Entrepreneurial and ethical adoption behaviour of cloud computing

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ABSTRACT

In light of continuing use and media attention placed on cloud computing, the study of ethical behaviour in technology innovations remains an important area of research, which helps to understand the antecedents of a person's intention to adopt cloud computing based on their ethical orientation. The present study examines how ethics influences a person's decision to adopt cloud computing, and how in turn ethical behaviours affect technology innovations. Based on social cognitive theory, this paper proposes that a higher ethical and entrepreneurial orientation will lead to a person adopting cloud computing. Moreover, the marketing, learning and outcome expectancy a person has about cloud computing will positively affect their intention to adopt this technology. The predictions are tested through a survey, which indicates that ethics and marketing are important determinants of a person's behavioural intention towards technology innovations.

1. Introduction

Cloud computing contributes to a vast array of complex internet applications that require different types of technological innovation (Moch, Merkel, Gunther, & Muller, 2011). Cloud computing has a number of advantages over other types of information storage including reduced information technology overhead for the user, more flexibility and on-demand services (Vouk, 2008). Most businesses rely on some form of information technology services but the key differentiating feature of cloud computing is that it includes cyberinfrastructure that implies a service orientated architecture that is built upon distributed, grid and utility computing (Vouk, 2008). Due to the large amount of electronic information requiring storage, cloud computing has evolved as a service to maintain this computing infrastructure and has been referred to as Software as a Service (SaaS), Infrastructure as a Service (IaaS) and Platform as a Service (PaaS). Jaeger, Lin, and Grimes (2008:269) define cloud computing as a "computing platform that is able to dynamically provide, configure and reconfigure servers to address a wide range of needs, ranging from scientific research to e-commerce" and this definition is adopted in this paper.

Cloud computing infrastructure usually resides in a large data centre that is managed by a third party and is accessible by anyone at anytime that has an internet connection (Bradshaw, Millard, & Walden, 2011). Cloud computing enables the user to gain access to information and lowers the barrier to conducting information process intensive activities. With cloud computing people do not need to maintain their own technology infrastructure as they transfer the burden of system management and data protection to the cloud computer service provider (Jaeger et al., 2008). This creates an ethical issue for the cloud service provider in terms of managing the information in the event of cybertheft or system crashes.

Cloud computing has evolved from earlier technology such as grid computing but has only recently reached the stage of commercialisation (Jaeger et al., 2008). Cloud computer service providers enable massive data management and the ability to mine data (Bradshaw et al., 2011). Companies providing cloud computing services include Amazon, Yahoo and Salesforce. In addition, some educational institutions such as universities in the United States have partnered with Google and IBM to create an academic–industrial collaboration that provides faculty and students access to clouds for educational and research purposes (Jaeger et al., 2008).

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In conjunction with the rise in cloud computing services, ethical issues including privacy, security, anonymity, liability, reliability and government surveillance have increased (Jaeger et al., 2008). Cloud computing enables a third party electronic file storage system that has ethical risks in the storing of confidential information in a third party virtual environment. The ethical risk for professional service providers such as lawyers, doctors and accountants is that the cloud computer service provider will have access to confidential information that could be illegally accessed by other parties (Batchelor, Bobrowicz, Mackenzie, & Milne, 2012). A recent article by McCauley (2011) suggested that cloud computing is an ethical thunderstorm for lawyers because the consumer relinquishes control over confidential data. As some cloud computing contracts may not realise that the confidential information of data is stored, any unauthorised disclosures of client information may jeopardise the relationship between client and service provider (Carusi & De Grandis, 2012).

Cloud computing gives rise to important ethical issues including security and reliability as when information is stored on cloud computers professional service providers have an ethical duty to safeguard information. However, the use of outside agencies means that it is hard to safeguard professional service providers' ethical obligations based on their industry code and mandated as part of their company practice (Charlesworth, 2012). Whilst businesses and professional service providers are obligated to take reasonable and competent steps to safeguard their client's electronic information, the cloud service providers such as Google or Amazon are not under the same ethical guidelines. This is due to cloud service providers providing a market-based contract on a pay per service basis that does not include any long-term time commitment. This means that businesses and professional service providers will have a different ethics opinion on how the client information is stored and maintained (Charlesworth, 2012).

Recently, Nevada's Ethics committee found that a lawyer can store confidential information in a cloud computing environment provided that they have the reasonable expectation the company will keep the data confidential (McCauley, 2011). However, this means that lawyer's clients may lose control over what data is accessed by the cloud service provider and if that information is unethical or shows a person or business engaged in illegal activity then the cloud service provider may be under a duty of care to share that information with relevant government authorities. In Alabama and Virginia, there has been further discussion on lawyers' use of cloud computing in an ethics advisory opinion that requires lawyers to access due care in the selection of the cloud computing service provider (McCauley, 2011). This has an important ethics implication that a lawyer may not have to obtain a client's consent before storing information in a cloud computing environment. However, putting information in the hands of a cloud computing provider means a loss of control for a business that could give way to potential ethical issues such as who owns the data and who can access the date in the future (Kim & Park, 2012). Due to the complexity of cloud computing technology, businesses have to be careful with cloud computing and monitor who accesses their information (Batchelor et al., 2012). In addition, the changing international business environment means that as cloud service providers change the location of stored information to other countries different ethical guidelines may exist that differ to the businesses of home countries' legal environment.

Potential ethical considerations for businesses operating in multiple international countries include 'Where will the date be stored?' and 'What rights do they have if the data is moved to another country (Carusi & De Grandis, 2012)?' As cloud computing is an emerging technology, many ethical issues will continue to arise that enable entrepreneurial firms to be innovative and proactive in how they deal with ethical issues. By being proactive businesses can limit potential ethical hazards by disclosing their information handling services and customer security features. Innovative service providers need to consider the different types of valuable information in order to ensure compliance with ethical guidelines and take into account privacy features. Businesses need to do due diligence on their cloud service providers but be entrepreneurial to consider potential business opportunities that may present themselves in the cloud computing environment.

These ethical issues are also impacted by different international laws that have yet to keep up to date with this technological innovation. This means that despite the advantages of cloud computing, there are ethical issues related to the use of information and computing concepts. In addition, policy issues related to new technology like cloud computing have created a gap between the current usage of it and laws governing its applications. This growing ethical problem between current cloud computing devices and the existing law creates an area that merits more attention (Bradshaw et al., 2011). In the current business environment, the laws and regulations create an ethical issue for how consumers and commercial entities adopt cloud computing. This paper focuses on the ethical issues and entrepreneurial usage of cloud computing. The primary goal of this paper is to focus on the intersection of ethics and entrepreneurship by providing possible solutions to how people adopt cloud computing.

Cloud computing has evolved from the large growth of the internet and the number of e-commerce transactions occurring globally. Technology companies have built large data centres to handle the increasing amount of internet traffic that is conducted on a daily basis (Leymann, Fehling, Mietzner, Nowak, & Dustdar, 2011). Recent research by Yang, Liu, Wu, Yang, and Meng (2011:222) states that "cloud computing is rapidly emerging as a technology trend almost every industry that provides or consumes software, hardware and infrastructure can leverage". Cloud computing has enabled internet services to no longer require the large capital outlays in hardware to operate it (Armbrust, 2010). Moreover, companies no longer require the human expense to operate their internet services as large tasks can get results quickly through cloud computing.

Cloud computing comprises both the applications delivered as services over the internet and the hardware software systems in the data centres that provide these services (Armbrust, 2010). Cloud computing is a technological innovation that has gained in popularity in recent years as more people look to external storage devices for their information needs and the advantages of the internet. Freestone and Mitchell (2004:121) state that "the internet offers the "advantages" of anonymity, a reduced chance of being detected owing to the difficulty of procuring damning tangible evidence, and convenience to perpetrators, allowing aberrant behaviour to remain somewhat "faceless" and perpetrators to remain in their home".

Cloud computing has been around for some time but only recently become popular as companies such as Google and Amazon have focused on developing this area of their business as more people use mobile computing devices. However, this has raised