Exploring Self-image Congruity and Regret for IS Continuance based on the Expectation-Confirmation Model

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Abstract

In order to understand information system post-adoption phenomena, the expectation-confirmation model (ECM) was proposed. Past studies based on the ECM focus on a referent centered on the target IS being studied. The effect of this reference, captured through confirmation, has been strongly shown. However, the saliency of two additional reference effects, captured through self-image congruity and regret, has not been explored. In order to fill this knowledge gap, this paper attempts to develop a research model that extends the ECM by incorporating self-image congruity and regret as well as perceived enjoyment. For this extension, we synthesize the extant literature on continued IS use, self-image congruity, and regret. The analysis results tell us that self-image congruity plays a key role in forming two post-adoption beliefs, perceived usefulness and perceived enjoyment. It is also found that the absolute effect of regret on continuance intention is larger than those of other antecedents identified in IS. Overall, this study preliminarily confirms the saliency of self-image congruity and regret in post-adoption phenomena. Our study results is likely to help the IS community systematically address unexplored effects of self-image congruity and regret.

Keywords:

Information systems continuance; Expectation-confirmation model; Self-image congruity; Regret; Online social network

Introduction

It is known that employees' continued use of an organizational IS leads to long-term productivity [24]. Especially, for business-to-consumer (B2C) e-commerce organizations, their customers' continued use of a website contributes to long-term profitability [2]. This is so not only because repeat customers buy or use more and, in the process, generate more revenue, but also it costs less to retain them than to attract new customers. Therefore, research into these post-adoption phenomena has recently emerged as an important issue in the IS literature [e.g., 8,9].
The expectancy-confirmation paradigm has been strongly confirmed across a wide range of product repurchase and service continuance contexts [2]. Furthermore, individuals' continued IS usage decisions are congruent with consumers' repeat purchase decisions. For this reason, drawing from the paradigm, Bhattacherjee [2] developed the expectation-confirmation model (ECM) of continued IS use. The model has been applied and shown to be successful across B2C online and mobile service contexts [2,12,21].
The original ECM hypothesizes that an individual's intention to continue IS usage depends on three variables: the individual's level of satisfaction with use of the IS; the extent of the individual's confirmation of expectation about the IS; and post-adoption expectation (belief), in the form of perceived usefulness. Recently, in order to expand the original ECM, two additional post-adoption expectations, perceived enjoyment/playfulness and perceived ease of use, have been incorporated [12,21].
The expectancy-confirmation paradigm proposes that a consumer refers to his or her initial expectations about a target object (product or service) when forming post-consumption satisfaction judgments [14]; the paradigm focuses on a referent (i.e., comparison standard) centered on the target object being studied. This *target-object* referent denotes the consumer's existing expectations about the target object. In the domain of IS, when a user compares the perceived performance of a target IS with his or her expectations, any resulting confirmation is shown to affect satisfaction judgments and post-adoption expectations about the target IS [2,12,21].
In addition to this target-object referent type, two additional major types of referents can be identified across the research domains of services, consumer behavior, and social psychology: *other-object* and *self-based* referents. An other-object referent refers to the perceived performance of an alternative that the consumer compares with the target object. Regret captures the resulting judgment of this comparison [6,22]. If the comparison is unfavorable (the alternative performs better than the target object), the consumer will experience regret while if it is favorable, the consumer will experience rejoicing. Regret has been found to have a negative influence on satisfaction and repurchase intention [6,20,22].
In contrast, a self-based referent refers to the consumer's self-image (or self-concept) he or she compares with the image (or symbolic value) of the target object. Self-image congruity is formed from this comparison [17,18]. Self-image congruity influences consumers' purchase motivations because they prefer products or services that

are consistent with their own self-image. Indeed, self-image congruity has been empirically shown to influence post-consumption satisfaction and loyalty [11,25] as well as pre-consumption evaluations such as attitude, preference, and intention [e.g.,1].

In sum, regret and self-image congruity as well as confirmation result from the comparison of the perceived performance/image of a target object against a reference point. However, as noted above, the reference point for the three constructs is different. The effect of the target-object referent type, captured through confirmation, on satisfaction and continuous intention has been strongly shown in the IS literature. However, few studies have explored the saliency of the other-object and self-based referent types, captured through regret and self-image congruity respectively, in post-adoption phenomena.

In order to fill this knowledge gap, this paper attempts to develop a research model that extends the original ECM by incorporating two additional comparison judgments – regret and self-image congruity – as well as perceived enjoyment. Specifically, our proposed model will enhance the ECM by testing for additional and relative contributions of regret and self-image congruity on two post-adoption expectations (perceived usefulness and perceived enjoyment), satisfaction, and continuance intention.

Theoretical Background

Expectation-Confirmation Model and its Extension

Under the expectancy-confirmation paradigm, a consumer has initial expectations about a product or service in mind before a consumption experience. After consumption, the perceived performance of the product or service is compared with the initial expectations. The consumer's level of satisfaction is formed by these expectations and the discrepancy between the expectations and the perceived performance (confirmation). In turn, the level of satisfaction determines repurchase intention. The process by which the consumer reaches repurchase intention implies that the expectancy-confirmation paradigm focuses on a referent centered on the product or service in question (i.e., target-object referent).

In order to understand users' continued IS usage behavior, Bhattacherjee [2] proposed the ECM. Past studies based on the ECM have been successfully applied to B2C online and mobile services. In order to reflect the unique characteristics of these target ISs and their specific usage contexts, the ECM has been successfully extended by incorporating two additional post-adoption expectations – perceived ease of use and perceived enjoyment/playfulness [12,21].

Self-image Congruity

Products and services have personality images, just as people do [1,18]. Specifically, products and services are assumed to have a "personality" that reflect the stereotypic image of the typical user. This personality image is determined by a host of factors such as advertising, price, and stereotype of the generalized users [18]. Consumers attempt to evaluate products and services by matching the image of the products and services against their self-image. This matching process is referred to as self-image congruity. In this process, self-image serves as a self-based referent [17,18].

Regret

Regret theory [13] hypothesizes that people feel regret (rejoicing) when evaluating an outcome if the choice of an alternative would have given rise to a better (worse) outcome. Thus, regret (rejoicing) is the resultant judgment of comparing one's outcome with a better (worse) outcome that would have occurred had a different alternative been selected. This experienced regret may lead to product/service switching even when consumers are satisfied with the purchased product/service. To be clear, regret has been found to negatively affect satisfaction and repurchase intention [6,20,22].

Research Model and Hypotheses

As depicted in Figure 1, our research model extends the original ECM by synthesizing the extant literature on continued IS use, self-image congruity, and regret. The research model hypothesizes that users compare with three referents when they form IS post-adoption satisfaction and continuance intention. The three referents are the expectation of the target IS, the performance of another IS that is considered, and the self-image of the users. The effects of these referents are captured through confirmation, regret, and self-image congruity, respectively. Because, like confirmation, regret and self-image congruity result from comparison with a reference point, the incorporation of these two comparison judgments can enhance the original ECM without breaking theoretical logic.

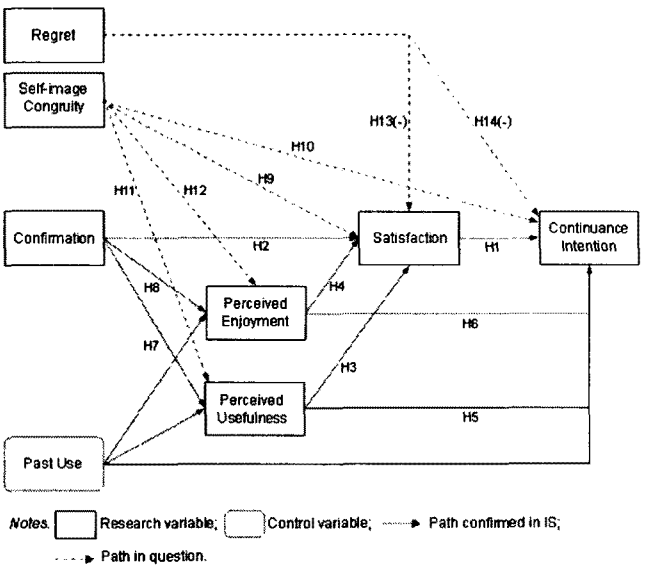

Figure 1 – Research Model

Research Constructs based on ECM

Three research constructs – confirmation, perceived usefulness, and satisfaction – were found to determine IS

continuance intention in the original ECM. Recently, the ECM has been expanded by incorporating perceived enjoyment/playfulness and perceived ease of use [12,21]. However, in general, perceived ease of use seems to become insignificant in the post-acceptance stage [7]. Therefore, we only incorporate perceived enjoyment into our model. Hypotheses 1–8 can be derived from past studies based on the ECM (refer to Figure 1).

Past use (a good proxy for habit [9]) as a control variable is included in our proposed model. According to the theory of self-perception [15], the more an individual uses an IS, the more favorable the individual evaluations. Based on this theory, past use has been confirmed as a salient determinant of post-adoption beliefs and continuance intention in the field of IS [8]. Thus, we attempted to explicitly control for the direct effects of past use on perceived usefulness, perceived enjoyment, and continuance intention.

Role of Self-image Congruity in the Post-adoption Decision Process

As consumer-oriented ISs permeate into our daily life, they are assumed to have personality images. For example, Cyworld (www.cyworld.com) is one of the most popular websites in South Korea because of its personal blogging service, the "mini-home page service." The service is based on an online social network. The interesting fact is that while many Koreans use the mini home page as a tool to communicate with friends, they also use the home page to present their self-image to others. For this reason, the saliency of self-image congruity has been confirmed in the adoption process of information technology (IT) services [10]. Furthermore, several marketing studies have empirically confirmed the effect of self-image congruity on post-consumption evaluations such as satisfaction and loyalty [11,25].

Therefore, on the basis of support from this research stream and the congruence between users' continued IS usage decisions and consumers' repeat purchase/patronage decisions, we suggest hypotheses 9 and 10.

Confirmation is based on information processing of functional attributes of a target IS while self-image congruity is based on information processing of self-relevant attributes (i.e., the target IS personality). Two post-adoption expectations, perceived usefulness and perceived enjoyment, are two evaluation criteria for functional attributes of the target IS, in terms of utilitarian and hedonic benefits [2,12,21].

If information processing of self-relevant attributes leads to high self-image congruity, then users are likely to form an initial favorable attitude toward the IS. In turn, this high self-image congruity is likely to favorably bias the users in the way they process the functional attributes of the IS. Conversely, if self-image congruity is low, the users are likely to form an unfavorable attitude toward the IS, which in turn biases their evaluations of the functional attributes in a negative way [17,18].

Furthermore, the biasing effect of self-image congruity on information processing of functional attributes of retail or a product has been confirmed in the marketing literature [11,19]. On the basis of the above discussion and this research stream, we posit that users' self-image congruity with a target IS will bias their post-adoption evaluations of functional attributes of the IS, in terms of perceived usefulness and perceived enjoyment. Therefore, we advance hypotheses 11 and 12.

Role of Regret in the Post-adoption Decision Process

Many new IT innovations can be used in different contexts other than the workplace. Like other consumer products and services, the IT innovations have to contest with other competitors for adoption and continuance by consumers. In these contexts, the consumers may experience regret if the chosen IT innovation performs worse than other alternatives. Furthermore, even in work contexts, users may feel a sense of regret if a newly installed IS performs worse than a predecessor.

Recall that regret has been found to have a negative impact on satisfaction and repurchase intention [6,20,22]. Therefore, on the basis of this research stream, we suggest hypotheses 13 and 14.

Research Method

Instrument Development

Data was collected using a carefully developed self-report survey instrument based on guidelines and exemplars in the literature. The research model contains eight constructs including one control variable, past use. In order to ensure a high level of measurement reliability in operationalizing the constructs, we derived the measurement items for them from previous research. Items measuring satisfaction were based on seven-point semantic differential scales. Past use was measured two self-reported items. One of the items asked about the duration of IT use (1 = less than 10 mins; 2 = 10 – less than 20 mins; 3 = 20 – less than 30mins; 4 = 30mins – less than 1 hr; 5 = 1 – less than 2 hrs; 6 = 2 – less than 3 hrs; 7 = 3 hrs or more). The other item was related to behavioral frequency (1 = less than once a month; 2 = once a month; 3 = a few times a month; 4 = a few times a week; 5 = about once a day; 6 = several times a day). A seven-point Likert-type scale anchored between "strongly disagree" and "strongly agree" was used for all remaining scale items. Operational definition and sources for these constructs are provided in Table 1. Detailed descriptions of actual wording are available from the first author.

Data Collection

We conducted a field survey of online users who use the Cyworld website. We selected Cyworld for several reasons. First, recall that users employ Cyworld's mini home page to present their self-image to others. Second, the website is in severe rivalry with other competitors. Therefore, the Cyworld website is a relevant IT artifact for verifying our research model. Finally, interest in Internet social networking websites has recently emerged across online users, businesses, and researchers. MySpace had more page views than Google in 2005 [16]. However, fewer studies have attempted to explore users' continued usage behavior

Table 1 – Operational Definition of Constructs

Construct	Operational Definition	Source
Regret	Users' feeling sorry for choosing Cyworld	Tsiros and Mittal [22]
Self-image Congruity	Users' perception of the congruity between their actual image and the image of Cyworld	Yim et al. [25]
Confirmation	Users' perception of the congruence between expectation of Cyworld use and its actual performance	Bhattacherjee [2]
Perceived Enjoyment	The extent to which the activity of using Cyworld is perceived to be enjoyable in its own right.	Davis et al. [5]
Perceived Usefulness	Users' perception of the expected benefits of Cyworld use	Davis et al. [4]
Satisfaction	Users' affect with (feelings about) prior Cyworld use	Bhattacherjee [2]
Continuance Intention	Users' intention to continue using Cyworld	Bhattacherjee [2]
Past use	Users' utilization of Cyworld in the previous period	Kim et al. [9]

of these websites.

Questionnaires were administered to 300 undergraduate students. The survey manifested that responses would be kept confidential. Respondents were asked to complete the questionnaire with regard to the last usage experience with the website. In order to increase the response rate, data was gathered from the students during their class hours. Incomplete questionnaires or those from respondents who had not used the website were discarded, leaving an analysis sample of 272.

Of the respondents, 115 were men and 157 were women. Most respondents were in their late 10s (n = 92, 33.5%) or early 20s (n = 121, 44.5%). The number of respondents whose target IT experience was more than one year was 226 (83.1%). In addition, the number of respondents whose average usage time of the website per day over the last month was less than one hour was 224 (82.4%). Finally, about 80% of the respondents visited the website more than a few times a week.

Analysis Results

The research model was tested using partial least squares (PLS), a structural modeling technique that is well suited for highly complex predictive models [3].

Measurement Model

In order to check the properties of our measurement scales, confirmatory factor analysis (CFA) was conducted. We assessed the reliability, convergent validity, and discriminant validity of the scales. Reliability is acceptable if the composite reliability is 0.70 or higher and the average variance extracted (AVE) is 0.50 or higher [3]. All variables meet both criteria for acceptable reliability (refer to Table 2).

Convergent and discriminant validity is adequate. First, according to PLS CFA outputs, all items loaded well on their respective factors. Furthermore, all loadings are much higher than all cross loadings. Second, as shown in Table 2, the square root of all AVEs is much larger than all other cross correlations. Jointly, these findings suggest adequate convergent and discriminant validity [3].

Structural Model

In order to test for additional and relative effects of self-image congruity and regret on post-adoption phenomena, the extended ECM and the proposed model were separately tested through the SEM technique. The extended ECM enhanced the original ECM by incorporating perceived enjoyment and past use. In contrast, our proposed model was specified to include self-image congruity and regret in the extended ECM.

Table 3 reports the standardized estimates of structural paths as well as explained variances. Based on these results, we compared the proposed model with the extended ECM in more detail. The extended ECM serves as a base model for comparison with our proposed model.

Results of the Extended ECM

The results of the extended ECM show that in line with past studies based on the ECM, all of the eight structural paths hypothesized were significant. Furthermore, the effects of past use on perceived enjoyment (path = 0.284) and continuance intention (path = 0.240) were significant.

Results of the Proposed Model

As shown in Table 3, the extended ECM was found to be a valuable theoretical framework to explain continued IS usage behavior even after controlling for the effects of self-image congruity and regret. Except for the relationship

Table 2 – Descriptive Statistics and Correlations of Latent Variables

Construct	Mean	Std. Dev.	Construct Reliability	Regt	SelC	Conf	PEnj	PUsf	Sati	CInt	PtU
Regret	2.63	1.08	0.92	**0.89**							
Self-image Congruity	4.36	1.29	0.94	-0.26	**0.92**						
Confirmation	5.11	1.06	0.93	-0.44	0.47	**0.90**					
Perceived Enjoyment	4.80	1.18	0.95	-0.30	0.56	0.57	**0.93**				
Perceived Usefulness	5.20	0.99	0.95	-0.32	0.42	0.46	0.50	**0.90**			
Satisfaction	4.72	1.08	0.90	-0.29	0.44	0.48	0.57	0.44	**0.83**		
Continuance Intention	5.14	1.18	0.90	-0.51	0.45	0.55	0.55	0.53	0.48	**0.87**	
Past Use	3.75	1.34	0.87	-0.19	0.38	0.31	0.43	0.21	0.24	0.44	**0.88**

Note: Values on the diagonal are the square-root of the average variance extracted for each construct (AVE).

Table 3 – PLS Analysis Results

Effects	Causes	Extended ECM	Proposed Model
Perceived usefulness	Past use	0.084	0.015
	Confirmation	0.430***	0.328***
	Self-image congruity		0.259***
Perceived enjoyment	Past use	0.284***	0.207***
	Confirmation	0.488***	0.369***
	Self-image congruity		0.303***
Satisfaction	Confirmation	0.178**	0.136*
	Perceived usefulness	0.174**	0.149*
	Perceived enjoyment	0.380***	0.338***
	Self-image congruity		0.111
	Regret		–0.057
Continuance intention	Past use	0.240***	0.206***
	Perceived usefulness	0.314***	0.244***
	Perceived enjoyment	0.190*	0.143
	Satisfaction	0.173**	0.125*
	Self-image congruity		0.058
	Regret		–0.302***
Variances Explained (R^2)			
	Perceived usefulness	0.214	0.261
	Perceived enjoyment	0.405	0.470
	Satisfaction	0.377	0.389
	Continuance intention	0.459	0.537

Note: *p < 0.5, **p < 0.01, ***p < 0.001.

between perceived enjoyment and continuance intention, all of the other relationships confirmed in the extended ECM were still significant.

As assumed, self-image congruity was found to be strongly related to perceived usefulness (path = 0.259) and perceived enjoyment (path = 0.303). Addition of self-image congruity accounted for more variance in perceived usefulness and perceived enjoyment (22% and 16% respectively). However, contrary to our expectation, the effects of self-image congruity on satisfaction and continuance intention were not significant. Meanwhile, regret (path = −0.302) was found to negatively influence continuance intention although its negative effect on satisfaction was not significant. Of special interest is that the absolute effect of regret on continuance intention is larger than those of the other antecedents such as perceived usefulness and past use.

Discussion

Summary of Results

Our findings showed that self-image congruity plays an important role in forming two post-adoption expectations, perceived usefulness and perceived enjoyment. Furthermore, regret was found to be the most important antecedent to continuance intention. Overall, this study contributes to the IS continuance literature by demonstrating that self-image congruity and regret can be seamlessly incorporated into the ECM perspective to explain users' continued IS usage behavior. In addition, our research is expected to help the IS community systematically explore the important yet understudied subject of self-image congruity and regret.

Theoretical Implications

Our findings have several theoretical implications. First, to the best of our knowledge, this study is the first to confirm the effect of a self-based reference point, captured through self-image congruity, in post-adoption phenomena. Our study initially demonstrated the effects of self-image congruity on two post-adoption beliefs, perceived usefulness and perceived enjoyment. Second, our study provides preliminary evidence supporting the effect of an other-object reference point, captured through regret, in post-adoption phenomena. Of special interest is that regret plays a more important role in forming users' continuance intention than the antecedents previously identified in IS such as past use, satisfaction, and perceived usefulness. Finally, the extended ECM was shown to be a valuable theoretical framework to explain continued IS usage behavior. However, the comparison of the extended ECM with our proposed model demonstrated that simply using the extended ECM may be insufficient to explain our data. Therefore, in order to better explain continued IS usage behavior, we recommend that researchers give consideration to reference points beyond the target IS reference point that the previous research on IS continuance focuses on.

Practical Implications

Several important practical implications arise from our findings. First, managers should understand that users consider multiple reference points related to the target IS, other alternatives, and themselves when they form post-adoption decision process. Failure to consider the effects of these multiple reference points may lead the managers to underestimate the possibility of defection among satisfied or habitual users, or overestimate defection rates among dissatisfied or nonhabitual users. This failure would result in misallocations of customer retention resources or employee training resources. Second, in order to favorably bias users' evaluations of target IS use, managers should imbue their ISs with a clear IS image. The IS image should be tailored to the self-image of target users. In the case of a consumer-oriented IS, managers should create advertising and promotional messages to elicit psychological appeals and emotional responses that help to link their ISs to the target users. In the case of an organizational IS, managers should emphasize the fit between the image of an IS and the image of their target employees in a training session on the IS. So far, this advice on the organizational IS has been generally ignored. However, these endeavors of the managers will contribute to their employees' continued IS use. Third, managers in B2C e-commerce organizations may be better able to maintain long-term relationships with their customers by making regret more salient to the customers. For example, Cyworld can run an advertisement depicting customers who switched to other competitors for free digital items only to realize that they had no friends to connect with. After regretting their decision, they decided to come back to Cyworld. This advertisement may make current Cyworld users think twice before switching to other competitors for free digital items. On the other hand, managers in charge of an organizational IS should manage the negative effect of regret on their employees' continuance intention when an

old IS is replaced with a new one. If the new IS performs poorly at the initial stage of installation, the employees may feel a sense of regret for the replacement. This sense of regret, in turn, has a strong negative impact on their continuance intention of the new IS. Furthermore, at this stage, they are more conscious of functional benefits and realization of their expectations [2,23]. Thus, we recommend that they are allowed to use the new IS after thoroughly validating its performance.

Conclusion

Our knowledge of the effects of the self-based and other-object reference types on post-adoption phenomena, captured through self-image congruity and regret respectively, is severely limited. By seamlessly incorporating these two reference types into the extended ECM, the proposed model provides a valuable tool for explaining and predicting continued IS use. Furthermore, our research provides interesting and challenging issues that await further exploration. We hope that more researchers will explore these understudied areas of self-image congruity and regret and that our conceptual model will serve as a useful conceptual tool for their endeavors.

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