Proposing a Comprehensive IS Continuance Model and Its Factors

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Abstract. Continuous use of information systems (IS) has become crucial for an organization's survival as it provides efficiency and effectiveness of managing business transactions. Lacking continuance usage of IS poses an obstacle in the advancement of IS in an organization. Previous studies have examined continuance intention using the Expectation Confirmation Model (ECM) as it provides a basis of investigating IS continuance. However, the expansion in IS role in today's business requires a further integration with other factors such as social support, experience, technology fit and self-efficacy. Therefore, the aim of this study is to develop a comprehensive IS continuance model through the extension of ECM by integrating new factors from other related theories. Upon developing the model, we extensively review the literature in order to understand the theories used, then extracted the relevant factors to be used in the model. The outcome of this study would provide the richness of knowledge in IS continuance domain and provides an opportunity for businesses to develop an effective plan of IS continuance in the organizations.

Keywords: Information systems · Information systems continuance
Information systems theory

1 Introduction

Nowadays, IS plays a critical role in an organization's success, where globalization, digital economics, and digital organizations take place. IS can facilitate organization through several courses of process of information including gathering, processing and disseminating information in an organization. Therefore, the ineffectiveness of IS creates a risky situation to organizational success and survival (Bhattacherjee 2001). The positive impacts through the existence of IS in organization is shown through the organizational effectiveness and individuals job performance. This will motivate organizations to increase their investments in the IS field. IS in an organization should be considered as a vital resource, as those without an IS implementation are considered as a competitive disadvantage (Chen et al. 2015).

IS continuance has not yet received a comparable attention as IS acceptance (Chen et al. 2015). It can be said that, the IS continue research still lacking in-depth understanding of its drivers (Mouakket 2015). Thus, this will provide a significant

input to investigate the need for a comprehensiveness of IS continuance. Previous studies have mainly examined variables that motivate individuals to accept a new system, and how to use it (Limayem and Cheung 2011; Venkatesh et al. 2011). Most of these studies investigated IS continuance were mostly based on Expectation-Confirmation Model (ECM) (Chen et al. 2015; Mouakket 2015; Terzis et al. 2013). They employed mainly the three (3) factors to explain behavioral intention, namely confirmation, perceived usefulness, and satisfaction. However, behavioral intention towards adopting IS would also be affected by other factors, such as the ability of the individual to use the IS, organizational tasks, and its suitability. This is because with the evolution of a new business model focusing on consumers and an open-access system, other factors related to consumer characteristics such as self-efficacy, prior experience, and utilization may need to be included for the investigations of its impact on IS continuance. Therefore, this study explores the possibility of integrates other models including Task-Technology Fit (TTF), Social Cognitive Theory (SCT), Social Support Theory (SST), and Unified Theory of Acceptance and Use of Technology (UTAUT) with ECM to develop a comprehensive IS continuance model. Integrating these factors will provide an extended view of IS continuance research.

This paper is organized as follows. First is conducting a literature review on IS continuance. Second is a derivation of IS continuance factors and model development. The last section is about the conclusion and opportunity for further research.

2 Literature Review

Various definitions of Information Systems (IS) are provided by different researchers through their own understanding based on their study domains. Generally, IS is described as a complete system that is designed for storing, producing, processing and distributing information for organizations or institutions. IIS have become the important backbone that supports in most organizational activities such as planning and decision making. In this study, IS is defined as a group of correlated process including a combination of software, hardware, infrastructure and trained personnel to help organizational activities to improve efficiency and effectiveness in performing organizational functions and achieving its objectives (adapted from Murcko 2012).

Continuance is a type of post-adoption behavior which it can also relate to IS research domains. Limayem and Cheung (2011) suggested that IS continuance is a similar term of post-adoption phase. However, there is an argument with the term of post-adoption phase within IS research such as adoption, continuance, diffusion, and compliance. Bhattacherjee (2001) moved beyond post-adoption studies by exploring the long-term consequences of continued use from the first-time use of IS. It is found that, IS continuance research concentrated more on exploring the role of satisfaction and trust in user continuance behaviors compared to acceptance research. Also, IS continuance is concerned the relationship between actual usage of an IS system with the formation of trust, confidence, and satisfaction. IS continuance or post-adoption is the decision to continuously use a certain product or service which is a kind of "acceptance" behavior at a later stage (Bhattacherjee 2001). In the perspective of an

individual, IS continuance is a center of survival of several types of businesses such as banking, online retailers, and online travel agencies.

According to Table 1, several studies have been conducted on IS continuance focusing on different study domains. All these studies use quantitative research approach as their methodology. Based on the existing literature, there is a lack of a theoretical model of IS continuance as a comprehensive model. In addition, the search for factors that may explain the continuous use of IS remains an important effort for the success of firms.

Table 1. Previous studies of IS continuance.

No	Author	Title	Theory used
1.	Venkatesh et al. (2011)	Extending the two-stage information systems continuance model: incorporating UTAUT predictors and the role of context	UTAUT, ECT
2.	Tseng (2015)	Exploring the intention to continue using web-based self-service	TAM, IS Success Model
3.	Mouakket (2015)	Factors influencing continuance intention to use social network sites: The Facebook case	ECM
4.	Chen et al. (2015)	Why do teachers continue to use teaching blogs? the roles of perceived voluntariness and habit	ECM
5.	Lu and Yang (2014)	Toward an understanding of the behavioral intention to use a social networking site: An extension of task-technology fit to social-technology fit	SCT, TTF
6.	Terzis et al. (2013)	Continuance acceptance of computer-based assessment through the integration of user's expectations and perceptions	ECM
7.	Ramayah et al. (2012)	International Forum of Educational Technology & Society An Assessment of E-training Effectiveness in Multinational Companies in Malaysia	TAM, ECM, IS Success Model
8.	Lin (2012)	Perceived fit and satisfaction on web learning performance: IS continuance intention and task-technology fit perspectives	IS continuance theory, TTF
9.	Chang and Zhu (2012)	The role of perceived social capital and flow experience in building users' continuance intention to social networking sites in China	ECM
10.	Shin et al. (2011)	Smartphones as smart pedagogical tools: Implications for smartphones as u-learning devices	UTAUT, ECM
11.	Kang et al. (2009)	Exploring continued online service usage behavior: The roles of self-image congruity and regret	ECM

(*continued*)

Table 1. (*continued*)

No	Author	Title	Theory used
12.	Akter et al. (2013)	Continuance of mHealth services at the bottom of the pyramid: the roles of service quality and trust	ECM
13.	Chen et al. (2010)	Confirmation of Expectations and Satisfaction with the Internet Shopping: The Role of Internet Self-efficacy	SCT, ECT
14.	Liang et al. (2011)	What Drives Social Commerce: The Role of Social Support and Relationship Quality	SST
15.	Shanmugam et al. (2015)	A theoretical extension and empirical investigation for continuance use in social networking sites	SST
16.	Hajli (2015)	A study on the continuance participation in on-line communities with social commerce perspective	SST

3 The Purposed Model

3.1 Theoretical Foundation

Various theories were employed by researchers to investigate IS continuance in different contexts as shown in Table 1. This study uses five (5) theories namely; ECM, TTF, SST, UTAUT, and SCT as a theoretical foundation for extending the IS continuance model as they provide the core factors and cited by many previous studies. The explanations of four selected models are presented in the following paragraphs.

Expectation Confirmation Model (ECM). Expectation Confirmation theory—IS continuance predominantly described to predict and understand the continuance intention of users in the consumer behavior research which includes post-purchase behaviors and satisfaction (Chang and Zhu 2012; Limayem and Cheung 2011; Venkatesh et al. 2011). In another word, it aims as to understand the post-adoption behavior by utilizing satisfaction. Firstly, individuals initialize their expectation towards the product or service. Next, individuals accept and utilize the product or service, then individuals weight the product or service performance with the initial expectation which bring to confirmation. It is important to note that IS continuance is not simply an extension of adoption behavior. Bhattacherjee (2001) has empirically shown that the antecedents or initial of IS continuance usage are different considerably from those of initial adoption behavior. He further indicated that the relationship between satisfaction and the earlier use of products or services is an important element in the determination of individuals' intention to continuously use the products or services. In consumer behavior literature, ECM theory is widely applied to study users' satisfaction and post-purchase behavior. ECM remains as one of the important models in continuance intention studies which specifically usually commonly applied in IS, shopping and marketing contexts (Bhattacherjee 2001).

Task-Technology Fit (TTF) Model. The task-technology fit (TTF) model is a model extensively used as a theoretical model to examine the ways of information technology can lead to performances and examine the match between the task and technology characteristics (Wu and Chen 2017). For an IS to positively influence the use of technology, the technology should fit the task where it can support to have a performance impact. The fit of the technology to task is the degree which the technology features correspond to the task requirements (Lu and Yang 2014). The impact of TTF is not only covered to predict current utilization and performance intensity but TTF also helps in predicting future utilization and performance (Aljukhadar et al. 2014). TTF has been widely used and applied in several range of IS studies such as to examine the behavioral intention in using social networking sites (Lu and Yang 2014), online context (Aljukhadar et al. 2014), and continuance intention (Wu and Chen 2017).

Social Cognitive Theory (SCT). This theory mainly concentrated on the concept of self-efficacy, which is practically one of the most beneficial concept formulated in modern psychology. SCT postulates that, the combination of internal self-influence factors and external social system able to motivate and regulate individuals' behavior ((Bandura 2012). As theorized from self-influence factors, it is found that self-efficacy (SE) is the main component that refers to individuals' perception of their capabilities to organize, manage and execute series of action that required to achieve desired performance. Self-efficacy has a strong influence on individuals output in an organization. Once individuals exhibit higher self-efficacy in an organization, it perceived that the individuals are more likely to execute the job more effective and easily achieve the satisfaction level compared to those with lower self-efficacy.

Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT has included four main factors that are performance expectancy, effort expectancy, social influence, and facilitating conditions to directly and indirectly investigate and predict intention to use and use behavior. Besides, the use of 4 moderators including gender, age, experience, and voluntariness of use to study the impact on intention to use and use behavior (Venkatesh et al. 2003). The theory considerably inherited some quality from the theory of planned behavior (Ajzen 1991), especially the model's structure. The idea is that technologies can help users to complete and achieved their tasks more quickly (performance expectance), people who are important to them use the system and expect them too (social influence), systems are easy to use and learn as such it should be unambiguous and simple, (effort expectancy), and there are knowledge, resources, and system supports that can be found to assist users (facilitating conditions).

Social Support Theory (SST). Social support is a huge concept with multidimensional aspects including emotional, instrumental, appraisal, and informational. Precisely, emotional support has some connection with listening and expressing sympathy or trust (Shumaker and Brownell 1984). Colloca and Colloca (2016) identified social support as an important mechanism in maintaining the quality of life. This theory has been used in IS research domain such as investigating role of social support in social commerce (Liang et al. 2011) and continuance use of networking sites (Shanmugam et al. 2015).

3.2 Factor Derivation

After an extensive review, the researchers identify the relevant factors that always used in IS continuance study. All these factors appear to be scatted and not in one comprehensive model as shown in Table 2. Therefore, this study compiled the selected factors in one model and will be empirically validated in the next stage of research. The definition for each of the factor as modified in this study is presented in Table 3.

Table 2. Factors of IS continuance

Theory/model	Factors	Selected factors
Unified Theory of Acceptance and Use of Technology (UTAUT)	Performance expectancy, Effort expectancy, Social influence, Facilitating condition, Behavioral intention, Use behavior, Gender, Age, Experience	Prior Experience Self–efficacy Utilization Perceived task technology fit Confirmation Perceived usefulness Perceived support Is continue intention User satisfaction
Expectation confirmation theory (ECT)	Expectation, Perceived performance, Disconfirmation of beliefs, Satisfaction	
Technology Acceptance Model (TAM)	Perceived usefulness, Perceived ease of use, Behavioral intention to use, Actual system use	
IS Success Model (ISM)	Information quality, System quality, Service quality, Intention to use, User satisfaction, Net benefit	
Information Systems Continuance Theory (ISCT)	Perceived usefulness, Perceived ease of use, Confirmation, Satisfaction, Attitude, IS continue intention	
Social cognitive theory (SCT)	Observing, Outcome expectancies, Self–efficacy, Identification	
Task Technology fit (TTF)	Task characteristics, Technology characteristics, Task Technology fit, Performance impact, Utilization	
Expectation confirmation model (ECM)	Perceived usefulness, Confirmation, Satisfaction, IS continue intention	
Social Support Theory (SST)	Perceive Support, Receive Support, Social Network	

It is clear that the previous literature employed the ECM (Bhattacherjee 2001) which is an integration and modification of Technology Acceptance Model (TAM) and Expectation-Confirmation Theory (ECT). The ECM hypothesizes that an individuals' degree of satisfaction and perceived usefulness of an innovation determine its continuous use. Thus, an individuals' degree of satisfaction with an innovation is determined by the level of the individuals' confirmed expectations and perceived usefulness. The ECM will be extended with other factors such as prior experience, task-technology fit on individuals continuous use of an IS. Individuals mainly utilize technologies to aid

in their task performance. Individual features such as computer experience, motivation could influence how effectively an individual use a technology (Goodhue and Thompson 1995). These factors have been shown to impact individual behavior in several studies. Thus, this study is motivated to consider the integration of these factors with ECM in order to improve understanding of the continuance use of IS in an organization. The explanations of the selected factors are as follows:

Prior Experience (PE)
Experience contributes to better a user's confidence in employing a system. People with such a long experience using a system will lead to greater ability to deal with it (Venkatesh et al. 2003). Individual gains experience by learning and acquiring knowledge as such the increase in understanding with a product or service will lead to the sustainable use. Therefore, this study perceives the usefulness of prior experience that drives individual to adhere to the long-term use.

Utilization (UT)
From the literature, the increase in utilization can result in positive performance impacts (Goodhue and Thompson 1995). Utilization is a complex result based on other factors apart from technology fit such as social norms, habit, and situational factors. As seen the functionality of job search website (JSW) utilization, it had a statistical influence on unemployment duration (Huang and Chuang 2016). The integration of utilization can be beneficial to increase the understanding of CI on this part.

Perceived Support (PS)
It is necessary to receive the adequate level of social support for people in a society (Shumaker and Brownell 1984). Besides, there exists that the need to investigate social support that forces users' intention to continue using an online-service thus this will ensure the successful implementation (Hajli 2015). As a result, this study found it legitimate to include perceived support to improve the prediction and understanding of CI from the social dimension.

Perceived Task Technology Fit (PTTF)
If a task that would be performed is not compatible with the technology, it is said to be a poor fit. Goodhue and Thompson 1995 There are many digital-services that users encountered, and they fit the tasks that users want to perform so they will continue to use these services. Lin and Wang (2012) employed TTF to investigate confirmation and usefulness in continuing use of e-learning. Further, they reported TTF had positive impacts on both confirmation and usefulness. Therefore, TTF should be used to investigate CI.

Self-Efficacy (SE)
Self-efficacy involves an individual's convictions in his or her capacities to execute significant courses of action to fulfill situational demands (Bandura 1986). Self-efficacy has been included in many studies of CI. Hsu and Chiu (2004) used web specific self-efficacy which was analyzed having statistical impacts on both intention and E-service usage. Bhattacherjee (2001) integrated IT self-efficacy to investigate CI and found IT self-efficacy could make a positive correlation to CI. As such, self-efficacy will be one of the factors that helps research to enhance the comprehension of CI.

Confirmation (Con)
Confirmation refers to a cognitive mechanism that is the result of the operation between expectation and perceived performance (Kim 2014; Hsu et al. 2006). Confirmation has been discovered to influence satisfaction levels (Kim 2014) and, in turn, influences IS continuance Intention. Moreover, confirmation was found to have a significant impact on PU in the post-use stage (Bhattacherjee 2001). Confirmation remains some extent of important in predicting and understanding CI as such the inclusion of confirmation is imperative.

IS Continuance Intention (ISCI)
The benefits of successfully understanding continuance behavior will improve the success of an IS implementation. Goods and services cannot only rely on pre-consumption (adoption); to be specific, stakeholders must find the best possible channels maintain continuance usage (Chiu et al. 2007). Abandoning the goods and services is usually the result of dissatisfaction which prompts scholars to thoroughly understand the characteristics of ISCI to avoid failure. Thus, it is mandatory to include ISCI in this study as the dependent variable (DV).

Perceived Usefulness (PU)
Usefulness, a cognitive factor, signifies the extent of being possible to use as a person senses that using goods or services can increase the performance of tasks (Davis et al. 1989; Davis 1993). In IS continuance, usefulness is the result of cognitive beliefs and has greatly and steadily influenced attitude in first-time use as well as the post-adoption processes (Kim 2014). Al-Maghrabi et al. (2011) concluded that usefulness has a quantity of influence on ISCI. These are the reasons that perceived usefulness should be included in the proposed model.

User Satisfaction (SAT)
Measuring satisfaction is considered as one of the most important measures of IS success and satisfaction has strong connection with the feelings about like or please with a system. Satisfaction also associates with distinct cognitive and emotional states, and that these different states influence future (Stauss and Neuhaus 1997). The goal of the ECM is to understand the post-adoption behavior by using satisfaction. ECM exists in the process that satisfaction is the key determinant of the model. In general, prior models paid huge attention on satisfaction, thus, this makes satisfaction a huge space in this study (Fig. 1).

**Table 3.** Factors and their definitions

Factors	Definition	Source
Prior Experience	It is defined as an individual's psychological views based on previous experience with an IS	Venkatesh et al. (2003)-UTAUT
Self-efficacy	It refers to person's beliefs in their abilities to manage series of action that required to achieve the desire type of performance	Bandura (2001)-SCT

(*continued*)

Table 3. (*continued*)

Factors	Definition	Source
Utilization	It is defined as the behavior of employing an e-waqf system in completing a task	Goodhue and Thompson (1995)-TTF
Perceived Task-Technology Fit	It is defined as the degree of e-waqf fits or assists users in completing their work	Goodhue and Thompson (1995)-TTF
Confirmation	It is defined as the degree to which users' expectation of the performance of the e-waqf system is acknowledged in the course of actual use	Bhattacherjee (2001)-ECM
Perceived Usefulness	It refers to users' perception that using a particular system able to enhance the job performance	Bhattacherjee (2001)-ECM
Perceived Support	It is defined as how much help is accessible when users face challenges with an e-waqf system	Shumaker and Brownell (1984)-SST
User Satisfaction	It is defined as a positive emotional state results from the utilization of an e-waqf system	Bhattacherjee (2001)-ECM
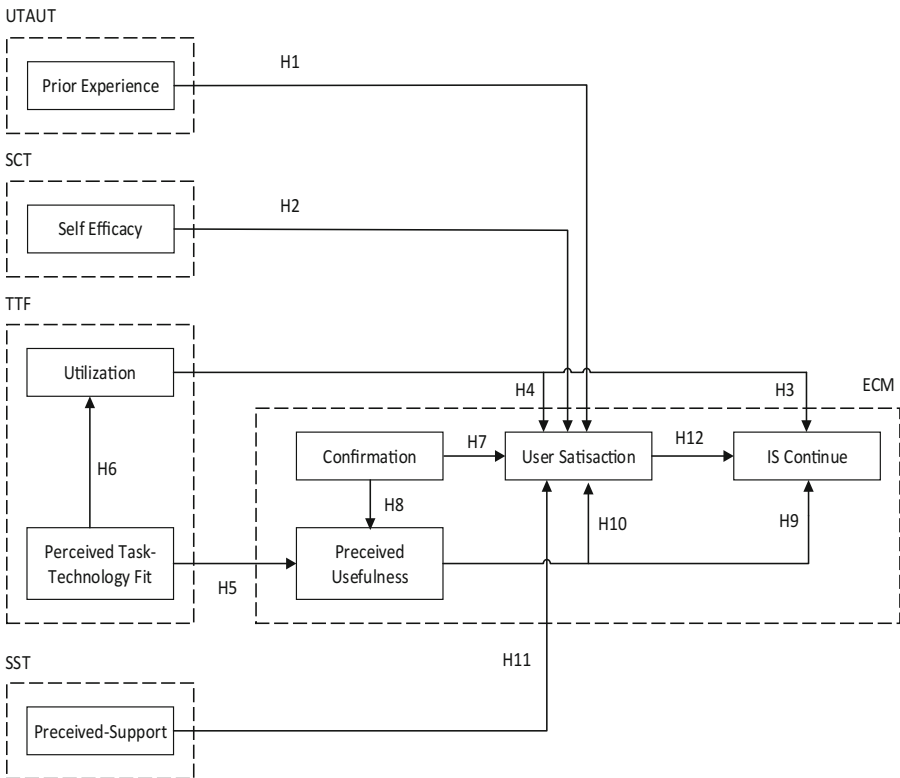
Fig. 1. The proposed IS continuance model

4   Conclusion and Future Work

Most of the studies considered in this research were conducted using different approaches and also obtained varying results. The ultimate goal of the present study is to develop comprehensive IS continuance model. With useful information derived from the literature review, the study used several well-known IS theories related to IS continuance and factors. This will increase the knowledge in IS continuance field. The proposed model will used as a guideline for the future research direction which hypotheses, the survey instrument, and reliability and validity test in the e-waqf context.

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