

Development of Instrument for Assessing Information Systems Continuance Use

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ABSTRACT

Information systems (IS) or computer based systems plays a critical role in an organization's success. IS can facilitate organization through several courses of information management including gathering, processing and disseminating information. However, lack of research in continuance use of IS poses an obstacle in IS usage in an organization. Previous studies have examined continuance intention using the Expectation Confirmation Model (ECM) as it provides a basis of investigating IS continuance. ECM employed mainly the three factors or constructs to explain behavioural intention, namely confirmation, perceived usefulness, and satisfaction. However, the expansion in today's business requires a further integration with other constructs such as experience, self-efficacy, task technology fit, utilization and perceived support. Thus, this paper proposes a new comprehensive IS continuance model through the extension of ECM by integrating new constructs from other related theories which include Task-Technology Fit (TTF), Social Cognitive Theory (SCT), Social Support Theory (SST), and Unified Theory of Acceptance and Use of Technology (UTAUT). The items are grouped into nine constructs modified to suit the context of the study. The proposed model and measurement items will provide useful knowledge for exploring ISC research.

CCS Concepts

Information systems~Data warehouses • Theory of computation~Logic

Keywords

Information systems, Information systems continuance, Information systems theory

1. INTRODUCTION

Nowadays, information systems (IS) play a critical role in an organization's success, where digital economics and digital

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organizations take place. The positive impacts of IS in organization is shown through the organizational effectiveness and performance [2]. This will motivate organizations to increase their investments in the IS field because it is considered a vital resource in leading the business competition [5, 6, 15]. Therefore, huge investment in IS require the organization to know the its impact in terms of acceptance and continuance.

Many IS projects experience the high rate of failure. The project failure come from many sources including changes in requirement or a long project delay which results in outdated when comes to the finishing production line. IT projects will be cancelled at 31 % and an IT projects ended up with higher than the estimated cost with the average of 189% [7]. Besides, IS projects also encounter a variety of issues that cause project failure in adoption. This means after a project has completed, there is no guarantee of success. Apart from those, IS projects also have to break through many barriers in continuance use or users only use in a short time. Therefore, research in IS continuance is important to ensure the IS project success.

IS continuance (ISC) research has not yet received a comparable attention as IS acceptance or adoption [2, 5, 6]. It can be said that, the IS continuance research is still lacking in-depth understanding of its drivers [15, 19]. Enhancing or finding comprehensive factors or constructs will provide an extended view of ISC research and can be a useful source for those who want to explore this area. IS continuance is important both for the successful implementation of a system in an organization as well as for teeming consumers. While, an initial acceptance of IS poses the first important step towards IS success and the ultimate viability of IS depends on its continuance use. This paper is organized as follows. The theoretical foundation on ISC is presented in section 2. The analysis of the constructs is explained in section 3. The validation process is explained in Section 4. Finally, section 5 presents the discussion and conclusion of the paper.

2. Theoretical Background

IS continuance refers to a sort of post-adoption behavior and with the argument that continuance is similar to the term "post-adoption phase" Limayem et al., (2007). However, IS research interprets the term "post-adoption" as the incorporation a number of behaviors that take place after acceptance which including adoption, diffusion, continuance and compliance, while in the interactions with many other users. IS continuance can be perceived by analyzing user intentions and their decisions to keep on using IS in the long-run without separating this into smaller phases [2]. IS continuance research become to perceive that the

relationship between actual usage of a system and the creation of satisfaction, confidence and trust is the elopement of ongoing continuance research.

The involvement of IS has not been simple due to the complexity of implementation as it encompasses of several components including users, technologies, and contextual environments. Previous studies [5, 9, 12, 15] have examined continuance intention of IS mainly based on the Expectation Confirmation Model (ECM) as proposed by Bhattacharjee [2]. ECM employed three constructs to explain behavioral intention, namely confirmation, perceived usefulness, and satisfaction. However, behavioral intention towards adopting IS would also be affected by other constructs, such as the individual ability, experience, technology utilization and its suitability. This is due to the evolution of a new technology that connect people and new business model that focusing on consumers and an open-access system. Therefore, this study explores the possibility of integrates a few constructs from 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 constructs will provide an extended view of IS continuance research.

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 [5, 12, 19]. Individuals initialize their expectation towards the product or service before accept and utilize the product or service, then individuals weight the product or service performance with the initial expectation which bring to confirmation.

Task-Technology Fit (TTF) model. The task-technology fit (TTF) model is a used to examine the ways of information technology can lead to performances and examine the match between the task and technology characteristics [9]. The fit of the technology to task is the degree which the technology features correspond to the task requirements [8]. 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.

Social Cognitive Theory (SCT). This theory mainly concentrated on the concept of self-efficacy (SE), which is formulated for the combination of internal self-influence constructs and external social system able to motivate and regulate individuals' behavior [1]. 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. SCT possesses useful explanation on cognitive processes which have not been addressed in ECM. Whereas, the absence of cognitive behaviors in ECM can be bridged by combining SCT with ECM.

Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT has included four main constructs that are performance expectancy, effort expectancy, social influence, and facilitating conditions to directly and indirectly investigate and predict intention to use and use behavior [19]. 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). UTAUT posits that prior experience has an influence on behavioral intention and use behavior. Therefore, integrating "experience" from UTAUT into a conceptual model to analyze the CI of information systems is essential in confirming its contribution.

Social Support Theory (SST). Social support is a concept with multidimensional aspects including emotional, instrumental, appraisal, and informational. Emotional support has some connection with listening and expressing sympathy or trust [17]. This theory has been used in IS research domain such as investigating role of social support in internet-based learning [9] and continuance use of networking sites [15]. Social support discusses about the assistance in using a technology. Without this, users may easy to give up and abandon using the technology as it poses some degree of difficulty on them. Users would be more appreciated social support once they confront with barriers as such this brings a positive outcome of continue using a technology.

3. Research Methodology

This study uses positivist paradigm to examine the relationships among independent and dependent variables. The main goal of this research study is to develop an IS continuance model and therefore it is required to test a set of hypotheses regarding the model by collecting quantitative data using a survey and statistical analysis [10]. A set of questionnaire is designed based on the developed research model and distributed among targeted respondents. Therefore, in this study, the research problem is formulated from a reading of the literature, followed by the research questions and research objectives. On this basis, the scope of the research is determined. The literature also provided insights into relevant theories and models, as well as important variables for preparing an adoption model for the study. After identifying the constructs that are relevant to IS continuance, hypotheses are then generated. Table 1 shows the details of operational framework.

Table 1: Research design for model development

| Activities | Objectives | Deliverables |
|----------------------------|--|--|
| Initiation of the research | - To understand the background of the problem and identify research problems, objectives, and scope | - Research problem, questions, objectives, and scope |
| Literature Review | -To review the previous related literature, analyze journals, articles -To identify the concepts and review IS continuance theories | - Identify constructs to IS continuance -Selected theoretical model and variables |
| Develop theoretical model | -To propose a model for IS continuance in an organization -To produce measurement items | - Research model, associated hypothesis, and measurements items for questionnaire. |

4. The Derivation of Constructs and Proposed Model

The discussion from literature suggest that continue intention toward IS should not only based on confirmation, perceived usefulness and user satisfaction as suggested in ECM theory [2]. Constructs related to technology, support and individual background should not be neglected in understanding the field of IS continue intention. Therefore, in order to identify what are the other constructs worth to be considered for IS continue intention,

10 previous studies on IS continuance focusing on different study domains have been analyzed. Table 2 provides list of the previous related studies on IS continuance.

Table 2: Previous studies of IS Continuance

| No | Author | Title | Theory used |
|-----|--------|---|-------------|
| 1. | [19] | Extending the two-stage information systems continuance model: incorporating UTAUT predictors and the role of context | UTAUT, ECM |
| 2. | [16] | Factors or constructs influencing continuance intention to use social network sites: The Facebook case | ECM |
| 3. | [14] | 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 |
| 4. | [18] | Continuance acceptance of computer-based assessment through the integration of user's expectations and perceptions | ECM |
| 5. | [13] | Perceived fit and satisfaction on web learning performance: IS continuance intention and task-technology fit perspectives | ECM, TTF |
| 6. | [6] | User experience, satisfaction, and continual usage intention of IT | ECM |
| 7. | [12] | Predicting the continued use of Internet-based learning technologies: the role of habit | UTAUT, ECM |
| 8. | [4] | Confirmation of Expectations and Satisfaction with the Internet Shopping: The Role of Internet Self-efficacy | SCT, ECM |
| 9. | [15] | A theoretical extension and empirical investigation for continuance use in social networking sites | SST |
| 10. | [11] | A study on the continuance participation in on-line communities with social commerce perspective | SST |

Based on Table 2, the researchers identify the relevant constructs that often used in IS continuance study. All these constructs appear to be scattered and not in one comprehensive model as shown in Table 3. Therefore, this study compiled the selected constructs in one model and will be empirically validated in the next stage of research.

- Perceived ease of use (PEU)
- Perceive Support (PS)
- Perceived usefulness (PU)
- Performance expectancy (PEX)
- Performance impact (PI)
- Receive Support (RS)
- User Satisfaction (US)
- Self-efficacy (SE)
- Social influence (SI)
- Social Network (SN)
- Task characteristics (TC)
- Task Technology fit (TTF)
- Utilization (UT)
- Actual system use (ASU)
- Attitude (At)
- Behavioral intention (BI)
- Confirmation (Co)
- Disconfirmation of beliefs (DB)
- Effort expectancy (EE)
- Expectation (Ex)
- Facilitating condition (FC)
- Gender, Age, Experience (GAE)
- Identification (Id)
- Intention to use (IU)
- Continue intention (CI)
- Observing (Ob)
- Outcome expectancies (OE)

From Table 3, it seems that ECM has no inclusion of technology fit, experience, belief, usage, and support which may also contribute to the ISC. Therefore, this study proposes the aforementioned constructs to enhance the understanding the ISC in complementing ECM for ISC. The use of TTF can gain the understanding the task that will be performed and matched with the technology that will be used. The absence of cognitive behaviors in ECM can be bridged by combining SCT with ECM. In addition, SCT has the potential of producing a positive outcome among users when it is used to understand the ability to overcome any barriers confronting during a product or service usage in the long-term. As though, the decision to continue using a product or services is from the reflection of experience. Therefore, integrating “experience” from UTAUT into a conceptual model to analyze the CI of IS is essential in

confirming its contribution. Table 4 summarize the proposed constructs to be further investigated their impacts to ISC.

Table 3: Extracted constructs of Theories used in IS continuance

| | UTAUT | TAM | SCT | TTF | ECM | SST |
|-------------------------|-------|-----|-----|-----|-----|-----|
| Perceived ease of use | | ✓ | | | | |
| Perceive Support | | | | | | ✓ |
| Perceived usefulness | | ✓ | | | ✓ | |
| Performance expectancy | ✓ | | | | | |
| Performance impact | | | | ✓ | | |
| Receive Support | | | | | | ✓ |
| Satisfaction | | | | | ✓ | |
| Self-efficacy | | | ✓ | | | |
| Service quality | | | | | | |
| Social influence | ✓ | | | | | |
| Social Network | | | | | | ✓ |
| System quality | | | | | | |
| Task characteristics | | | | ✓ | | |
| Task Technology fit | | | | ✓ | | |
| Utilization | | | | ✓ | | |
| Actual system use | | ✓ | | | | |
| Attitude | | | | | | |
| Behavioral intention | ✓ | ✓ | | | | |
| Confirmation | | | | | ✓ | |
| Effort expectancy | ✓ | | | | | |
| Facilitating condition | ✓ | | | | | |
| Gender, Age, Experience | ✓ | | | | | |
| Identification | | | ✓ | | | |

| | UTAUT | TAM | SCT | TTF | ECM | SST |
|-----------------------|-------|-----|-----|-----|-----|-----|
| Information quality | | | | | | |
| Intention to use | | ✓ | | | | |
| IS continue intention | | | | | ✓ | |
| Net benefit | | | | | | |
| Observing | | | ✓ | | | |
| Outcome expectancies | | | ✓ | | | |

Table 4: Enhancement Opportunity in ECM for ISC

| Enhancement Opportunity | Selected Constructs |
|-------------------------|---------------------|
| Technology relevant | Task Technology Fit |
| Behaviour ability | Experience |
| Social support | Perceived Support |
| Technology usage | Utilization |
| Cognitive belief | Self-efficacy |

Table 5: Constructs and their definitions

| Constructs | Definition | Source |
|--------------------------------------|--|--------|
| Prior Experience (PE) | It is defined as an individual's psychological views based on previous experience with an IS. | [12] |
| Self-efficacy (SE) | It refers to person's beliefs in their abilities to manage series of action that required to achieve the desire type of performance. | [1] |
| Utilization (UT) | It is defined as the behavior of employing an e-waaf system in completing a task. | [6] |
| Perceived Task-Technology Fit (PTTF) | It is defined as the degree of e-waaf fits or assists users in completing their work. | [6] |
| Confirmation (Con) | It is defined as the degree to which users' expectation of the performance of the e-waaf system is acknowledged in the course of actual use. | [2] |
| Perceived Usefulness (PU) | It refers to users' perception that using a particular system able to enhance the job performance. | [2] |
| Perceived Support (PS) | It is defined as how much help is accessible when users face challenges with an e-waaf system. | [11] |
| User Satisfaction (US) | It is defined as a positive emotional state results from the utilization of an e-waaf system. | [2] |
| IS Continue (ISC) | During the post-consumption stage to using IS, an individual psychologically ends up with intention to continue/discontinue | [2] |

It is clear that the previous literature employed the ECM which is an integration and modification of Technology Acceptance Model (TAM) and Expectation-Confirmation Theory (ECT). The ECM will be extended with other constructs which include prior experience, self-efficacy, utilization, task-technology fit, and perceived support on individuals continuous use of an IS. This study is motivated to consider the integration of these constructs with ECM in order to improve understanding of the continuance use of IS in an organization. The definition of the selected constructs are provided in Table 5.

Figure 1 shows the proposed model, which consists of 5 new constructs integrated with ECM model. These five constructs namely prior experience, self-efficacy, utilization, task technology fit, and perceived support are believed to have positive impact on the individual to continues use of IS.

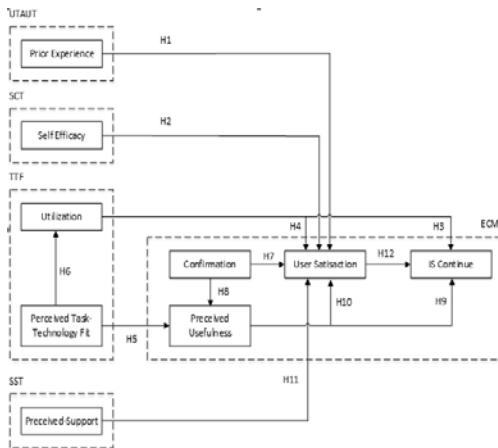


Figure 1: The proposed IS Continuance Model

The proposed model consists of 12 hypotheses, which will be expatiated in the following sections. Table 6 summarizes the list of hypotheses posited for testing the research model in the present study.

Table 6: Summary of the proposed hypotheses

| Hypothesis | Description |
|------------|--|
| H1 | Prior experience is positively associated to user satisfaction in e-waqf system |
| H2 | Self-efficacy is positively related to user satisfaction in e-waqf system |
| H3 | Utilization level is positively associated with e-waqf system continuance |
| H4 | Utilization level is positively associated with user satisfaction in e-waqf system |
| H5 | Perceived task-technology fit is positively associated with perceived usefulness in e-waqf system |
| H6 | Perceived task-technology fit is positively associated with e-waqf system utilization level |
| H7 | Confirmation of the expectations of users using an e-waqf system positively affects their satisfaction |
| H8 | Confirmation is positively related to perceived usefulness of e-waqf system |
| H9 | Perceived usefulness has positive impact on e-waqf continuance |
| H10 | Perceived usefulness has a positive effect on user satisfaction in e-waqf system |
| H11 | Perceived support positively affects users' satisfaction with the e-waqf system |
| H12 | User satisfaction has positive impact on e-waqf system continuance use |

5. Constructs and Measurement Items

Given the development of the model, a set of measurement items are proposed for further step of the research. The items used are grouped into for constructs prior experience (PE), self-efficacy (SE), perceived task technology fit (PTTF), utilization , confirmation, satisfaction and continuance are adapted. All items used in this study is shwon in Table 7.

Table 7: Constructs and their measuring items

| Items | Revised Measuring Items | References |
|-------|---|------------|
| PE1 | My prior experience with IT usage help in the effective use of e-waqf system | [12] |
| PE2 | My prior experience with IT usage makes e-waqf system use easy | |
| PE3 | My prior experience with IT usage makes me feel confident in using e-waqf system | |
| SE1 | The level of my capability in using e-waqf system to successfully finish the job is very high | [1] |
| SE2 | The level of my understanding about what to do in using e-waqf system is very high | |

| Items | Revised Measuring Items | References |
|-------|--|------------|
| SE3 | The level of my confidence in using e-waqf system is very high | [6] |
| SE4 | The level of my comfort in using e-waqf system is very high | |
| SE5 | In general, the level of my skill in using e-waqf system for accomplishing the assigned task(s) is very high | |
| UT1 | I fully use all the feature of e-waqf system. | |
| UT2 | I update waqf donations regularly. | |
| UT3 | I make waqf information available on the e-waqf system. | [6] |
| UT4 | I use the e-waqf system to update donor's information. | |
| PTTF1 | The functionalities of e-waqf system are very adequate | |
| PTTF2 | The functionalities of e-waqf system are very appropriate | |
| PTTF3 | The functionalities of e-waqf system are very useful | |
| PTTF4 | The functionalities of e-waqf system are very compatible with the task | |
| PTTF5 | The functionalities of e-waqf system made the task very easy | [2] |
| PTTF6 | In general, the functionalities of e-waqf system best fit the task | |
| CON1 | My experience with using e-waqf system is better than what I expected | |
| CON2 | The service level provided by e-waqf system is better than what I expected | [2] |
| CON3 | Overall, most of my expectations from using e-waqf system are confirmed | |
| PU1 | My job would be difficult to perform without e-waqf system | [2] |
| PU2 | Using e-waqf system gives me greater control over my work | |
| PU3 | Using e-waqf system improves my job performance | |
| PU4 | The e-waqf system addresses my job-related needs. | |
| PU5 | Using e-waqf system saves my time | |
| PU6 | e-waqf system enables me to accomplish tasks more quickly | |
| PU7 | e-waqf system supports critical aspects of my job. | |
| PU8 | Using e-waqf system allows me to accomplish more work than would otherwise be possible. | |
| PS1 | When faced with difficulties, I always contact the e-waqf system support team | [2] |
| PS2 | When I need help, some of the e-waqf system support team will offer suggestion | |
| PS3 | When faced with difficulty, I always get solutions from the e-waqf system manual | |
| ST1 | Based on my experience with the e-waqf system, I am very contented with using the system | [2] |
| ST2 | Based on my experience with e-waqf system, I am very satisfied with using the system | |
| ST3 | Based on my experience with e-waqf system, I am delighted with the system | |
| ISC1 | I intend to continue using the e-waqf system in the future. | [2] |
| ISC2 | I will continue using e-waqf system in the future. | |
| ISC3 | I will regularly use the e-waqf system in the future. | |

6. Conclusion and Future Work

The results have exhibited that even there are a number of studied in continuance use of IS, there appears to be only a few research studies that attempted to comprehend continuance use of IS in an organization. Therefore, the present study perceived the gap as to build a research model comprises of ECM, TTF, SCT, UTAUT, and SST theory to understand users for the continuance use of IS.. The comprehensive model consists of all ECM constructs

together with new additional constructs namely prior experience, self-efficacy, task technology fit, utilization, and perceived support. This study has formed the hypotheses according to the model structure and every construct has the minimum of 3 items. Consequently, the instrument has 38 items in total. The instrument will be used to assess IS continuance use among users of e-Waqf system from 10 districts in Johor, Malaysia. In overall, this study would provide the richness of knowledge in IS continuance domain and provides an opportunity for businesses to develop an effective study of ISC in the organizations.

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