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EXTENDING THE EXPECTATION-CONFIRMATION MODEL TO EVALUATE THE POST-ADOPTION BEHAVIOR OF IT CONTINUERS AND DISCONTINUERS

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Abstract

The expectation-confirmation model (ECM) has often been applied to investigate the satisfaction with and continued use of information technology (IT) after its adoption. This theory, which is based in social psychology, has already proven to be useful in the evaluation of IT post-adoption behavior. However, this project identifies a few important omissions that, if modified, could improve the ECM’s theoretical validity and applicability. First, we argue that the ECM has important missing variables that affect user satisfaction and continuance. These variables include users’ cognitive consonance/dissonance, a psychological state that arises in response to the confirmation or disconfirmation of their expectations about the services received; individual influences that moderate this relationship; and social influences, a psychological variable that can help explain why dissatisfied users choose to stay and satisfied users choose to leave. The inclusion of these variables in the ECM could better explain the psychological evolution from expectation confirmation to continuance. Additionally, the ECM has been validated in many studies using data from continuers, but it has been insufficiently explored in the context of discontinuers. In reality, continuers and discontinuers behave differently, opting for various decision alternatives after their IT adoption. Thus, research efforts should extend the capacity of the ECM to accommodate and explain the post-adoption behavior of both continuers and discontinuers.

Keywords: Expectation confirmation model, IS continuance/discontinuance, Cognitive consonance/dissonance.
1 INTRODUCTION

The expectation-confirmation model (ECM) has been widely explored in consumer behavior and information systems (IS) research. Recent studies utilizing expectation-confirmation models (such as (Limayem et al. 2007; Thong et al. 2006)) propose that user expectations of a specific information system before its adoption and the subsequent confirmation (or disconfirmation) of these expectations after adoption has a significant influence on user satisfaction. User satisfaction, in turn, has a critical influence on the likelihood of the continued use of the specific IS. In other words, when a user’s expectations of the technology are confirmed (expectation confirmation) it leads to satisfaction, but if the user’s expectations are non-confirmed (expectation disconfirmation) it promotes dissatisfaction. Satisfied users are more inclined to continue with existing IS and dissatisfied users are more inclined to switch to alternative IS. This ECM-based confirmation-satisfaction-continuance relationship has been confirmed in many recent IS continuance studies.

We propose that the ECM could be extended in additional ways to improve its theoretical validity and applicability. First, most ECM studies only focus on existing users’ post-adoption behavior, leaving discontinued users’ behavior inadequately explored. To ensure that the ECM is capable of effectively explaining the post-adoption behavior of all users, it is critical that both continuing and discontinued users are investigated. The behavior of continuers and discontinuers exhibits different levels of innovativeness, communication influence, and commitment; continuers and discontinuers also hold different attitudes toward online services (Parthasarathy & Bhattacherjee 1998). Although the findings derived from existing users reflect the behavior of continuers, these findings cannot adequately address the behavior of discontinuers. Therefore, including discontinuers in ECM research will contribute to an understanding of why customer satisfaction and retention continue to decline for online services.

Second, many have argued that the ECM may have overlooked important predictors of IS satisfaction. For example, it has been hypothesized that the failure of a product to meet a user’s pre-adoption expectations could initiate psychological discomfort. However, it is not known whether this psychological discomfort would continue to affect satisfaction over time without proper adaptation from users? The theory of cognitive dissonance (Festinger 1957) can provide insights into a user’s response to confirmation disparity and their subsequent psychological reactions over time. According to the cognitive dissonance theory, a person is in a dissonant state if two elements in the person’s cognition or knowledge are inconsistent. Cognitive dissonance refers to the psychological discomfort associated with the inconsistency of these cognitive elements. This psychological discomfort, which may include anxiety, uncertainty, or doubt (Mowen 1995), motivates the individual to attempt to reduce the dissonance. Based on this theory, a person who is in a dissonance state regarding adopted IT services will take actions to reduce the discomfort associated with the expectation-confirmation disparity they are experiencing, prior to their on-going evaluation of their psychological satisfaction and dissatisfaction. This process will be moderated by the extent to which the individual believes they can influence their cognitive state (Festinger 1957). Although dissonance reduction is critical to satisfaction, it has seldom been investigated along with expectation-confirmation dissonance in the context of IS satisfaction research. Thus, the evaluation of dissonance reduction along with other ECM constructs may offer important new insights into confirmation-satisfaction research.

Third, it has been hypothesized that the ECM may have overlooked some of the complexities associated with the satisfaction-continuance relationship. Although the positive correlation between satisfaction and continuance has been confirmed by several ECM-based studies (Limayem et al. 2007), being highly satisfied does not guarantee that a customer will repurchase from the same company or brand at the next opportunity. Given this fact, the assumption that satisfaction and continuance move in tandem is incorrect (Stewart 1997). Thus, the relationship between satisfaction and continuance intention is likely to be complicated and nonlinear. Our research hypothesizes that satisfaction, which is often the only construct used to explain continuance, may explain the psychological motives for IS
continuance but that it is insufficient to capture the social dimensions of IS continuance intention. In practice, IS continuance is susceptible to the influence of both psychological and social forces, as evidenced by online businesses’ common practice of using social media to lock-in users. Hence, the satisfaction-continuance relationship is likely to be a consequence of both psychological and social forces. As such, the inclusion of social influence, which has been frequently proposed as a determinant of loyalty and a moderator of the satisfaction-loyalty relationship, as a construct of ECM can enrich our understanding of both continuance and the satisfaction-continuance relationship. The addition of a social influence construct may also improve the theoretical completeness of the ECM, particularly in the context of online services. The three dimensions of social influence proposed in the theory of social influence (Festinger 1957) can be used to evaluate the effects of social influence on IS satisfaction and continuance.

This project intends to provide insights into how the ECM could be modified to extend its theoretical applicability to both continuers and discontinuers by collecting empirical data for validation. Thus, this project contributes to the growing body of literature that examines IT post-adoption behavior. This project also enhances our understanding of the effects of cognitive consonance and dissonance, and social capital in IT continuance and discontinuance.

2 RESEARCH BACKGROUND

2.1 Expectation-confirmation Model (ECM)

The ECM posits that satisfaction is a function of prior expectations and confirmation (Triandis 1977). Expectations are a set of pre-exposure beliefs about the product, which may be discrepant from actual experiences, leading to better-than-expected confirmation or worse-than-expected disconfirmation (Susarla et al. 2003; Venkatesh & Goyal 2010). This confirmation or disconfirmation of expectations drives satisfaction, which, in turn, determines product or service repurchase intentions and the decision to continue using the product or service. The ECM is a mature model and has been widely applied to investigate behavior in the areas of marketing, service quality, medicine, and human resources (Venkatesh & Goyal 2010).

Over the past decade, the ECM has been applied to investigate the continued use of many information technologies. For example, Bhattacherjee (2001) modified the ECM, integrating it with the theoretical and empirical findings from previous IS research to investigate the continuation intentions of online banking users. Limayem and Cheung (2008) also extended the ECM to include habit as a moderating factor between continuance intention and continued use. Their findings concluded that the strength of intention as a predictor of continuance is weaker at high levels of IS habituation. Along the same line of research, Thong et al. (2006) and Hong et al. (2006) extended Bhattacherjee’s revised ECM and validated different paradigms in the context of the mobile Internet. Their results suggested that their extended ECM had good explanatory power and they concluded that an ECM can provide supplementary information that is relevant to understanding continued IT use.

2.2 Cognitive Consonance/Dissonance

Festinger (1957) proposed the theory of cognitive dissonance. This theory describes and explains the psychologically uncomfortable state that impels an individual to reduce or eliminate this dissonance. The term “cognition” is defined as a knowledge, opinion, or belief about oneself, one’s behavior, or one’s environment. In a situation in which an individual has two cognition elements that are dissonant to each other, the individual experiences cognitive dissonance. Thus, cognitive dissonance is caused by inconsistent knowledge, opinions, or beliefs. When these inconsistencies exist, an individual rarely accepts them psychologically, but instead attempts to rationalize their inconsistent behavior. When this rationalization fails, dissonance is induced, generating pressure on that individual to reduce the dissonance. Festinger proposed three dissonance reduction methods: adding consonant cognitive elements, changing one or more existing cognitive element to be more consonant with the other
elements, and reducing the importance of the cognitive elements involved. In addition to Festinger’s three methods, other proposed cognitive reduction solutions that do not involve addressing the inconsistency include denial (Zimbardo et al. 1966), distraction (Zanna & Cooper 1974), and expressing discomfort (Pyszczynski et al. 1993). Festinger also proposed that cognitive dissonance reduction is moderated by the importance of the cognitive elements involved, individual influence over them, and the rewards associated with them. Individuals may have more desire to reduce cognitive dissonance when the cognitive elements (the attitudes or behavior) are important to that individual, when the individual believes he/she has a certain influence or control over the elements, or there is little reward associated with the dissonance.

2.3 Social Influence Theory

Social influence theory was proposed by Kelman (1958), who argued that an individual’s attitudes, beliefs, and behavior are influenced by others through the processes of compliance, internalization, and identification. Compliance occurs when an individual allows himself/herself to be influenced to gain rewards or approval, and avoid punishments or disapproval. Identification occurs when an individual allows himself/herself to be influenced because the content of the induced behavior is intrinsically rewarding and congruent with his/her own personal values. These three processes represent three qualitative ways of social influence, which can each be represented as a function of three determinants – the relative importance of the anticipated effect, the relative power of the influencing agent, and the prepotency of the induced response.

In the IS discipline, studies on social influence, particularly of IS adoption and use, are predominantly compliance-based and normally operationalized as subjective norms (such as the theory of planned behavior (Ajzen 1991) or the theory of reasoned action (Fishbein & Ajzen 1975)). The findings of this research stream have produce mixed conclusions, with some studies (such as (Taylor & Todd 1995)) identifying significant correlations between subjective norms and usage intentions, and others (such as (Davis 1989; Mathieson 1991)) finding no significant correlation between subjective norms and usage intentions. Hartwick and Barki (1994) hypothesized that these mixed findings could be due to the mandatory and voluntary usage contexts of IS. Thus, they split their research respondents into mandatory and voluntary categories and their findings confirmed that subjective norms are important in mandatory but not in voluntary settings.

Venkatesh and Davis (2000) tap into social influence via subjective norms by extending the technology acceptance model (TAM) to construct TAM2. TAM2 confirms that subjective norms have a direct compliance-based effect on computer usage intention. However, the effects of these norms on internalization and identification happen indirectly via the perceived usefulness and image of the technology. These psychological pathways of internalization and identification of social influence suggest that social beliefs and the power of an individual’s referent are internalized and modeled upon as if they were the individual’s own (Lewis et al. 2003), thus affecting the beliefs and behavior of the individual. Additional insights of TAM2 suggest that compliance-based effects will only occur when system usage is compulsory, whereas internalization- and identification-based influence can occur regardless of whether it is compulsory or voluntary (Venkatesh & Davis 2000). It is also known that experience plays a critical role in social influence. When users have little experience with the system at the initial stage of IS adoption, compliance-based social influence is effective in maintaining system usage. However, when users accumulate more experience with the system, the effectiveness of compliance-based social influence decreases (Thompson et al. 1991; Venkatesh & Davis 2000). In contrast, the effects of the identification and internalization of social influence are more likely to persist over longer periods (Fulk 1993), suggesting that users begin by internalizing others’ opinions and focus on their own judgment during the later stages of IS adoption and use (Venkatesh & Davis 2000).

The social influence theory has also been used to investigate commitment to the use of IS in non-mandatory contexts. In this line of research, Malhotra and Galletta (2005) approach commitment using two dimensions of psychological attachment: affective and continuance commitment. Affective
commitment is based upon internalization and identification, whereas continuance commitment is based upon compliance. Their findings suggest that internalization- and identification-based commitment have a positive influence on IS usage and compliance-based commitment has a negative influence on IS adoption and usage. Wang et al. (2013) confirm the utility of identification and internalization social influence for understanding the use of knowledge management systems over time in organizational settings. Their study also finds that social influence patterns tend to be very different across groups, with bottom-up social influence having significant effects, peer-level influence having limited effects, and top-down influence having no significant effect.

3 RESEARCH MODEL AND HYPOTHESES

The research model proposed here and illustrated in Figure 1 is based on the ECM’s constructs from a user’s perspective. The ECM postulates that perceived usefulness and confirmation determine customer satisfaction, which in turn influences continuance intention and actual behavior. However, our model proposes that this fundamental ECM construct can be enriched theoretically if both the ‘perception’ and ‘cognition’ of IS use are evaluated in the context of user satisfaction, because satisfaction, which is emotional in nature, should comprise both perception (affective) and cognitive components (Dabolkar et al. 2000; Sweeney et al. 2000). In fact, this perception (expectation-confirmation) and cognition (cognitive dissonance) may affect each other to influence user satisfaction. In this process, an individual’s belief in his/her ability to control and reduce dissonance may interact with these two components to affect user satisfaction.

We also hypothesize that the effect of user satisfaction on continuance behavior is subject to the influence of users’ peer groups. In other words, we believe that continuance behavior is not only a consequence of psychological responses, but also of social responses to IS use. Thus, the extension of the ECM to include social influence could allow this theory to explain IS continuance behavior from both psychological and social perspectives.

Figure 1. Research Model

Grounded cognitive theory believes that individuals’ perceptions affect their cognition (Barsalou 2008). In the context of IS use, perceptions framed prior to the use of that IS may not be actualized after the actual use of that system. When the IS exceeds original expectations, this is known as a positive confirmation; when the IS does not meet original expectations, a negative confirmation occurs. The gap between expectation and perception will lead to cognitive dissonance. Cognitive consonance theory also proposes that it is the inconsistent cognitions that promote the psychologically uncomfortable state of cognitive dissonance (Festinger 1957). Based on these arguments, we advance the following hypotheses.

H1: Expectation confirmation has a significant effect on cognitive consonance.
Based on cognitive dissonance theory, people seek to reduce their cognitive dissonance and this desire is moderated by element importance, award associated, and individual influence (Festinger 1957). In the present study in which we aim to examine the continuance behavior in a specific IT context, the effects of element importance and award associated are less important than that of individual influence. Individual influence is the extent to which people believe that they have control over the elements of their dissonance. Thus, people will try to reduce their cognitive dissonance when they encounter a negative confirmation. Strong individual influence may facilitate dissonance reduction. In other words, people with stronger individual influence may be more likely to continue IS usage, due to their stronger beliefs associated with dissonance control and reduction. However, not all individuals are capable of adjusting their attitudes or rationalizing their behavior to incompatible situations. As a consequence, their cognitive dissonance is less likely to be reduced, leading to their eventual discontinuation of use of the IS. Based on this reasoning, we put forward a second hypothesis.

**H2a:** Individual influence moderates the effect of expectation confirmation on cognitive consonance.

**H2b:** Continuers with disconfirmation will have higher beliefs in their individual influence than discontinuers with disconfirmation.

The traditional ECM has indicated a positive relationship between expectation confirmation and satisfaction (Limayem et al. 2007; Thong et al. 2006; Triandis 1977). In this study, satisfaction is defined as a positive feeling toward the IS. In addition to continuers who experience high levels of positive confirmation leading to satisfaction, we hypothesize that discontinuers may encounter low or negative confirmations that lead to lower satisfaction.

**H3a:** Expectation confirmation has a direct effect on satisfaction.

**H3b:** Continuers are more satisfied because they experience higher levels of positive confirmation and discontinuers are more dissatisfied because they experience higher levels of negative confirmation.

In addition to expectation confirmation (people’s perceptions), cognitive consonance (people’s cognitions) may also influence their satisfaction. The cognitive segment of an attitude is believed to be related to its affective segment (Breckler 1984). Therefore, we believe that the development of cognitive consonance may lead to positive feelings and an increase in satisfaction. For example, after successfully reducing cognitive dissonance, continuers will be more satisfied. However, discontinuers may fail to reduce their cognitive dissonance and therefore feel less satisfied. Therefore, we put forward the following hypothesis.

**H4a:** Cognitive consonance has a direct effect on satisfaction.

**H4b:** Continuers are more satisfied because they are more cognitively consonant and discontinuers are more dissatisfied because they are more cognitively dissonant.

Previous studies based on the traditional ECM have confirmed the positive effect of satisfaction on people’s usage behavior (Limayem et al. 2007; Thong et al. 2006). If someone feels satisfied with the IS, he/she is more likely to continue using it. If someone feels dissatisfied with the IS, he/she may be more inclined to switch to an alternative. This reasoning leads to the following hypothesis.

**H5a:** Satisfaction has a direct effect on continuance.

**H5b:** Satisfied users are more likely to continue using the IS and dissatisfied users are more likely to discontinue.

However, the relationship between satisfaction and continuance may vary in reality. Sometimes satisfied customers leave while dissatisfied ones stay. This suggests that continuance is more complicated than a simple linear relationship between satisfaction and continuance. We believe that social influence theory (Kelman 1958) can help to explain this variation. This theory posits that individual behavior is influenced by social context, through compliance, identification and internalization. Of these three social influence types, internalization and identification may have an effect on people’s intrinsic and image motivations to behave more like others. However, compliance-based influences are extrinsic forces that cause people to comply. Based on
self-determination theory, extrinsic motivations usually have less effect than intrinsic ones (Deci 1971). Researchers (such as (Venkatesh & Davis 2000)) also believe that extrinsic compliance-based forces are less effective in influencing IS usage practices after the IS adoption stage. Therefore, we hypothesize that the effect of compliance-based influence is mild, compared with internalization and identification.

H6a: Social influence moderates the effect of satisfaction on continuance.

H6b: The moderation effects of internalization-based and identification-based social influence are stronger than that of compliance-based social influence.

In addition to its moderating effect, social influence (especially the internalization-based and identification-based) is also believed to have a direct effect on continuance. Researchers have confirmed the effect of internalization-based and identification-based social influence on the usage intention no matter under the mandatory or voluntary settings (Venkatesh & Davis 2000), with or without experience (Fulk 1993), or over time (Wang et al. 2013). Therefore, we hypothesize:

H7: Social influence, especially the internalization-based and identification-based social influence, has a direct effect on continuance behavior.

4 RESEARCH METHOD

4.1 Variable Operationalization

Continuer and discontinuer types will be identified by asking respondents whether they are still using the online service. If discontinuers are identified, we will determine whether they belong in the replacement or entrenchment categories based on a three-item scale adopted from Parthasarathy and Bhattacherjee (1998). Confirmation will be measured using Bhattacherjee’s (2001) three-item scale, with two items to measure the perceived congruence in terms of user experience and service level, and one item to measure the overall assessment of confirmation extent. Cognitive consonance will be assessed by four reversed items adapted from (Koller & Salzberger 2007). Due to the different research context, only three of the eight items will be kept and revised. The respondents will be asked whether they are sure or feel uncomfortable about using the IS, and whether they think it is a good choice. In addition, a new item based on the definition of cognitive dissonance will be developed to measure the incompatibility between the behavior of using the IS and the attitudes toward it.

Satisfaction will be measured using the four semantic differential adjective pairs developed by Bhattacherjee (2001) and Spreng et al. (1996): very pleased/very displeased, very satisfied/very dissatisfied, very content/very frustrated, and absolutely delighted/absolutely terrible. Social influence will be assessed in relation to the internalization, identification, and compliance structural, and relational and cognitive dimensions, following the construct developed by Malhotra and Galleta (2005).

4.2 Instrument Development and Pre-tests

To ensure the validity and reliability of the questionnaire, a three-stage survey validation will be conducted. In the first stage, we will try to identify and adopt items and questions for our survey that have previously been validated. We will also follow generally accepted instrument construction guidelines (such as those of Boudreau et al. (2000)) as closely as possible in developing our questionnaire. In the second stage, a group of selected Internet banking users will be asked to review the questionnaire so that we can improve its quality and content validity. In the last stage, a pilot test will be administered to a group of MBA students taking a graduate-level class in electronic commerce. The reliability of the questionnaire items will then be evaluated by calculating their Cronbach’s alphas.
4.3 Data Collection

Individuals selected for this study will be randomly chosen users of a major security company that offers online services to their customers. Data collection will be performed in two stages. First, the security company will use a computer program to randomly select 1,000 active and 1,000 inactive users from its customer database of over 55,000 users. The inactive users are those registered customers who have not performed any online transactions and have not responded to their retention campaigns in the previous two years. In the second stage, the security company will send an email with an attached survey questionnaire to encourage each of these selected users to participate in the survey.

4.4 Data Analysis Procedures

First, confirmatory factor analysis will be used to assess the convergent and discriminant validity of our construct. Second, LISREL will be used to test the linear effect of our research model. The moderating effect will also be tested by LISREL after constructing the interaction values. Third, Chi-square tests will be performed to examine the differences between the continuers and discontinuers in their continuance/discontinuance intention, along with other ECM variables, in the post-adoption use of online services.
References