Abstract

Software-as-a-Service, a new model of accessing software presents individual users with tremendous opportunities to work and live conveniently and efficiently. However, the challenges that come with SaaS are equally highlighted and deserve careful attention from researchers. Among them, privacy has emerged as the key inhibitor of SaaS adoption and use among individual users. The purpose of this study is to understand the specific privacy concerns that inhibit SaaS adoption and analyze the key benefits that are weighted against such privacy concerns by individual users in their decision process of using SaaS. We expect this study to have both academic and practical implications. For researchers, this study will provide an empirically-verified framework focused on privacy issues and key benefits specific to SaaS at individual level which, to the best of our knowledge, has not been developed. For SaaS providers, this study will enhance their understanding on the most salient privacy issues raised by individual users and how to address them by increasing the key benefits driving adoption. Consequently, SaaS providers will be able to develop user-centered services that minimize their privacy concerns and maximize their benefits.

Keyword: SaaS adoption, privacy concerns, benefits, individual users
1 Introduction

Though cloud computing has been presented as a new way of accessing software and computational resources, individuals have been using cloud-based applications such as email services, e-government services and other types of services that were accessed through network, processed on a remote computer and stored on a remote data centers. However, the innovation across the software industry both in technical and business aspects resulted in new possibilities that have disrupted the way and the type of software that is provided to the end consumer, going beyond traditional, less power hungry services such as emails. Innovations such as Virtual Machine (VM), Multi-tenancy, Service Oriented Architecture (SOA) and on-demand capability, have allowed software companies to provide their products as services through the Internet (Misra & Mondal 2011). Accordingly, instead of purchasing and installing software on their machines or storing and working on documents placed in their local machine, a growing number of consumers are relying on software provided as a service and cloud data storage to store and process information (Gartner 2012).

This new way of accessing software, computational power and data storage bring tremendous benefits to the end users. The fact that computation happens on the server-side and files are stored in the cloud removes the need for high-performance and large-storage devices on the user-side. Using a browser, the user can have access to the latest, state-of-the-art software and data storage services. Hence, the convenience, efficiency and availability anytime and anywhere provided by cloud computing is driving a rapid shift of users towards this new paradigm (Ion et al. 2011). The growth of SaaS shows no sign of slowing down, with estimations pointing the global market of SaaS at 12.1 billion USD by 2014, with an average annual growth rate of 26 % (Lee et al. 2013). Reports on information technology (IT) trends consistently rank cloud computing as one of the most important trends in IT (Gartner 2009; Gartner 2010; Gartner 2011). The SaaS segment of cloud computing shows even greater potential growth in some regions. For instance, Gartner predicted that the Indian SaaS market growth is projected to have a Compound Annual Growth Rate of 34.4% between 2012 and 2017 (Gartner 2013).

Along with these cloud computing opportunities, a number of challenges have been identified which might have a negative impact on the predicted growth of the SaaS market. Among these challenges, security and privacy issues have been repetitively raised as threats to SaaS adoption (Kim 2009; Armbrust et al., 2010; Blue & Tirotta, 2011). Paquette et al. (2010) raised the security and privacy risks that might occur in case of unauthorized access of private customer data, and stated that the success of cloud computing will be related to the ability to mitigate such risks. On the other hand, Ion et al. (Ion et al., 2011) found that losing data control may be a factor preventing consumers from using Cloud storage and Chow et al. (2009) affirmed that users’ “perceived lack of control” over their own data is holding back organizations from fully utilizing the large potential of cloud computing.

Prior research on SaaS challenges, therefore, have placed organizations at the center of attention. Several studies were conducted within small and medium enterprises (SME) and large corporations from private and public sector (Shin 2013; Benlian et al. 2009; Wu 2011). However, a few studies have focused on individual users of SaaS, though consumer exposure and consequences of the violation of their privacy might be as devastating as in case of organizations. Moreover, most of the privacy-related studies on Cloud computing and SaaS are descriptive and lack empirical basis and verification. Lastly, existing studies have either focused on privacy concerns or on benefits, even though the two aspects represent a tradeoff and a dilemma for users during the decision-making process of SaaS use.

The purpose of this study is therefore to examine the key privacy concerns and the expected benefits that are weighted against these concerns in the adoption process of SaaS. We attempt to answer the following research questions:

What are the key privacy concerns that hinder the adoption of SaaS in case of individual users?

What are the key benefits that are weighted against user privacy concerns in their consideration to use SaaS?
2 Literature review

2.1 SaaS characteristics and adoption literature

Cloud computing, marketed as “the Cloud” has become a pervasive word used by providers of web-based services and consumers of such services. By definition, cloud computing refers to a computing model which enables the provision of ubiquitous, network-based and on-demand services to individual users and organizations. These metered services are enabled by high computational power and computing resources shared among users and provisioned with minimum effort and interaction by the service provider (Mell & Grance 2011). The SaaS cloud computing model presents consumers with the capability to access and use application software through a web browser or an application interface. SaaS emerged as an efficient and alternative way to delivering software due its technical and economical characteristics, and it has shown a sustainable growth and adoption across different sectors.

SaaS adoption has been investigated by researchers, considering different dimensions and contexts. At the organizational level, sufficient evidence exists on various drivers and inhibitors of SaaS. For example, Benlian and Hess (2011) found cost advantage to be the highest motivation, while security concerns stand as the greatest inhibitors for adopting SaaS among firms. Using the rough set theory, Wu et al. (2011) explored the perceived benefits and risks associated with the adoption of SaaS among firms, and found organizational structure, organizational readiness and internal and external factors to have a great impact on the adoption of this cloud-based services. The authors, on the other hand, found privacy, security and outage issues to be the main challenges to SaaS adoption. Among organizations, previous studies found that the adoption of SaaS might be driven or inhibited by different factors, depending on business strategies and business models. For instance, Shin (2013) compared the adoption factors of cloud computing in the public sector with those in the private sector. Although the results showed similar factors affecting intention to use the cloud in both sectors, the intensity and the role played by those factors differed across them. Factors such as access, reliability and availability were found to be more salient in the private sector whereas security and usefulness were found to be of greater importance in the public sector.

At the individual level, existing research explored the adoption factors of cloud computing in general, and SaaS in particular. The low price or free cloud services, the accessibility and simplicity of such services have been identified as some of the most important benefits of the Cloud among the general public (Iomega 2010). However, most of those studies concurred on the fact that privacy is the most predominant concern for individual users while considering to use SaaS. Moreover, previous studies noticed the complexity of privacy issues and the importance of clearly understand privacy risks related to cloud computing prior to adoption (King & Raja 2012; Microsoft 2009). Privacy risks related studies have highlighted the denial of responsibilities by cloud storage providers in case of user data loss and privacy breaches (Hu et al. 2010; Svantesson & Clarke 2010). In their study on privacy expectations of cloud storage users for example, Ion et al. (2011) observed “a great mismatch” between users’ beliefs and actual privacy protection by cloud service providers. This situation suggests that cloud service providers should pay more attention to the actual, key privacy concerns of users and close the gap between their understanding of users’ concerns and the actual users’ expectations.

Though a great body of knowledge and empirical evidence exist on benefits and risks of cloud computing at organizational level, little research has been done to understand individual users’ approach to this new technology. Moreover, previous studies pointed out privacy as the main concern for users, but little empirical verification of the key privacy concerns has been done so far. The same situation was observed with the benefits associated with SaaS adoption after going through existing literature. Therefore, the present research tries to fill in this gap by providing empirically a better understanding of the various factors influencing individuals’ decisions to use SaaS.
2.2 Research Model Development and Hypotheses

2.2.1 Theory of Reasoned Action (TRA)

TRA has been widely used to describe volitional human behaviors and it was also found by numerous researchers suitable for understanding technology adoption behavior among individual users (Ajzen & Fishbein 1973; Verkasalo et al. 2010; Lu et al. 2007; Pavlou 2003). In fact, TRA posits that for a certain behavior to happen, there is a logical and sequential thinking that leads individuals to perform the behavior. According to TRA, the decision process starts with the formation of individuals’ beliefs about the potential outcomes of the action. These behavioral beliefs through attitudes, combined with the beliefs of others’ perceptions of the action (subjective norms), influence behavioral intention to perform a certain behavior. Therefore, the attitude towards the behavior and Subjective Norms (SN) will shape your intention to perform the behavior which, according to TRA, is the most proximal antecedent to the actual behavior.

Considering that SaaS adoption is a conscious decision that is made through a logical and systematic thinking process by each individual, we found it reasonable to base our theoretical framework on TRA. Therefore, we posit that the individual intention to use SaaS will be influenced by two attitudinal factors, trust and information privacy concerns, which in turn will be influenced by perceived benefits beliefs.

2.2.2 Trust (TR)

The concept of “Trust” has been extensively analyzed and a great amount of research has focused on understanding this construct, its plausible dimensions and its effects on human behavior (Bélanger 2008; Gefen et al. 2003; Lippert & Davis 2006). In the present research, we define trust as the user’s optimism about the behavior and the goodwill of SaaS providers (Hart & Saunders 2014). Research on Information Systems (IS) has greatly used trust to explain IT adoption behavior (Koufaris & Hampton-Sosa 2004; Lee & Chung 2009; Luo et al. 2010). Results showed that trust is more salient when there are high levels of uncertainty or risks such as in the e-commerce context (Pavlou, 2003; Gefen et al. 2003). Information privacy literature shows the important positive role played by trust, and the findings from multiple studies concur on trust and risks being the most salient beliefs when privacy is at stake (Miyakazi et al. 2001; Cespedes & Smith 1993; Malhotra et al. 2004). Interestingly, SaaS usage puts privacy at stake because individuals store and process their personal, professional and other types of information when using these services. As individuals take high risk in sharing great amounts of information, trust towards SaaS vendors is expected to be an important factor. Hence, we posit that trust has a significant positive impact on SaaS use intention.

HI: Trust towards SaaS providers positively affects behavioral intention to use (BIU) SaaS

2.2.3 Information Privacy Concerns (IPC)

The Concerns for Information Privacy (CFIP) was first developed by Smith et al. (1996) as a framework to understand individuals’ privacy concerns while handing their personal information to organizations in offline settings. The CFIP framework identified collection of private information, unauthorized secondary use, improper access and errors as the main privacy concerns during the collection of privacy information by vendors (Smith et al. 1996). The collection dimension refers to the concern that extensive amounts of information are being stored during the data collection process by organizations. The present study, however, focuses on information such as personal documents, photos and videos that are willingly placed by users on platforms provided by SaaS providers. In this context, no actual collection of information takes place and the amount of information provided depends solely on the information owner. Hence, the collection dimension becomes irrelevant and it will not be considered for this study. Unauthorized secondary use (USU) represents individuals’ fear that personal information might serve to different purposes others than its primary goal, without prior owner’s authorization. Information privacy laws, which role is to protect individuals’ privacy and regulate unauthorized use of customer personal data, were found to be inefficient in the case of cloud service providers. For example, Svantesson et al. (2010) highlighted the limitation of trans-border data laws because they protect users
only when data is transferred from the cloud provider to a third party and not in cases such as Google Docs (SaaS provider) where data can be transferred within the same organization, leaving room to secondary use of individuals’ data without prior consent. Recent reports on the access of the US Government to users’ data stored across different cloud providers have alerted users on the unauthorized use of their information and have raised users’ concerns on how SaaS providers handle their information in regard to third party organizations. A recent study by safemonk.com, conducted among hundreds of US citizens, affirms that 46% of the respondents are concerned with their privacy being breached by their government (SafeNet Labs 2013). Therefore, we consider USU as a core dimension of privacy concerns among individual users of SaaS. As for the improper access (IA) dimension, it refers to the fact that personal information might be accessed without a proper clearance, leading to potential misuse or information alteration. IA was numberedly mentioned as a key privacy concern for cloud users. In fact, in a study by Fujistu (Fujitsu Global Business Group 2010), 88% of the respondents affirmed to be worried about who access their personal data when using SaaS services. The multi-location of data storage exacerbates the issue of who has access to user information because SaaS providers usually sub-contract other vendors. This practice may lead to potential risks such as the exposure of users’ information to people who have no proper clearance to handle it (Zhou et al. 2010). Errors were identified as any mistake that can be made during data entry by vendors. Given that SaaS users input their own information on SaaS platforms, no data entry by the SaaS provider occurs as such; hence, the irrelevance of this dimension in our context.

Later on, Malhotra et al. (2004) adapted the CFIP to fit online users and developed the Internet User’s Information Privacy Concerns (IUIPC). IUIPC added control (CON) as another component of privacy concerns, highlighting online users’ fears of losing their right to alter or delete personal information handed to organizations. In a data privacy survey among 1,000 US adults, 45% of the respondents stated to feel low or no control over their personal information gathered by companies when using the Web or online services, while around 24% of the respondents felt to have low or no control over their personal information intentionally shared online (Microsoft 2013). Additionally, an in-depth empirical validation of Internet privacy concerns confirmed the lack of control perceived by individuals over the management of their personal information provided online (Hong et al. 2013). Given these findings, we propose control to be an important dimension of privacy concerns among SaaS users.

Overall, we hypothesize that unauthorized secondary use, improper access and control are key dimensions of SaaS information privacy concerns, which in turn negatively influence intention to use SaaS. This statement is consistent with prior research.

**H2: Information privacy concerns negatively affects behavioral intention to use SaaS**

Additionally, SaaS users expect and trust that cloud-based applications handle their information to their best interest by protecting their privacy. It is the role of SaaS providers to ensure that users’ information privacy is protected, and such commitment is usually expressed through privacy protection policies published by providers. Previous studies have noticed that an enhancement of such privacy statements may increase the level of trust towards websites (Kim et al. 2008). Moreover, Cheung and Lee (2006) found perceived privacy control to have a positive effect on consumer trust towards Internet shopping. Similarly, users’ perception of privacy threats may affect their trust towards SaaS providers. Hence, we hypothesize that an increase in users’ privacy concerns may reduce their trust towards SaaS providers.

**H3: Information privacy concerns negatively affects trust towards SaaS providers**

### 2.2.4 Subjective Norms (SN)

TRA argues that apart from attitudes, subjective norms play an important role in intention to perform a certain behavior. SN captures psycho-social factors that affect an individual behavior and refers to “the degree to which an individual thinks that important others believe he or she should perform or not the behavior” (Ajzen & Fishbein, 1973). SN have been vastly analyzed in the IS domain, and this variable was found to predict intention to use such systems (Park & Ryoo, 2013; Shin 2007). Considering these findings, and consistent with TRA, we postulate that SN will positively influence individuals’ intention
to use SaaS

**H4:** Subjective norms positively affect behavioral intention to use SaaS

### 2.2.5 Perceived Benefits (PB)

Efforts have been invested in IS research and consumer behavior to understand the benefits that are linked with new technology adoption. These benefits have been categorized broadly into utilitarian and hedonic benefits. The former refers to the functional benefits that fulfill a certain necessity or primary needs, while the latter refers to non-functional benefits that rather address users’ emotional needs and happiness (Forsythe et al. 2006). The identification of utilitarian benefits of SaaS has been subject to research recently. Most studies on cloud computing and SaaS, in particular, agree on the convenience provided by these new technologies (Rayport & Heyward 2009). Convenience (CVN) captures the “anytime, anywhere” phrase that is often associated with cloud computing, whereas a great number of academic studies have confirmed it as an important factor driving SaaS adoption (Marston 2011; Hirsch & Ng 2011; Song & Sun 2010). In the present study, we consider and verify convenience as an important benefit factor to individual users. Another important factor associated with cloud computing adoption is cost. Cost advantage (CADV) was found to be the most important benefit to SaaS adoption (Benlian & Hess 2011), and Wu et al. (2011) showed that IT-related costs are the principal reasons for SaaS adoption by SMEs. Based on these findings, we argue that cost advantage is an important component of overall benefits that individual users expect from SaaS. Performance (PERF) is another factor that is often identified as a salient driver for technology acceptance (Venkatesh et al. 2003; Venkatesh et al. 2012). By adopting a specific technology, users expect their life to be easier and to achieve their goals more efficiently (Thong et al. 2006). Individual users opt for SaaS to increase their daily task performance. The synchronization of data across devices and the ease of information sharing and collaboration provided by cloud services allow individual users to timely access their information from any location provided with Internet availability and a Web browser (Park & Ryoo 2013). Hence, we hypothesize that the expected performance improve constitutes an important component for individual users in their assessment of SaaS benefits.

Apart from utilitarian benefits, IT adoption was also associated with enjoyment as a potential benefit. Shin (2007) examined the role of perceived enjoyment (ENJ) in mobile Internet adoption and found it to be a good predictor of users’ intentions to adopt this technology. This relationship has been also validated across various types of technologies (Childers et al. 2001; Verkasalo et al. 2010). SaaS applications also offer a certain degree of enjoyment to users. Special features of SaaS, such as easy sharing of information and collaboration, allow users to interact within their social networks by sharing, editing and commenting on their information with friends and family members, which makes their life more enjoyable. This situation was illustrated by Vartiainen and Matilla (2010) who examined users’ experiences on a cloud-based photo-sharing application, finding a strong need for social interaction features which would allow them to share their photos with others and hence, be more enjoyable. Based on these findings, we propose enjoyment to be part of the benefits that might influence individuals to use SaaS applications.

### 2.2.6 Perceived Benefits, Information Privacy Concerns, and Trust

The privacy calculus model that extends the risk-benefits paradigm to privacy contexts stipulates that individuals assess privacy risks against potential benefits, and the result of this calculus is relied upon to provide or not personal information to an organization (Dinev & Hart 2006). SaaS usage, excluding the login process, does not involve information requested by SaaS vendors but represents a voluntarily disclose of information. This decision made by individuals to store and process their information using SaaS applications involves a balance process between users’ privacy concerns and the potential benefits from SaaS use. The higher the users’ perceptions of benefits, the lower their privacy concerns. This hypothesis is in line with Benlian’s work (2011) that found IT executives assess opportunities against risks in their decision-making process of adopting SaaS in their organizations. Hence, in line with TRA, we argue that the belief that SaaS carries certain benefits will decrease individuals’ privacy concerns regarding SaaS use.
**H5: Perceived benefits negatively affects information privacy concerns**

On the other hand, cognitive factors such as perceived benefits or usefulness have been linked to trust in new or innovative services. Pointed out initially by McKnight (1998), cognitive factors, among others, were found to play a key role in the formation of initial trust towards a service provider. Kim et al. (2009) analyzed the effect of perceived benefits on initial trust in mobile banking acceptance and confirmed the close relationship between these two variables. Similar results were found by Suh and Han (2002) who asserted that trust is built upon perceptions of the usefulness of the offered services. Therefore, we argue that the perception of values or benefits by SaaS users will increase their trust towards SaaS providers.

**H6: Perceived benefits positively affects trust towards SaaS providers**

![Figure 1. Research Model](image)

### 3 Research Methodology

#### 3.1 Measurement Development

We used a survey to test our proposed research model. All measurement items in the present research were drawn from related previous studies and adapted to fit our research context. All these items were measured in a seven-point Likert scale: “1. strongly disagree” to “7. strongly agree.”

#### 3.2 Data Collection and Analysis

We conducted a pilot test which consisted of 62 samples from SaaS individual users at the Korea Advanced Institute of Science and Technology (KAIST) in South Korea. Respondents were undergraduate and graduate students and voluntarily users of Google Drive, Dropbox, Naver Drive, SkyDrive and icloud. These personal cloud SaaS allow individual users to store and process their document files, pictures, videos. Based on this pilot sample, we examined the internal consistency, reliability, and validity of our measurement model before collecting a full-scale sample. As for the analysis section, we used partial least squares (PLS) as structural equation modeling (SEM) technique, and Smart PLS 2.0 as analysis tool to assess our measurement model.

#### 3.3 Reliability and Validity (Pilot Test)

To examine the internal consistency and reliability of our measurement model, we assessed the Average Variance Extracted (AVE), composite reliability (CR), and Cronbach’s alpha (α) values (Chin 1998). To
check the reliability of items, we checked the items’ loadings. Items’ loadings were all greater than the cut-off value of 0.70 suggested by Barclay et al. (1995). On the other hand, Table 1 shows that AVE values are all greater than the cut-off value of 0.5, while CR and Cronbach’s alpha values are all higher than the cut-off value of 0.7 (Hair et al. 2009; Numally 1978). Based on these results, we claim that our measurement model is internally consistent.

As for the discriminant validity of our measurement model, we compared the correlations among variables with the square root of AVEs (Chin 1998). Results supporting an adequate discriminant validity are as follows: the square root of the AVEs should be greater than the correlations among the constructs (Chin 1998). Table 1 shows that our measurement model meets the described criterion and thus, we claim that our measurement model has discriminant validity.

![Table 1. Reliability and Validity Results](image)

4 Expected Implications and Further Study

The objective of this study is to investigate the factors that influence individual users’ intentions to use SaaS. We expect our study to identify privacy issues that are salient to SaaS users and the benefits that make users willing to trade their privacy when using SaaS. Furthermore, we expect our study to have both of academic and practical implications. The study attempts to provide an empirically-verified privacy calculus model that is specific and tailored to the unique environment of SaaS. Furthermore, the results might provide specific benefits that might be maximized and the adverse privacy concerns that might be minimized by SaaS providers to encourage individuals to use their services. In a future study, we plan to collect around 300 observations from active SaaS users in South Korea through online survey method to test our structural model and hypotheses. Detailed results and implications of our study will be discussed in the final paper, following analysis of the sample data collected.
References


Song, W., & Sun, G. (2010). The role of mobile volunteered geographic information in urban management. 2010 18th International Conference on Geoinformatics, 1–5. doi:10.1109/GEOINFORMATICS.2010.5567728

Suh, B., & Han, I. (2002). Effect of trust on customer acceptance of Internet banking, 1, 247–263.


