Looking Through The Clouds: A Tale Of Two Universities

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LOOKING THROUGH THE CLOUDS: A TALE OF TWO UNIVERSITIES

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Abstract

Cloud computing has become a popular buzzword and a trend in the IT industry. With characteristic features of scalable computing resources on-demand, and accessibility on a pay-per-use basis, it has been promoted as the harbinger of good tidings to its subscribers, such as the minimization of in-house IT infrastructures, substantial cost savings, and diminished administrative hurdles, thereby appearing as an appealing outsourcing proposition for non-IT enterprises, such as universities. This paper presents a comparative case study of two universities, one in Australia (UniOz) and one in Sweden (UniSwed). The two universities illustrate examples of how contemporary organisations interpret cloud computing, of drivers behind moving services into the cloud, and of prevailing concerns. Similarities pertaining to drivers for cloud computing are identified at the two cases (seeking scalable computing resources, and the re-allocation of IT resources to focus on core enterprise operations, with an aim to trim costs). This is identified in spite of differences in the culture of respective IT departments. Differences were also identified in terms of student vs. staff driven sourcing of services (email), and early vs. late adoption. The case study also illustrates interesting patterns in terms of the organisational implications of cloud services over time that calls for longitudinal studies. The implication of this paper is three-fold; two cases are consistent with outsourcing theories, they point to a transformation of the status quo, rather than an erosion of the role and influence of the internal IT department, and also reveals gaps in outsourcing theories and a possible future research direction in strengthening the relevant theoretical framework.

Keywords: Cloud computing, IT services, IT in organisations, outsourcing, universities, case research
1 INTRODUCTION

Cloud computing is definitely a force to be reckoned with, as early cloud sceptics, such as Oracle, have even jumped on the bandwagon in order to retain their competitiveness vis a vis the cloud pioneers – Google, Amazon, and Microsoft. It has become the backbone of social networking applications such as Facebook, enabled audio exhibits through Soundcloud, facilitated human resource operations with SalesForce.com, and catered to an ever-growing need for storage with Amazon S3. Yet, is cloud computing just an evolution of classical question of “make or buy” associated with traditional IT outsourcing, at least from the viewpoint of IT managers? According to Babcock (Babcock, 2010) and Leimeister et al. (Leimeister, Bohm, Riedl, & Kremar, 2010), cloud computing is an evolution of outsourcing. Indeed, cloud computing involves the purchase and use of IT services from an external organisation, which is synonymous with the concept of Outsourcing, defined as “a form of predetermined external provision with another enterprise for the delivery of goods and/or services that would previously have been offered in-house” (Kakabadse & Kakabadse, 2000). Organisations, of various sizes, have outsourced aspects of their IT needs since the mid-1960s (McFarlan & Nolan, 1995). As with outsourcing, cloud computing reveals the similar implications for organisations with regards to changes in the roles and structures of corporate IT departments (Khajeh-Hosseini, Sommerville, & Sriram, 2010; Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011; Tyndall, 2010). On the other hand, cloud computing is also being viewed as a disruptive technology (Sultan & Van de Bunt-Kokhuis, 2011). According to Marston et al (Marston, et al., 2011, p176), cloud computing “represents a fundamental change in the way information technology (IT) services are invented, developed, deployed, scaled, updated, maintained and paid for”. Fellows (Fellows, 2008) has argued in the same strain by stressing that IT departments within organisations, intent on using cloud services, need to implement relevant changes in their attitudes, culture, and modus operandi. The adoption of cloud computing is expected to further transform the way IT resources are viewed by policy-makers and users (Creeger, 2009; Khajeh-Hosseini, et al., 2010; Tyndall, 2010). Such transformations invokes the need for academic research (Khajeh-Hosseini, et al., 2010). Whilst there has been a plethora of papers on cloud computing in the computer science discipline, there is ample room for Information Systems (IS) researchers to study the adoption of cloud computing and its implication on IT policy and organisational structures (Marston, et al., 2011). Given that cloud computing has been viewed as another form of outsourcing, the theories of Transaction Cost Economics (TCE) (Marcolin & Ross, 2005; Willcocks & Feeny, 2006), Political Power model (Dibbern, Goles, Hirschheim, & Jayatilaka, 2004; M. Lacity & Hirschheim, 1993; Lee, Huynh, Kwok, & Pi, 2000), and Resource Based-View (RBV) (Bharadwaj, Saxena, & Halemame, 2010; Haried & Ramamurthy, 2010; Lee, et al., 2000) have been applied to explain the adoption of cloud services in an Australian university (Sarkar & Young, 2011).

On the other hand, cloud computing marks a slight departure from traditional outsourcing in that the services can be availed with relative ease and within a shorter time frame, without the need for lengthy negotiations and long-term contracts (Marston, et al., 2011). At the same time, the risks of privacy, security, reliability, and performance, in general outsourcing, are magnified with cloud computing (Jaeger, Lin, & Grimes, 2008). This adds to the importance of continued IS research in the area.

This paper expands upon the longitudinal study of Sarkar and Young (Sarkar & Young, 2011) to include a comparative analysis with a Swedish university that has undergone a similar cloud adoption. Given the dearth of relevant comparative studies in IS, this paper “looks through the clouds” to investigate the commonalities and differences pertaining to the adoption decisions, and subsequent changes in the role of in-house IT departments in the two organisations. The research questions addressed in this paper relates to “why” cloud computing is adopted, and “how” it influences the role of the internal IT departments. Following on with the application of outsourcing theories (above), we investigate the decisions, concerns, and outcomes, with the move into the cloud. For the sake of brevity and the wide availability of articles discussing basic cloud computing, the various definitions
of cloud computing, set-ups (private, public, and hybrid) and service types (IaaS, PaaS, and SaaS), have been omitted in this paper.

2 CLOUD COMPUTING: OVERVIEW

Cloud computing is based on the fundamental technologies of “virtualisation” and “grid computing” (Carr, 2009), as well as the concept of “time-sharing” owing to which it has been called “time-sharing 2.0” (Campbell, 2009). Sultan and van de Bunt-Kokhuis (Sultan & Van de Bunt-Kokhuis, 2011) refer to cloud computing as both sustaining and disruptive technologies. Cloud services are considered to be sustaining as they can enhance an organisation’s IT-enabled business processes, i.e. an improvement on time-sharing. At the same time, it is disruptive owing to its enabling non-IT savvy enterprises to receive the benefits of robust business applications. Cloud computing has received the limelight in view of the much-touted benefits of flexibility or scalability on-demand (elasticity), and the pay-per-use model (Armbrust et al., 2009; Babcock, 2010; Zhang, Cheng, & Boutaba, 2010). The fact that public cloud services can be availed with relative ease, and computing resources scaled up or down as per demand, can save organisations the trouble of having to build in-house IT infrastructures, thus converting capital expenditures to operations expenditures (Marston, et al., 2011). In view of this, public cloud services may be ideal for small and medium-sized enterprises (SMEs) (Marston, et al., 2011; Sultan, 2011). With regards to large enterprises, by moving non-core applications onto the cloud, IT departments are able to re-allocate resources to mission-critical applications and core operations (Babcock, 2010; Sarkar & Young, 2011). General-purpose applications, such as email systems and collaborative tools, are considered to be the most suitable for migration onto public clouds (Marston, et al., 2011).

Cloud computing also enables the use of disruptive tools and technologies by academic institutions, while preventing a strain on their budgets (Ercan, 2010). Large cloud vendors, such as Amazon, Google, and IBM, have established joint working groups with various universities to further develop cloud computing (Amazon Web Services; Anonymous, 2007). Notable examples of cloud computing adoption in universities include University of California at Berkeley (Fox, 2009), Washington State University (DeCoufle, 2009), a number of UK universities (Hicks, 2009; Sultan, 2010), East African universities (HEALTH Alliance) (Wanjiku, 2009), Beijing University of Technology, China, (Kshetri, 2010), the Indian Institute of Technology (IIT) -Kanpur (MacMillan, 2009; Raghu, 2009), and the Vietnam National University (VNU) (Ariff, 2008), to list a few.

Despite the benefits of the elasticity of computing resources and pay-per-use benefits associated with cloud computing, it has its share of concerns of loss of control, vendor lock-ins, security, privacy, and reliability (Jaeger, et al., 2008; Marston, et al., 2011; Yanosky, 2008). In fact, IT departments may view the advent of cloud computing as an erosion of their control over IT resources, with possible implications for security and privacy of corporate data and possible redundancies in IT positions (Marston, et al., 2011; Yanosky, 2008). This has been illustrated by an IDC survey, which revealed that 75% of high-ranking IT executives were concerned primarily about security, followed by concerns over performance and reliability (Wired.com, 2011). Added to these are uncertainties regarding regulations at the national and transnational levels, as cloud services, by their very nature, may involve datacentres located in offshore locations (Jaeger, et al., 2008; Marston, et al., 2011). Cloud providers interacting with clients in the same country might, in order to avail economies of scale, use the services of another cloud vendor situated in another country, without the knowledge of the clients, thereby heightening the concerns of privacy and security. This indicates that such concerns, associated with traditional outsourcing, are magnified in cloud computing scenarios. Thus, large enterprises have been recommended to retain their mission-critical applications in-house or within a private cloud (Babcock, 2010; Marston, et al., 2011).
3 THEORETICAL UNDERPINNINGS

As this work extends previous research the same research framework and set of theories (Sarkar & Young, 2011) will be used to compare the two university cases in the context of Cloud Computing. The three theories were chosen to represent different dimensions of the outsourcing decision. As with (Sarkar & Young, 2011), these theories are TCE (Marcolin & Ross, 2005; Willcocks & Feeny, 2006), the Political Power model (Dibbern, et al., 2004; M. Lacity & Hirschheim, 1993; Lee, et al., 2000), and the RBV (Bharadwaj, et al., 2010; Haried & Ramamurthy, 2010; Lee, et al., 2000).

3.1 Transaction Cost Economics (TCE)

Past and current literature on outsourcing has been associated with the “make or buy” or “in source vs. outsource” decisions concerning the behaviour of business organisations (Bharadwaj, et al., 2010; Clemons, Reddi, & Row, 1993). One of the most common theories used to explain the motivation behind outsourcing is TCE (Coase, 1937; Williamson, 1985). It is claimed TCE can be used to decide between outsourcing and producing internally through an economic decision. Although there have been research expressing mixed results in using TCE to explain IT outsourcing behaviour, the findings have concluded that TCE is still useful as a normative theory and with better precision and consistency in using TCE and its constructs research results could be less mixed (Alagheband, Rivard, Wu, & Goyette, 2011; M. C. Lacity, Willcocks, & Khan, 2011). In consideration of this, TCE is used in this research in conjunction with other theories with the intent to explain the behaviour behind cloud computing or reveal the need for a new theory. In this research we can use TCE as a normative theory to comment on outsourcing through economies of scale, switching costs, and the coordination of transaction costs. It has been argued that the use of IT may lower coordination costs without increasing the associated transaction risk, leading to more outsourcing and less vertically integrated firms (Clemons, et al., 1993). Transaction costs can include switching costs such as sunken investment costs, lost performance, management upgrade, uncertainty of future IT operations, induction re-training performance costs, candidate search costs, and information transfer and setup costs. Therefore, it is claimed that organisations are encouraged to outsource to other suppliers who have economies of scale (especially those who have the expertise in certain areas (M. Lacity & Hirschheim, 1993)) and to outsource when switching costs are high (Whitten, Chakrabarty, & Wakefield, 2010).

3.2 The Political Power Model

The political power model in this framework uses four different aspects of power. The first aspect is treating power as a function of position within a structure. Concerning outsourcing, departments or employees who are in a position of influence can use their power to determine whether to outsource or not (Salancik & Pfeffer, 1977). The second aspect is based on the evidence that resource acquisition is also a critical source of power. In the case of outsourcing, the more resources a member brings into the organisation, the more power she/he accumulates and is able to influence the purchasing of IT services (M. Lacity & Hirschheim, 1993). The third aspect of power refers to the idea that power comes from offering value that is unique and not substitutable. Therefore, the party that holds this valuable resource can influence the make or buy decision. Finally, the fourth aspect of power is the ability to absorb uncertainty. The argument is that reduction in task uncertainty is viewed as a major element in decision making. Lacity (1993) argues that the ability to provide information concerning new technology or services absorbs uncertainty and therefore, puts the service provider or department in an influential position when it comes to decision making (M. Lacity & Hirschheim, 1993).

3.3 Resource-Based View (RBV)

The Resource-Based View (RBV) proposes that an organisation has strategic resources that can assist in its competitive positioning where the key measure of whether a resource is strategic is:
heterogeneity, value, inimitable and non-substitutable (Barney, 1991). Organisations can explore the strategy of outsourcing activities that are seen as non-essential or not considered as core competencies or core capabilities. Competence refers to the ability to deploy combinations for firm-specific resources to accomplish a given task (Bharadwaj, et al., 2010), whereas a core IS capability is a capability needed to facilitate the exploitation of IT, measurable in terms of IT activities supported, and resulting business performances (Willcocks & Feeny, 2006).

As in the previous research of the authors’, these three theories, traditionally used to comment on outsourcing, will be used in this paper to explore the decision making process and motivational drivers behind policy changes through cloud computing. The findings of our research will reveal how well these three theories explain the behaviour of the two case studies and to show any weaknesses or gaps in theoretical explanatory power. This is intended to contribute to future guidelines in policy making associated with the organisational use of cloud services and to elaborate on the change in roles of future IT services.

4 RESEARCH METHODOLOGY

Two in-depth case studies, of an Australian tertiary institute (UniOz) and a Swedish tertiary institute (UniSwed), provided this research project with a revelatory empirical data (Yin, 1994). Both cases offered us with the opportunity to analyse particular organisations’ motivations and decisions behind moving sections of its IT services to a “cloud”, IT managers’ interpretations and underlying reasoning behind the adoption of cloud services and relevant concerns, as well as implications for their IT departments in the future. A qualitative approach consisting of the two case universities was chosen on the basis of the fact that these two institutions afforded the authors the rich in-depth empirical data needed to analyse the phenomenon of cloud computing in large enterprises, and examine management interpretation, decision processes, and the corporate governance of deciding how, what, and when to outsource previously in-house applications and services to a cloud provider (Benbasat, Goldstein, & Mead, 1987; Eisenhardt, 1989; Walsham, 1995). By doing this we are aiming at gaining rich insights into the adoption of cloud computing in large enterprises (Walsham, 1995).

Though both UniOz and UniSwed are similar in their focus on scholarly pursuits on science and technology and in their adoption of cloud services, they have different histories with regards to IT implementation. UniOz has experienced “misadventures” in its IT undertakings in the past and thus developed a conservative and cautious approach towards disruptive technologies in the process. UniSwed, on the other hand, has historically dealt with unsuccessful IT endeavours by attaining the status of early adopter of technology, such as gaining a first mover advantage through the migration of student emails onto the cloud. By taking a first move and an innovative approach, UniSwed has attained the status as a forward-thinking institution in Sweden amongst other universities with regards the nature and quality of IT services to students. In-depth explorations into why and how the organisations approach cloud computing, given their differing outlook towards new technology, and the possible implications lend themselves to the pursuits of a qualitative and interpretive study (Eisenhardt & Graebner, 2007) with the data collection technique consisting of semi-structured interviews.

The findings in this paper offer an analysis of different types IT managers’ perceptions of cloud computing and their changing roles, and the organisational arrangements (structures), gathered over a period of two years, as part of a longitudinal project. Purposive sampling was used to select participants for in-depth interviews in both universities (Patton, 1980), i.e. interview participants were selected on the basis of their intimate involvement with institutional cloud adoption. Qualitative interview guides were used, with a mix of pre-defined open and open-ended questions, topics and informal communication (Patton, 1980). In this paper, we interviewed 3 senior IT managers from UniSwed, and 4 IT personnel in high positions (including informal discussions with the new CIO and the director of electronic research (eResearch) from UniOz. Under the conditions stipulated in the agreements with the two participating universities, we will refer to the two case universities as UniOZ
and UniSwed. Within the two cases we will address the respondents’ roles with abstract terms, thereby offering respondents confidentiality by not identifying them by their name (cf. Walsham, 2006). The fact that we analyse data from two different cases, in different geographical contexts and education systems, and that we do this in different constellations make us claim that we have both obtained data and researcher triangulation (Klein and Myers, 1999). This is used as an attempt to generate a rich picture of descriptions. We analyse the case study data by using a set of concepts and themes highlighted in the literature review. In that sense theories guided our analysis (Walsham, 2006). We also aimed at being explorative, investigating the data, trying to find new insights directly from the interviews. Data from interviews were partially transcribed as a part of a content analysis.

Note that one weakness in our methodology at this stage is the focus on management perceptions only. This is not sufficient if one wishes to have a more comprehensive, multi-perspective, picture of moving a portion of IT services to a “cloud”. However, this study is a part of a longitudinal project that will broaden the perspective on the phenomena in the future. Thus, future empirical work will be aimed at data gathering from a diverse set of cloud service users in the universities, and junior IT personnel, to enhance external validity issues. It is to be noted that we are not claiming generalisations of cloud computing to universities as organisations at this point in time, as this is a dual case study. Furthermore, we are not looking into the intricacies of the two western cultures, Swedish and Australian, in this paper (Hofstede, 2010).

5 CASE BACKGROUND

The dual case studies comprise of an Australian university, UniOz, and its Swedish counterpart, UniSwed. The latter was proactive with its adoption of cloud services, in line with its innovative and forward-thinking approach towards disruptive technologies. On the other hand, UniOz followed a relatively conservative approach towards new tools and technologies and was often considered to be a late adopter. The following sections provide a brief overview of the two universities.

5.1 UniSwed

UniSwed is a large, multi-faculty, public university in Sweden with its origins in the technology disciplines. The university offers both undergraduate and post-graduate programs in the areas of engineering, medicine, design, arts, the sciences, and education, with the aim of developing and preparing students to take up professional positions in industry, with strong emphasis on both teaching and research. UniSwed has an enrolment of 30,000 students and employs over 3,800 academics and administrative support staff, with campuses in three cities.

The Swedish Government is the prime undertaker of the higher education system in Sweden and is responsible for funding, program accreditation, and regulating institutions in the sector. The universities operate on the basis of an agreement with the Government and are obliged to follow the statutes, ordinances and regulations relevant to the sector.

Within UniSwed, IT issues are managed by various bodies. The main groups dealing with strategic IT issues are: IT Management Group, IT Office, IT Council, and the IT Services Unit. The IT Management Group consists of the rector of UniSwed and three head of schools (cf. a steering group). The IT Office is manned with the CIO, an IT strategist, and an IT controller. Within the IT Council, are a representative organisational body consisting of several head of schools. The IT Service Group, headed by the IT Manager, provides IT services to university services, including IT infrastructure, help desk, systems maintenance, and systems development services. Some IT infrastructure, support and maintenance issues are also dealt with at the departmental levels (particularly within schools with technical and engineering profiles). Its main legacy IS are linked to a national system used by higher education institutions called LADOK, which aims to facilitate and abridge the daily work of departments and administration following up academic results, and to ensure the legal security and rights for the individual student, a financial ERP system module (Agresso) and a set of 4 disparate
system handling HR matters. The administrative system platform at UniSwed also contains e.g. a learning management system (LMS), “It’s Learning”, an email system for staff (MS Exchange).

Between 2006 and early 2007, key actors within UniSwed realised that they wanted to offer students a better email system than the one hosted and managed by the university. The old internal email system, hosted by UniSwed IT Services, was in urgent need of improvement. However, the IT managers were aware of the fact that students were largely forwarding their student emails to their own externally-provided email accounts. During that period, UniSwed was also undertaking a strategic assessment of its IT resources in terms of cost reduction and re-allocation of resources to core business services, directly related to research and teaching. UniSwed also started to investigate other services to outsource during that time period, which included printing. This took place after a time period of internally focused IT services and a traditional internal service provider role for the IT Service Unit. This shift in focus is driven and legitimized by all key actors within UniSwed. In May 2007 UniSwed moved the student email to Google. This made them an early adopter.

“[UniSwed] was one of the first universities in Sweden using Google Apps for education in May 2007. […] “Number two in Europe” (CIO, UniSwed, December 15, 2010)

Looking at academic staff, a number of staff members use cloud services today, based on their own initiative, not supported by UniSwed at a central level. Some of the services used are for cooperation (The Projectplace), and for file storage and exchange (Dropbox), scheduling and bookings, and some academics also forward their UniSwed mails to their own gmail account.

5.2 UniOz

The IT department at UniOz has long been run with an extremely cautious and conservative approach, owing to bad experiences with failed projects in the past. Thus, the department was initially sceptical about cloud computing. However, in 2009, it began to host servers in an external datacentre as part of a private cloud. The lack of physical space on campus was cited as the main reason to move computing resources externally. At the same time, it was also a known fact that several academics and senior administrators were either using cloud applications, revealed through participant observations, or were vocal proponents of cloud computing. It is to be noted that UniOz was already an integral part of a network of Australian universities that use a cloud-based supercomputing facility, funded by the Australian government. The facility is used for storage of large datasets and high-performance computing, and is used extensively for academic research in science and technology. In late 2010, UniOZ underwent a change in its IT leadership with the recruitment of a new CIO, with extensive experience in corporate applications development and project management, and with an ardent interest in exploring cloud services for organisational usage. The role of the CIO at UniOz is that of the chief strategist for the organisation’s IT capability, and reports to the Vice Chancellor. UniOz’s involvement in a private cloud and the preliminary moves towards certain cloud services, such as student emails and LMS, began in late 2009 to 2010, but it was in 2011 that the university proceeded with the adoption of gmail for students, spearheaded by the new CIO. The new CIO’s pro-cloud directive was also supported by other senior cloud computing proponents in the university, such as the eResearch Director, whose role is to oversee the electronic frontier that interfaces with academic research activities. Immediately upon assuming the role of CIO, the new IT manager established a cloud computing steering committee, which set out to evaluate possible cloud solutions for student emails. The committee conducted trials, focus groups and surveys to elicit student requirements, and also consulted with counterparts in other Australian universities that had already deployed cloud-based email services for students. By mid-2011, student email accounts were migrated to Google and Google apps went ‘live’ for use by students. Currently, UniOz is well into its post-cloud adoption phase with plans to migrate staff email and offer Google Docs for staff usage by 2012. Even though the move towards a cloud computing had begun prior to the recruitment of the new CIO, the new IT leader has accelerated the process. Evidence of this has been the current work on virtualised computing space for
students, the use of storage space (hosted by the Amazon cloud) for research purposes, and the use of a dedicated webpage for business process initiators to evaluate cloud offerings.

6 DISCUSSION OF FINDINGS

6.1 Drivers

The primary motivator for both universities to seek services from external datacentres was the need for scalable computing resources, and the re-allocation of IT resources to focus on core enterprise operations, with an aim to trim costs. In this regard, both universities were driven by similar motivators. UniOz was faced with the constraints of physical space that was needed by the expanding IT infrastructure, resulting in the relocation of a large part of its computing resources to an external datacentre. This facility was managed as a private cloud by a vendor that also took care of maintenance and upgrade of racks and servers, and facility management (heating and cooling) (Sarkar & Young, 2011). Even though the lack of physical space was not a major issue for UniSwed, they were, nevertheless, keen on scalable computing resources to meet growing user needs and to achieve efficient server maintenance.

The migration of student email accounts to gmail were perceived in a similar manner by IT managers in both universities. IT managers at UniSwed perceived the move to gmail as bringing forth benefits for all parties concerned, from the primary user group of students to the provision of IT from a university perspective. In addition to offering students with a more robust email service, such as gmail, the university was able to harness Google Apps, including zero-cost Google Docs for student usage. Through the feedback mechanism, IT managers found out that students and the student union were satisfied with gmail. UniSwed is an early adopter of cloud-based email services in Sweden. In fact, the adoption of gmail in UniSwed was considered to be student-driven, in that the move was motivated by the aim to provide students with satisfactory customer services. However, such a perspective was not offered by the IT managers at UniOz. Rather, part of the need for greater computing resources was said to have been driven by academic needs. In the words of a senior executive, also an official proponent of cloud computing within UniOz:

“For research stuff, the storage requirements have increased exponentially. The file sizes are larger and the number of files storing digital data are getting bigger and bigger”, senior executive, UniOz, November 15, 2011).

By linking these main drivers to our theoretical framework (section 3), we can see that the need for scalable resources and for focusing on core enterprise operations is important. TCE may have explanatory value in this situation because the requirement for scalable resources and physical space may be linked to the traditional make-buy decision where coordination costs are compared. For UniOz, it was more cost effective to outsource the physical space for their data servers. For both organisations, the need for scalable computing resources and physical space can be also commented on by political models and RBV. Concerning Political models, IT managers and academic (research and teaching) departments are in a strategic position to influence the decision to outsource and IT service providers are in a position to leverage their resources. Significant stakeholders are either supporting or restraining certain services being internally or externally provided. RBV becomes relevant when organisations such as UniOz and UniSwed outsource or reduce their non-core operations to enable themselves to focus on their core capabilities. What is interpreted as non-core operations and core capabilities, however, is not obvious. Different stakeholders can view staff email, as in the UniSwed case, as core or non-core capabilities critical for significant processes of the organisation.

6.2 Concerns

A number of concerns have been raised by the CIO, The IT Manager and a Coordinator of IT infrastructure at UniSwed, the legal aspect is one, regarding cloud computing as being a government
organisation. There are also cost aspects and technical aspects: security and integration issues (with legacy systems). UniSwed is not, formally, obliged to provide students with email, a major reason why UniSwed offers student with gmail accounts in the university format. Staff emails at UniSwed, on the other hand, are based on MS Exchange and run internally as it’s considered an internal asset. There are concerns about the security, legal and political issues surrounding applications that are considered assets. Several schools within the organisation identify staff email as a part of core business and a backbone of the processes within the university. There is, however, “an ongoing discussion” as the CIO phrased it, looking at external hosting for the staff email. The pace of doing this, however, is slower than its initial migration of student emails, which gave the institution the status as a forward-thinking university in the first place. Regarding staff e-services, UniSwed also considers MS Office 365 as a worthwhile alternative. The ongoing discussion also includes legal aspects, and the launching of a forum involving a test group of 100 users, aimed at generating greater information and facilitating decision-making in the make or buy in this context. Concerns also include the actual cost, integration with legacy systems (staff email being more integrated with other systems than e.g. student email), end user usability, exit possibilities, and agreement issues. UniSwed also raised the question of data integrity regarding patents and loss of data. However, efficiency dominates this discussion (to free resources to be using in core business) together with technical aspects. The following citations describe the issue of trust at UniSwed:

“Trust is an important issue – do we trust the services and the service providers? Can we read different logs from here, can others read the information, US government? […] especially at the more technical oriented departments at the university, the technicians at the department level trust their own email solutions more that the outsourced ones. If that isn’t the case the IT unit at the university is the second option, because we (the technicians at the department level) know the technicians at the university IT unit. And the scariest thing is to put the service in the cloud hosted by a large company like Google or Microsoft […]” (IT Manager, UniSwed, September 5, 2011).

What was interesting was view was also expressed by the senior IT managers at UniOz prior to the recruitment of the new CIO as will be discussed in the next paragraph. Coming back to UniSwed, the organisations and hosting of staff emails are still a political issue, besides being a question of trust. Some actors within the university, however, seem to downplay the role of trust and awareness among staff by using this analogy:

“People in general do not reflect on where their data is. You do not reflect on where your money is for example, if we compare with the bank system. Your money is not at your local branch office. It is more a question of a mindset […] when looking at the Cloud it is much a question of trust” (Coordinator, Infrastructure, UniSwed, April 18, 2011)

Prior to the change in the top IT role at UniOz, the central IT department had been run conservatively. New tools and technology perceived to heighten security and privacy concerns were considered with utmost caution. Cloud computing was initially perceived in such a light. The senior IT managers at that time were concerned about the loss of control over organisational data, and feared vendor lock-ins by cloud providers. Such concerns centred primarily around email and LMS. There were less concerned over the private cloud and the cloud-based supercomputing environment, over which UniOz (and the Australian government) held greater control. Even though much of these concerns have gradually subsided with the decision to move email systems and Blackboard (an LMS) to the cloud and the adoption of Google Docs, the IT department and cloud proponents in the university are still aware of the potential threats to privacy and security.

“We need to determine if data collected as part of research (and stored in the cloud) raises privacy and copyright concerns. Sometimes, researchers may want to keep the data confidential for a certain period of time, if there are copyright issues (relevant to creative rights associated with a piece of work). There are legal concerns surrounding some research datasets” (senior academic executive, UniOz, November 12, 2011).
This is in line with the reasoning at UniSwed. However, the UniOz senior executive, an academic and official proponent of cloud computing, was confident that such concerns can be addressed via comprehensive SLAs and legal contracts between the university and the vendors. With regards to the possibility of the storage of some data in off-shore datacentres, the executive, while acknowledging concerns, expressed confidence in the safeguards put in place by large cloud vendors, such as Apple, in line with the strategic importance of such measures, and translated operationally through dedicated teams of experts and organisational resources. It was also pointed out by the executive that data security becomes a bigger issue data is moved from a private cloud to a public one. The issue of security becomes important when the transparency of the relationship between the cloud provider is yet to be firmly established, especially when the cloud provider is part of a computing value chain that resides in an offshore data centre.

For UniSwed, the main concerns include security and trust. Whereas for UniOz, the fear is a loss of control over data and being locked into a trade agreement. Here, TCE may have some explanatory power. Transaction costs include contract costs and therefore, organisations such as UniSwed and UniOz, may be hesitant in going into outsourcing agreements where contract costs are high, or there is a likelihood of high switching costs, should they decide to have an exit strategy. The political model also point out that organisations may outsource when the service reduces task uncertainty and therefore, if task uncertainty still remains with security and trust issues, an organisation may choose not to do so.

6.3 Outcomes

According to the IT managers, students at both UniSwed and UniOz voiced satisfaction with gmail. It was a free service for both students and the universities. Gmail was considered to be one of the most frequently used email services by students, to which emails from the in-house system were often being directed. UniSwed, was able to gain early mover advantage by being the first university in Sweden to outsource students emails to the cloud. However, the IT managers in the university expressed reluctance to move staff emails out into the cloud, citing legal concerns surrounding staff information. Student emails have less bearing, legally, which makes it a prime candidate (cf. Marston et al, 2011) for the migration onto the cloud.

Exit routines regarding external hosting and provision seems to be a neglected area. This is highlighted by an IT manager at UniSwed:

“Exit routines are seldom an issue. What happens if the cloud service provider becomes insolvent? Or if we would like to move the service to another provider or in-house again; what happens then? It is surprisingly little discussion concerning that. We need to have strategies for that. It is a kind of lock-in effect.” (IT Manager, UniSwed, September 5, 2011).

Again, such concerns were raised by IT managers in the previous regime that existed within the IT department. Staff emails are considered as part of the core applications at UniSwed, which will continue to be run and managed by the in-house IT department. The IT department considers the core applications and the associated IT infrastructure as central to the university’s operations. Thus, the unit has an intrinsic stake in the current IT set up, and is concerned with the loss of IT capability if aspects of the infrastructure were to move externally onto the cloud. However, an ongoing investigation of putting the staff email in the cloud, has begun to question parts of this, as reported above. UniSwed have also discussed hybrid or transitive solutions as illustrated below:

“My plan is to develop the same kind of service internally – as long as it is possible. For sure we cannot guarantee the same service level as external suppliers, but we can be as close as possible in order to be a kind of intermediate station before the users enter the cloud. The value we can offer is to support the measuring of e.g. traffic during a period of three months.” “Then the user has a fairly good ground to estimate the cost of the external solution.” “If one is going for a cloud solution it is fine for us. Then we have to buy less junk [hardware] internally. We can support and manage those systems.” (Coordinator, Infrastructure, UniSwed, April 18, 2011).
On the other hand, UniOz has been a late adopter of cloud services, yet in a relatively short time frame, from late 2009 to mid-2010, it began moving Blackboard and student emails onto the cloud. Staff emails will follow suit in mid-2012. In addition, Google Docs (seen as another form of cloud storage) will be made available for use by all university users as a free service. The change in attitude from being cloud-averse, to proceeding along full stream with it can be attributed to the urgent need to free up resources for core IT operations, and a change in the key IT role in the university – a new CIO with an inherent interest in cloud computing. This is one example how a new CIO can influence the interpretation and adoption of cloud computing. Neither student nor staff emails and Blackboard are considered part of the portfolio of core ‘mission-critical’ enterprise applications, which include the legacy ERP system and the SAP-driven Human Resource application. The latter will continue to be managed internally, though they are housed in the private cloud. It is to be noted that the private cloud does not hold the same concerns with regards to reliability, security, and privacy, as public clouds. Having released resources once dedicated to the email and LMS, the IT department plans to focus on the core applications, and importantly, reallocate personnel to ensure that cloud services are being optimally received by the university users. Moreover, IT personnel will be given the task of making a full risk assessment of cloud vendors in light of quality of service, and privacy and security concerns, which, in turn, will involve drafting SLAs and legal contracts.

Both organisations have emphasised that through using cloud services, the main outcomes are focusing on the core services or core competencies of the organisation. For UniSwed, the student emails were quickly outsourced because they were not core to their operations. However, there is a reluctance to do the same with the staff email, which they do consider as core applications. For UniOz, the situation is different but the focus is still on core services. Here, this organisation has had the motivation to free up their core IT operations, through a change in attitude and a new CIO. Email (staff and student) is not considered as mission-critical and thus, IT services will be free to focus on core applications and focus on maintaining their cloud services (SLAs and legal contracts). UniSwed has the same CIO since 1997, and though the university undertook an innovative move in 2007 for student emails, but they seem to have lost momentum since then. Here, RBV is used to best explain the implications as both organisations have identified their core and strategic resources and wish to focus on them.

7 CONCLUSION AND IMPLICATIONS

In summary, as shown in Table 1, the findings are also consistent with the research stated in the literature review, in Section 2, where both case studies cloud initiatives have started with student email (Marston, et al., 2011). However, unlike the University of Westminster (Sultan, 2010), it is not yet clear how much cost savings have been achieved by either UniOz or UniSwed. From the findings, cost has not been a major driver for the two universities moving towards the cloud. Instead, the main motivations have been fulfilling space and economies of scale requirements. This is where the political model and RBV show more explanatory powers than TCE. In addition, the releasing of resources to focus on core operations has been the main driver and outcomes for both organisations when it comes to outsourcing to the cloud. On the basis of this understanding of the case study findings in light of the above theories, cloud computing, as evidenced in the two cases, indicates another form of outsourcing, which in itself is not a totally new paradigm or approach.

No evidence was found to support notion that that the role and influence of the IT department will erode, as warned by Yanosky (2008). Rather, a change in skill-set is gradually taking place in UniOz, as personnel managing non-core IS will be assigned to other key systems, or assume the role of business analysts and user support. There is also expected to be roles for personnel with the skills to draft SLAs and legal contracts. From the perspective of UniSwed, there does not appear to be any change in IT structure at all, especially as their cloud initiatives have slowed down concerning staff resources.
### Table 1: Research Findings

<table>
<thead>
<tr>
<th>Findings</th>
<th>Sub-Category</th>
<th>UniOz</th>
<th>UniSwed</th>
<th>Lesson from Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivers</td>
<td>Scalable Computing Resources</td>
<td>Needed to meet growing needs of Academic Research. Had constraints of physical space A new (external) CIO recruited</td>
<td>Needed to meet growing needs of Students A steering group with strong operational focus becoming more powerful</td>
<td>TCE can comment on how service providers have the infrastructure and the economies of scale of providing certain services</td>
</tr>
<tr>
<td></td>
<td>Re-allocation of IT resources</td>
<td>To focus on core operations</td>
<td>To focus on core operations</td>
<td>Political models state that IT managers and schools/departments or other powerful academic constellations are in a strategic position to influence the decision to outsource especially when there is a need. IT service providers themselves are also in a position to leverage their resources</td>
</tr>
<tr>
<td>Concerns</td>
<td>Cost</td>
<td>Not too much of a concern</td>
<td>Linked with legal and exit aspects</td>
<td>Transaction costs include contract costs and therefore, organisations may be hesitant in going into outsourcing agreements where contract costs are high or there is a likelihood of high switching costs</td>
</tr>
<tr>
<td></td>
<td>Data security, trust and integrity</td>
<td>Fearing the loss of control over data (especially with public clouds) and vendor lock-ins</td>
<td>Trusting an outside provider is difficult and interpreted as dangerous</td>
<td>The political model may point out that organisations outsource when the outsourced service reduces task uncertainty and therefore, if task uncertainty still remains with security and trust issues, an organisation may choose not to outsource</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Focus on Core Operations</td>
<td>Freeing up IT service to focus on core applications and SLAs</td>
<td>There is a reluctance to move Staff email to the cloud as they are considered core by dominant actor constellations</td>
<td>RBV (above) explains the desire for organisations to focus on their core capabilities or core operations</td>
</tr>
</tbody>
</table>

However, the outsourcing theories do not explain how the two universities, one with an innovative image and the other with a more conservative approach, switched positions when it came to the further outsourcing of applications to the cloud. UniSwed is closely tied administratively to the Swedish government, and its IT infrastructure is managed by different bodies within the organisation. Since its update of gmail for students in 2007, UniSwed has slowed down its move towards the cloud and is hesitant with gmail, or similar solutions, for staff. On the contrary, UniOz adopted gmail for students in 2011, but has since moved ahead with further outsourcing of IT services to cloud vendors. Although the new CIO at UniOz has accelerated the move towards cloud services, the initial interest and exploration of cloud computing began in 2009 and 2010 with increased interactions of the IT department with the senior university executives, and the migration of Blackboard onto the cloud. Thus, a gradual change in culture was brewing as early as 2009 (Sarkar and Young, 2011). The Political Power model, while attributing the accelerated move as a result of the arrival of a pro-cloud CIO and the rising influence of the non-IT executives in favour of cloud computing, does not shed light on this latent change in outlook since 2009. Furthermore, the theory does not explain why the forward-thinking IT managers at UniSwed began to distance themselves from further cloud services. However empirical findings show that dominant actor constellations within UniSwed have slowed down the process for staff email, raising several concerns (security, legal etc.). This may be explained using the Political Power model where the steering group at the operational side, manned with several head of schools/departments have dominated the discussion with senior IT staff. Future research will be directed at further examination of this issue and the development of an appropriate theoretical framework to explain sudden change in approaches to new technologies and the sourcing of technology.
Therefore, the implication of this paper is three-fold. First, the findings of the two cases are consistent with outsourcing theories, and support the notion that cloud computing is an evolution or another form of outsourcing. Secondly, the cases so far point to a transformation of some IT roles and responsibilities, as in UniOz, or maintaining the status quo (UniSwed), rather than an erosion of the role and influence of the IT department. This may be linked to the fact that what was considered as non-core applications (email) were outsourced in the two cases. What is considered as core or non-core applications by different actor groups or at different moments in time seems to be crucial as illustrated above. More comprehensive changes regarding IT roles and responsibilities may occur in the future if previously core applications are out in the cloud. Finally, the two case studies reveal gaps in the outsourcing theories, discussed in this paper, when it comes to understanding how a sudden change in culture occurs, which transformed UniSwed’s usual innovative outlook into an environment of conservatism, while UniOz began to take a proactive position in its evaluation of new outsourcing scenarios. The changes in culture calls for longitudinal studies of cloud computing and has implications on how we understand changes, dominant actors within organisations and culture on stakeholder and organisational level.

One limitation in this exploratory and comparative case study at this stage is the focus on management perceptions only. This is not sufficient, as commented upon above if one wishes to have a more comprehensive, multi-perspective, picture of outsourcing IT services to a “cloud”. However, this study is a part of a longitudinal project and future empirical work will be aimed at data gathering from a diverse set of cloud service users in the universities, and junior IT personnel, to enhance external validity issues. Further research will also address organisational culture as an explicit theme in order to discuss the process and the outcome above. This may also include exploring organisational theories such as Meyer and Rowan’s theory of myth and ceremony (Meyer & Rowan, 1977), or developing new theory. As a result, this may be helpful in closing the gap identified above and discuss organisational culture related to the cloud.
REFERENCES


