Continuance use intention of cloud computing: Innovativeness and creativity perspectives☆

Vanessa Ratten

La Trobe Business School, La Trobe University, Bundoora, Melbourne 3086, Australia

ABSTRACT

Cloud computing offers a better knowledge management process for organizations, thus allowing for more linkage between information systems and managerial requirements. This study proposes the use of social cognitive theory in continuance use intention of technology innovations including cloud computing services. The theoretical framework explores the role of innovativeness, creativity, risk, behavioral control and personal attitude towards the continual use of cloud computing services for technology organizations in Australia. The results will help technology organizations to develop strategies about how creativity and innovativeness can foster better managerial outcomes. Future research suggestions highlight the importance for technology organizations to adapt and evolve their current information systems management practices.

© 2015 Elsevier Inc. All rights reserved.

1. Introduction

Cloud computing is an important technological innovation in the area of information systems development that provides the benefits of resource pooling, broad network access and self-service applications (Son, Lee, Lee, & Chang, 2014). Cloud computing is an information service providing software, platform and infrastructure for an organization (Arpaci, Kilicer, & Bardaki, 2015). There are a number of different cloud computing types including private, community, public and hybrid types (Lian, Yen, & Wang, 2014). As this study focuses on technology organizations, which are often knowledge intensive, private cloud computing is the focus of this study.

In the technology industry, cloud computing is exponentially changing the implementation of information technology services and management systems. When an organization decides whether to continue with cloud computing services they consider management technology security and legal issues (Lian et al., 2014). These issues are important drivers of innovativeness and creativity in technology organizations as they enable strategic change to take place (Lee, 2012). This then results in better organizational performance and workplace practices that encourage further technological innovation.

2. Theoretical background and framework

2.1. Basics of cloud computing technology

The key risk issues of cloud computing for organizations include identity management, governance, compliance, software isolation and security responses. These risks incorporate the most important concerns for technology organizations adopting cloud computing, which are 1) comparability with organizational policy, 2) information systems requirements and 3) relative business advantages (Lin & Chen, 2012). Cloud computing incorporates utility computing because media networks share information resources (Sultan, 2014). Much of the benefits of cloud computing for organizations is in the online software and virtual maintenance of internet infrastructure, which can synchronize data from any geographic location. This means the virtual updating of documents and files making information sharing easy; however, there are some inherent disadvantages with this type of information investment. These disadvantages include high costs and access concerns, particularly for organizations whose cloud providers are in different geographic locations (Lacity & Reynolds, 2014).

Cloud computing uses the power of large computing devices, which work on a common software format making parallel networks possible (Park & Kim, 2014). The large processing power of cloud computing makes multiple systems on the internet work by the interaction with virtual physical resources. Cloud computing includes internet applications that can provide different information systems services; such as networking, filing and storage (Arpaci et al., 2015).

The structural information systems made possible by cloud computing enable greater linkage between network performance and user friendliness (Lin, Wen, Jou, & Wu, 2014). This helps cloud computing to facilitate better collaboration, mobility and connectability of organizations information management systems (Park & Kim, 2014). Organizations see cloud computing as providing better security and efficiencies in the way data is managed (Sultan, 2014). This helps organizations to provide higher quality software and hardware services in a virtual environment with modalities (Grossman, 2009).

Marston, Li, Bandyopadhyay, Zhang, and Ghalsasi (2011) reports more research should address the organization issues about implementing cloud computing. Arpaci et al. (2015) highlights that cloud computing is the on-demand and expandable technology service available over the internet from data centers. Continuing to use a new system helps ensure the long term success of the innovation (Ajjan, Hartshorne, Cao, & Rodriguez, 2014). This is important for the viability of a new system, which incorporates technological innovation (Agarwal & Karahanna, 2000). Continuance use intention is the decision a user makes to use an application beyond the initial adoption (Ajjan et al., 2014).

2.2. Background on social cognitive theory

Social cognitive theory concerns the role of perceived behavioral control to encompass conditions when individuals do not completely control their own behavior (Ajzen, 1991). This theory uses internal and external environmental factors to understand the role of innovation in organizations (Wang & Lin, 2012). Part of the appeal of social cognitive theory is the focus on the behavior of individuals towards technological innovation in the workplace (Cho, Cheng, & Hung, 2009). As the continual use of a technology requires confidence in the ability of an organization to use an innovation, this theory is helpful particularly with emerging innovations like cloud computing. The premise of social cognitive theory is the ability of individuals to adjust behavior concerning attitudes and competences (Bandura, 1986). Previous research identifies social cognitive theory as being useful in the information technology context because of the social and cognitive elements of environmental behavior (e.g. Compeau, Higgins, & Huff, 1999; Wang & Lin, 2012). Social cognitive theory is the theoretical framework of this study to understand continuance use of cloud computing. The next section will discuss each research hypothesis.

3. Research hypotheses

3.1. Personal attitude

Personal attitude is the degree a person believes using cloud computing is positive or negative in the organization (Ajjan et al., 2014). Personal attitude towards using a technological innovation affects continuance use (Ajjan et al., 2014). The attitude a person has influences their perception about using a technological innovation over the long term (Davis, 1989). This means that individuals who believe using a technology that is fun will anticipate outcomes differently (Davis, Bagozzi, & Warshaw, 1992). Often attitudes develop from other colleagues experiences in a workforce about performing a certain behavior (Ajzen, 1991). Ajzen and Fishbein (1980) finds that attitude influences behavioral intentions. Attitude can include good and bad feelings about behavior (Premkumar, Ramamurthy, & Liu, 2008). Therefore, the next hypothesis is:

Hypothesis 1. Personal attitude positively relates to continuance use of cloud computing.

3.2. Perceived behavioral control

Individual behavior influences intentions and actual behavior (Ajzen, 1991). Perceived behavior control is the degree an individual believes the performance or non-performance of their behavior is under control (Nasri & Charfeddine, 2012). Volitional control over an individual's own behavior influences behavior directly and indirectly through behavioral intentions. This means an individual's motivation to perform a behavior influences their perception about whether they can perform an activity (Nasri & Charfeddine, 2012). Perceptions include whether the behavior is difficult or easy to perform and this happens when individuals use cloud computing. Therefore, the next hypothesis is:

Hypothesis 2. Perceived behavioral control positively relates to continuance use of cloud computing.

3.3. Risk

Cloud computing involves different types of risk depending on the frequency and use of the technology. These risks are environmental and behavioral depending on the organizational context (Pavlou, 2003). Environmental risk involves the unpredictability of secure transmissions and information on the internet (Burda & Teuteberg, 2014). Often this type of risk is beyond the control of an individual or organization and can include data hacking. Some environmental risk organizations can control such as data privacy and changes to data on information systems (Burda & Teuteberg, 2014). Perceived risk is a user's subjective belief in probability in suffering a loss when using cloud computing (Burda & Teuteberg, 2014). This leads to the next hypothesis:

Hypothesis 3. Risk negatively relates to continuance use of cloud computing.

3.4. Innovativeness

Innovativeness concerns an organization engaging in and supporting new processes or services (Pesamaa, Shoham, Wincent, & Ruvio, 2013). Innovative organizations are those open and tolerant to new ways of doing things, which involve change in the current way of thinking (Cardon, Wincent, Singh & Drnovsek, 2009; Weng, Huang, Kuo, Huang, & Huang, 2011). There is likely to be more innovation when organizations commit to launching new ideas (Rogers, 1995; Zhou, Gao, Yang, & Zhou, 2005). Therefore, the next hypothesis is:

Hypothesis 4. Innovativeness positively relates to continuance use of cloud computing.

3.5. Creativity

Creativity is useful in developing new and insightful processes within an organization. Pesamaa et al. (2013, p. 174) defines creativity as "the ability to generate innovative ideas through original thinking and information processing". Creativity matches people's competences with the ability to change existing service innovations by making suggestions (Tierney & Farmer, 2002; Weng et al., 2011). Creative suggestions enable organizations to use their resources better (Chang, 2011). Creativity is a gradual process, which involves an organization working together on innovative ideas (Ford, 1996; Pesamaa et al., 2013). As cloud computing is an innovative service, creativity plays a part in ensuring continuance use of the technology. This leads to the next hypothesis:

Hypothesis 5. Creativity positively relates to continuance use of cloud computing.

4. Methodology

Cloud computing is the focus of this study in terms of continuance of usage intention. The survey questionnaire includes the following factors: