

# CLLOUD COMPUTING: DIFFERENCES IN PUBLIC AND PRIVATE SECTOR CONCERNS

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## ABSTRACT

*This paper addresses the research question: Do sector-level cultural differences influence the importance placed on concerns about the potential adoption of cloud computing? To answer this question, a survey based on previous efforts that measured private sector IT professionals' perceptions of an emerging technology (cloud computing) was replicated using a public sector sample of military and civil service IT professionals. Results indicate that there are significant differences between how members of private and public sector organizations rate the concerns surrounding the potential adoption of new technologies. Specifically, the public sector members were more concerned with availability and performance issues, and less concerned with on-demand costs or ability to bring the IT capabilities back in-house.*

## INTRODUCTION

In August, 2008, CIO Research surveyed 173 Information Technology (IT) and business leaders to get first-hand feedback on what enterprises really think about cloud computing, and how, when and why they planned to deploy it in their organizations. The respondents included 93 heads of IT at their company or business unit level. The survey found that 58 percent said that cloud computing would cause a radical shift in IT and 47 percent said they were already using it or actively researching it (McLaughlin, 2008). Supporting this finding, a recent report by **International Data Corporation (IDC)** shows worldwide revenue from IT cloud services exceeded \$16 billion in 2009 and is forecast to reach \$55.5 billion in 2014. This trend represents a compound annual growth rate of 27.4%, which is over five times the projected growth rate for

traditional IT products. The recent economic downturn has accelerated the adoption of cloud services adoption due to the great potential for cost-cutting that has become the mantra of most organizations (IDC, 2011).

Many reports can be found on the success stories of the benefits gained from adopting cloud computing in one form or another, with claims of estimated savings reaching 40% (Del Nibletto, 2011). But, that doesn't mean there have not been investigations into the concerns surrounding its adoption into the organization. All of these reports, though, have all been in the context of private commercial organizations. Although the benefits of adopting cloud computing should translate into the public sector as well, adoption in this sector seems to be lagging.

One potential reason for this discrepancy lies in the cultural differences between public and private sector organizations. This paper reports on an early exploratory effort to examine the differences in ratings of IT professionals in public and private sector organizations concerning the issues surrounding promising emerging new technologies, such as cloud computing. Specifically, this effort addresses the question: Do sector-level cultural differences influence the importance placed on concerns about the potential adoption of cloud computing?

## BACKGROUND

When examining the determinants of innovation adoption, past research suggests that it is necessary to look at different contexts (Thong, 1999). In response, technological innovation research has determined several variables for studying organizational adoption in addition to innovation characteristics. For example, Tornatzky and Fleischer (1990) proposed that technological context, organizational context, and environmental context influence the process by which innovations are adopted. Damanpour (1991) argued that organizational innovations are affected by individual, organizational and environmental factors. Grover (1993) proposed that organizational factors, policy factors, environmental factors, support factors, and system-related factors determine the adoption of interorganizational information systems. Thong (1999) identified four elements of context that affects the adoption of technological innovations by organizations: characteristics of the organizational decision makers; characteristics of the technological innovation; characteristics of the organization; and characteristics of the environment in which the organization operates.

Although all of these studies were done in a private sector context, similar lenses have been used to investigate the adoption of computer technologies in public sector organizations. For example, Bingham (1976) identified four categories of factors that affect adoption of computer technologies: organizational characteristics; demand for computing; community environment; and organizational environment. Perry and Kramer (1999) investigated the effects of extra-organizational characteristics, intra-organizational

characteristics, and innovation attributes as the key determinants of the adoption of computer technologies by local government agencies. Thus, when examining the potential differences in the perceptions of IT professionals, the type of organizational context, whether private sector or public sector, will potentially have a significant impact.

## Private versus Public Sector

The distinct differences between private and public organizations are the core of public administration theory and have been the topic of on-going research. The main conventional distinction between public and private organizations is their ownership (Rainey, Backoff, & Levine, 1976). Private firms are owned by entrepreneurs or shareholders. Public agencies are owned collectively by members of political communities. The literature on the differences between public and private organizations is summarized by Rainey, et al. (1976). Stated in terms of the public sector's characteristics relative to those of the private sector, these differences include:

1. **Environmental Factors:** Public sector organizations have less market exposure (and therefore more reliance on appropriations) resulting in less incentive for productivity and effectiveness, and lower cost efficiencies; more legal and formal constraints; and higher political influences, including impacts of interest groups and need for support of constituencies.
2. **Organization/Environment Transactions:** Public sector organizations have more mandatory actions due to the unique sanctions and coercive powers of government; wider scope of concern and significance of actions in the "public interest"; higher level of scrutiny of public officials; and greater expectation that public officials act fairly, responsively, accountably, and honestly.
3. **Internal Structure and Processes:** Public sector organizations have more complex

criteria (e.g., multiple, conflicting, and intangible); managers with less decision making autonomy, less authority over subordinates, greater reluctance to delegate, and a more political role for top managers; more frequent turnover of top managers due to elections and political appointments; difficulties in devising incentives for individual performance; and lower work satisfaction and organizational commitment.

Taking all of this into account, it is clear that market-based IT practices that work well in the private sector may not automatically or easily transfer to the public sector. This is attributable to the differences between the public and private sector discussed above, as well as more specific differences in the nature of the IT management environment in the private versus the public sector. Bretschneider (1990) empirically tested the argument that IT management in public organizations differs from that of the private sector. Using a sample of 1,005 public and private sector organizations, his study concluded that the two environments are indeed different. He found that the critical difference was that the public sector features greater interdependencies across organizational boundaries, which in turn, contribute to increased accountability and coordination problems. Additionally, public sector IT managers are confronted with greater external review and control by third parties, as well as being subject to a host of regulatory, legislative, and political influences.

Using these general and specific IT management differences between public and private sector enterprises, and some propositions on public information systems (Bozeman & Bretschneider, 1986), the expected differences in perceptions of the concerns surrounding the adoption of new technology innovations are presented.

### **Concerns with Adopting New Technologies**

The survey concerning cloud computing conducted by CIO Research in 2008, elicited responses in thirteen categories. These categories included: security, integration with existing systems, loss

of control over data, availability, performance issues, IT governance issues, regulatory/compliance concerns, dissatisfaction with vendor offerings/pricing, ability to bring back in-house, lack of customization opportunities, measuring ROI, not sure, and other (McLaughlin, 2008). In 2009, a similar survey by International Data Corporation (IDC) of its commercial enterprise panel examined the top challenges and issues of cloud computing. Their results tapped the top seven challenges and issues ascribed to the cloud computing, which included seven of the previous categories from the CIO Research study including: availability, performance, security, integration with in-house IT, ability to customize, on-demand costs, and bringing back in-house (Gens, Mahowald, Villars, Bradshaw, & Morris, 2010). Using these seven recurring issues, the expected differences in perceptions of IT professionals in the public sector are derived.

### **Expected Differences in IT Professionals' Concerns**

#### **Availability**

Availability is the state of being able to ensure users can use any information resource when ever and whenever it is needed. Availability depends on the accessibility of the data, the system, the applications and the infrastructure used to access that data. The loss of availability is critical if there is a serious incident, network failure, or natural disaster. For the public sector IT personnel, the availability of the data and services could be critical to the completion of missions such as a military unit in a combat zone. Public organizations are "open systems" that are easily influenced by external events. Indeed, it is the responsibility of public managers to protect and promote this permeability of organizational boundaries to ensure that services are responsive to public needs (Boyne, 2002). A wide variety of public agencies, such as emergency services, are also bound to provide services constantly, with little regard for the notion of "typical business hours". In the case of the military, such services have to be available 24 hours a day, every day, for even the most routine of operations. Add to this the global nature of their operations, and the environment described is one where the availability

of IT services is paramount. By contrast, where loss of availability would impact the commercial organization in terms of time and profit, private sector entities may ignore most constituents' demands, at least in the short term (Ring & Perry, 1985). Thus:

Public sector IT professionals are expected to rank concerns about the availability of cloud computing services as higher in importance than their private sector counterparts.

### Performance

Cloud computing performance can either be cloud-oriented or client-oriented (Linthicum, 2010). Cloud-oriented performance is where the processing occurs in the "cloud" and is compared to the performance of completing the processing on-premise. Cloud-oriented performance is generally seen as an advantage. Performing large amounts of processor intensive calculations or queries can take many hours on the local network, but the scalable nature of the cloud allows additional processors to be quickly added resulting in calculation or queries taking minutes instead of hours to complete. Client-oriented performance is where users constantly interact with the cloud provider where there is latency with the constant back-end machine-to-machine communications that occurs between the Software-as-a-Service (SaaS) provider and the browser. Client-oriented performance issues may not be as noticeable in terms of latency until network saturation is reached (Linthicum, 2010). The latency on bandwidth constricted networks severely hampers the ability to communicate and accomplish the mission and is generally deemed not acceptable for such entities. To overcome this limitation, many public sector agencies, such as emergency services, have dedicated bandwidth channels for their communications due to the saturation of normal communication channels that occurs during emergencies (Hwang, 2005). Thus:

Public sector IT professionals are expected to rank concerns about the performance of cloud computing services as higher in importance than their private sector counterparts.

### Security

Public sector organizations are particularly concerned about the security on the information entrusted to their care, and are especially wary of making the information collected by them being available to outsiders. One concern is that public agencies want to have full control over the information collected and perceive that storing off-site might reduce control over the information (Dawes, 1996). Agencies are also concerned about the security of information shared online and apprehensive about unauthorized access and privacy rights (Rochleau, 1997). Information collected by public sector entities is often highly sensitive or even classified. Sharing this information might result in problems related to privacy rights of individuals (Dawes 1996, Landsbergen and Wolken 2001, Rocheleau 1997) or detriment to national interests. The adopting of cloud computing services can exacerbate these concerns, as it presents its own set of security risks, which require comprehensive safeguards. If the connections are not secured, such implementations can easily invite unauthorized access and misuse of information. Thus:

Public sector IT professionals are expected to rank concerns about the security of cloud computing services as higher in importance than their private sector counterparts.

### Integration with in-house IT

Organizations want to maximize the control of their business core systems, which can be in-house legacy systems, and integrate these systems across externally sourced cloud services (Gens, 2008). In the commercial industry, an organization's proprietary management systems are implemented and leveraged to provide them with a competitive advantage (Mata, Fuerst, & Barney, 1995). Compared to public organizations, private organizations are much more likely to have to act quickly and invest substantial amounts of money in expensive and potentially risky technology ventures if they believe these could lead to a competitive advantage and, ultimately, profits. But, despite these risks, prior research has shown that private sector organizations rankings of integra-

tion issues have been declining over the years, ranking third in 1984, seventh in 1985, and tenth in 1986 (Caudle, Gorr, & Newcomer, 1991). This seems to indicate that the private sector has been getting this issue under control. The public sector, however, is still hamstrung by red tape and procurement rules leading to long delays and divergent mixes of equipment (Bozeman, Reed, & Scott, 1992). Additionally, whereas private sector organizations often have to act quickly, public sector IS errors can affect a much larger body of people in negative ways (e.g., cutting off of Social Security or welfare benefits); thus, public-sector information systems need more deliberate development and more extensive testing (Rochleau & Wu, 2002). Thus:

Public sector IT professionals are expected to rank concerns about the ability to integrate cloud computing services with in-house IT as higher in importance than their private sector counterparts.

#### Ability to customize

The public sector features greater interdependencies across organizational boundaries (Beyah & Gallivan, 2001). Also, public sector organizations often are expected to collaborate with other organizations offering similar services (Nutt and Backoff 1993). A consequence of this interdependence is a reliance on standardized processes and procedures to insure interoperability among the various public agencies. These characteristics of public agencies reflect the lack of rewards or incentives for successful innovations and the penalties for violation of established procedures (Fottler, 1981). In this context, the limits placed on managers' autonomy to change processes or their delivery mechanisms discussed above are deemed necessary for successful operations. Overall, the environment is best described as one that is highly structured and intolerant of deviations or customization. Additionally, the public sector model of sharing information amongst each other about key systems has important advantages (Rochleau & Wu, 2002). For example, public organizations involved in implementing new technologies can benefit from each other's experiences, whereas private sector organizations

are likely to keep secret any information they feel gives them competitive advantage. Consequently, the public sector is likely to be better able to take advantage of other organizations' experiences, thereby avoiding many problems (Rochleau & Wu, 2002). Thus:

Public sector IT professionals are expected to rank concerns about the ability to customize cloud computing services as lower in importance than their private sector counterparts.

#### On-demand costs

Unlike the private sector, cost minimization has not been a priority in the public sector until relatively recently (Jensen & Stonecash, 2005). As stated above under environmental factors, public sector organizations have less exposure to market forces, leading to lower cost efficiencies. That is, because public agencies typically have few rivals for the provision of their services, there are no built in market incentives to lower costs to gain a greater portion of the market (Boyne, 2002). Additionally, the lack of cost consciousness can also be attributed to the fact that cost allocation techniques are difficult to apply in the public sector because many outputs are joint products. This has changed in recent times with the introduction of activity-based-costing, but the underlying problem is still pervasive. Thus:

Public sector IT professionals are expected to rank cost concerns about cloud computing as lower in importance than their private sector counterparts.

#### Bringing back in-house

The use of an external entity to assume IT responsibilities can negatively impact the downstream consequences of IT projects by altering whether and how in-house employees learn and retain important knowledge (both tacit and explicit), leading to an atrophy of internal knowledge assets (Beyah & Gallivan, 2001). Furthermore, once the organization limits or ceases investing in its own competencies in an area, it may be difficult to renew a specific competence. The in-house IT organization thus leaves itself unprepared to re-

integrate former services back in-house without significant investments in training and technological upgrades. Such concerns are less pervasive for public sector organizations.

Organizations in the public sector are more risk-averse than their private sector counterparts (Bozeman & Kingsley, 1998). To minimize risk, public sector organizations often undertake a costly dual operating capability wherein both the old and new technologies are kept available until the new technology has been proven to be able to take over (Rochleau & Wu, 2002). Thus:

*Public sector IT professionals are expected to rank concerns about cloud computing services having to be brought back in-house as lower in importance than their private sector counterparts.*

### Methodology and Sample

To test the seven propositions above, a web-based survey based on the prior efforts of CIO Research and IDC was developed. For an accurate comparison of private and public entities, the survey scales and questions were maintained from the IDC survey. In the IDC survey of its commercial enterprise panel in 2009 on the top challenges and issues of cloud computing, two-hundred sixty-three IT executives/CIOs and their line-of-business colleagues completed the survey about their companies' use of, and views about, IT Cloud Services.

When selecting from the vast array of public sector entities to sample for the survey, careful consideration must be given to select a representative public organization. A public organization may, depending on usage, be a government organization, an organization charged with operating in the public interest, or one with goods and services having public goods characteristics (to name just a few of the possibilities). The degree to which an organization operates for the public interest is termed its "publicness" which is more formally defined as a characteristic of an organization which reflects the extent the organization is influenced by political authority (Bozeman & Bretschneider, 1994). Bozeman (1984, 1987) presents a dimensional model of "publicness" that based on organization resource processes and other fundamental organizational activities such as goal setting, structuring and design, and

organizational maintenance. According to this dimensional model, few, if any, complex organizations are purely public or purely private. Instead, some mix of public and private authority influences the behavior of most organizations. As a consequence of this model, some public sector or governmental organizations can be deemed "more public" than others, while some private sector business organizations are "more private" than others, creating a continuum. To minimize any overlap in samples and to maximize the potential impacts of the cultural differences between the public and private sectors, an entity high on the "publicness" scale, the Department of Defense, was selected.

The respondents for this effort included eighty-three DoD IT professionals including both Civil Service and uniformed members. Like the previous effort, the respondents completed the survey about their companies' use of, and views about, IT Cloud Services. The survey respondents were asked to rate the seven challenges/issues ascribed to the cloud computing model using a 5-point Likert-type scale ranging from 1 (Not Significant) to 5 (Extremely Significant). The selected sample were senior IT professionals currently employed by the Department of Defense. Following the IDC's method, the results were tabulated from the respondents that selected 3, 4, or 5 for a challenge/issue and reported in percentages.

To determine if the percentages were significantly different, a series of Z-tests were conducted. A Z-test compares the sample and population means to determine if there is a significant difference between the samples when the samples are large ( $n > 30$ ), each sample represents a random sample of the relevant population, and that each group to be tested is independent of the other, as in the case of the collected and archived data. The critical Z-value for the 99% confidence interval for a one-tailed test is 2.33. If the sample returns a test statistic of less than 2.33, then there is insufficient evidence to reject the null hypothesis that there is no significant difference between the two samples. If the test statistic is more than or equal to 2.33, then there is sufficient support to reject the null hypothesis and state that the difference in ratings between the public and private sector respondents are statistically significant at

the 99% confidence level. The data analysis and results are presented in the next section.

**DATA ANALYSIS AND RESULTS**

As shown in Figure 1, the top three issues for the private sector were security, availability, and performance. These issues were also rated as the most significant in the 2008 survey by CIO Research, indicating a consistent trend for concerns for emerging technologies in these areas. As shown in Figure 2, the top three issues for the public sector were performance, availability, and security, matching the private sector concerns, although in a different order. A side-by-side comparison using the public sector respondent's top concerns is shown in Figure 3.

The following presents the results of the Z-tests for the seven issues surveyed.

**Availability**

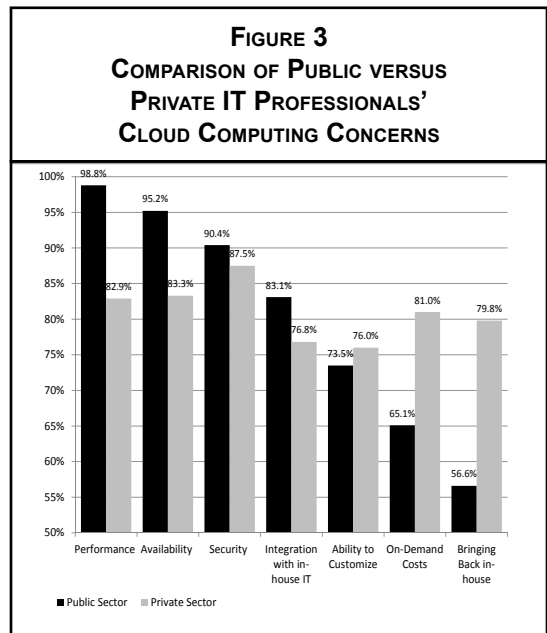
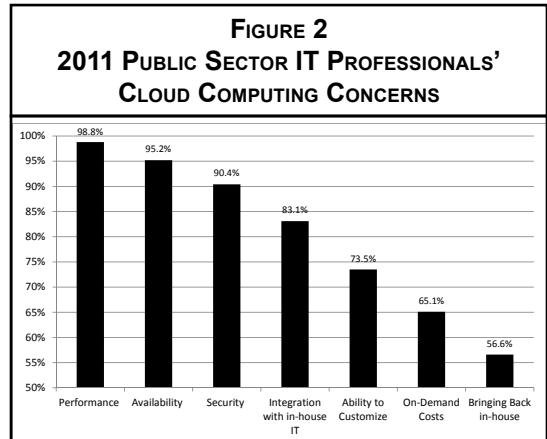
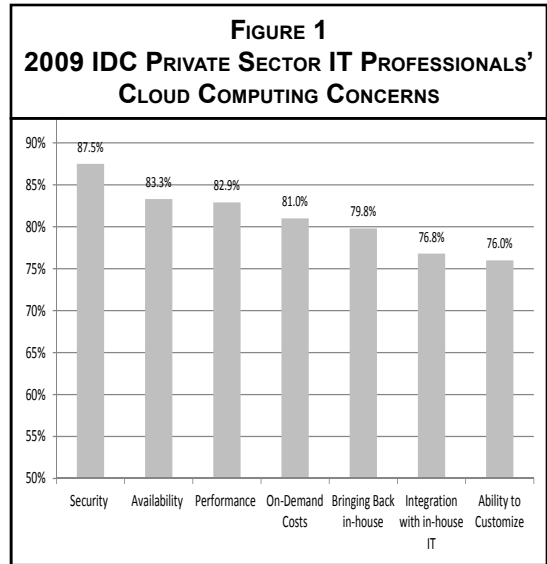
As proposed, there was a significant difference ( $Z = 3.537, p < .01$ ) between the percentage of DoD IT personnel (98.8%) that rated availability as a significant issue compared to the percentage of IDC Enterprise personnel (82.9%). That is, public sector IT professionals ranked concerns about the availability of cloud computing services higher in importance than their private sector counterparts.

**Performance**

As proposed, there was a significant difference ( $Z = 2.555, p < .01$ ) between the percentage of DoD IT personnel (95.2%) that rated Performance as a significant issue compared to the percentage of IDC Enterprise personnel (83.3%). That is, public sector IT professionals ranked concerns about the performance of cloud computing services as higher in importance than their private sector counterparts.

**Security**

Contrary to expectations, there was not a statistically significant difference ( $Z = 0.52, n.s.$ ) between the percentage of DoD IT personnel (90.4%) that rated Security as a significant issue compared to the percentage of IDC Enterprise



personnel (87.5%). That is, public sector IT professionals did not rank concerns about the security of cloud computing services as higher in importance than their private sector counterparts.

### **Integration with in-house IT**

Contrary to expectations, there was not a statistically significant difference ( $Z = 1.066$ , n.s.) between the percentage of DoD IT personnel (83.1%) that rated the ability to integrate with in-house IT as a significant issue compared to the percentage of IDC Enterprise personnel (76.8%). That is, public sector IT professionals did not rank concerns about the ability to integrate cloud computing services with in-house IT as higher in importance than their private sector counterparts.

### **Ability to customize**

Contrary to expectations, there was not a statistically significant difference ( $Z = 0.326$ , n.s.) between the percentage of DoD IT personnel (73.5%) that rated the ability to customize cloud computing services as a significant issue compared to the percentage of IDC Enterprise personnel (76.0%). That is, public sector IT professionals did not rank concerns about the ability to customize cloud computing services as lower in importance than their private sector counterparts.

### **On-demand costs**

As proposed, there was a significant difference ( $Z = 2.864$ ,  $p < .01$ ) between the percentage of DoD IT personnel (65.1%) that rated On-demand costs as a significant issue compared to the percentage of IDC Enterprise personnel (81.0%). That is, public sector IT professionals ranked cost concerns about cloud computing as lower in importance than their private sector counterparts.

### **Bringing back in-house**

As proposed, there was a significant difference ( $Z = 4.075$ ,  $p < .01$ ) between the percentage of DoD IT personnel (56.6%) that rated bringing IT services back in-house as a significant issue compared to the percentage of IDC Enterprise

personnel (79.8%). That is, public sector IT professionals ranked concerns about cloud computing services having to be brought back in-house as lower in importance than their private sector counterparts.

The comparative analysis of the IDC Enterprise panel 2009 IT Cloud Services Survey and the 2010-2011 DoD IT personnel cloud computing in the military survey shows that the majority of the a priori expectations were confirmed. As expected, more DoD IT personnel cited availability, performance, and in-house integration with cloud computing services as significant issues than did personnel on the IDC Enterprise panel, with the first two concerns being statistically significant. There were also statistically significant differences between the number of IDC Enterprise panel personnel citing on-demand costs and bringing the IT services back in-house as important concerns than the number of personnel in the DoD IT survey. Contrary to expectations, concerns over the security of cloud computing and ability to customize cloud computing services were virtually identical between the two sectors. These results are discussed in the next section.

## **CONCLUSIONS**

This study examined the differences in the perceptions of public and private sector IT professionals towards an emerging new technology, cloud computing. Testable propositions based on prior research were presented and tested. In general, the results were in line with a priori expectations, with four of the seven propositions supported by the empirical analysis. Specifically, the results of the statistical analysis indicate that public sector IT professionals are more concerned with the availability and performance of cloud computing implementations than their private sector counterparts. And, the public sector respondents were less concerned with cost issues or the difficulties of bringing IT services back in house if a cloud computing project failed to bring the desired results.

In keeping with expectations, but not statistically significant, were the expectations that the public sector members would rate concerns surrounding the security of cloud computing and



the integration of cloud services with in-house IT higher than their private sector colleagues, as well as the non-supported expectations that the public sector would consider cloud computing service customizing abilities as lower in importance than the private sector entities would. In sum, the results indicate that there are significant differences between how members of private and public sector organizations rate the concerns surrounding the potential adoption of new technologies. Specifically, the public sector members were more concerned with availability and performance issues, and less concerned with on-demand costs or ability to bring the IT capabilities back in-house. The three non significant results and some potential reasons that results were not in keeping with expectations are discussed in more detail next.

### Security

Contrary to expectations, there was virtually no difference between the percentage of public and private respondents to issues regarding the security of cloud computing services. Even though a slightly higher percentage of public sector respondents ranked security as important, the difference was not statistically significant. This is especially surprising due to the purposeful selection of Department of Defense, a known security-conscious culture, from which to draw sample respondents. Potential reasons for this result are the current trends of increases in identity thefts through unauthorized access to corporate records of customers (Kabay, 2010), and the rise in corporate espionage (Power, 2010). With all of the media attention on these issues, there is an increased emphasis being placed on security of information systems in the private sector, including calls from IT professionals to require mandatory reporting of intrusions (iClass, 2011). This increased emphasis may account for the closing of the gap in security concerns between public and private organizations.

It has been reported that the number of identity fraud cases rose by 12 percent in the U.S. last year, to 11.1 million, while the amount of these frauds grew by 12.5 percent, to \$54 billion (Ingram, 2010). Part of the rising figures is the fact that state laws have been passed all over the United States to force holders of personally identifiable

information to inform data subjects when their records are compromised by accident, employee malfeasance, or outside criminal activity (Kabay, 2010). When a customer is a victim of identity theft or data loss, the business suffers along with the victim. Monetary losses of goods and services are often compounded by chargebacks. Then there is the loss of customer trust, and in turn, loss of customers. According to CIO magazine, after a breach, 20 percent of customers sever all ties with the company, 40 percent say they consider doing the same, and another 5 percent will be hiring lawyers (Tynan, 2008). This increased visibility by consumers can be one more potential source of increased emphasis on IT security amongst the private sector respondents.

On the corporate espionage issue, the recent wikileaks incident is but one of a string of incidents in the past year that have brought to light the increasing ease of stealing corporate data in the digital age. Major corporations such as GM, Motorola, and Ford all had high profile cases in 2010 (Abatan, 2010). In light of these cases, private industries have started to put data security measures in place to avoid the potential huge financial losses which could jeopardize jobs and the very future of the business (Burgess & Power, 2008). These measures are disruptive to the IT professionals and adds a great deal of new responsibilities in areas such as endpoint security tools like enterprise information rights management, data loss prevention, email encryption and many other tools that can specifically lock data down (Abatan, 2010). The increased responsibilities and security implementations are potential explanations for the closeness in ratings between the already security conscious public sector IT professionals and the private sector entities surveyed.

### Integration with in-house IT

Even though, as proposed, a higher percentage of public sector respondents ranked concerns with integrating cloud computing services with in-house IT as important, the difference was not statistically significant. This result may partially be due to the public sector's desire to improve the efficiency of their IT/IS services by copying the practices of the private sector, leading to approaches to purchasing and planning for com-

puting systems narrowing between the two sectors during the past few years (Rochleau & Wu, 2002). As Federal, State, and local government agencies seek to improve efficiency, they increasingly turn to IT consultants (Bureau\_of\_Labor\_Statistics, 2010-11 Edition). These outside IT experts bring with them vast amounts of knowledge gained from their private sector experience. Thus, the public sector may be enjoying the same decline in concerns over integrating new technologies as has been reported in the private sector (Caudle, et al., 1991), leading to a closer set of ratings among the private and public sector respondents.

### Ability to customize

Even though the expected lower percentage of public sector respondents ranked concerns with the ability to customize cloud computing services as important, the difference was not statistically significant. This result may partially be due to the DoD's relatively recent efforts at standardizing computing services at most locations by consolidating much of their IT services into centralized processing centers (Robb, 2007). Add to this the U.S. Chief Information Officer's initiative announced in late 2010 to reduce number of Federal data centers by at least 800 by 2015 (Kundra, 2010), and the distance between DoD end user needs for customization and the implementing organization increases significantly, potentially leading to higher concerns than expected among the DoD respondents.

### LIMITATIONS

As with any research, this study has its limitations. One possible limitation of the studies' findings, is the use of the DoD from which to draw the sample respondents. The DoD is not fully representative of the public end of the "publicness" continuum of the public sector, but rather an extreme case. Additionally, the sample size, although sufficient for Z-tests, was somewhat small for that organization. A larger sample size would have increased the ability to detect small effects, such as those that potentially exist but were not significant in this study, especially the integration concern which approached significance at  $p < .10$ . Simply put, although the DoD

was purposefully selected to minimize any overlap in samples and to maximize the potential impacts of the cultural differences between the public and private sectors, that very selection was the source of a limitation that should be addressed in future research.

### Future Research

This study expanded the understanding of the differences in perceptions among IT professionals in the public and private sectors. To expand on these findings, future research efforts should examine other portions of the "publicness" continuum of both the public and private sector. Additionally, future researchers in this area should endeavor to acquire larger numbers of respondents from both sectors to increase the point where small effects could be discerned, possibly between members of the same sample. For example, a larger sample of DoD IT professionals would allow comparisons of the responses from the civil service members to those of the uniformed members and those of the IT leadership to their line of business colleagues. Additionally, future research efforts could expand the target technology beyond cloud computing to encompass other emerging technologies such as computational knowledge engines, semantic web, and social networking, to determine if perceptions differ by technology characteristics.

### BIBLIOGRAPHY

- Abatan, P. (2010). Corporate and Industrial Espionage to Rise in 2011 Retrieved April, 2011, from <http://www.enterprisedrm.info/post/2742811887/corporate-espionage-to-rise-in-2011>
- Beyah, G., & Gallivan, M. (2001). *Knowledge Management as a Framework for Understanding Public Sector Outsourcing*. Paper presented at the 34th Hawaii International Conference on System Sciences.
- Bingham, R. D. (1976). *The Adoption of Innovation by Local Government*: Lexington Books.

- Boyne, G. A. (2002). Public and Private Management: What's the Difference? *Journal of Management Studies*, 39(1), 97-188.
- Bozeman, B. (1984). Dimensions of 'Publicness': An Approach to Public Organization Theory. In B. Bozeman & J. Straussman (Eds.), *New Directions in Public Administration* (pp. 46-62). Monterey, CA: Brooks/Cole.
- Bozeman, B. (1987). *All Organizations Are Public: Bridging Public and Private Organization Theory*. San Francisco, CA: Jossey-Bass.
- Bozeman, B., & Bretschneider, S. (1986). Public Management Information Systems: Theory and Prescription. *Public Administration Review*, 46(Special Issue), 475-487.
- Bozeman, B., & Bretschneider, S. (1994). The Publicness Puzzle in Organization Theory: A Test of Alternative Explanations of Differences between Public and Private Organizations. *Journal of Public Administration Theory and Research*, 4, 197-223.
- Bozeman, B., & Kingsley, G. (1998). Risk Culture in Public and Private Organizations. *Public Administration Review*, 58(109-118).
- Bozeman, B., Reed, P., & Scott, P. (1992). Red Tape and Task Delays in Public and Private Organizations. *Administration and Society*, 24(3), 290-322.
- Bretschneider, S. (1990). Management Information Systems in Public and Private Organizations: An Empirical Test. *Public Administration Review*, 50(5), 536-545.
- Bureau\_of\_Labor\_Statistics. (2010-11 Edition). Management Analysts. *Occupational Outlook Handbook* Retrieved April, 2011, from <http://www.bls.gov/oco/ocos019.htm>
- Burgess, C., & Power, R. (2008). *Secrets Stolen, Fortunes Lost: Preventing Intellectual Property Theft and Economic Espionage in the 21st Century* Syngress.
- Caudle, S. L., Gorr, W. L., & Newcomer, K. E. (1991). Key Information Systems Management Issues for the Public Sector. *MIS Quarterly*, 15(2), 171-188.
- Damanpour, F. (1991). Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators. *Academy of Management Journal*, 34(3), 555-590.
- Dawes, S. S. (1996). Interagency Information Sharing: Expected Benefits, Manageable Risks. *Journal of Policy Analysis and Management*, 15(3), 377-394.
- Del Nibletto, P. (2011). Formula 1 Team Uses Cloud Computing for Grand Prix Success Retrieved 14 April, 2011, from [http://www.cio.com/article/596949/Formula\\_1\\_Team\\_Uses\\_Cloud\\_Computing\\_for\\_Grand\\_Prix\\_success?page=1&taxonomyId=3024](http://www.cio.com/article/596949/Formula_1_Team_Uses_Cloud_Computing_for_Grand_Prix_success?page=1&taxonomyId=3024)
- Fottler, M. (1981). Is Management Really Generic? *Academy of Management Review*, 6, 1-12.
- Gens, F. (2008). IT Cloud Services User Survey, pt.2: Top Benefits & Challenges, 2011
- Gens, F., Mahowald, R., Villars, R. L., Bradshaw, D., & Morris, C. (2010, 14 April). Cloud Computing 2010: An IDC Update Retrieved April, 2011, from <http://www.slideshare.net/JorFigOr/cloud-computing-2010-an-idc-update>
- Grover, V. (1993). An Empirically Derived Model for the Adoption of Customer-Based Interorganizational Systems. *Decision Sciences*, 24(3), 603-640.
- Hwang, W. G. (2005). Bandwidth on Demand for Deployed - IP Users. *IT Professional*, 7(1), 21-26.
- iClass. (2011). U.S Registers Increase in Information Security Breaches. Experts Suggest Mandatory Reporting Retrieved April, 2011, from <http://www.impactwire.com/mbarticle.asp?id=2997>
- IDC. (2011, 14 April 2011). IDC Cloud Research, from [http://www.idc.com/prodserv/idc\\_cloud.jsp](http://www.idc.com/prodserv/idc_cloud.jsp)
- Ingram, M. (2010). Identity Theft on the Rise Retrieved April, 2011, from <http://gigaom.com/2010/02/10/identity-theft-on-the-rise-survey/>
- Jensen, P. H., & Stonecash, R. E. (2005). Incentives and the Efficiency of Public Sector-Outsourcing Contracts. *Journal of Economic Surveys*, 19(5), 767-787.

- Kabay, M. E. (2010). Identity Theft on the Rise Retrieved April, 2011, from [http://www.pc-world.com/article/187257/identity\\_theft\\_on\\_the\\_rise.html](http://www.pc-world.com/article/187257/identity_theft_on_the_rise.html)
- Kundra, V. (2010). 25 Point Implementation Plan To Reform Federal Information Technology Management.
- Linthicum, D. (2010). How to Gauge Cloud Computing Performance Retrieved April, 2011, from <http://www.infoworld.com/d/cloud-computing/how-gauge-cloud-computing-performance-722>
- Mata, F. J., Fuerst, W. L., & Barney, J. B. (1995). Information Technology and Sustained Competitive Advantage: A Resource Based Analysis. *MIS Quarterly*, 19(4), 487-505.
- McLaughlin, L. (2008). Cloud Computing Survey: IT Leaders See Big Promise, Have Big Security Questions Retrieved 14 April, 2011, from [http://www.cio.com/article/455832/Cloud\\_Computing\\_Survey\\_IT\\_Leaders\\_See\\_Big\\_Promise\\_Have\\_Big\\_Security\\_Questions](http://www.cio.com/article/455832/Cloud_Computing_Survey_IT_Leaders_See_Big_Promise_Have_Big_Security_Questions)
- Perry, J. L., & Kraemer, K. L. (1999). *Technological Innovation in American Local Governments/The Case of Computing*: Pergamon Press Inc.
- Power, R. (2010). Security and the Rise of Corporate Espionage Retrieved April, 2011, from <http://features.techworld.com/security/3213882/security-and-the-rise-of-corporate-espionage/>
- Rainey, H. G., Backoff, R. W., & Levine, C. H. (1976). Comparing Public and Private Organizations. *Public Administration Review*, 36(2), 233-244.
- Ring, P., & Perry, J. (1985). Strategic Management in Public and Private Organizations: Implications of Distinctive Contexts and Constraints. *Academy of Management Review*, 10, 276-286.
- Robb, D. (2007). NetApp Facilitates DoD Data Migration Retrieved April, 2011, from <http://www.enterprisestorageforum.com/management/features/article.php/3704921/NetApp-Facilitates-DoD-Data-Migration.htm>
- Rochleau, B. (1997). Governmental Information Systems Problems and Failures: A Preliminary Review. *Public Administration and Management: An Interactive Journal*, 2(3).
- Rochleau, B., & Wu, L. (2002). Public Versus Private Information Systems: Do they Differ in Important Ways? A Review and Empirical Test. *American Review of Public Administration*, 32(4), 379-397.
- Thong, J. Y. L. (1999). An Integrated Model of Information Systems Adoption in Small Businesses. *Journal of Management Information Systems*, 15(4), 187.
- Tornatzky, L., & Fleischer, M. (1990). *The Process of Technological Innovation*. Lexington Books.
- Tynan, D. (2008). Identity-Theft Protection: What Services Can You Trust Retrieved April, 2011, from [http://www.cio.com/article/343913/Identity\\_Theft\\_Protection\\_What\\_Services\\_Can\\_You\\_Trust\\_?page=1&taxonomyId=3169](http://www.cio.com/article/343913/Identity_Theft_Protection_What_Services_Can_You_Trust_?page=1&taxonomyId=3169)

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