

An Integrated Model to Investigate an Individual's Behavioural Towards using Cloud Computing

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Abstract: Cloud computing technology can bring benefits at both individual level and organisational level, for example, flexibility and cost saving. However, there is a lack of empirical studies that examine the usage of cloud computing technology from an individual's perspective. In fact, the adoption of cloud services in Middle Eastern countries like Saudi Arabia is still low compared with developed countries. Therefore, this study aims to investigate the end users' behavioural towards using cloud computing services in Saudi Arabia. In this paper, we propose an integrated model in an attempt to understand individuals' attitudes and to identify the key factors that might impact on their behaviour to use cloud technology services. The proposed model integrates the critical factors from technology adoption theories Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT), along with other factors to examine the effect of these variables on end users' behaviour.

1 INTRODUCTION

Cloud computing is the emerging technology for providing IT services to consumers over a network as a utility service (Buyya et al., 2009). In the past different paradigms have been proposed such as grid computing and virtualisation to deliver services as a utility. However, none of these previous paradigms succeeded in providing a public service to end users as cloud computing does. All the essential characteristics of cloud computing are covered by this definition by Mell and Grance (2009): “[It is] a model for enabling convenient, on-demand network access to a shared pool of computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.” There are three different types of service provided by cloud computing: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS) (Armbrust et al., 2010).

Cloud computing can bring a variety of benefits for individuals as well as for enterprises. Individuals can access the cloud services from various places and anytime. The cloud allows end-users to pay only

for the services they use instead of setting up an IT infrastructure in-house (Marston et al., 2011; Buyya et al., 2012). This can increase flexibility, performance and reduce costs for both individuals and organisations.

Most of studies in the literature concentrate on identifying the cost and advantages of utilising cloud services. However, there are few studies that examine cloud adoption from the individual perspective (e.g. Park and Ryoo, 2013; Sharma et al., 2016). Therefore, this study aims to investigate the factors that impact on individuals' behavioural towards using cloud computing services in a developing country like Saudi Arabia. The usage of cloud services in Saudi Arabia is still in the early stages. In this paper, a conceptual model is proposed in an attempt to examine end user's behaviour regarding the use of cloud computing technology.

The rest of the paper is structured as follows. Section 2 presents the proposed model to investigate individual's behavioural intention to use cloud computing. The research methods that will be used to test the model are explained in Section 3. Finally, Section 4 provides the conclusion and future work.

2 THE PROPOSED MODEL

As discussed in Section 1, there is a lack of empirical studies that investigate cloud adoption at individual level. In this paper, an integrated model is proposed which incorporates critical factors derived from technology adoption theory along with other factors to examine the impact of these variables on the end users behavioural towards using cloud services. The Technology Acceptance Model (TAM) was developed by Davis (1989) and Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh et al., (2003). The TAM model and UTAUT are two of the commonly accepted theories designed for explaining and predicting the acceptance of new technologies at individual level. These models measure users' behaviour in relation the use of new information technology and how far they accept or reject the technology. The TAM theory analyses the impact of two variables (perceived usefulness and perceived ease of use) on the user's intention to use a new technology.

In this study, the conceptual model has been developed by integrating critical factors from TAM and UTAUT theory, along with other factors (such as trust in cloud technology and trust in cloud provider) to examine cloud usage from the end users' perspective in Saudi Arabia. Figure 1 presents the theoretical model for individuals' acceptance of cloud computing.

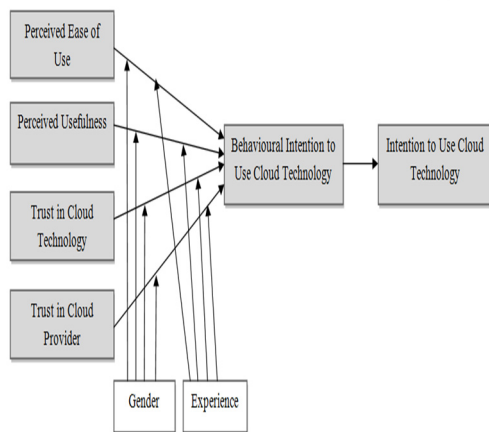


Figure 1: A conceptual model for individuals' acceptance of cloud computing.

2.1 Perceived Ease of Use

Perceived ease of use is an element of the TAM model (Davis, 1989). It is defined as the extent to which the end users believe that using cloud computing services would be free of effort. This factor plays a significant role in acceptance of a new technology at individual level (Ghorab, 1997). It is more likely that the cloud computing will be used by end users when they find the technology is easy to use. Several studies that utilised UTAUT model have found that the relationship between perceived ease of use and behavioural intention to use are moderated by gender and experience. The authors believe that the impact of this factor on end users' intention to use cloud technology will be moderated by gender and experience. Thus, the hypotheses are proposed as follows:

H1: Perceived ease of use will have a positive influence on individual's behavioural intention to use cloud computing technology.

H1a: Gender will moderate the relationship between perceived ease of use and behavioural intentions.

H1b: Experience will moderate the relationship between perceived ease of use and behavioural intentions.

2.2 Perceived Usefulness

Perceived usefulness refers to level of benefit that the individual perceives from utilising a new technology. This factor is also one of the elements of the TAM model and is similar to the element of relative advantage in the Diffusion of Innovations (DOI) theory proposed by Rogers (1995).

Several studies have found that this variable has a significant impact on users' acceptance of new technology (Anandarajan et al., 2002). For example, Sharma et al.(2015), found that perceived usefulness has a strong influence on use of internet related services. Cloud computing technology can be useful for individuals use in different ways, the users can access hardware and software resources from anywhere and at anytime. This flexibility can improve the users performance. Thus, in this study it is believed that individuals are more likely to adopt cloud services when they perceive significant value from using cloud services and that gender and experience will moderate the relationship between the perceived usefulness and an individual's attitude

towards use of cloud services. So, the following hypotheses are constructed:

H2: Perceived usefulness will have a positive influence on individual's behavioural intention to use cloud computing technology.

H2a: Gender will moderate the relationship between perceived usefulness and behavioural intentions.

H2b: Experience will moderate the relationship between perceived usefulness and behavioural intentions.

2.3 Trust in Cloud Technology and Cloud Provider

Trust depends on trusting the cloud services and the cloud providers to provide a good service without interruption and loss of data. The lack of control over data and the sharing of resources with other parties in the cloud could lead to trust issues. Alkhater et al. (2014; 2015) found that the level of trust has a significant impact on cloud adoption in organisations in Saudi Arabia. Therefore, the present research is premised on the belief that trust has a relationship with the individual's behavioural intention towards use of cloud technology and that the effect of this factor on an individual's intention to use cloud services will be moderated by gender and experience. The following hypotheses are proposed:

H3: Trust in cloud technology will have a positive influence on an individual's behavioural intention to use cloud computing technology.

H3a: Gender will moderate the relationship between trust in cloud technology and behavioural intentions.

H3b: Experience will moderate the relationship between trust in cloud technology and behavioural intentions.

H4: Trust in the cloud provider will have a positive influence on an individual's behavioural intention to use cloud computing technology.

H4a: Gender will moderate the relationship between trust in the cloud provider and behavioural intentions.

H4b: Experience will moderate the relationship between trust in the cloud provider and behavioural intentions.

2.4 Behavioural Intention to Use Cloud Technology

Behavioural intention refers to the overall reaction of persons to using cloud computing services. Several studies have stressed that behavioural intention has a significant positive impact towards the usage of technology (Venkatesh et al., 2003). In this study, the individuals' intention to use the cloud technology is determined by their behavioural intention towards using cloud services. It is proposed that the perceived ease of use, perceived usefulness and trust have a direct influence on behavioural intention to use cloud computing.

H5: Behavioural intention will have a positive influence on individual's intention to use cloud computing technology.

3 METHODOLOGY

Questionnaire are among the tools commonly used to collect quantitative data (Saunders et al., 2009). In this study, a questionnaire will be used in order to test the proposed hypotheses and explore the individuals' behavioural intentions towards using cloud computing. Before distribution of the survey, the participants will be introduced to cloud services such as Google Apps, and they will be asked to try these services. After these steps the data will be collected through the questionnaires from students (undergraduate and postgraduate) and staff. The survey will consist of two sections. The first part will include questions related to demographic information, such as gender and education level, while the second part will use close-ended questions to measure the end users' behavioural intentions towards using cloud computing.

4 CONCLUSIONS

Cloud computing is one of the current popular technologies which provides IT resources as utility services. Cloud computing technology can be beneficial for personal use not just for business use, as the users can obtain resources in a dynamic way and based on their needs. However, the use of this technology at individual level is still low. This

research seeks to fill the gap in literature by analysing end users' behavioural intention to use cloud services in Saudi Arabia, as well as to encourage individuals to adopt cloud technology. This paper has presented our initial model which incorporates the influential factors from the TAM and UTAUT models with other factors to investigate the influence of these variables on cloud computing acceptance from an individual's perspective. This is an ongoing research study, and in future a questionnaire-based survey will be carried out in order to test the proposed model and hypothesised relationships. The outcomes will be published shortly.

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