Influence of Trust, Security, and Privacy on IS Continuance Intention: A Theoretical Model

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ABSTRACT
The proliferation of e-services has initiated several concerns for consumers regarding trust, security, and privacy that make consumers hesitant to use e-services. Although the influence of trust, security, and privacy on the continuance of e-services use is highlighted in literature, there is scarcity in research that investigates the influence of the accumulation of these three dimensions on the continuance use of IS. The purpose of this research-in-progress paper is to propose a model that can examine the role of trust, privacy, and security in the post adoption context by augmenting these three variables to the post-acceptance model of IS continuance [3].

Keywords:
Information systems continuance intention, trust, security, privacy

INTRODUCTION
The growth of the internet improves the ability of the providers of e-services to retain their customers by hoping that consumers continue using the provided electronic services. Acquiring new customers may cost five times more than keeping current customers [3]. In insurance industry, for instance, 5% raise in customer retention can be equivalent to 18% savings in operating costs [9]. Encouraging customers to continue using e-services has many benefits. Conducting electronic financial transactions online, for example, has reduced the providers’ costs and raised their revenues by offering self-services to consumers [27]. IS research suggests that IS continuance intention is essential to organizational success [21]. In addition, research suggests that IS continuance intention, which is a form of post acceptance behaviors, is an outcome of customer retention [37].

On the other hand, the proliferation of e-services has initiated several concerns for consumers regarding trust, security, and privacy that make consumers hesitant to use e-services. For instance, many consumers face difficulties in trusting the providers’ abilities in delivering the promised commitment [36]. Un-confidence in electronic applications of e-services can occur because of insufficient security and privacy protection [14]. Consumers also worry about threatening their financial information by hackers or another third party [38]. Furthermore, several researchers argue that privacy is not protected in many firms [4,11] even though customers provide sensitive information while accomplishing e-services online.

Trust and IS continuance have been discussed in IS literature [29,30,31,15,20]. IS literature shows that the association between privacy and IS continuance have been proposed [10], and security and IS continuance have also been studied [45,6]. Although the influence of trust, security, and privacy on the continuance of e-services use is highlighted in literature, there is scarcity in research that empirically investigates the influence of the accumulation of these three dimensions on continuance use of IS. We argue that it is important to study the IS continuance intention in a holistic way by considering the influence of trust, security, and privacy. Therefore, the purpose of this research-in-progress paper is to propose a model that can examine the role of trust, privacy, and security in the post adoption context by augmenting these three variables to the post-acceptance model of IS continuance [3].
Since continuance intention to use information systems can be influenced not only by users’ satisfaction, perceived usefulness, and confirmation, but also affected by users’ perception regarding trust, security, and privacy, the key theoretical contribution of this paper is developing an integrative model of IS continuance intention by augmenting trust, security, and privacy to the post-acceptance model of IS continuance [3]. To the best of our knowledge, developing such model is a novel idea that is not discussed before.

The rest of the paper is organized in three sections. In section 2, we review the related literature, and present the suggested model. In section 3, we briefly describe the methodology that we plan to use in our future research to validate the proposed model. Finally, we conclude in section 4.

THEORETICAL BACKGROUND AND PROPOSED MODEL

In this section we present the original post acceptance model, and we review the related literature of trust, security, and privacy.

Post-acceptance Model of IS Continuance

Since continuance use is considered one of the appropriate measures of system success, it is important to understand the factors that affect the continuance use of IS. Users’ post adoption behavior can be explained by the Expectation Confirmation Theory (ECT), which is originally proposed in consumer behavior literature to explore consumers’ satisfaction and their re-purchasing decision. Bhattacherjee [3] has introduced ECT to IS context and proposed an IS continuance model based on ECT as shown in figure 1. In order to explain the IS continuance intention, Bhattacherjee integrates user satisfaction and perceived usefulness to the original ECT model. The author concludes that IS confirmation of expectation from prior IS usage has positive impact on perceived usefulness of IS. Also, he concludes confirmation of expectation and perceived usefulness are the determinants of user satisfaction.

![Figure 1: Post-acceptance model of IS continuance [3]](image)

Related literature of Trust, Privacy & Security

Trust, security, and privacy concerns have become a major impediment for the continuance use of IS such as e-commerce [40]. Malhotra et al. [32] and Mayer et al. [33] argue that trust, which consists of ability, integrity, and benevolence as the key factors, is the major player of the adoption of e-commerce system.

From various trust research [33,35,12,25], trust description embraces two key concepts. First, the trusting party has uncertainty about a future or current relationship that may lead to a perception of risk. Second, the potential perception of risk is based on three characteristics: ability, integrity, and benevolence. Ability is related to the skills and competences that the trustee has. Integrity means that the trustee should follow ethical and moral rules that are
adequate for the trusting party. Benevolence implies that the trustee should have kindness to the trusting party. The combination of these three features may lead to the desirousness of the trusting party to depend upon the trustee in a certain beneficial task. In this paper, we adopt the desirousness of the trusting party as the definition of trust, and this definition is coherent with trust definition in previous research [16,19,23].

Liao et al. [30] include habit, perceived usefulness, and trust to predict consumers’ continued behavior of using B2C websites. All three key variables determine consumers’ behavioral intentions to continue using a B2C web site. Lin and Shih [31] argue that users’ satisfaction with their values, and mobile technology trusting expectations are important determinant in the continued m-commerce usage. Floh and Treiblmaier [15] explore the importance of trust, quality of the website, quality of the service and overall satisfaction to the loyalty of online banking. They found that trust and satisfaction are important determinants of online loyalty.

Horst et al. [22] argue that trust of users of e-government is the main determinant of the perceived usefulness of e-government services. Gefen [17] argues that trust is one of the perceived usefulness determinants in cyberspace environment because the received usefulness from the website, for example, depends on the unseen staff behind the website. Chircu et al. [8] and Pavlou [39] purport that trust affects perceived usefulness since trust permits customers to be vulnerable to the internet to guarantee that customers receive the expected usefulness. In research that examines electronic commerce participation and attitudes, McCloskey [34] finds that trust has a positive effect on perceived usefulness.

Confirmation can be perceived as users’ confidence that systems will function as expected. Confirmation can be also expressed as the user’s perception of the analogy between user expectations and the actual performance of e-services [3]. In the context of e-commerce, Kim et al. [27] report a positive and significant association between consumers’ trust and expectation. Therefore, we propose the following:

P1: Trust will positively affect IS continuance intention

P2: Users’ trust is positively associated with perceived usefulness

P3: Users’ trust is positively associated with their extent of confirmation

Information security and privacy are considered two of the most important issues in today’s internet environment [26]. Security threat can be defined as “circumstance, condition, or event with the potential to cause economic hardship to data in the form of destruction, disclosure, modification of data, and/or fraud, waste, and abuse” [24]. Udo [43] shows that privacy protection is the most important concern of internet purchasers. Privacy can be defined as “the claim of individuals or institutions to determine for themselves when, how, and to what extent information about them is communicated to others” [46].

Security protocols (i.e. authorization, encryption) and privacy protocols (i.e. privacy seals) enhance perceived security and privacy which in turn strengthen the trust of using e-services [2]. Chellappa [5] argue that the perception of security and privacy affects the customers’ trust in e-commerce transactions. Vatanasombut et al. [45] integrate ECT, Commitment-Trust, and Technology Acceptance theories to explore the IS continuance intention of web-based customers. They find that IS continuance intention is determined by relationship commitment and trust. Also, they conclude that perceived trust is affected by perceived security, and relationship commitment is influenced by perceived empowerment. Based on the above review, we propose the following:

P4: Users’ security is positively associated with their trust

P5: Users’ privacy is positively associated with their trust
Dai et al. [10] propose a positive association between privacy and customer satisfaction. Eid [13] found that security and privacy are positively associated with users’ satisfaction. Therefore, we propose:

P6: Users’ security is positively associated with their satisfaction
P7: Users’ privacy is positively associated with their satisfaction

We also plan to test the following propositions that are hypothesized in the original post-acceptance model of IS continuance:

P8: Users’ level of satisfaction with initial IS use is positively associated with their IS continuance intention
P9: Users’ extent of confirmation is positively associated with their satisfaction with IS use
P10: Users' perceived usefulness of IS use is positively associated with their satisfaction with IS use
P11: Users' IS continuance intention is positively associated with their perceived usefulness of IS use
P12: Users' extent of confirmation is positively associated with their perceived usefulness of IS use

The proposed model is shown in figure 2.

![Figure 2: The proposed model](image)

**METHODOLOGY**

Appendix 1 depicts the constructs used in the web survey that we plan to design. The constructs related literature, from which they were chosen, is also shown in appendix 1. To validate the proposed model, we plan to conduct a web survey with the users of Bahrain’s e-government national portal (www.bahrain.bh). According to the United Nations E-government Survey [44], Bahrain has achieved a high rank in the United Nations e-government readiness index as follows: 13th at the world level, 3rd at the Asia level, and 1st at the Arab level. The proposed research model will be analyzed using PLS structure equation modeling tool, which evaluates the psychometric properties of measurement model, and estimate the parameters of structural model. Specifically, SmartPLS software will be used to analyze the dataset. In addition for being prediction-oriented [7], PLS, rather than covariance-based and parameter-oriented structural equation modeling, is used because PLS is preferred to handle large number of variables and relationships [18].
CONCLUSION

The increase using of e-services has initiated several concerns for consumers regarding trust, security, and privacy that make consumers hesitant to use e-services. Literature shows that there is scarcity in research that investigates the influence of the accumulation of trust, security, and privacy on continuance use of IS. In this research-in-progress paper, we have proposed a model that can examine the role of trust, privacy, and security in the post-adoption context by augmenting these three variables to the post-acceptance model of IS continuance [3]. We have already defined the constructs based on literature, and we plan to conduct a web survey with the users of Bahrain’s e-government national portal to validate the proposed model.

References


## Appendix: The constructs and their related literature

<table>
<thead>
<tr>
<th>Latent variable</th>
<th>Construct</th>
<th>Measurement</th>
<th>Related literature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Continuance Intention</strong></td>
<td>CIN1</td>
<td>I intend to continue using the national portal rather than discontinue its use.</td>
<td>Bhattacherjee (2001)</td>
</tr>
<tr>
<td></td>
<td>CIN2</td>
<td>My intentions are to continue using the national portal than use any alternative means.</td>
<td></td>
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<tr>
<td></td>
<td>CIN3</td>
<td>If I could, I would like to continue using the national portal as much as possible.</td>
<td></td>
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<tr>
<td><strong>Confirmation</strong></td>
<td>CO1</td>
<td>My experience with using the national portal was better than what I expected.</td>
<td></td>
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<tr>
<td></td>
<td>CO2</td>
<td>The service level provided by the national portal was better than what I expected.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CO3</td>
<td>Overall, most of my expectations from using the national portal were confirmed.</td>
<td></td>
</tr>
<tr>
<td><strong>Satisfaction</strong></td>
<td>SAT1</td>
<td>My overall experience of the national portal use was: very satisfied</td>
<td></td>
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<tr>
<td></td>
<td>SAT2</td>
<td>My overall experience of the national portal use was: very pleased</td>
<td></td>
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<tr>
<td></td>
<td>SAT3</td>
<td>My overall experience of the national portal use was: very contented</td>
<td></td>
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<tr>
<td></td>
<td>SAT4</td>
<td>My overall experience of the national portal use was: very delighted</td>
<td></td>
</tr>
<tr>
<td><strong>Perceived usefulness</strong></td>
<td>PU1</td>
<td>Using the national portal improves my performance in managing personal electronic services</td>
<td>Stewart (2003) &amp; Pennington et al. (2003)</td>
</tr>
<tr>
<td></td>
<td>PU2</td>
<td>Using the national portal increases my productivity in managing personal electronic services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU3</td>
<td>Using the national portal enhances my effectiveness in managing personal electronic services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU4</td>
<td>Overall, the national portal is useful in managing personal electronic services.</td>
<td></td>
</tr>
<tr>
<td><strong>Trust</strong></td>
<td>TRUST1</td>
<td>The national portal that I use keeps its promises</td>
<td></td>
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<tr>
<td></td>
<td>TRUST2</td>
<td>The national portal services meet my needs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TRUST3</td>
<td>The national portal is trustworthy</td>
<td></td>
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<tr>
<td></td>
<td>TRUST4</td>
<td>I think the national portal is concerned with the present and future interests of users</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TRUST5</td>
<td>Overall, I trust the national portal</td>
<td></td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>SEC1</td>
<td>I feel secure sending sensitive information using the national portal</td>
<td>Salisbury et al. (1998)</td>
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<td></td>
<td>SEC2</td>
<td>The national portal is a secure means through which to send sensitive information</td>
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<td></td>
<td>SEC3</td>
<td>I would feel totally safe providing sensitive information about myself using the national portal</td>
<td></td>
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<tr>
<td></td>
<td>SEC4</td>
<td>Overall, the national portal is a safe means to transmit sensitive information</td>
<td></td>
</tr>
<tr>
<td><strong>Privacy</strong></td>
<td>PRV1</td>
<td>It usually bothers me when I am asked for personal information.</td>
<td>Smith et al. (1996)</td>
</tr>
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<td></td>
<td>PRV2</td>
<td>When I am asked for personal information, I sometimes think twice before providing it.</td>
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<td></td>
<td>PRV3</td>
<td>It bothers me to give personal information to so many people.</td>
<td></td>
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<tr>
<td></td>
<td>PRV4</td>
<td>I am concerned that the national portal is collecting too much personal information about me.</td>
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