



The role of trust and risk perceptions in cloud archiving – Results from an empirical study



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ARTICLE INFO

Available online 14 September 2014

Keywords:

Cloud Storage
Cloud Archiving
Cloud Computing
Trust
Risk
SEM

ABSTRACT

This study presents and empirically validates a model that strives to explain end-user adoption of cloud storage as a means of personal archiving. Drawing from prior research on IT adoption, trust, risk and cloud computing, we develop a technology acceptance model that incorporates users' perceptions of risk and trust as well as major antecedents of trust. The research model is empirically tested with survey data collected from 229 cloud storage users. Our results show that trust can be conceived of as a factor that mitigates uncertainty and reduces the perception of risk, which is a significant inhibitor of the intention to use cloud storage for archiving. We find evidence that trust can be increased through both the provider's reputation and user satisfaction. Based on the results, we highlight important practical implications that can be used to inform marketing efforts of cloud storage providers and further suggest some opportunities for future research.

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1. Introduction

Preserving digital data for the long-term is a challenging task in the light of rapidly changing technologies and the associated risk of obsolete soft-/hardware and media degradation (Burda & Teuteberg, 2013). In the private domain, all the valuable personal files, such as photographs, documents and music, are still primarily archived on traditional media such as local, external hard disks or DVDs (Ion, Sachdeva, Kumaraguru, & Capkun, 2011). From a user perspective, these files are often irreplaceable memories that money cannot buy. However, hard drives will fail eventually, which usually takes place at random and results in a loss of files (Top, 2013). To counteract those threats, consumer cloud storage solutions provide adequate means and have seen an increasing rise in demand and diffusion. Despite abundant headlines about privacy breaches or government surveillance programs, market analysts forecast that cloud storage will continue to grow at an aggressive pace in the next years and consumers are expected to increase their use (Verma, 2012).

Using cloud storage, end-users can remotely store their data and use convenient on-demand storage services from a shared pool of highly reliable computing resources, without the burden of local data storage (C. Wang, Chow, Wang, Ren, & Lou, 2013). Compared to archiving on traditional media, archiving in the cloud, referred to as cloud archiving in this study, offers several advantages. It provides central and continuous availability of archived data that can be accessed simultaneously from various devices such as laptops or mobile devices anytime and anywhere. In addition, long-term data access can be preserved without the threat of media obsolescence that is usually extant and requires periodic replication of data onto newer storage media (Burda & Teuteberg, 2013).

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However, against the backdrop of the advantages of cloud archiving compared to traditional storage media, there are also risks associated with cloud archiving as users relinquish the ultimate control over the fate of their data (Ackermann, Widjaja, Benlian, & Buxmann, 2013; Wang et al., 2013). In fact, when archiving data on cloud storage, additional requirements regarding security, privacy and accountability need to be met in order to fulfill the expectations of the users, gain their trust and build long-term business relationships. The latter is particularly important in the archiving context because data is usually intended to be kept for an infinite period of time. Prior research provides some first empirical insights on user's perceptions of cloud storage and observed a general tendency to prefer local storage over cloud storage. Furthermore, it also showed the existence of latent mistrust, particularly for data considered sensitive by the user (Ion et al., 2011).

Thus, it is the intention of this study to investigate the realm of cloud archiving at an individual level of analysis to provide an understanding about end-user acceptance of cloud archiving while focusing on the role of trust and risk. In particular, we strive to answer the following research questions: 1) How do trust and risk perceptions influence cloud archiving adoption decisions? 2) How can trust be established in the context of cloud archiving?

We build on previous research that has addressed the issue of risk and uncertainty as important determiners of cloud adoption (Benlian, Hess, & Buxmann, 2009) and the importance of trust in both cloud adoption (Pearson, 2011; Walterbusch, Martens, & Teuteberg, 2013) as well as in the archiving domain (Burda & Teuteberg, 2013). Drawing on the technology acceptance model (TAM) (Davis, 1989), we propose a research model that incorporates trust and risk to investigate the adoption of cloud archiving in the private domain. Additionally, we integrate antecedents of trust to explain how trust can be built by cloud storage providers. The research model and underlying hypotheses are tested by using data collected through a survey of current cloud storage users that already had prior experience with cloud storage.

This paper is structured as follows: We first review previous research and discuss the theoretical foundation of this study. Then, we derive our research model and hypotheses. Next, we delineate our research methodology followed by the results of the data analysis. The subsequent discussion section highlights the important findings as well as the practical implications and contributions of this study. Finally, we discuss the limitations and future research directions and conclude the paper.

2. Theoretical framework

2.1. Previous research

In the advent of this research, we conducted a literature review. Therefore, we searched the databases of the top 20 MIS journals according to the AIS journal ranking list (AIS, 2013), the proceedings of major IS conferences (e.g. ICIS, ECIS) as well as the Digital Libraries of ACM and IEEE for relevant extant research.¹ Our literature review shows a vast amount of research that has been published in pertinent information systems (IS) and computer science journals and conferences. Acknowledging this extant research, we find that studies have been conducted from an organizational, individual as well as technological perspective.

While the technological literature focuses on addressing the issues of security, privacy and infrastructure performance by proposing new architectures, methods or prototypes (see, e.g., Brandt, Tian, Hedwig, & Neumann, 2012; Spillner et al., 2011; Wang et al., 2013), current organizational research on cloud computing primarily addresses the issues of opportunities and risks (Benlian & Hess, 2011) as well as decision making in cloud computing adoption. For example, Martens and Teuteberg (2012) propose a cost and risk based decision making model for cloud computing while Repschlaeger, Zarnekow, Wind, and Klaus (2012) suggest a framework to support organizations to systematically gather cloud computing requirements. Other authors examine perceived security risks in cloud computing and their measurement (Ackermann et al., 2013), the measurement of service quality in cloud computing (Benlian, Koufaris, & Hess, 2011), pricing models (Eaton, 2009) or risk/compliance management in cloud computing (Martens & Teuteberg, 2011).

Most of the work that examines cloud computing from an individual end-consumer perspective focused on important determiners and inhibitors of cloud computing by applying commonly used IT adoption theories such as TAM or the theory of planned behavior (TPB). For example, Bhattacharjee and Park (2014) study the motivation of end-users to migrate from client-hosted computing to cloud computing and Ratten (2012) examines the impact of ethical and entrepreneurial orientation in cloud computing adoption. Behrend, Wiebe, London, and Johnson (2011) examine adoption behavior of students of software as a service (SaaS) solutions based on TAM3, while Giessmann and Stanoevska (2012) study end-user preferences in platform as a service (PaaS) solutions using a conjoint analysis. However, considering extant research, we only find the work of Ion et al. (2011) who specifically examined the realm cloud storage adoption from an end-user perspective. Ion et al. (2011) empirically investigated users' perceptions and privacy concerns with cloud storage providers. Based on interview and survey data collected from 402 participants, Ion et al. (2011) observed that 69% of all respondents preferred local storage over cloud storage and that they do not use cloud storage as their main storage medium for security and privacy reasons. They conclude that there is a general mistrust of the cloud based on a feeling that the internet is intrinsically insecure.

Despite the above research and the work of Ion et al. (2011), there is a lack of research that investigates the realm of consumer cloud storage and in particular its usage as a means of personal archiving from an adoption perspective. Therefore, the present

¹ More information on the applied literature review approach (e.g., used keywords/databases) are provided in Appendix A.

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