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Cloud computing: the nexus of strategy and technology

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Introduction

Cloud computing is an innovative ''disruptive'' technology that is changing how information and communication technologies (ICTs) are accessed and used. Its perceived benefits include lower costs, scalability, portability and reduced software and hardware obsolescence. Cloud computing has been linked to entrepreneurship and innovation with its ''pay on demand'' model making it ''easier and cheaper than ever for anyone anywhere to be an entrepreneur and to have access to the best infrastructure of innovation''. Commentators suggest that these changes will lead to innovative business models as organisations increasingly leverage the opportunities provided by the cloud (Baker, 2007).

The impact of cloud computing technologies on management practices and business strategies is not only a topical area for investigation, but little research has been conducted into the extent to which human resource management (HRM should be involved in the planning and introduction of information and communication technologies (ICTs). This gap in the literature is somewhat surprising given the growth in strategic human resource management literature suggesting that HRM policies should be better integrated into overall organisational strategies (Stone, 2010). This paper examines the potential role of HRM departments in supporting the organisational changes required for the introduction of cloud-based business strategies, an area that provides some interesting grounds for conjecture. We include an analysis of the changing role and function of ICT departments and their workers in a cloud context.

The study is exploratory, and is based on qualitative research conducted in Australia and the US between 2011 and 2012. The paper utilises the resource view of the firm and transaction costs economics (see Ross, 2003; Wright and McMahan, 1992), to assist in its analysis of cloud business strategies, including the outsourcing of ICT services, as these theories provide useful frameworks for understanding and predicting the likely organisational and workplace impacts of this innovation. The paper begins by outlining the background to this research. It then synthesises the literature with the qualitative research data and concludes by considering the future implications of these findings for organisational strategies and HRM practices in a cloud context.

Research background

The research was undertaken in collaboration with the Queensland Government Department of Science, Information Technology, Innovation and the Arts (SITIA). The primary data collected during this research project included interviews with a range of stakeholders associated with the Australian and US ICT sectors from 2011 to 2012. This included more

than 20 interviews in Australia and 16 interviews in the US. Interviewees included chief information officers (CIOs), managers of ICT-focused firms (i.e. where ICT was the primary focus of the firm), managers in ICT support departments (i.e. where ICT played a supporting role for the firm), ICT industry association representatives and government representatives. Confidentiality guarantees and associated university ethical requirements meant that interviewee names and specific firms could not be used in this paper. During interviews, particular attention was focused on the reasons behind the implementation of cloud computing strategies and decisions made by management in relation to the potential risks and challenges associated with their implementation. The interviews further examined the HRM impacts of cloud computing approaches, including changing ICT worker roles and skill sets. The interview data were then examined to draw out recurring comments and themes pertinent to this analysis. The qualitative data were further supported by direct observations and discussions made by the researchers.

Cloud computing, outsourcing and transaction cost economics (TCE)

Bias (2010) suggests that from an end-user perspective, cloud computing should be defined as ''self-service ICT'' rather than outsourcing. However, while the ''self-service'' nomenclature creates a useful distinction from earlier outsourcing strategies, from an organisational perspective cloud models usually involve the sourcing of ICT services from external third party providers, which accords with earlier definitions of outsourcing (Ross, 2003). Mell and Grance (2011, pp. 1-3) recognise that cloud computing is an ''evolving paradigm'' and frame the discourse in terms of the major features associated with cloud computing, as outlined in Table I. These features include ''essential characteristics'', ''service models'' and ''deployment models''.

The first two essential characteristics, on-demand self-service and broadband network access, refer to the ability of clients to access cloud services via the internet (Mell and Grance, 2011, pp. 1-3). Mell and Grance's (2011, p. 2) third characteristic, resource pooling, refers to cloud vendors being able to gain economies of scale. Amazon and Google, for example, reduce costs by operating large data centres that are pooled at scale.

Storing data in the cloud, however, raises security and privacy concerns. In this regard, ''public clouds'' are owned by external cloud vendors who, as their name suggests, make their services publically available (DFD, 2011, p. 12). The data may be stored offshore in multiple locations and/or shifted from one location to another without the knowledge of the client. This in turn creates security and third party access concerns. Public clouds further raise data ownership and intellectual property (IP) right issues (Geambasu, 2011).

Data security, ownership and intellectual property issues accord with a transaction cost economics (TCE) analysis of outsourcing challenges. TCE links the make/buy decisions of

Table I Cloud computing features		
Essential characteristics	*Service models*	*Deployment models*
On-demand self-service	Software as a service (SaaS) – software applications available via the internet, e.g. web based e-mail services	Private cloud
Broad network access	Resource platform as a service (PaaS) – allow firms to develop, install and run their own applications on external internet-based platforms (Jones, 2010, p. 3)	Public cloud
Resource pooling	Infrastructure as a service (IaaS) – Provides underlying ICT infrastructure requirements, e.g. externally based servers and data bases	Hybrid cloud
Rapid elasticity (scalability) Measured service		
Sources: Developed from Mell and Grance (2011); Jones (2010); Ross (2011)		

firms to the asset-specificity of the goods or services being produced (Williamson, 1991, 1996). When coordinating these external contracts, managers encounter typical principal/agent problems, including bounded rationality and asymmetric information. This in turn leads to potential problems of shirking and opportunism on the part of agents in areas such as quality control and safeguarding intellectual property rights. A transaction cost economics approach therefore suggests that outsourcing ICT services to public cloud providers will generate associated transaction costs related to opportunism and bounded rationality (Williamson, 1991, 1996), including the need to closely analyse and monitor vendor contracts and service level agreements (SLAs) (Geambasu, 2011). An alternative strategy is for organisations to create their own ''private clouds'', which cover their specific organisation only. Private clouds have become increasingly popular with large organisations such as Australian banks and government departments that have to deal with extensive amounts of confidential data (DFD, 2011).

A TCE approach suggests that firms may be more reticent in outsourcing firm-specific ICT data and/or intellectual property that may be linked to a firm's competitive advantage. Cloud computing business strategies are therefore prompting organisations to better classify their data. For example, low-level security data may be more easily outsourced to an external data centre provider, as opposed to higher-level confidential data that is more likely to be retained in-house. This has led to the development of ''hybrid cloud'' deployment models with organisations shifting more generic data into external public clouds but retaining more confidential data in-house.

The cloud computing characteristics outlined in Table I include ''rapid elasticity'' (often referred to as scalability) and ''measured service''. While in-house ICT systems can only be increased through capital expenditure, cloud-based services allow firms to rapidly increase or decrease their ICT requirements through a pay-on-demand ICT managed services model. Interviewees linked elasticity in technology to greater agility in business strategies. Cloud technologies, for example, allow firms to rapidly scale up or scale down their ICT requirements depending on the success of their product launches (Ross, 2011). Firms can also rapidly increase their ICT capabilities for R&D projects that may otherwise have been delayed due to a lack of in-house ICT infrastructure (Ross, 2011). However, this increased organisational agility may be reduced by potential transaction costs, including vendor lock-in and legacy ICT system integration issues.

## Resource view of the firm and the commoditisation of ICT

In their discussion of the resource view of the firm, Wright and McMahan (1992, pp. 302-303)outline four criteria that a resource must possess in order to add value to a firm and develop its competitive advantage; it must add value, be rare, inimitable and it cannot be substitutable. The resource view of the firm suggests that new technologies are more likely to provide a firm with a unique competitive advantage if they are firm-specific and cannot easily be copied by competitors. Cloud computing models, however, are in many ways the antithesis of the resource view of the firm in that they allow virtually any firm, including small- and medium-sized enterprises, to purchase relatively high-level ICT services from specialist external provider firms. Further, given that cloud providers will generally supply ICT services to a number of firms, they are more likely to provide generic ''off the shelf'' products and services, rather than firm-specific ICT services (Ryan and Loeffler, 2010, p. 23). Buyya et al. (2009, p. 600) see the increasing commoditisation of ICT as ''the twenty-first century vision of computing'', as cloud-based ICT providers increasingly mirror utilities, such as telecommunications and electricity, with customers buying ICT services as required.

This then begs the question that if new productivity enhancing cloud technologies can be freely purchased in the market by competitor firms at relatively cheap prices, how then do firms gain a sustainable competitive advantage? This research suggests that a firm's competitive advantage in a cloud computing environment will shift toward its

ability to take a strategic holistic approach towards how it, first, plans and coordinates its cloud services and, second, better integrates these ICT services into its overall business processes and outcomes. Figure 1 outlines some of the factors that organisations need to consider when adopting a strategic approach to the implementation of cloud-based technologies.

Cloud computing business models therefore require ICT sections to play a more strategic role within firms, as opposed to the more isolated ''cost centre'' role that many ICT departments have played in the past, but this may not accord with current management attitudes. During interviews, ICT managers regularly complained that senior and middle managers from other sections of their organisations either did not know or did not want to know about the potential strategic value of ICTs. Rather they tended to see ICTs as simply a cost that needed to be contained. For cloud-based business models to reach their full potential, this attitude has to change.

Figure 1 Cloud computing strategic model
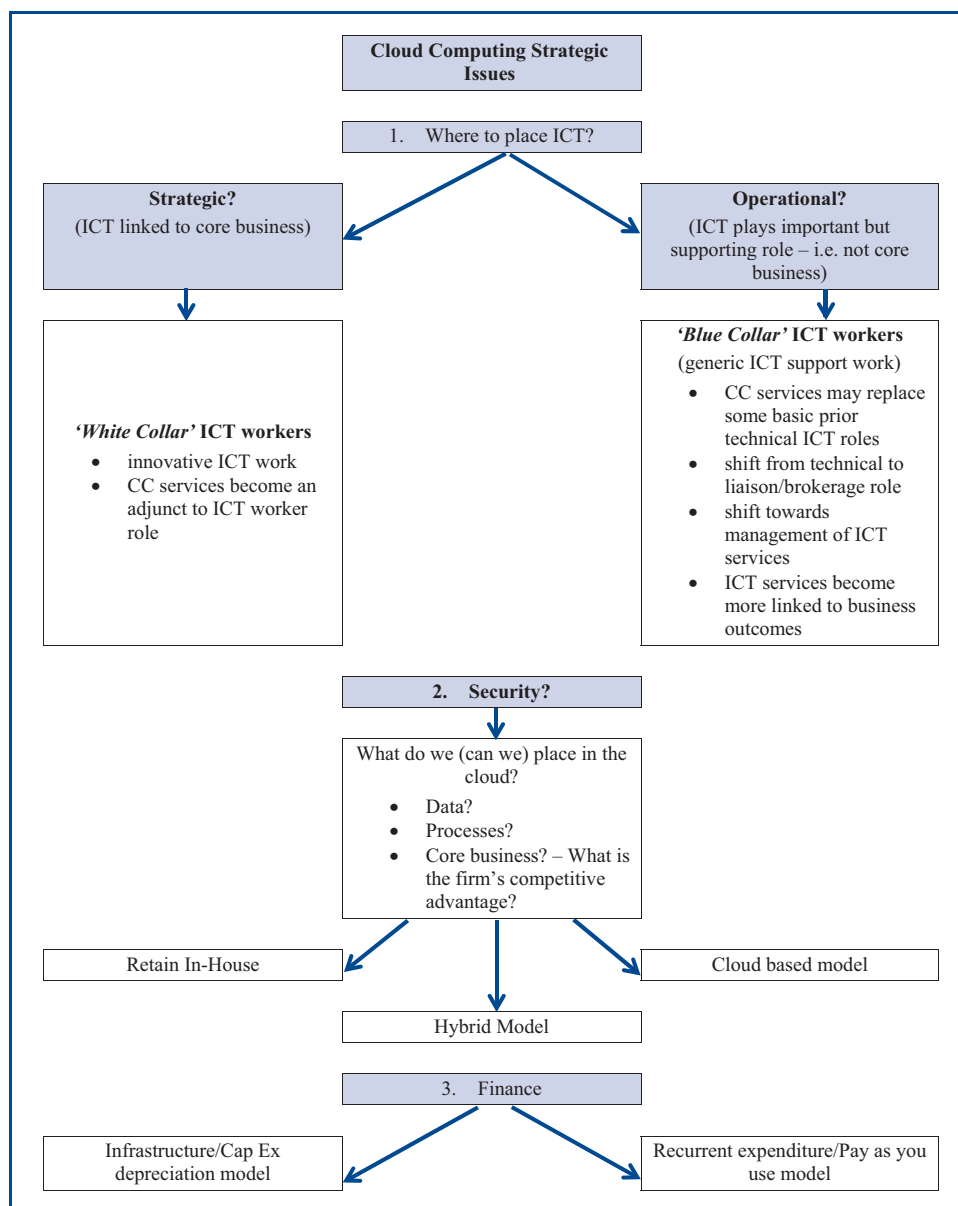
Human resource management: its role in ICT and business strategy

What then is the role of HRM in a cloud computing context? In line with the resource view of the firm, Becker and Huselid (1998) suggest that strategic human resource management must address the issue of inimitability. As outlined above, sustainable innovation and productivity-enhancing strategies associated with cloud computing will not generally come from the ability to simply access new technologies as they become available on the internet. Rather, innovation and competitive advantage will increasingly be linked to an organisation's ability to train its workers to better design and coordinate firm-specific cloud computing strategies that support and enhance overall business outcomes. This research therefore suggests that organisations are more likely to gain an inimitable competitive advantage if they adopt a ''contingent'' approach to strategic human resource management, where practices are aligned with firm-specific cloud strategies and objectives, rather than trying to adopt some kind of generic ''best practice'' approach.

The recent proliferation of chief information officer (CIO) positions is evidence of this shift towards a more strategic approach regardomg the formulation and coordination of ICT processes and goals within firms. Further, HR managers as potential ''strategic partners'' and ''change agents'' (Stone, 2010, pp. 9-10) may help to facilitate required workplace changes that better link ICT services to firm strategies and business outcomes.

The creation of cross-functional teams, for example, is one HR strategy to better integrate ICT staff with other personnel across the firm. As product and service markets become increasingly internet-based and/or supported, it becomes progressively more important for firms to develop cross-functional teams that link and coordinate the operations side of the firm, such as production, sales and marketing, with their ICT workers. An interviewee with a strong ICT technical background advised, ''We need to know more about the business side of the firm, but they (i.e. non-ICT managers) need to know more about us!'' This nexus between business strategy and ICT functions therefore becomes of prime importance for firms shifting to cloud-based (i.e. internet) business models.

Cloud business models, however, do not necessarily change the *function* of ICT support sections. Rather, cloud computing changes the way that ICT services are *delivered*. This in turn may impact ICT worker roles and skill sets as the role of the in-house ICT worker shifts towards being a solution provider, rather than a mechanic or repairperson. HR departments therefore need to hire, train and retain ICT workers who have the skills to operate in this new environment. Some ICT workers, for example, will shift from a technical to more of a liaison or brokerage role with external cloud vendor firms. Sourcing ICT services from third parties then requires a greater focus on governance and ''cloud supply chain'' management practices (Lindner *et al.* 2010). While third party external governance issues are not new, they are exacerbated by the ''self-service'' component of cloud computing services, as virtually any staff member, senior management and lower level employees alike, can access and subscribe to cloud-based services. ICT managers are finding it increasingly difficult to monitor all the external cloud-based ICT services that their employees are using.

The proliferation of mobile internet linked devices has exacerbated this trend. Clark suggests that:

> One of the most important CIO agenda items for 2012 is addressing and managing employee-owned mobile devices. This is where productivity, cost, and security intersect on a scale larger than any other IT initiative for executive management.

While cloud-connected mobile devices can be a boon for productivity, they raise associated security and governance issues. HRM departments need to introduce contract management and ICT governance training programs for managers who have formerly only managed in-house ICT services. Third party software also raises data security risks with a concomitant need to increase operational security training.

Outsourcing and downsizing

Transaction cost economics states that firms are more likely to outsource generic work and retain higher-valued firm-specific work in-house (Ross, 2003). Our research suggests that cloud strategies are shifting in-house ICT workers away from more basic technical work, which may be outsourced, towards higher value-added work. Such changes will require HRM departments to be involved in the development of new ICT worker skill sets, including a better understanding of the need to find the best ''fit'' between the organisation's ICT architecture and its business requirements (Schultz, 2011, pp. 35-35). One interviewee, for example, advised that technically-oriented workers tended to make decisions based on technical considerations and were more likely to get caught up in problems, such as vendor lock-in and switching costs, because they did not stop to consider the business-related impacts of their decisions. Cloud business models require ICT managers who not only have broad technical skills but who also possess good business acumen. Many interviewees advised that demand for such workers is increasing and they are difficult to find. Firms may have little option than to retrain their existing ICT staff with the required new skills.

The adoption of cloud technologies is also being driven in part by their perceived ability to reduce ICT labour costs (Southam, 2010, p. 5). Further, the increasing commoditisation of ICT has led to a relative decrease in the costs of ICT hardware and software relative to labour costs. This means that in many cases ICT labour is now the relatively expensive part of ICT processes, while ICT hardware and software has in many cases become the relatively inexpensive part of ICT processes, giving firms an added incentive to outsource services that may reduce their ICT labour requirements. Anecdotal evidence from this research suggests that as a general rule, ICT support departments employed one in-house ICT worker for every 70 non-ICT workers employed by the organisation. However, when the organisation outsourced to a managed ICT services provider, the ratio increased to one in-house ICT worker for every 200 non-ICT employees. This is in line with the job-shedding goals often associated with outsourcing strategies (Ross, 2003).

Will cloud computing lead to the extensive downsizing of ICT workers or will it simply lead to changes in the role of ICT employees? A transaction cost economics approach to outsourcing suggests that this will be linked to the asset-specific nature of the employee's job (see Ross, 2003). Organisations should be reticent in outsourcing firm-specific ICT work, such as research and development (R&D), to cloud providers, as this work may be linked to the firm's competitive advantage (Ross, 2003; Williamson, 1991, 1996). More generic ICT support roles, in contrast, such as the maintenance of e-mail systems and data bases, are more likely to be outsourced to cloud providers, subject to security and privacy clearances. One interviewee outlined these scenarios in terms of white-collar and blue-collar ICT workers, with the former being linked to higher-level R&D work and the latter being linked to more generic ICT support roles. A TCE analysis suggests that blue-collar ICT workers are more at risk of redundancy than white-collar ICT workers (see Figure 1). The nature of cloud computing also means that some former in-house ICT work will inevitably be relocated offshore to lower cost providers.

A number of factors may militate against widespread redundancies, at least in the short-term. To begin, the adoption of cloud computing models will generally be an incremental process, as organisations are unlikely to outsource all their ICT requirements to the cloud, at least in the short- to medium-term. Rather, most firms will adopt a hybrid-cloud approach as they learn to navigate through ICT data integration, security and vendor management challenges. As outlined above, shortages of ICT professionals with the required skills to manage and innovate in a cloud environment may also induce firms to train and develop the skills of their existing ICT workers, rather than trying to find new workers in the external market (Colley, 2012). Further, while some ICT roles may disappear, the rapidly changing nature of the ICT sector means that new roles and product markets are constantly evolving, which in turn will require new ICT worker skill sets and abilities. A survey of 500 ICT and business professionals and 400 IT firms in the US suggests that 75 per cent of these

organisations were in the process of introducing new cloud-focused ICT jobs, including cloud architects, departmental liaison personnel, integration specialists and compliance specialists (McKendrick, 2012). When queried about possible redundancies in a cloud computing environment, one interviewee advised that it was not the ICT *job* that becomes redundant but rather it is the job *function* that may become redundant. In this context, redundancies will depend on the ability of ICT workers to upgrade and/or change their skill sets.

Conclusion

This research finds that cloud computing business models lie at the nexus of ICT and business strategies. CIOs (or cloud computing managers) need to ensure that new technologies are integrated with organisational strategies that support business outcomes. Technical ICT skills are not enough for a CIO or senior ICT manager to fulfil their role. Rather, organisations require managers with a combination of technical skills and business acumen.

Transaction cost economics provides a useful starting point in helping to predict some of the initial organisational changes being cloud computing technologies generate, including the increased need for organisations to better classify data and the resulting shifts to hybrid-cloud models. This research finds that the ubiquitous nature of cloud-based services may reduce the ability of organisations to gain any long-term competitive advantage from simply accessing new ICT technologies on the internet. Rather, cloud business models place increased pressure on organisations to take a more strategic approach towards how they plan and coordinate cloud-based ICT services and integrate them into overall business processes and outcomes. Competitive advantage in a cloud context will therefore depend on the extent to which organisations can develop inimitable organisational processes and worker skill sets that differentiate them from their competitors.

HRM departments can play a positive role in this process, including bringing ICT units ''in from the cold'', so that they can be better integrated into business decision making processes. The development of cross-functional teams may advance this process. For many organisations this will require a change in the mindset of senior management in relation to their perceptions of ICT departments. Technically-oriented process innovations linked to the introduction of cloud computing technologies will therefore need to be accompanied by organisational innovations (de Leede and Looise, 2005, p. 109), including dynamic HRM strategies that complement and support cloud-based business models. HRM departments will need to facilitate the required changes in ICT worker roles and skill sets. Some ICT staff, for example, will perform less hands-on technical work, as their job shifts towards a cloud supply chain management role.

From a social perspective the link between cloud computing and potential ICT worker redundancies is mixed. While it is unlikely that ICT support units will disappear, cloud computing business models aim to reduce costs and this may include a reduction in ICT labour costs in some circumstances. The nature of cloud computing also means that cloud vendors can locate their services in countries with relatively low ICT labour costs. From a HRM perspective, TCE predicts that firms will be more likely to outsource generic type ICT related work and retain more firm-specific and/or value-added work linked to the firm's competitive advantage. This research supports a transaction cost economics analysis by suggesting that blue collar ICT workers who are engaged in basic and/or generic ICT technical support roles, will be most at risk of redundancy in cloud computing environments, as this work will tend to be more suitable for outsourcing and off-shoring. These workers are likely to face increased international competition from low-wage countries. White collar ICT workers engaged on higher level firm-specific R&D-type work in contrast are more likely to simply use cloud technologies to assist in their ICT development work. The rapidly changing and expanding nature of the ICT sector further suggests that new ICT jobs will continue to

evolve, giving ICT workers additional job opportunities subject to their ability to develop the skills and competencies required for new roles and functions.

Despite its initial explanatory power, this research recognises that future research into cloud business models requires further development of TCE models in order to take into account the rapidly increasing complexities of cloud computing environments. New technologies, for example, are fostering greater collaboration between individuals and firms without regard to their geographical proximity. Technical improvements in data security along with an increased acceptance of cloud technologies over time will also lead to organisations shifting more firm-specific data into the cloud. This paper therefore is part of on-going research that will continue to examine the opportunities and challenges of cloud computing business models, as the theory of the firm continues to shift beyond the dualism of organisations and markets towards a more integrated networked future (Dunning, 1995).

References

Baker, S. (2007), ''Google and the Wisdom of Clouds: a lofty new strategy aims to put incredible computing power in the hands of many'', *Bloomberg Business Week*, available at: www.businessweek.com/magazine/content/07_52/b4064048925836.htm (accessed 13 December 2007).

Becker, B.E. and Huselid, M.A. (1998), ''High performance work systems and firm performance: a synthesis of research and managerial implications'', *Research in Personnel and Human Resources Management*, Vol. 16, pp. 53-101.

Bias, R. (2010), ''The Cloud is not outsourcing'', *Cloudbook*, Vol. 1 No. 2, pp. 11-13.

Buyya, R., Yeoa, C-S., Venugopala, S., Broberg, J. and Brandic, I. (2009), ''Cloud computing and emerging IT platforms: vision, hype, and reality for delivering computing as the 5th utility'', *Future Generation Computer Systems*, Vol. 25 No. 6, pp. 599-616.

Colley, A. (2012), ''ACS warns of skills shortage'', *The Australian: Australian IT*, 28 February, p. 38.

de Leede, J. and Looise, J.K. (2005), ''Innovation and HRM: towards an integrated framework'', *Creativity and Innovation Management*, Vol. 14 No. 2, pp. 108-117.

Department of Finance and Deregulation (DFD) (2011), *Cloud Computing Strategic Direction Paper*, Version 1.0, ACT, Australian Government Information Management Office, Department of Finance and Deregulation, April.

Dunning, J.H. (1995), ''Reappraising the eclectic paradigm in an age of alliance capitalism'', *Journal of International Business Studies*, Vol. 26 No. 3, pp. 461-492.

Geambasu, R. (2011), ''Regaining control over cloud and mobile data'', Dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy, University of Washington, Seattle, WA.

Jones, D. (2010), *Data Center, Virtual Environments, and the Cloud*, RealTime Publishers, available at: http://nexus.realtimepublishers.com/.

Lindner, M.A., Galan, F., Chapman, C., Clayman, S., Henriksson, D. and Elmroth, E. (2010), *Cloud Supply Chain: A Framework for Information, Monitoring, Accounting and Billing, CloudComp 2010*, Springer Verlag, New York, NY.

McKendrick, J. (2012), *Majority of Companies Expanding Cloud Computing Skills: Survey*, Forbes, available at: www.forbes.com/sites/joemckendrick/2012/07/24/majority-of-companies-expanding-cloud-computing-skills-survey/ (24 July 2012).

Mell, P. and Grance, T. (2011), *The NIST Definition of Cloud Computing*, NIST Special Publication 800-145, September 2011, National Institute of Standards and Technology, Information Technology Laboratory, available at: http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf (accessed 11 June 2012).

Ross, P.K. (2003), ''Organisational and workforce restructuring in a deregulated environment: a comparative study of the Telecom Corporation of New Zealand (TCNZ) and Telstra'', PhD thesis, Griffith University, Brisbane.

Ross, P.K. (2011), ''How to keep your head above the clouds: changing ICT worker skill sets in a cloud computing environment'', *The Employment Relations Record*, Vol. 11 No. 1, pp. 62-74.

Ryan, W.M. and Loeffler, C.M. (2010), ''Insights into cloud computing'', *Intellectual Property & Technology Law Journal*, Vol. 22 No. 11.

Schultz, B. (2011), ''Steer your career to the cloud'', *Information Age*, July/August, pp. 34-35.

Southam, K. (2010), ''Turn on, plug in, opt out: the outlook for big companies' in-house IT staff is cloudy'', *The Courier Mail: Careerone.com.au*, 25-26 September, p. 5.

Stone, R. (2010), *Managing Human Resources*, 3rd ed., John Wiley & Sons, Chichester.

Wright, P.M. and McMahan, G.C. (1992), ''Theoretical perspectives for strategic human resource management'', *Journal of Management*, Vol. 18 No. 2, pp. 295-320.

Williamson, O.E. (1991), ''Strategizing, economising, and economic organisation'', *Strategic Management Journal*, Vol. 12, S2, pp. 75-94.

Williamson, O.E. (1996), *The Mechanisms of Governance*, Oxford University Press, Oxford.

Further reading

Defence Signals Directorate (DSD) (2011), *Cloud Computing Security Considerations*, Cyber Security Operations Centre, Defence Signals Directorate, available at: www.dsd.gov.au/infosec/cloudsecurity.htm (12 April 2011).

Krikos, A. (2011), ''Cloud computing as a disruptive technology'', *Cloudbook Journal*, Vol. 2 No. 2, pp. 13-18.

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3. Ogan M. Yigitbasioglu. 2015. External auditors' perceptions of cloud computing adoption in Australia. *International Journal of Accounting Information Systems* **18**, 46-62. [CrossRef]

4. Ogan M. Yigitbasioglu Accountancy Department, Queensland University of Technology, Brisbane, Australia . 2015. The role of institutional pressures and top management support in the intention to adopt cloud computing solutions. *Journal of Enterprise Information Management* **28**:4, 579-594. [Abstract] [Full Text] [PDF]

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