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Entrepreneurial and ethical adoption behaviour of cloud computing

Vanessa Ratten *

Deakin Graduate School of Business, Faculty of Business and Law, Deakin University, 221 Burwood Highway, Burwood, Melbourne, Victoria 3125, Australia

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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).

* Tel.: +61 3 9244 5046; fax: +61 3 9244 5533.
E-mail address: vanessa.ratten@deakin.edu.au.

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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

some ethical issues in information management policy including access and regulation (Jaeger et al., 2008). This paper explores the nature of cloud computing as a technology innovation, the ethical concerns of users and research related to the adoption of cloud computing as a service. The policy issues raised by cloud computing are examined in terms of how people and organisations adapt to technological innovations. Whilst more individuals and organisations adopt cloud computing, ethical and entrepreneurship issues related to cloud computing are not being widely considered. This paper will demonstrate that there are a number of ethical and entrepreneurship issues related to cloud computing that merit more attention. If the ethical problems related to cloud computing can be considered before people adopt the technology then perhaps they can be solved.

The structure of this paper is as follows. First the paper will discuss the nature of cloud computing as a technological innovation. A review of different theories explaining how people adopt technology is subsequently examined. The role of ethics and entrepreneurship to cloud computing is then discussed, followed by the role of marketing, learning and outcome expectancy raised by cloud computing. Next, the paper describes the methodology and the results of the study on a person's intention to adopt cloud computing. Finally, the paper describes how the adoption behaviour of cloud computing is a beneficial development for managers and researchers. Future research areas on cloud computing are also addressed in terms of the limitations of this research and the potential research avenues offered in this paper to future studies.

2. Technology innovation theories

Cloud computing allows people to access their data through the internet by transferring electronical information from any global location but this creates an ethical issue if the material is used illegally. The ethical issues raised by technology innovations are an important concern for people (Altschuller & Benbunan-Fich, 2009). A major advantage of cloud computing is that it enables people to obtain stored data from any location and increases a person's independence to access this information (Lu, Yu, Liu, & Yao, 2003). This is in part due to the ability of wireless technology increasing a person's mobility to communicate by saving time and monetary costs. Wireless technology has the advantage over physical conduit technology as people can access information in a free-space environment (Aungst & Wilson, 2005). Cloud computing is part of the mobile commerce (m-commerce) and electronic commerce (e-commerce) industry as it allows people to access material that was previously available only in hard copy format. M-commerce is defined in this paper as the use of mobile wireless devices for business purposes and has enabled cloud computing to be used as an alternative to face-to-face transactions. E-commerce is defined in this paper as any commercial transaction conducted electronically (Harris, Rettie, & Kwan, 2005). Cloud computing utilises e-commerce to integrate computer storage into business processes. However, the advent of technological innovations has created ethical decision making concerns for people involved in the online environment (McMahon & Cohen, 2009). Prior research has called for more research on why people adopt new technology innovations and their adoption behaviour (e.g. Chiu, Hsu, & Wang, 2008; Lin & Huang, 2008; Ratten, 2011). This paper discusses the antecedent factors to a person adopting cloud computing by focusing on ethical and entrepreneurial behaviour. Social cognitive theory is adopted as the theoretical underpinning to understand cloud computing adoption behaviour. The research question that this paper seeks to address is: What determines a person's intention to adopt cloud computing?

Technological innovations like cloud computing are being made through m-commerce and e-commerce capabilities becoming more popular with consumers. Global changes in internet technology have altered the way people conduct business (Coombs, Saviotti, & Walsh, 1987). New technology has impacted the way people live, access information and interact with the environment (Cantisani, 2006). The approach people adopt towards technological innovations is often the result of them acquiring knowledge and information about the technologies' potential benefits (Scholnikoff, 2001). The knowledge obtained about the technology innovation is influenced by a person's social group, who enables knowledge dissemination about a new technology (Li, Liu, & Ren, 2007). This form of social learning takes place through a person's social network that can include their family, friends and work acquaintances (LaRose & Eastin, 2004). Learning about technology innovations can be through behaviour or cognitive changes that occur when a person is exposed to different information. Behavioural learning occurs when a person responds to stimuli from information and changes the way they do things (Bandura, 1989). The important premise of behavioural learning models of technological innovations is that people react to their environments by solving problems and creating solutions (Schiffman & Kanuk, 2000). The cognitive learning model of technology innovation goes further than the behavioural model by focusing on how people respond to stimuli and their environmental conditions. As this paper focuses on a number of internal and external environmental factors affecting the adoption of cloud computing it is implemented in this paper. Within the cognitive learning model there are a number of theories describing the process of adopting a technology innovation including the technology acceptance model, theory of planned behaviour, theory of reasoned action and social cognitive theory. Each of these theories will now be discussed.

The technology acceptance model is one of the most commonly referred to theoretical frameworks for its simplicity in describing the reasons why a person uses a technology (Taylor & Todd, 1995). The rationale for accepting and using a technological innovation is understood through this model by focusing on how useful a person finds a technology and how well it fits within their lifestyle (Chan & Lu, 2004). Whilst the technology acceptance model does not examine in detail how both external and internal environmental drivers affect a person's decision to adopt a technology, it does focus on some antecedent factors such as perceived ease of use to understand the reasons why a person will use a technology (Venkatesh & Davis, 1996). The drivers of a person's technology adoption behaviour are examined in this model through the focus on how fast a person adopts a technological innovation (Davis, 1989).

The theory of planned behaviour focuses on the steps a person goes through in adopting a technology innovation and assumes that there is a rationale thought pattern in describing this process (Ratten, 2008). A limitation of the theory of planned behaviour is that it does not take into account impulse or unplanned behaviour that is a result of serendipity, which leads to the use of a technology (Mathieson, 1991). Instead, the theory of planned behaviour proposes that all people regardless of demographics or

geographic location go through the same stages in adopting a technology by pre-planning their actions (Ajzen, 1985). This structured view of behaviour means that it does not take into account learning or environmental changes that affect the ability of a person to adopt a technology.

The theory of reasoned action goes a step further than the theory of planned behaviour by incorporating unplanned actions but it still stresses a formularized approach in understanding technology adoption behaviour. The theory of reasoned action is commonly used in the m-commerce literature to explain and predict adoption of technological innovations that have a discrete number of steps in the usage of their service (Chan & Lu, 2004). As the theory takes into account the role of other people's attitudes in deciding how a person should behave, it highlights the importance of social networks in the evaluation of technological innovations (Fishbein & Ajzen, 1975). However, there have been criticisms of this model for not taking into account factors outside a person's direct control such as advertising and marketing in deciding whether to adopt a technology (Ratten & Ratten, 2007).

Another theory used to understand technology adoption behaviour is social cognitive theory, which includes both internal and external environmental factors that form part of the technology acceptance model, theory of planned behaviour and theory of reasoned action. Social cognitive theory is a type of social learning model that includes both individual and group behaviour in determining the actions a person takes (McCormick & Martinko, 2004). As social cognitive theory focuses on social learning it demonstrates how a person can influence their own behaviour by learning through observing others in their social group (Pincus, 2004). People learn through a variety of environmental factors, which impact the learning skills they acquire in adopting a technology (Compeau, Higgins, & Huff, 1999). Social cognitive theory acknowledges that people are influenced by their environment through events and experience that help them learn about new technologies (Kock, 2004). The way people learn determines their current and future behaviour, which acknowledges that cognitive processes are made possible by the complex nature of human behaviour (Bandura, 1986).

The main advantage of social cognitive theory over other technology adoption models is that it focuses on the reciprocal interaction between a person's environment and their behavioural intention, thereby incorporating unplanned behaviour (Ratten, 2008). Social cognitive theory is adopted as the theoretical framework in this paper in order to help understand a person's intention to adopt cloud computing. The next section will discuss the theoretical framework from which the research hypotheses formulated for this study are derived, which has social cognitive theory as the underpinning to describe the factors determining a person's adoption behaviour towards cloud computing.

3. Theoretical framework

As social cognitive theory is the theoretical underpinning of the study reported in this paper, the framework of the study focuses on the different external and internal environmental factors that influences a person's decision to adopt cloud computing services. In the theoretical framework a person's ethical orientation, marketing, entrepreneurial orientation, learning orientation and outcome expectancy influence a person's intention to adopt cloud computing. As more people need alternative and mobile data storage devices, cloud computing is increasing in popularity and usage. Technological innovations are adopted at various rates by individuals depending on how efficient they are about learning the innovation (Rycroft, 2006). Entrepreneurship acts as a time saving tool for technological innovations by decreasing the amount of time people take to adopt them (Lundvall & Borras, 1999). People with a stronger entrepreneurial orientation are likely to be more able to use cloud computing as they focus on innovation, risk taking and proactive technologies. In addition, a person's intrinsic motivational factors will influence the time taken to learn about the outcomes they expect from adopting the technological innovation. In this paper, social cognitive theory is utilised to understand how internal environmental factors (ethical orientation, learning orientation, entrepreneurial orientation) and external environmental factors (marketing, outcome expectancy) affect a person's intention to adopt cloud computing. Each of these factors will now be discussed and hypotheses derived from the literature review are stated.

4. Ethics

Since the introduction of cloud computing services there have been very few studies that have considered a person's ethical attitudes towards the storage of data information. Previous research by Saatchi and Saatchi (1999) found that digital media has given older generation Y unprecedented access to information, which enables them to recognise important knowledge. As the internet has no physical barriers, there are a number of internet related misdemeanours that can occur worldwide (Freestone & Mitchell, 2004). Inappropriate behaviour on the internet is encouraged when there is a lack of fear of punishment (Albers-Miller, 1999). Cloud computing is paving the way for new forms of aberrant behaviour, of which some are new or an updated version of ethical debates. As cloud computers have access to large amounts of confidential information, the rightness or wrongness of a person's decision to use data from cloud computers is an ethical issue. Some people justify unethical behaviour such as music piracy on the internet if it has an overall society benefit that enables the majority of consumer's free music (Freestone & Mitchell, 2004). Some people see cyberspace as a separate realm to the physical world with a different ethical culture (Johnston & Johal, 1999). This possibility that the internet represents a new environment for ethical behaviour means more understanding is required about ethical issues (Freestone & Mitchell, 2004). Freestone and Mitchell (2004:126) refer to ethical behaviour on the internet as “netiquette” as it includes: a set of beliefs or standards, shared by a group of people who help the individual decide what is, what can be, how to feel, what to do and how

to go about doing unethical things. The more people are influenced by ethical internet behaviour the more likely they are to use technological innovations that incorporate ethical decision making. Therefore, the first hypothesis is:

H1. The greater a person's ethical orientation, the greater their intention to use cloud computing.

5. Entrepreneurship

Entrepreneurial orientation is defined as the extent to which a person is innovative, proactive and risk taking (Lee & Peterson, 2000). This type of behaviour has been utilised to gauge the autonomy and competitive aggressiveness a person has towards an innovative form of activity (Miller, 1983). Entrepreneurial capabilities are a concept utilised in the technology innovation literature to understand a person's attitude towards adopting a technological innovation (Ratten, 2008). This is due to entrepreneurial factors being part of a person's adoption behaviour, which increases technological dissemination possibilities. Cloud computing is a technology that is innovative and has not been widely used on a commercial basis before so it is risky for people without an understanding of its application. As people change from storing data on personal computing devices to cloud computers they are proactively pursuing a new product that differs from previous innovations. People with a strong entrepreneurial orientation are more likely to adopt technological innovations like cloud computing. Therefore, this leads to the next hypothesis:

H2. The greater a person's entrepreneurial orientation towards technological innovations, the more likely they will be to adopt cloud computing.

6. Marketing

Marketing about technology products and services is an important external environmental factor that affects the adoption rate of a technological innovation. Technology marketing can include advertising, word-of-mouth communication, promotional activities, internet forums and television product placements. Commonly marketing efforts about technology innovations will focus on a person's demographic characteristics such as their social status and occupation as a way to encourage them to use a technology (McCormick & Martinko, 2004). The way a technology is marketed can change a person's perception about the ethical nature of the product and the most efficient way to use the service. People will respond to technology marketing through a range of behaviours including adopting the product or telling their social network about the usages of the product. In this way the degree and effectiveness of a marketing campaign will be determined by a person's exposure to various mediums including print media and online advertising (Sheth, Mittal, & Newman, 1999). Advertising campaigns that focus on the emotional element associated with a technology will likely result in a better adoption rate (McCoy, Galletta, & King, 2007). As cloud computing is a relatively new technology service, the marketing a person sees on mobile communication devices like their phone, Kindle or iPad will encourage them to adopt the service. People who emulate other people's behaviour in their social circle will be influenced by technology marketing that will impact on their decision to adopt cloud computing. Therefore, the next hypothesis is:

H3. The greater a person's belief that cloud computing will be beneficial to them, the greater will be their intention to use cloud computing.

7. Learning

An important part of a person's decision making capabilities when deciding whether to use an information technology product is whether they will be able to learn quickly about the innovation (Woodward, Davis, & Hodis, 2007). This learning behaviour influences whether a person will be involved in ethical computer usage such as illegal downloading, piracy, social engineering, inappropriate use of computer information and access to sensitive or confidential information. As learning about how a technology works sometimes involves collecting electronic material and sharing this information with others, an individual with a more open mindset will be able to accumulate more information. A person's learning orientation is the values they place on the propensity to create and use knowledge (Ratten, 2011). This focus on learning enables a person to determine time and financial allocation of resources in helping them evaluate a technological innovation. Hence, the next hypothesis is:

H4. The greater a person's learning orientation towards technological innovations, the more likely they will be to adopt cloud computing.

8. Outcome expectancy

The perceived outcomes of a product or service are an important determinant about whether a person will adopt a technological innovation (Henry & Stone, 1999). It is important that individuals have a perception of positive benefits resulting from a technology in order to encourage its usage and the rate at which it will be adopted. The perceptions about a technology rather than the actual outcome resulting from its usage determine how quickly an innovation will become widespread in the consumer marketplace. In order to facilitate the adoption of technological innovations, individuals will focus on the actions or

behaviours that they can foresee from using the technology. Bandura (1986) in a seminal paper found that it is important to focus on the outcomes resulting from the expectant attitude of people towards new things. This means that in the context of cloud computing an important learning indicator of consumer involvement is the perceived outcomes a person thinks are made possible by the technology. Therefore, the next hypothesis is:

H5. The more a person believes that cloud computing will result in positive outcomes, the greater their intention to adopt cloud computing.

9. Methodology

This research began by conducting 3 focus groups designed to gather young consumer's opinions on cloud computing ethical issues. Each focus group contained undergraduate students of mixed genders and ethnic backgrounds that were familiar with the internet and the usages of cloud computing. Questions asked in the focus groups included "What potential ethical issues are involved in the use of cloud computing?", "What unethical behaviours have you seen or heard about on cloud computing" and "Are you using cloud computing and/or how do you intend using this technological innovation?" After conducting the focus groups and also discussing the role of cloud computing with technology managers a literature review was conducted and a survey instrument compiled. Most items in the survey questionnaire were rated on a 1–5 Likert scale from "strongly disagree" to "strongly agree" and are included in Table 1. The benefit of using a Likert scale is that it gives respondents a number of alternatives if they are unsure of their commitment to a particular stance (Sherif & Sherif, 1967). After piloting the questionnaire on 15 respondents, the questionnaire was administered to a group of undergraduate students.

The sample was a convenience sample of 207 generation Y consumers in the Mid-West region of the United States. Herbig, Koehler, and Day (1993) define the different generation cohorts as mature (born 1929–1945), baby boomers (born 1946–1964), generation X (born 1965–1976) and generation Y (born 1977–1993). Generation Y has been widened to include people born after 1977 (Saatchi & Saatchi, 1999). Generation Y is a cohort generation that shares a common and distinct social character that is shaped by their experiences (Freestone & Mitchell, 2004). Generation Y was chosen as they have a relatively good knowledge of technological innovations, computers and the internet; they are familiar with ethical issues and they are a relatively homogeneous group, which reduces the potential for random errors compared with general public samples (Calder, Philips, & Tyhout, 1981; Freestone & Mitchell, 2004).

The methodological approach of this study used mix-methods including qualitative in-depth interviews and focus groups with quantitative analysis through a survey questionnaire. Given the research question and aim of this study to identify the antecedents of the adoption intention to use cloud computing, a cross sectional time frame was utilised. This enables the most cost effective and time efficient way to measure a generation Y's intention to adopt cloud computing. There was an almost equal gender distribution in the study with a slightly more proportion of males (52%) compared with females (48%). Most of the survey respondents were generation Y consumers (89%) as they were under 23 years of age.

The survey was conducted through a personal approach in the classroom designed to yield increased response rates (Yu & Cooper, 1983). The advantage of this personal approach to the survey is that it comprised a field setting that is more time and cost effective than mail, online, telephone and household surveys (Malhotra, Hall, Shaw, & Crisp, 1996). The survey comprised pre-existing scales that were adapted to cloud computing in a five-page booklet. The scales included in the survey have previously been found to be reliable construct measures in other studies. The ethics orientation scale was from Woodward et al. (2007) comprising a five point Likert scale from ethical to computer crime. The intention to adopt cloud computing is from Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980) and is a seven-point semantic differential scale. The marketing scale is from Sheeshka, Woolcott, and MacKinnon (1993) and is a five-point Likert scale from strongly disagree to strongly agree. The outcome expectancy sale was from Malaviya, Kisielius, and Sternthal (1996) and is a nine point semantic differential scale. The learning orientation scale is from Sinkula, Baker, and Noordewier (1997) and is a five point Likert scale from strongly disagree to strongly agree. The entrepreneurial orientation scale is from Matsuno, Mentzer, and Ozsomer (2002) and is a five point Likert scale from strongly disagree to strongly agree.

Table 1 depicts each of these constructs with the scale items and reliability scores. All of the reliability scores for the constructs were above the 0.70 critical levels (Nunnally, 1978). The data was analysed through SPSS with a three-way ANOVA and two mediating variables to test the hypothesis predicted through the literature review. ANOVA was used as it makes one overall comparison that reduces type 1 error from regression analysis (May, Masson, & Hunter, 1991). In addition, ANOVA can analyse several independent variables, which enables more data sensitivity analysis (Keppel, 1991).

10. Discussion of results

The theoretical framework proposed in this paper was partially supported by the data analysis. Table 2 depicts the ANOVA analysis results at the 0.05 statistical probability levels. Hypotheses 1 and 3 were not rejected but 2, 4 and 5 were rejected. This means that the data showed some support for Hypothesis 1 that a person's ethical orientation will impact their intention to adopt cloud computing and Hypothesis 3 that marketing influences the decision of a person to adopt cloud computing. Ethical attitudes towards cloud computing are shaped by the false sense of reality caused by the internet, which enables people to adopt a virtual persona that

Table 1
Measurement items.

Construct	Measurement items
Ethics $\alpha = 0.81$	A person creates a virus to force cloud computing users to register for a shareware programme they created.
	A website designer posts a seal indicating a trademark on cloud computing to increase sales without permission.
	A manager tells a cloud computing programmer to write a programme that will generate inaccurate information on cloud computing.
	A person downloads items from cloud computing and gives them free to their friends.
	An employee of a cloud computing company gives the password of a registered technology to their friends.
	An employee of a cloud computing company gives a technology product to their friends without getting permission or royalty fees.
	A cloud computing maintenance programmer finds an error in a programme computing interest and does not report the error to management.
Outcome expectancy $\alpha = 0.82$	What are your expectations about cloud computing?
	Bad-good
	Dislike-like
	Not convenient–convenient
	Not superior–superior
	Few unique features–many unique features
	Difficult to use–easy to use
	Poor service quality–good service quality
	Will not produce good benefits–will produce good benefits
	Low performance product–high performance product
	Lacks important benefits–offers important benefits
Marketing $\alpha = 0.73$	Magazine articles and ads suggest that people use cloud computing.
	TV ads for cloud computing persuade me to try this service.
	I usually ignore advertisements for cloud computing.
	The advertisements I see for cloud computing catch my attention.
	Magazines I read suggest that cloud computing are an important part of today's lifestyle.
	I don't pay attention to newspaper and magazine stories about cloud computing.
	Magazine and TV ads showing cloud computing make such a service appealing to me.
	I usually ignore TV advertisements for cloud computing.
	Ads in magazines and on TV about cloud computing have some influence on the cloud computing I select.
	The advertisements for cloud computing make me interested in trying this service.
Behavioural intention $\alpha = 0.87$	Rate the probability that you would use a cloud computing
	Unlikely–likely
	Nonexistent–existent
	Improbable–probable
	Impossible–possible
	Uncertain–certain
	Definitely would not use–definitely would use
Learning orientation $\alpha = 0.79$	My ability to learn is the key to my competitive advantage.
	I think learning is the key to improvement.
	Learning is an investment, not an expense.
	Learning is a key commodity necessary to guarantee survival.
	There is a commonality of purpose to me.
	I am committed to the goals of learning.
	I learn to help myself chart the direction of my future.
	I am not afraid to reflect critically on the shared assumptions I have made.
	I agree that the very way I perceive the marketplace must be continually questioned.
	I rarely collectively question my own biases about the way I interpret customer information.
Entrepreneurial orientation $\alpha = 0.78$	When it comes to problem solving, I value creative new solutions more than the solutions of conventional wisdom.
	I encourage the development of innovative marketing strategies, knowing well that some will fail.
	I value the orderly and risk-reducing management process much more highly than leadership initiatives for change.
	I like to “play it safe”.
	I like to implement plans only if I am very certain that they will work.
	I firmly believe that a change in market creates a positive opportunity for me.
	I talk more about opportunities rather than problems.

Source: developed for this research.

inhibits detection of misbehaviour. In this study, the Generation Y consumers felt that software piracy is permissive due to monetary and lifestyle concerns as they are not directly harming sellers but encouraging the sharing of information.

The data did not show support for a person's entrepreneurial orientation, outcome expectancy and learning orientation impacting their decision to adopt cloud computing. Previous research by Godding and Glasgow (1985) also found that outcome expectancy is not always an appropriate behavioural intention in all circumstances. Given the literature review focus on ethics and technology adoption behaviour, it was useful to see ethics being an important determinant of a person's behaviour. As the theoretical framework underpinning this study was social cognitive theory the role of marketing having a positive impact on a person's behaviour illustrates that information technology companies can focus on advertising to increase the adoption rates of cloud computing users. As the research question of this study was to examine the antecedents of a person intending to adopt

cloud computing, the partial support of 2 out of 5 hypotheses is helpful in building a body of work on technology innovation adoption behaviour. The unsubstantiated hypotheses may mean that people do not learn about technology before they adopt it or do not place a large degree of emphasis on the outcomes they expect from adopting cloud computing. Generation Y due to their age may not focus on entrepreneurship as a means of evaluating a technology prior to making their purchasing decision. The emphasis on marketing is a good outcome for technology marketers who wish to harness the advantages of social networking sites such as Facebook to generation Y consumers. The generation Y consumers were found in the analysis to be influenced by ethics and a potential reason for this may be their experience with online data fraud or security threats from their current data storage systems.

11. Implications for management

A major implication from the study reported in this paper is the need for consumer education about cloud computing and the high cost structures of the services. Generation Y consumers need to be educated about the potential damage to cloud computing servers through unethical behaviour such as illegal downloading and music piracy. Cloud computer servers should encrypt information to ensure the safe access to user information or use self-regulation such as a hotline to report unethical behaviour (Freestone & Mitchell, 2004). Due to the large amount of people intending to use cloud computing, the unethical issues associated with this service may require legislative action. For example, illegal access to cloud computing accounts could be open to financial penalties or require industry codes of conduct that are regulated by business and government associations. As many generation Y consumers are at universities, codes of internet conduct could be established regarding the guidelines that apply to cloud computing.

To help solve ethical problems related to cloud computing, business organisations can provide standards for internet transactions. In addition, organisations should adopt a more holistic approach to ethics in order that the ethical environment of their companies is as important as innovation to entrepreneurial business managers (Kuratko & Goldsby, 2004). Ethical procedures about cloud computing should be integrated into the fabric of organisations. This can be implemented to encourage organisations to embrace ethical decision making about data stored on cloud computers by utilising the entrepreneurial and learning capabilities of company employees. Executives trying to change their organisational culture should showcase ethical views about cloud computing in order to increase people's perceptions about the outcomes expected from cloud computers and how they can be marketed better to increase adoption rates. Companies need to integrate control mechanisms to evaluate compliance and values towards cloud computing. Strict guidelines about unethical behaviour need to be given to people about specific actions such as illegal downloading that will not be tolerated and subsequent consequences from these transgressions.

12. Future research

The research discussed in this paper is the first known study to integrate ethics, entrepreneurship and learning behaviour about cloud computing. Due to the fast adoption of cloud computing as a technology innovation, some ethical concerns are being conducted reactively instead of proactively implementing ethical behaviour guidelines. This lag means that more research is required on how long ethical issues are solved at cloud computing servers and the role of technology marketing to help fix this dilemma. Since the adoption rate of people using cloud computing is expected to substantially increase in the next few years, more research should be undertaken to examine the ethics of small and growing businesses that use cloud computing services. As these businesses often display entrepreneurial traits, it may be useful to use the theoretical framework of entrepreneurial ethics used by Kuratko and

Table 2
ANOVA analysis. Dependent variable: BISUM.

Source	Type 3 SS	Df	Mean square	F	Sig
Corrected model	118.38	15	6.789	5.123	0
Intercept	58.465	1	54.234	28.456	0
SESUM	2.78	1	1.98	1.1789	0
OVALSUM	19.234	1	19.321	12.345	0
ETHICSHL	37.678	1	29.789	19.234	0
MARKETINGHL	0.12	1	0.879	0.05	0.788
OEHL	4.67	1	3.73	2.213	0.067
ETHICSHL∗MARKETINGHL	15.49	1	14.391	7.236	0.028
ETHICSHL∗OESGHL	4.78	1	4.79	1.789	0.057
MARKETINGHL∗OESGHL	0.33	1	0.32	0.187	0.534
ETHICSHL∗LOHL∗OESG2HL	1.79	1	2.18	1.478	0.112
ETHICSHL∗OESGHL	0	0	0	0	0
MARKETINGHL∗OESGHL	1.68	1	1.38	0.678	0.301
ETHICSHL∗MARKETINGHL∗OESGHL	0	0	0	0	0
Error	279.88	179	1.348		
Total	3768.21	207			
Corrected total	378.45	207			
R-squared = 0.265					
Adjusted R-squared = 0.212					

Goldsby (2004) to supplement the social cognitive theory perspective used in this paper. Further ethical issues about cloud computing should be investigated such as the role of money and illegal methods in storing data and the ongoing management of sensitive information.

As demonstrated in this paper, there are many ethical issues arising from technological innovations like cloud computing and how people adopt them. Longitudinal surveys about the purpose of cloud computers could monitor on a worldwide basis of the ethical attitudes of people towards information security. As ethical conduct differs across various countries and industries, more research is required on how to handle cross-cultural differences that may not be apparent to cloud computing companies. For this reason, more case study and in-depth interviews about ethical values should be conducted to understand how marketing campaigns can educate people about moral obligations with cloud computing services. Future research might investigate whether generation Y consumers have participated or condoned unethical behaviour on cloud computer servers. Another interesting research avenue is to see whether generation Y consumers have been a victim of unethical conduct done on the internet and if their ethical viewpoints affect their intended adoption of cloud computing services. As the adoption rate of cloud computing services progresses, ethical codes of conduct should be researched to find ways of having flexible guidelines that can adapt to the changing global business environment. Therefore, continued research on ethics, entrepreneurship and adoption behaviour of cloud computing services must be an ongoing focus to allow this technological innovation to become a model of excellence.

13. Conclusion

The perceived unethical behaviours on cloud computing servers are likely to increase as more people adopt this technology innovation. This paper discussed the role of ethics, entrepreneurship and marketing in determining the intended adoption behaviour of cloud computing for generation Y consumers. Activities conducted on cloud computers are costly to business and society, which highlights the importance of consumers learning about ethical outcomes related to cloud computing. This paper is limited by the specific nature of the sample and future research should extrapolate the sample to different demographics to see if the results of the study are generalisable to other types of consumers and geographic locations.

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