard
- ☐ I don't know
- ☐ Other (Please specify) _____

Which service provider(s) is your organization considering using?(Please type in company and/or product name(s).)

What kind of cloud service model is your organization using?

A public cloud is made available to the general public or a large industry group that shares the same needs, and is normally owned by an organization in the business of selling cloud services. A private cloud is operated by a specific organization for its use alone. A hybrid cloud contains more than one of the above types of cloud service models. A community cloud is an infrastructure shared by several organizations that supports the specific community to which they belong and its specific needs.

- ☐ Public cloud
- ☐ Private cloud
- ☐ Hybrid cloud
- ☐ Community or industry-specific cloud
- ☐ I don't know
- ☐ Other (Please specify) _____

What kind of cloud service is your organization using? (Select all that apply)

- ☐ IaaS (Infrastructure as a Service), such as Amazon EC2, Rackspace Cloud, ReadySpace Cloud Services, SAVVIS, Terremark, NaviSite, and Linode

- ☐ PaaS (Platform as a Service), such as Force.com, EngineYard, Mendix, OpenShift, Google App Engine, Windows Azure Cloud Services and OrangeScape
- ☐ SaaS (Software as a Service), such as Google Apps, Microsoft Office 365, Onlive, GT Nexus, Marketo, and TradeCard
- ☐ I don't know
- ☐ Other (Please specify) _____

Which service provider(s) is/are your organization using?(Please type in company and/or product name(s).)

What kind of cloud service model did your organization use?

A public cloud is made available to the general public or a large industry group that shares the same needs, and is normally owned by an organization in the business of selling cloud services. A private cloud is operated by a specific organization for its use alone. A hybrid cloud contains more than one of the above types of cloud service models. A community cloud is an infrastructure shared by several organizations that supports the specific community to which they belong and its specific needs.

- ☐ Public cloud
- ☐ Private cloud
- ☐ Hybrid cloud
- ☐ Community or industry-specific cloud
- ☐ I don't know
- ☐ Other (Please specify) _____

What kind of cloud service did your organization use? (Select all that apply)

- ☐ IaaS (Infrastructure as a Service), such as Amazon EC2, Rackspace Cloud, ReadySpace Cloud Services, SAVVIS, Terremark, NaviSite, and Linode
- ☐ PaaS (Platform as a Service), such as Force.com, EngineYard, Mendix, OpenShift, Google App Engine, Windows Azure Cloud Services and OrangeScape
- ☐ SaaS (Software as a Service), such as Google Apps, Microsoft Office 365, Onlive, GT Nexus, Marketo, and TradeCard
- ☐ I don't know
- ☐ Other (Please specify) _____

Which service provider(s) did your organization use?(Please type in company and/or product name(s).)

What are the primary reasons your organization uses cloud computing? (Select all that apply)

- ☐ Reduce cost
- ☐ Increase performance
- ☐ Improve security
- ☐ Increase storage capacity
- ☐ Increase collaboration
- ☐ Keep pace with the industry
- ☐ Other (Please specify) _____

Were you involved in your organization's selection of the cloud provider?

- ☐ Yes
- ☐ No

Which of the following statements most closely describes your role during your organization's selection of a cloud service? (Select all that apply)

- ☐ I was among those who made the decision
- ☐ I was among those who were consulted for advice
- ☐ I was among those who researched our cloud computing options
- ☐ I was among those who initiated the move to cloud computing
- ☐ Other (Please specify) _____

Did your organization negotiate a service-level agreement rather than accepting the provider's standard agreement?

- ☐ Yes
- ☐ No

When your organization negotiated a service-level agreement with the cloud service provider, which issues were important to your organization?(Select all that apply)

- ☐ Ownership of data and metadata
- ☐ Appropriateness of technology and security
- ☐ Availability of service (uptime and downtime)
- ☐ Multi-tenancy disclosure
- ☐ Retention and destruction of records
- ☐ Backup and recovery
- ☐ Location of cloud servers

- ☐ Information management
- ☐ Legal hold or e-discovery
- ☐ Other (Please specify) _____

Please add any comments you may have about the service-level agreement negotiation with your service provider.

Has your organization experienced any issues with cloud computing?

(For example: costs, access, security, etc.)

- ☐ Yes
- ☐ No
- ☐ I don't know

**Which of the following issues has your organization experienced using cloud computing?
(Select all that apply)**

- ☐ Legal issues
- ☐ Unexpected costs
- ☐ Internal security issues
- ☐ External security breach
- ☐ Privacy issues
- ☐ Loss of information
- ☐ Information or records management (IRM) issues
- ☐ Access issues
- ☐ Forensic issues
- ☐ I don't know
- ☐ Other (Please specify) _____

Were the issues your organization experienced resolved?

- ☐ Yes
- ☐ No
- ☐ I don't know

Would you like to comment further on the issues your organization has experienced with cloud computing?

(For example, who resolved the issue? How was the issue resolved?)

To what degree is your organization satisfied with cloud computing?

(1 = Lowest, 5 = Highest)

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ I don't know

Which industry best describes your organization?

- ☐ Government
- ☐ Education
- ☐ Professional, scientific and technical services
- ☐ Media, arts & entertainment
- ☐ Health care
- ☐ Technology
- ☐ Non-profit
- ☐ Wholesale trade & retail trade
- ☐ Information and culture industry
- ☐ Real estate, rental, leasing
- ☐ Finance and insurance
- ☐ Construction and manufacturing
- ☐ Agriculture, forestry, fishing and hunting
- ☐ Mining, quarrying, and oil and gas extraction
- ☐ Other (Please specify) _____

How many employees does your organization have?

- ☐ Less than 100
- ☐ 100-299
- ☐ 300-499
- ☐ More than 500

- ☐ I don't know

What title best describes your role in your organization?

- ☐ Records manager
- ☐ Information officer
- ☐ Archivist
- ☐ IT specialist
- ☐ Legal counsel
- ☐ Business executive
- ☐ Other (Please specify) _____

Which department(s) in your organization manages the relationship with your cloud service provider(s)? (Select all that apply)

- ☐ IT department
- ☐ Information or records management department
- ☐ Legal department
- ☐ Other (Please specify) _____
- ☐ I don't know

We welcome your comments and/or experiences! In the area below, please elaborate on any questions above or bring up issues that we did not specifically mention in the survey.

This survey is anonymous. We will also be conducting follow-up research and would welcome your comments or experiences. If you wish to be contacted for follow-up research or to receive the results of this survey, please provide your contact information below.