A dual-factor model of loyalty to IT product – The case of smartphones

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ABSTRACT

This study proposes a dual-factor model to study the factors driving consumer loyalty to IT products. This model was developed on the basis of expectation–confirmation model (ECM) and status quo bias (SQB) theory from both dedication–constraint perspective and cognition–affect perspective. Smartphones were chosen as the study context. A survey study was conducted to examine the proposed model and hypotheses. Our findings provide strong support for the proposed model. The dedication factors of satisfaction and relative advantage of incumbent, as well as the constraint factors of inertia and switching cost significantly influence consumers' intentions to rebuy and continue to use IT products. The constraint factor inertia influences the dedication factor satisfaction. This study demonstrates the cognition–affect–behavior loyalty phases by considering both dedication and constraint factors. The proposed model helps IT vendors devise proper strategies to build customer loyalty.

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1. Introduction

The lifecycle of an information technology (IT) product is typically very short. More than most other industries, the IT industry is characterized by technological innovation. IT product manufacturers frequently release new products in the constant battle for consumer attention. According to a study by Recon Analytics, the average lifespan for a phone handset in the United States is about 21.7 months (Entner, 2011). According to manufacturer HTC, the average "shelf life" (the amount of time before an item is considered unsuitable for sale, use, or consumption) for smartphones is about six to nine months (Goldman, 2011). In this highly competitive market, IT product makers need to know which factors influence consumers' loyalty to their products. This study examines the reasons why consumers would rather rebuy and continue to use an IT vendor's products than switching to the alternative at the post-adoption stages.

Researchers have consistently acknowledged the importance of the determinants of IT acceptance and utilization. Recently, users' post-adoption behaviors have garnered more attention. Several researchers have devoted themselves to studying consumers' post-adoption behavior regarding web-based services (Hong & Cho, 2011; Kim & Son, 2009; Lee & Kwon, 2011; Wang, Wu, Lin, & Wang, 2011), mobile services (Liu, Guo, & Lee, 2011; Zhou, 2011), and

social-networking services (Chiu, Cheng, Huang, & Chen, 2013). Surprisingly, little research has been done to understand consumers' repetitive same-brand purchasing regarding IT products. Oliver (1999) defined loyalty as "*a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing.*" Prior studies on IT use continuance can provide a lens to understand the factors driving consumers' loyalty to IT products. However, these studies focused mainly on dedication and cognitive factors and paid little attention to constraint and affective factors. Oliver (1999) suggested that assessing consumer beliefs, affect, and intention is needed to understand true brand loyalty because consumers become loyal following a cognition–affect–conation pattern. Moreover, Kim and Son (2009) argued that both dedication and constraint factors are drivers of consumers' post-adoption reactions. In order to fully understand the factors that influence consumers' loyalty at post-adoption stages the effects of and the relationships between dedication and constraint factors as well as those between cognitive and affective factors must be examined. Customers maintain relationships with providers either because they believe they have no other choice (constraint factors) or because they desire the benefits from the relationship (dedication factors) (Kim & Son, 2009; Zhou, Fang, Vogel, Jin, & Zhang, 2012). In addition, both the affective and cognitive factors determine their approach or avoidance behavior (Eroglu, Machleit, & Davis, 2001). Little research on IT continuance and loyalty has comprehensively examined the factors. This study fills the knowledge gap by developing a dual-factor model from both dedication–constraint and

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cognition–affect perspectives to study and explain consumer's loyalty to IT products.

This study develops the conceptual model on the basis of solid theories in order to enhance its explanation power and generalizability. The *dedication*-based perspective is constructed based on expectation–confirmation model (ECM) (Bhattacherjee, 2001). Status quo bias (SQB) theory is used to construct the *constraint*-based perspective. The ECM has been widely used for many information system (IS) continuance studies. It considers only dedication factors that include confirmation, satisfaction and perceived usefulness. The SQB explains why people will continue an incumbent action rather than choose another superior action (Samuelson & Zeckhauser, 1988). The constraint factors inertia and switching cost may cause an individual to remain in a status quo state and resist to adopt a new IS (Polites & Karahanna, 2012). Another reason why developing the conceptual model based on the two theories is that they comprise both cognitive and affective factors. In the ECM, satisfaction is an emotional response in contrast with the cognitive responses confirmation and perceived usefulness. Regarding to the SQB theory, switching cost is estimated by cognitive processing but inertia involves both cognitive and affective components. By integrating the two theories this study provides a convincing explanation of consumers' loyalty to IT product.

To summarize, this study would like to answer the following research questions:

(1) How do the dedication factors, i.e., confirmation, relative advantage of incumbent and satisfaction, and the constraint factors, i.e., switching costs and inertia, impact loyalty to IT product?
(2) What is the relationship between constraint and dedication factors?
(3) To what extent do the cognitive factors, i.e., confirmation, relative advantage of incumbent, switching costs and cognitive based inertia, and the affective factors, i.e., affective based inertia and satisfaction, matter in driving loyalty to IT product?
(4) Which cognitive factors have an influence on affective factors?

2. Literature review

2.1. Dedication–constraint perspective

Customers maintain relationships with providers either because of constraints or because of dedications (Bendapudi & Berry, 1997). While customers in constraint-based relationships preserve the relationship because they believe they have no other choice, customers in dedication-based relationships desire continuance. Constraints will only determine the stability of the relationship whereas dedication determines the quality of the relationship. Therefore, both sets of motivations must be studied to develop a full understanding of why relationships are maintained.

Kim and Son (2009) found that the dedication- and constraint-based mechanisms simultaneously, yet differentially, determine consumer post-adoption behaviors in the context of online portal services. Their model predicts that the dedication factors of satisfaction and perceived usefulness and the constraint factor of switching cost are all positively associated with customers' loyalty to the service that will lead to usage intention and word-of-mouth promotion. Zhou et al. (2012) investigated the determinants of continuance intention in social virtual world services. They used perceived benefits and service-specific investments to manifest the dedication- and constraint-based mechanisms, respectively. They reported that dedication-based mechanisms are the most important in explaining continuance intention with social virtual world services. The constraint-based mechanisms can facilitate the

dedication-based mechanisms and promote long-tenured users' continuance intention.

The dual-factor framework convincingly explains user commitment to online services. However, a comprehensive dual-factor model based on solid theories to more powerfully explain customer's loyalty to IT product has not yet been developed. Moreover, the interrelationship between dedication- and constraint-based mechanisms is not well understood.

2.2. Cognition–affect perspective

In addition to dedication–constraint perspective, both cognitive and affective factors must be examined in order to fully understand behavioral intention. Intentions have often been viewed as the conative (behavioral) component of attitude and it is related to attitude's affective and cognitive components (Fishbein & Ajzen, 1975). According to Oliver (1999), consumers become loyalty following cognitive, affective and conative phases. Cognitive loyalty is generated based on brand attribute information available to the consumer indicates that one brand is preferable to its alternatives. Affective loyalty is the degree of liking for the brand on the basis of cumulatively satisfying usage occasions. Conative loyalty is a commitment to the intention to rebuy the brand. This motivated intention is further converted to actions. Prior studies have found that both cognitive and affective factors influence intentions to continuously adopt online services (Lee & Kwon, 2011; Pi, Liao, & Chen, 2012) and to continuously use agile ISs (Hong, Thong, Chasalow, & Dhillon, 2011).

The present study examines the factors influencing consumers' decisions on whether or not to maintain the relationship with the incumbent providers and continue to use their IT products. In order to comprehensively understand the determinants, we investigate the factors based on the dedication–constraint framework and the tripartite model of loyalty. Thus, this study rigorously develops the research model on the basis of ECM and SQB theory, which represent dedication and constraint factors respectively and contain cognitive and affective factors.

2.3. Expectation–confirmation model and status quo bias theory

Expectation–confirmation theory (Oliver, 1980) is widely used in the consumer behavior literature to predict product repurchase and service continuance. Bhattacherjee (2001) developed an ECM on the basis of expectation–confirmation theory to explain the factors that influence IS continuance intention. This model postulates that IS continuance intention is a function of perceived usefulness (the extent to which a person believes that using an IT will enhance his or her job performance) and satisfaction. User satisfaction is influenced by the confirmation of the user's expectations which were based on prior IS use and the user's perception of the system's apparent usefulness. Post-acceptance perceived usefulness is influenced by the level to which the user's expectations of the system are confirmed. This model has been used as a theoretical foundation for many IS continuance studies. Thus, it is suitable to explain loyalty to IT product. However, the ECM does not consider constraint factors.

Most real decisions have a status quo alternative—that is, doing nothing or maintaining one's current or previous decision. The SQB theory (Samuelson & Zeckhauser, 1988) explains why an individual may remain in a status quo state even in the presence of better alternatives. It suggests that individual decision makers may be biased toward maintaining the status quo through mechanisms such as rational decision making, cognitive misperceptions and psychological commitment. Kim and Kankanhalli (2009) have used the SQB perspective to explain the inhibiting effect of switching costs on user resistance prior to IS implementation in

organizational contexts. In addition to switching costs, Polites and Karahanna (2012) demonstrated SQB ultimately manifests itself externally as inertia and it leads to decreased perceptions of the ease of use and relative advantage of a newly introduced system and has a negative impact on intentions to use the new system. Switching costs can be broken down into transition costs and sunk costs (Samuelson & Zeckhauser, 1988). In the context of our study, transition costs refer to the time and effort required to adapt to an alternative IT product (procedural costs) and the fees and losses associated with the termination of the current contract (contract termination costs). Sunk costs refer to the investments related to the incumbent IT product which will be lost as the result of switching to an alternative. As the costs increase, consumers are more reluctant to make the change. Moreover, both cognitive and affective inertia make customers unwilling to give up the status quo (Polites & Karahanna, 2012). An inertial consumer is unwilling to give up the current brand despite the belief that it might not be the best choice. In addition, they may feel comfortable with the current IT product and feel stress regarding a change. Consumers continue to use incumbent IT products can be due to the bias or preference to stay with the current situation. Thus, SQB theory provides useful theoretical explanations for understanding the impact of incumbent IT product use as a constraint that inhibits switching to an alternative.

The ECM and SQB theory use two disparate theoretical perspectives, dedication-based vs. constraint-based, on the phenomenon that users continue to use the incumbent IS or service and resist to adopt alternatives. The ECM postulates that consumers' intention to continue IS or service use is determined by their satisfaction with prior use of and perceived usefulness of that IS or service (Bhattacherjee, 2001). The SQB theory postulates that consumers' preference to stay with the incumbent IS or service is biased by switching cost and inertia even if there were better alternatives or incentives to change (Polites & Karahanna, 2012). Since ECM considers dedication factors and SQB theory considers constraint factors, the two theories are complementary to each other and therefore integrating them is appropriate (Mayer & Sparrowe, 2013) and allowed for a better understanding of customer loyalty than either theory could provide in isolation.

Little research has been done to address consumers' loyalty to IT product. In the IS field, existing studies on consumers' post-adoption behavior focus mainly on online services. The IT industry is a highly competitive market with high product diversity, short product lifecycles and fast update rates. Consumers frequently make decisions on repurchasing of the incumbent vendor's products or switching to other vendors. Hence, consumers' loyalty is the keys to a firm's survival in this market. Our study contributes to the knowledge base of consumer loyalty by systematically investigating the predictors of loyalty to IT product from dedication and constraint perspectives as well as cognitive and affective perspectives.

3. Dual-factor model of loyalty to IT product

The present study focuses on consumer IT products. It is a highly competitive market and we assume that multiple alternatives exist in the market. Thus, when consumers evaluate IT product usage not only the perceived usefulness of the incumbent product but also that of the alternative are compared. For this reason, the proposed model uses the construct relative advantage of incumbent to replace the construct perceived usefulness in ECM. Another reason is that, consumers may seek both of utilitarian and hedonic value when using an IT product (Lin & Bhattacherjee, 2010; Tuunanen, Myers, & Cassab, 2010; Yoo, 2010). Consumers' needs are, therefore, much broader than an organization's informational needs for the

performance of tasks. The construct relative advantage of incumbent represents the overall advantages of the incumbent IT product relative to the alternative. It is broader construct than perceived usefulness. The present study considers the constructs of confirmation, satisfaction and relative advantage of incumbent to be dedication-based commitments. We posit that if consumers have a higher level of satisfaction with the use of their current IT product, and the relative advantage of the product is high, their intention to rebuy the current brand will be stronger. This study also considers the contrasting constraints that lock users into preferring their current IT product over the alternatives. Switching cost refers to any impediment to a customer's changing of suppliers. Prior studies have shown that switching cost is a significant inhibitor to the adoption of IT products (Huang & Hsieh, 2012). Additionally, inertia has a negative impact on the intention to use a new system (Polites & Karahanna, 2012). The constructs of switching cost and inertia are considered to be constraint-based commitments in this study.

According to the tripartite model of loyalty (Oliver, 1999), consumers become loyal through cognitive, affective and conative phases. In the cognitive phase customer loyalty is based on the assessment of brand's performance. Affective phase is developed based on emotional responses toward the brand. In the conative phase the tendency toward the brand becomes devotion and the consumer wants to rebuy the brand. The proposed model classifies the factors into cognitive, affective and behavioral components in order to understand how customers form their loyalty to IT product and to examine the effects of cognitive and affective factors on intention to rebuy and continue to use an IT vendor's products.

Fig. 1 illustrates the dual-factor model. In addition to the impact of the dedication and constraint factors on loyalty to IT product, the relationships between these factors are also examined in this model. This section provides a theoretical rationale for these factors and develops the research hypotheses.

3.1. Dedication factors

Dedication factors increase consumer favorability toward a long-term relationship with the provider in anticipation of future benefits. Consumers determine the extent to which their expected benefits of IT product are confirmed during their initial use of it. This confirmation and their post-consumption expectation, i.e., relative advantage of the IT product, influence their satisfaction that further determines their loyalty. This model considers the dedication factors of satisfaction, relative advantage of incumbent and confirmation.

3.1.1. Satisfaction

Satisfaction is an emotional response resulting from a cognitive evaluation process comparing personal expectation to the product's perceived performance (Bhattacherjee, 2001). Oliver (1980) indicated that satisfaction can be seen as an additive combination of the expectation level and the resulting disconfirmation. Oliver and Linda (1981) examined the impact of satisfaction and its antecedents on behavioral intention and found that intention is almost exclusively a function of satisfaction. Furthermore, customer satisfaction is a key driver of loyalty (Ha, Janda, & Park, 2009; Oliver, 1999).

In the IS field, the positive relationship between satisfaction and loyalty has been confirmed in the contexts of online stores (Hsu, Wu, & Chen, 2013; Kim, Ferrin, & Rao, 2009; Yoon, Hostler, Guo, & Guimaraes, 2013), virtual communities (Lin, 2008), online appointment systems (Wang, Cheng, & Huang, 2013), and mobile instant message services (Denga, Lu, Wei, & Zhang, 2010). According to this rationale, we hypothesize that consumers tend to rebuy and continue to use an IT product if they are more highly satisfied with its use. The following hypothesis is proposed:
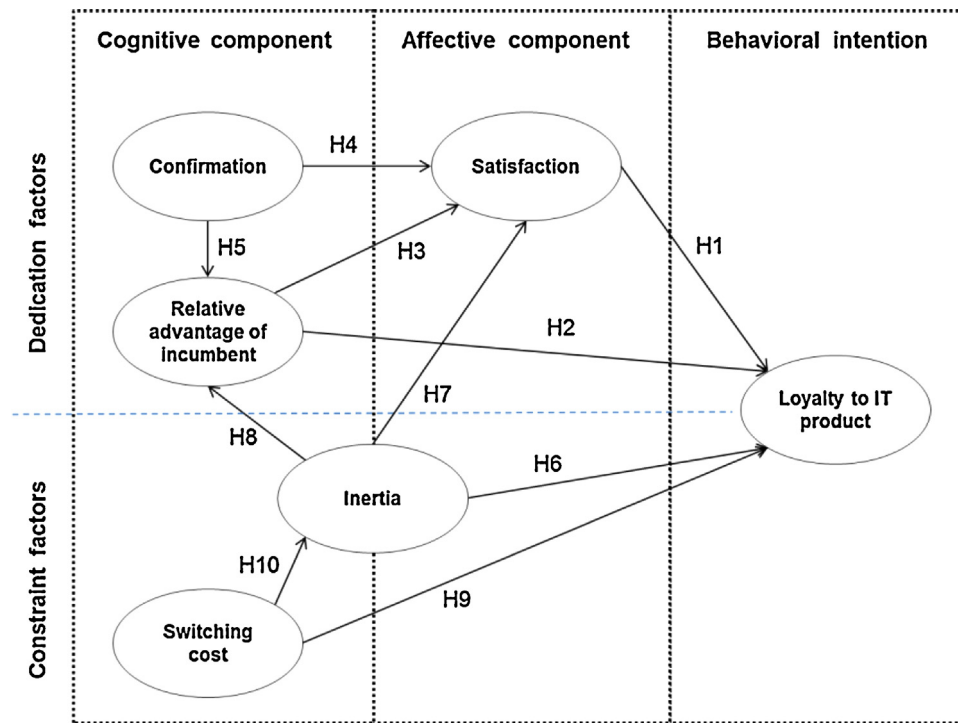
Fig. 1. Dual-factor model of loyalty to IT product.

H1. Consumers' level of satisfaction with IT product use is positively related to their loyalty to IT product.

3.1.2. Relative advantage of incumbent

Rogers' (2003) innovation diffusion theory is a fundamental technique to examine how the acceptance of a new technology spreads. The innovation attribute relative advantage is the most important innovation characteristics to explain the adoption of innovations (Choudhury & Karahanna, 2008; Huang & Hsieh, 2012; Wu & Wu, 2005). In this theory, *relative advantage* refers to the degree to which adopting an innovation is perceived as being better than continuing the practice it supersedes (Rogers, 2003). In our study, we consider attractiveness of incumbent instead of attractiveness of alternatives. Thus, relative advantage of incumbent refers to the degree to which continuing the practice is perceived as being better than adopting an alternative.

Prior studies showed that perceived product/service quality or superiority is positively associated with loyalty (Ha et al., 2009; Oliver, 1999). In the IS field, Rambocas and Arjoon (2012) found that relative advantage has a significant impact on customer loyalty toward online banking. Customers' perceived service quality in the post-adoption stage determines their loyalty to online services such as online travel agencies (Bernardo, Marimon, & Alonso-Almeida, 2012) and e-marketplaces (Janita & Miranda, 2013; Zhang, Agarwal, & Lucas, 2011). We can infer that if the advantage of incumbent IT product is better than that of alternative products, the incumbent will be perceived having better benefit and much more likely to induce users to rebuy and continue to use it. Thus, we propose the following hypothesis:

H2. Relative advantage of incumbent is positively related to consumer loyalty to IT product.

Mano and Oliver (1993) reported that consumers' product evaluations are antecedent to product-elicited affects that determine satisfaction. The ECM also postulates that users' post-consumption expectation or beliefs of IS use is positively associated with their satisfaction with IS use (Bhattacherjee, 2001). The significant impact of relative advantage on satisfaction has been confirmed in the contexts of spreadsheet systems (Al-Gahtani & King, 1999), consumer electronics (Rijsdijk, Hultink, & Diamantopoulos, 2007), and smartphones (Ha & Park, 2013). Thus we can infer that if consumers perceived the current IT product is more attractive than the alternative in the post-adoption stage they are more satisfied with the current IT product. The following hypothesis is developed.

H3. Consumers' perceived relative advantage of incumbent IT product is positively related to their satisfaction with the IT product use.

3.1.3. Confirmation

Confirmation is the extent to which consumers' expectation is confirmed (Bhattacherjee, 2001). According to expectation–confirmation theory, consumers form an initial expectation of a specific product or service prior to purchase and then, following a period of initial consumption, they form perceptions about its performance. The discrepancy between the performance outcomes and the original expectation is confirmed to one extent or another. Lower expectations and/or higher performance lead to greater confirmation, which, in turn, positively influence customer satisfaction. The opposite is also true: higher expectations and/or lower performance lead to decreased confirmation, and negatively influence satisfaction.

Bhattacherjee (2001) showed that confirmation of IS expectations is positively related to user satisfaction; many other IS studies produced the same results (Chen, Liu, & Lin, 2013; Halilovic & Cicic, 2013; Lee & Kwon, 2011). Given this strong theoretical and empirical support, we propose the following hypothesis:

H4. The extent to which consumers' expectations are confirmed is positively related to their satisfaction with IT product use.

The ECM postulates that users' extent of confirmation is positively associated with their cognitive beliefs of IS use (Bhattacherjee, 2001). The comparative judgment of initial expectations vs. perceived performance after adoption results in the

extent of confirmation. Greater confirmation will tends to elevate users' ex post expectation and disconfirmation will reduce such expectation because they try to remedy this dissonance by modifying their beliefs of IS benefit in order to be more consistent with reality. Bhattacherjee (2001) confirmed this relationship in an online banking context. In addition, Assensoh-Kodua and Lekhanya (2014) found that confirmation of expectations positively affects perceived benefit of online social network usage. Hong, Kim, and Lee (2008) reported that confirmation of expectations positively influences perception of hedonic and utilitarian benefits of an online portal. In this study, we define relative advantage of incumbent as the extent to which the incumbent product is perceived to be superior to alternatives. Thus, we posit that if consumers perceive the performance of the incumbent product can meet or exceed their original expectation the product will be perceived to be more beneficial and superior to alternatives. The following hypothesis is proposed.

H5. The extent to which consumers' expectations are confirmed is positively related to their perceived relative advantage of incumbent IT product.

3.2. Constraint factors

Some constraint factors lock in consumers to keep them from switching to an alternative. This study examines the inhibiting effects of these factors on acceptance of alternative IT products. The proposed model considers the factors inertia and switching cost on the basis of status quote bias theory.

3.2.1. Inertia

The SQB is one reason why people will continue an incumbent action rather than choose another superior action (Samuelson & Zeckhauser, 1988). It, often manifested as *inertia*, is defined as attachment to—and persistence of—existing behavioral patterns even in the presence of better alternatives and incentives to change (Polites & Karahanna, 2012). Inertia is expressed as an unwillingness to give up the status quo no matter how much better the alternatives may get in the future. Inertia negatively impacts one's intention to use a new system and it is a key barrier to the success of a new technology.

Polites and Karahanna (2012) conceptualized inertia as having behavioral, cognitive and affective components. Behavior-based inertia implies that a system continues to be used by an individual just because that individual has always used it in the past. This may be the expression of a subconscious habit. Cognitive-based inertia indicates that individuals continue to use a system consciously although they believe that it might not be the most efficient or effective way for completing a given task. Affective-based inertia occurs when individuals continue using a system because they enjoy doing so, they feel comfortable with it, or they have a strong emotional attachment to the current way of doing things and feel stressed regarding the change. No matter which type of inertia occurs, users tend to continue to use the incumbent system. Prior studies also found that consumer inertia positively influences repeat-purchase intention in online shopping (Kuo, Hu, & Yang, 2013) and loyalty to a mobile telecommunication firm (Wu, 2011b). Hence we propose the following hypothesis:

H6. Inertia is positively related to consumer loyalty to IT product.

Inertia may occur because people enjoy, feel comfortable, or have developed a strong emotional attachment to the current way of doing things (Polites & Karahanna, 2012; Rumelt, 1994). Inertia represents a rigid continuance of the status quo. Inertial consumers may draw from past decisions to guide present and future choices, and abandon the search for better alternatives (Yanamandram &

White, 2004; Pitta, Franzak, & Fowler, 2006). They reckon that "if it was good enough for me then, it is (must be) good enough for me now" (Samuelson & Zeckhauser, 1988) and keep believing the incumbent product can satisfy their needs. As such, we posit that an inertial user has a better emotional response to the current IT product and thus is more satisfied with it. The following hypothesis is developed.

H7. Inertia is positively related to the satisfaction with the incumbent IT product.

Polites and Karahanna (2012) found that inertia negatively impacts the perception of the relative advantages of a newly introduced system. An inertial user's lack of motivation for change will manifest itself in lowered perceptions of new system benefits. As inertia sets in, people may draw from past decisions to guide present and future choices (Samuelson & Zeckhauser, 1988). Additionally, if people do not want to give up their current way of doing things, they may justify viewing that alternative negatively to avoid suffering cognitive dissonance (Festinger, 1957). Thus, inertial users rationalize continuance in the status quo and bias their perceptions of a new system downward. Therefore, we expect that when consumers have high levels of inertia, they will perceive less benefits of the alternative IT product and hence will perceive higher relative advantage of the incumbent product. This study proposes the following hypothesis.

H8. Inertia is positively related to the relative advantage of the incumbent IT product.

3.2.2. Switching cost

Switching costs refers to all the costs that a consumer has to bear when abandoning the current provider or brand of product for an alternative. Switching costs arise as a result of prior commitments to the incumbent provider in terms of specific physical, informational, artificially created, or psychological investments (Klemperer, 1995). Switching costs have been studied as a means of customer retention (Burnham, Frels, & Mahajan, 2003). Using switching costs to lock in consumers is a typical approach for constraint-based consumer relationship development.

Switching costs can be broken down into transition costs and sunk costs (Samuelson & Zeckhauser, 1988). Transition costs include the procedural cost and contract lock-in associated with the change. They are the time, effort, and fees required to switch to a new situation. Sunk costs are retrospective costs that have already been incurred and cannot be recovered. These costs make a switch from the status quo much less likely to occur.

Perceived switching costs relate positively with e-tailer loyalty (Wang et al., 2011) and mobile telephony loyalty (Liu et al., 2011). We posit that if the time and effort required to evaluate, learn, and set up another IT product are perceived as being high, and the time and effort already invested in learning the incumbent IT product and purchasing accessories and applications are also high, consumers will be more likely to rebuy and continue to use the incumbent IT product. Therefore, the following hypothesis is proposed.

H9. Switching cost is positively related to consumer loyalty to IT product.

Polites and Karahanna (2012) found that consumer perceptions of high switching costs lead to increased inertia. This implies that when consumers perceive the time and effort required to learn another system as being high, or the more time and effort they have already invested in learning the incumbent system, the more likely they will be to exhibit inertia. Customers who want to avoid switching cost will willingly fall into inertia tracks and choose to remain with the current provider (Lai, Liu, & Lin, 2011). Switching costs

Table 1
Operational definitions.

Construct	Definition	Reference
Confirmation	Users' perception of the congruence between their expectations of Android phone use and its actual performance	Bhattacherjee (2001)
Satisfaction	Users' feelings about prior use of Android phones	Bhattacherjee (2001)
Loyalty	The intention of an individual to rebuy and continue to use an Android phone in the future	Davis, Bagozzi, and Warshaw (1989), Oliver (1999)
Sunk cost	Investments related to the Android phone which will be lost as the result of switching to an alternative	Jones, Mothersbaugh, and Beatty (2002), Burnham et al. (2003)
Procedural cost	The time and effort required to adapt to an alternative	Jones et al. (2002), Burnham et al. (2003)
Contract termination cost	Early termination fees and losses associated with the termination of the smartphone contract	Burnham et al. (2003)
Relative advantage of incumbent	The degree to which using the Android phone is perceived as being better than adopting an alternative	Rogers (2003), Teo and Pok (2003)
Affective based inertia	Users enjoy or feel comfortable to continue using an Android phone or it would be stressful to change	Polites and Karahanna (2012)
Cognitive based inertia	Users consciously continue to use an Android phone even though they are aware that it might not necessarily be the best, most efficient, or most effective way of doing things	Polites and Karahanna (2012)

strengthen inertia and lead to status quo bias (Kim & Kankanhalli, 2009). Thus, we propose the following hypothesis:

H10. Switching cost is positively related to inertia.

4. Research methodology

4.1. Research settings

Smartphones were chosen as the study case. Two major platforms, Android phones and iPhones, dominate the smartphone market. According to the International Data Corporation (IDC), in 2013, Android phones accounted for 78.6% of the worldwide smartphone market and iPhones comprised 15.2% (Llamas, Reith, & Shirer, 2014). Because of the Android phones' larger market share, this study investigates the major factors influencing Android users' intentions to rebuy and continue using Android phones and examines the proposed model in that context.

4.2. Measures

Based on the conceptual research model and a detailed review of the related literature, a 37-item questionnaire was devised as a measurement scale for the study. To the extent possible, previously published items were adopted or adapted. This study adopted the Likert scale, allowing the participants to choose one of seven levels of agreement with anchors ranging from 1 (strongly disagree) to 7 (strongly agree). The constructs and operational definitions are described in Table 1. We ignore behavior-based inertia in this study because this dimension of the inertia construct is non-significant for predicting usage intentions in the context of a new system (Polites & Karahanna, 2012).

After the draft was designed, in order to clarify any ambiguities, a pretest was performed on 5 users and 3 experts familiar with smartphones. Based on the respondents' feedback, the questionnaire was adjusted to improve readability and ensure its accuracy and appropriateness.

The questionnaire was then adopted in a pilot test. Seventy part-time MBA students from a university in Taiwan completed the questionnaire. They were asked to answer each item according to their judgment of Android phones and iPhones. We also collected their suggestions as to where the survey could be clarified and their opinions on other areas in which the survey could be improved. We then adopted an exploratory factor analysis using Smart PLS 2.0 M3 to conduct principle component factor analysis with Varimax rotation on all constructs in order to obtain a number of factors and determine the indicators of each factor. Among the initial 37 items, a total of 9 factors were extracted. Two contract termination cost indicators ("switching to iPhone will be a heavy burden for me" and "the contract keeps me from switching to iPhone") and two relative advantage indicators ("the Android phone feels more fashionable than iPhone to me" and "the Android phone feels to me like it has more variety of apps than iPhone") had loadings lower than 0.7 and were therefore eliminated (Fornell & Larcker, 1981). Thus, participants in the formal survey could clearly understand each question, and content validity was ensured.

4.3. Sample and data collection

Data for this study were collected via an Internet survey that was conducted in June, 2012. We developed an online survey system and programmed the Web pages to request and ensure all the participants answer every measurement item. Therefore, no missing values were found in the final result. An announcement with a hyperlink to the online survey system was posted for three weeks on the Mobile Communication forum on PTT (ptt.cc), the largest and most famous bulletin board system in Taiwan, to recruit participants who have an Android smartphone. The announcement stated the purpose of the study and the qualifications for participating in the survey. To preserve confidentiality, all participants were informed that their responses would remain anonymous and would be used for academic purposes only. The questionnaire asked them to state their smartphone brand and how long they had used their Android phone to ensure that all survey respondents were current Android users. According to Institute for Information Industry, in 2012, the estimated number of Android-phone users in Taiwan is three millions (FIND, 2012). The effective sample size was 296. The survey might have a margin of error of plus or minus 5.7 percent at a 95 percent level of confidence. The demographic information of these respondents is shown in Table 2.

We obtained the demographic data from late responders (latest one-fourth) and compared them with the early respondents (earliest one-fourth). A Chi-test was used to compare the demographic attributes of the late responders and those of the early respondents. The results revealed no significant differences, suggesting no substantive non-response bias.

5. Data analysis and results

5.1. Measurement model

The reliability of the scales can be ensured when composite reliability (CR) is greater than 0.7, Cronbach's alpha is greater than 0.7, and average variance extracted (AVE) is greater than 0.5 (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). The results are shown in Table 3 and indicate that the scales have good reliability.

Table 2
Sample demographics.

Attribute	Categories	#	%	Attribute	Categories	#	%
Gender	Male	168	56.8	Education	High school	10	3.3
	Female	128	43.2		Associate	5	1.7
					Bachelor	146	49.3
					Master	130	44.0
					Doctor	5	1.7
Age	<20	20	6.8	Smartphone Brand	Google	4	1.4
	20–25	200	67.6		Samsung	60	20.3
	26–30	43	14.5		HTC	136	46.0
	31–35	15	5.0		Sony Ericsson	47	15.9
	36–40	7	2.4		Motorola	18	6.0
	>40	11	3.7		Others	31	10.4
Frequency of changing cell phones in a year	0	59	19.9	How long have you used your Android phone?	<3 months	64	21.6
	1	206	69.6		3–6 months	64	21.6
	2	23	7.8		6–12 months	86	29.0
	3	5	1.7		1–2 years	68	23.0
	>3	3	1.0		>2 years	14	4.8

Convergent validity should be ensured when multiple indicators are used to measure one construct; this can be examined by item-total correlation (ITC), factor loading and AVE (Fornell & Larcker, 1981). Convergent validity requires that ITC, factor loading and AVE should be greater than 0.3, 0.7 and 0.5, respectively. The results are shown in Table 3 and indicate that the scales have good convergent validity.

Discriminant validity was examined by using the following tests. The cross-factor loadings (see Table 4) indicate that the discriminant validity is good because the loading of each measurement item on its assigned latent variable is larger than its loading on any other construct (Chin, 1998). However, the factor loading of ABI1 on PC is close to its assigned latent variable. We further test the collinearity of ABI1 with the measurement items of PC. The Variance Inflation Factor (VIF) value, 1.849, is lower than 10, which implies that collinearity is not a serious issue (Hair, Black, Babin, & Anderson, 2009). Since the proportion of variance the ABI1 shares with the items of PC is small ABI can discriminate from PC. Furthermore, the correlation coefficients among variables should be less than 0.9, and the square root of AVE should be greater than the inter-construct correlation coefficients (Fornell & Larcker, 1981). Descriptive statistics and the correlation matrix are shown in Table 5, which suggests that discriminant validity is satisfactory.

5.2. Common method variance

Common method variance (CMV) might have been a concern in this study because both independent and dependent variables were collected simultaneously from the same respondents (Avolio, Yammarino, & Bass, 1991). We followed Podsakoff, MacKenzie, Lee, and Podsakoff's (2003) recommendations and adopted a single-common-method-factor approach to controlling for CMV. The PLS marker variable approach was used to create a method factor (Rönkkö & Ylitalo, 2011). First, we selected three items that were collected in the same survey but are not included in the model being tested: (1) "Once I've come to a conclusion, I'm not likely to change my mind;" (2) "I don't change my mind easily;" and (3) "My views are very consistent over time (Oreg, 2003)." These were used as marker indicators. Second, a method factor was created using the marker indicators as an exogenous variable predicting each endogenous construct in the model. Finally, we compared the method factor model with the baseline model and found that the significant paths in the baseline model remain significant in the method factor model. Thus, we can conclude that the data did not have a CMV problem.

5.3. Test of research model and hypotheses

We tested the hypotheses through Partial Least Squares regression analyses using Smart PLS. The reason why we chose PLS rather than covariance-based SEM is that PLS is more suitable for measuring a construct with formative scales (Gefen, Rigdon, & Straub, 2011). Switching cost and inertia were conceptualized as second-order formative, first-order reflective, multidimensional constructs in order to reduce model complexity and keep theoretical parsimony (Becker, Klein, & Wetzels, 2012; Petter, Straub, & Rai, 2007). The dimensions of switching cost are sunk cost, procedural cost and contract termination cost; the dimensions of inertia are affective based inertia and cognitive based inertia. These dimensions together cause the construct, are not interchangeable, will not necessary covary, and do not necessarily have the same predictors; therefore, the relationships between the constructs and sub-constructs are formative according to the decision rules proposed by Jarvis, MacKenzie, and Podsakoff (2003). Prior studies also confirmed that switching cost and inertia are higher order formative constructs (Barroso & Picón, 2012; Polites & Karahanna, 2012). We used the two-stage approach to estimate the hierarchical latent variable model because this study focuses on the relationships between higher-order constructs (Becker et al., 2012). The explanatory power of the structural model is evaluated by the R^2 value. In order to examine if each hypothesis is supported, this study assessed the t-statistics of the standardized path coefficients. All path coefficients and explained variances for the model are shown in Fig. 2.

As indicated, the relationships between the dedication factors and loyalty were all found to be significant. Specifically, satisfaction has a positive influence on loyalty ($\beta = 0.352$, $p < 0.001$) and relative advantage of incumbent has a positive influence on loyalty ($\beta = 0.168$, $p < 0.001$). In addition, confirmation is positively related to satisfaction ($\beta = 0.655$, $p < 0.001$) and positively related to relative advantage of incumbent ($\beta = 0.252$, $p < 0.001$). Therefore, Hypotheses H1, H2, H4 and H5 are supported. However, the relationship between relative advantage of incumbent and satisfaction is insignificant and hence H3 is not supported.

The constraint factors also have significant influences on loyalty. Specifically, inertia ($\beta = 0.357$, $p < 0.001$) and switching cost ($\beta = 0.121$, $p < 0.01$) positively affect loyalty. The results confirm our expectations and support H6 and H9. Additionally, inertia is positively related to satisfaction ($\beta = 0.270$, $p < 0.001$) but insignificantly influences the relative advantage of incumbent. Switching cost has significant impact on inertia ($\beta = 0.439$, $p < 0.001$). Hypotheses H7

Table 3
The result of factor analysis.

Construct	Items	Loading	ITC
Confirmation (C)	CR = 0.964, Alpha = 0.944, AVE = 0.899		
C1	My experience with using the Android phone exceeded my expectations.	0.951	0.891
C2	The Android phone exceeded my expectations.	0.950	0.888
C3	Overall, most of my expectations regarding using the Android phone were confirmed.	0.943	0.868
Satisfaction (S)	CR = 0.966, Alpha = 0.948, AVE = 0.906		
S1	Overall, using the Android phone makes me feel satisfied.	0.952	0.887
S2	Overall, using the Android phone makes me feel pleased.	0.957	0.902
S3	Overall, using the Android phone makes me feel delighted.	0.946	0.882
Loyalty (L)	CR = 0.917, Alpha = 0.881, AVE = 0.735		
L1	I intend to rebuy and continue using an Android phone rather than discontinue its use.	0.932	0.807
L2	My intentions are to rebuy and continue using an Android phone rather than use any alternative phone, e.g., iPhone.	0.906	0.747
L3	If I could, I would like to discontinue my use of the Android phone (reverse coded).	0.785	0.701
L4	If I could, I would like to switch from the Android phone to an alternative, e.g. iPhone (reverse coded).	0.797	0.713
Switching cost: sunk cost (SC)	CR = 0.886, Alpha = 0.829, AVE = 0.661		
SC1	A lot of time, energy, and effort have gone into using and getting proficient with the Android phone.	0.774	0.593
SC2	I have spent a lot of money on the Android phone.	0.786	0.573
SC3	All things considered, I've put a lot into previous dealings with the Android phone.	0.824	0.714
SC4	Overall, I have invested a lot in the usage of the Android phone.	0.865	0.759
Switching cost: procedural cost (PC)	CR = 0.949, Alpha = 0.927, AVE = 0.822		
PC1	It's hard for me to switch from the Android phone to iPhone.	0.904	0.823
PC2	It's complicated for me to switch from the Android phone to iPhone.	0.936	0.879
PC3	It's hard for me to accommodate iPhone.	0.916	0.846
PC4	It's difficult for me to adapt to iPhone.	0.807	0.776
Switching cost: Contract termination cost (CC)	CR = 0.909, Alpha = 0.847, AVE = 0.769		
CC1	Switching to iPhone will generate a huge contract loss.	0.852	0.711
CC2	Switching to iPhone will make it hard for me to deal with the contract.	0.865	0.722
CC3	The loss from switching to iPhone is serious for me.	0.815	0.678
Relative advantage of incumbent (RAI)	CR = 0.891, Alpha = 0.850, AVE = 0.623		
RAI1	The interface of the Android phone feels friendlier than that of iPhone to me.	0.832	0.654
RAI2	It is easier for me to use the Android phone than iPhone.	0.851	0.683
RAI3	I like the esthetics of the Android phone better than iPhone.	0.730	0.665
RAI4	The Android phone feels to me like it has better quality than iPhone.	0.751	0.710
RAI5	The response of the Android phone feels faster to me than iPhone.	0.753	0.652
Inertia: affective based inertia (ABI)	CR = 0.912, Alpha = 0.851, AVE = 0.777		
	I will continue using an Android phone . . .		
ABI1	. . . because it would be stressful to change.	0.726	0.538
ABI2	. . . because I am comfortable doing so.	0.948	0.805
ABI3	. . . because I enjoy doing so.	0.951	0.818
Inertia: cognitive based inertia (CBI)	CR = 0.972, Alpha = 0.961, AVE = 0.896		
	I will continue using an Android phone . . .		
CBI1	. . . even though I know it is not the best way of doing things.	0.925	0.869
CBI2	. . . even though I know it is not the best quality system.	0.967	0.938
CBI3	. . . even though I know it is not the best quality interface.	0.952	0.913
CBI4	. . . even though I know it does not have the best quality and number of apps.	0.943	0.898

and H10 are supported; H8 is not supported. Satisfaction, relative advantage of incumbent, inertia and switching cost together explain 59.1 percent of the variance of loyalty.

Fig. 3 depicts the relationships between first- and second-order constructs. The path coefficients from the dimensions to the aggregate second-order construct are weights. These weights are analogous to a multiple regression analysis, and thus indicative of each dimension's relative importance. The results show that procedural cost is the major switching cost in the smartphone context. Affective based inertia and cognitive based inertia are equally important to loyalty.

In order to test the cognitive–affect–behavior sequence, we further split the construct inertia into cognitive based inertia and affective based inertia to examine their relationship and individual effects. Fig. 4 depicts the PLS analysis of the extended model. Cognitive based inertia has a positive influence on affective based

inertia ($\beta = 0.311$, $p < 0.001$). Both of them are positively associated with satisfaction ($\beta = 0.124$, $p < 0.001$; $\beta = 0.234$, $p < 0.001$) and loyalty ($\beta = 0.207$, $p < 0.001$; $\beta = 0.245$, $p < 0.001$). In addition, switching cost is positively related with cognitive based inertia ($\beta = 0.334$, $p < 0.001$) and affective based inertia ($\beta = 0.508$, $p < 0.001$).

5.4. Research results

Statistical results of the structural model are summarized in Table 6. Consumers' level of satisfaction with IT product usage coupled with the relative advantages of incumbent manifest as the IT product's perceived performance and advantages which drive consumers to continue to use their current IT product in order to get the expected benefits. Consumers' satisfaction with IT product usage is determined by the extent to which their expectation is confirmed. Confirmation also increases consumers' perceived

Table 4
PLS confirmatory factor analysis and cross-loadings.

	C	S	L	SC	PC	CC	RAI	ABI	CBI
C1	**0.9515**	0.7634	0.6234	−0.0057	0.2708	0.0194	0.3018	0.5924	0.4013
C2	**0.9502**	0.7589	0.5522	−0.0123	0.2369	−0.0116	0.3107	0.5591	0.3479
C3	**0.9427**	0.7943	0.6385	−0.0004	0.2515	0.0116	0.2915	0.5939	0.398
S1	0.78	**0.9517**	0.6796	0.0347	0.3214	0.085	0.2889	0.6596	0.5056
S2	0.7931	**0.957**	0.6303	0.0198	0.2836	0.0716	0.2905	0.631	0.4418
S3	0.7522	**0.946**	0.6305	0.029	0.3027	0.0972	0.3013	0.6383	0.444
L1	0.6657	0.7059	**0.9351**	0.1717	0.4842	0.1539	0.368	0.7389	0.5036
L2	0.6369	0.6811	**0.9095**	0.1922	0.4999	0.1974	0.3644	0.7123	0.4818
L3	0.4368	0.4751	**0.7804**	−0.0199	0.2482	0.0767	0.2841	0.4448	0.4254
L4	0.3688	0.3852	**0.7907**	0.0023	0.3291	0.1525	0.355	0.4522	0.3949
SC1	−0.0374	0.0288	0.1222	**0.7645**	0.15	0.1228	−0.1806	0.0754	0.0247
SC2	0.0756	0.0829	0.1097	**0.82**	0.2209	0.1163	−0.0672	0.15	0.065
SC3	−0.0373	−0.0103	0.1137	**0.8157**	0.1239	0.0071	−0.0894	0.0751	0.0273
SC4	−0.0917	−0.0712	0.015	**0.8302**	0.1127	0.0696	−0.0897	0.0459	−0.0167
PC1	0.2729	0.3071	0.4716	0.1802	**0.9045**	0.3978	0.3275	0.5523	0.3099
PC2	0.2275	0.272	0.4046	0.1698	**0.935**	0.4172	0.3226	0.5112	0.2667
PC3	0.2478	0.3076	0.4173	0.1523	**0.9145**	0.4044	0.3559	0.5094	0.3039
PC4	0.2183	0.266	0.4244	0.2333	**0.8707**	0.3538	0.381	0.5462	0.2771
CC1	−0.016	0.0479	0.1099	0.085	0.3452	**0.9003**	0.0198	0.1489	0.1948
CC2	0.015	0.0784	0.1517	0.1269	0.4119	**0.9133**	0.0646	0.191	0.1337
CC3	0.0151	0.1022	0.1885	0.0605	0.3744	**0.8113**	0.0474	0.1335	0.1915
RAI1	0.3004	0.2955	0.3919	−0.0952	0.3585	0.0305	**0.862**	0.4453	0.0802
RAI2	0.3188	0.3065	0.3889	−0.1893	0.3799	0.0591	**0.8834**	0.4827	0.0993
RAI3	0.1201	0.1324	0.2462	0.0301	0.2096	−0.0239	**0.6887**	0.2725	0.0087
RAI4	0.1888	0.1772	0.2234	−0.1236	0.2255	0.0536	**0.7229**	0.3228	−0.0129
RAI5	0.2657	0.2498	0.2754	−0.0841	0.2817	0.073	**0.7723**	0.3578	0.0102
ABI1	0.3326	0.4104	0.4547	0.1531	0.6714	0.2916	0.3913	**0.7291**	0.2868
ABI2	0.6179	0.6627	0.6974	0.0826	0.4677	0.1303	0.4618	**0.9471**	0.4828
ABI3	0.6276	0.6776	0.6951	0.1011	0.4688	0.1029	0.4455	**0.9501**	0.4819
CBI1	0.3432	0.4377	0.4563	0.0345	0.2823	0.203	0.0425	0.4248	**0.9229**
CBI2	0.4119	0.4822	0.5232	0.023	0.3295	0.2153	0.0658	0.4862	**0.9672**
CBI3	0.3725	0.451	0.4996	0.0576	0.2791	0.1599	0.0448	0.4425	**0.9514**
CBI4	0.3965	0.4747	0.5245	0.0428	0.3159	0.1637	0.0664	0.4755	**0.9446**

Table 5
Descriptive statistics and correlation matrix.

Constructs	Mean	Std dev.	Correlation matrix								
			C	S	L	SC	PC	CC	RAI	ABI	CBI
C	5.18	1.25	**0.948**								
S	5.21	1.20	0.815	**0.952**							
L	5.18	1.31	0.636	0.678	**0.857**						
SC	4.03	1.16	−0.021	0.015	0.111	**0.813**					
PC	3.81	1.48	0.267	0.318	0.472	0.192	**0.907**				
CC	4.09	1.26	−0.005	0.079	0.186	0.126	0.431	**0.877**			
RAI	3.35	1.05	0.320	0.310	0.401	0.122	0.381	0.051	**0.789**		
ABI	4.41	1.17	0.615	0.676	0.709	0.111	0.582	0.158	0.492	**0.881**	
CBI	4.72	1.31	0.403	0.488	0.529	0.034	0.319	0.225	0.059	0.484	**0.947**

Note: The diagonal line of correlation matrix represents the square root of AVE.

attractiveness of incumbent IT products. In contrast, the lock-in effects of inertia and switching cost make switching to an alternative difficult and higher switching cost increases inertia. Moreover, the constraint factor inertia has a positive impact on the dedication

factor satisfaction. The relationship between the relative advantage of incumbent and satisfaction is insignificant. It suggests that consumers view realizing their expectation as being more salient than instrumentality of IT in forming affect (Bhattacherjee,

Table 6
Results of hypothesis testing.

Hypothesis	Path	Coefficients	S.E.	T-value	Result
H1	Satisfaction → loyalty	0.352[***]	0.059	5.927	Supported
H2	Relative advantage → loyalty	0.168[***]	0.045	3.726	Supported
H3	Relative advantage → satisfaction	0.032	0.039	0.817	Not supported
H4	Confirmation → satisfaction	0.655[***]	0.045	14.604	Supported
H5	Confirmation → relative advantage	0.252[**]	0.075	3.343	Supported
H6	Inertia → loyalty	0.357[***]	0.064	5.586	Supported
H7	Inertia → satisfaction	0.270[***]	0.045	5.988	Supported
H8	Inertia → relative advantage	0.104	0.085	1.233	Not supported
H9	Switching cost → loyalty	0.121[**]	0.043	2.802	Supported
H10	Switching cost → inertia	0.439[***]	0.046	9.437	Supported

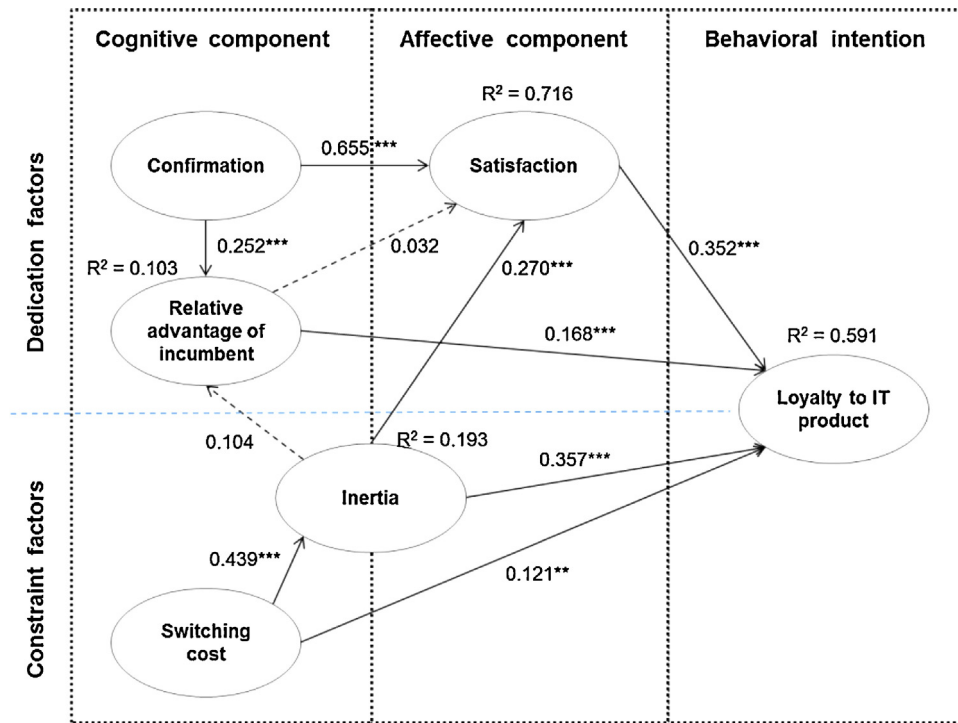[**] $p < 0.01$.
[***] $p < 0.001$.

Fig. 2. PLS analysis of research model.

2001). The relationship between inertia and the relative advantage of incumbent is insignificant in the context of IT products. This finding reveals that no matter the levels of inertia customers keep comparing the benefits of the incumbent to those of the alternative in a highly competitive market, e.g., an IT product market.

6. Discussion and conclusion

Our findings based on data from actual users of smartphones provide strong support for the dual-factor model proposed in this study. Dedication factors and constraint factors simultaneously influence consumers' intention to rebuy and continue to use an IT product. Additionally, cognitive and affective factors are interrelated and together influence consumers' behavioral intentions.

6.1. Theoretical implications

Computing has deeply penetrated our life outside of work, and IT is being inserted into more and more everyday artifacts. However, the vast majority of IS research still deals with the use of IT by organizations and pays much less attention to consumers' use of IT in everyday life (Yoo, 2010). This study expands the IS research domain by investigating consumers' loyalty to IT product.

This study demonstrates that both dedication and constraint factors influence consumer loyalty to IT product. These two contrasting types of factors have seldom been examined simultaneously in the IT disciplines. In addition to dedication factors, constraint factors play important roles in keeping consumers from switching to an alternative. Moreover, few studies have considered
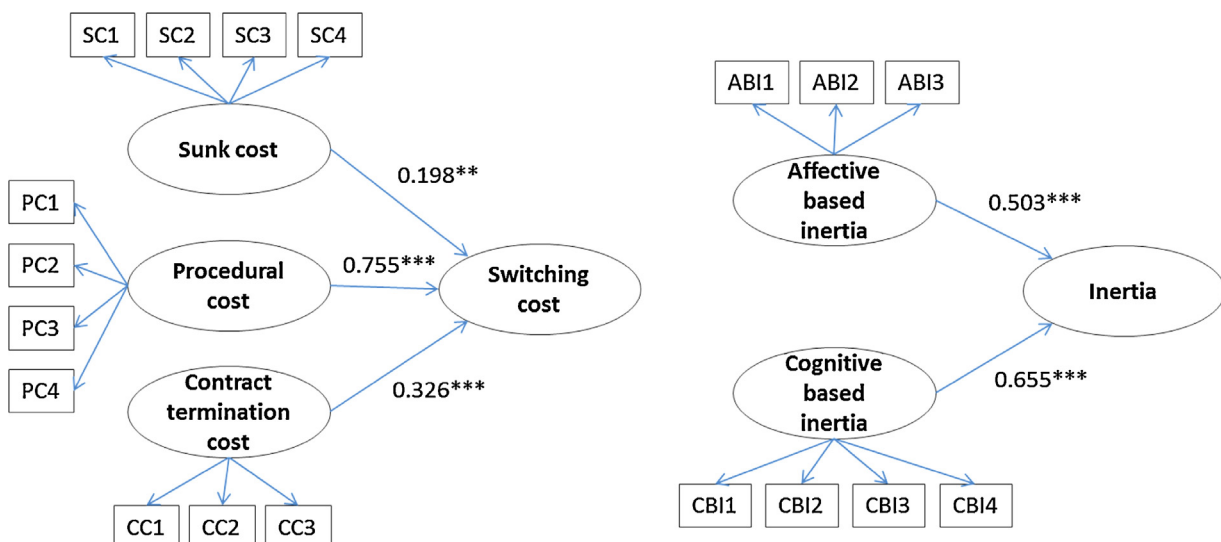

Fig. 3. Path coefficients between first- and second-order constructs.
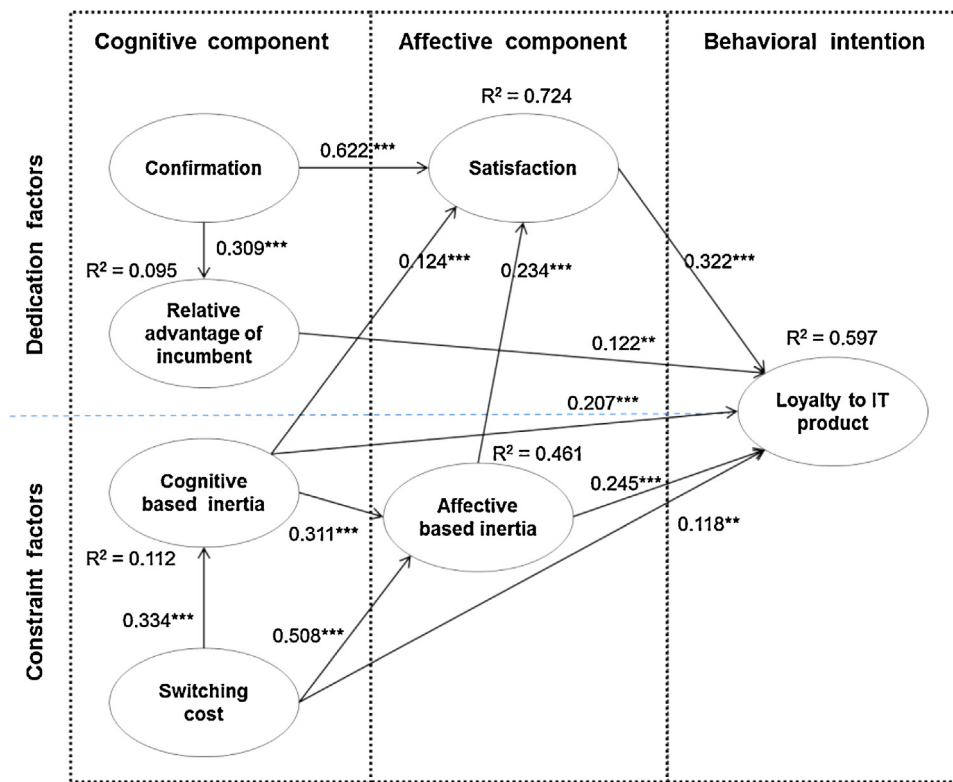
Fig. 4. PLS analysis of extended research model.

the relationship between dedication and constraint factors. This study has confirmed the impact of the constraint factor inertia on the dedication factor satisfaction. An inertial consumer has a positive emotional response to the status quo and therefore keeps believing the incumbent product can satisfy their needs. Furthermore, prior studies reported that satisfaction is the key driver to develop true loyalty (Licata & Chakraborty, 2009) and inertia is a primary component of spurious loyalty (Dick & Basu, 1994; Wu, 2011a). True loyalty represents repeat or concentrated purchasing that is associated with an attachment or commitment to attributes of the brand. Spurious loyalty represents repeat purchasing in the absence of an attachment to brand attributes (VonRiesena & Herndon, 2011). Consumers with spurious loyalty are more prone to switching in a highly competitive market if alternative attractiveness is high and switching cost is low (Wu, 2011a). Our study finds that inertia is positively associated with satisfaction, which implies that inertia has an impact on true loyalty. Inertial consumers are unwilling to give up the status quo and feel comfortable with the incumbent IT product. They believe that the incumbent IT product is good enough for them and thus their satisfaction and true loyalty can be improved. This study enhances our understandings of the relationship between dedication and constraint drivers of loyalty.

From the cognitive and affective perspectives, the findings have confirmed that both cognitive and affective factors have impacts on loyalty. Furthermore, the dual-factor model demonstrates the cognition–affect–behavior sequence. Cognitive processing takes place in the first stage. Next, the cognitive responses affect affective processing in the second stages. Finally, consumers form their behavioral intentions based on both cognitive and affective responses. Some studies have verified Oliver's (1999) cognitive, affective, and conative phases of consumer loyalty. Evanschitzky and Wunderlich (2006) reported that a consumer's perceived performance influences his/her overall satisfaction and further affects behavioral intention to continue buying. Ha et al. (2009) noted that customer orientation and perceived quality have an impact

on satisfaction that leads to brand loyalty. Matthews, Son, and Watchravesringkan (2014) considered brand image and perceived quality in the cognitive stage, brand emotional value and satisfaction in the affective stage, and brand loyalty in the conative stage. They found that brand emotional value and satisfaction are antecedents to brand loyalty. Brand image is positively related with brand emotional value and satisfaction; brand perceived quality is positively related with brand emotional value. However, these studies focus only on dedication factors. Our study demonstrates the cognition–affect–behavior loyalty phases by considering both dedication and constraint factors. We show that switching costs influence inertia and further affect loyalty. The extended model shows that cognitive based inertia is positively associated with affective based inertia. Few studies have paid attention to the both constraint factors as they relate to rational decision making (e.g., switching cost) and decision makers' psychological traits (e.g., inertia).

Prior ECM studies focused on the relationships between confirmation, perceived usefulness, satisfaction, and continuance intention without considering alternative products or services (Bhattacherjee, 2001; Chen et al., 2013; Halilovic & Cicic, 2013; Lee & Kwon, 2011). This study focuses on relative advantage of incumbent instead of perceived usefulness since the market of consumer IT products is a highly competitive market with a number of alternatives. The findings show that relative advantage of incumbent determines consumer loyalty to IT product. Confirmation of expectations causes consumers to perceive the incumbent IT product is superior to alternatives. Confirmation is more important than relative advantage of IT product in forming consumers' satisfaction.

The dual-factor model was developed based on the solid theories: ECM and SQB theory. These theories are complementary to each other and consider the effects of both cognitive and affective factors on behavioral intentions. Thus, the dual-factor model can explain consumers' loyalty to IT product powerfully (59.1% of the variance).

6.2. Practical implications

IT vendors are suggested to take advantage of both dedication and constraint factors for building consumer loyalty. Customers can be locked in via switching costs and inertia. For example, an IT vendor could employ proprietary technology which would increase the costs of learning a new alternative IT product and converting data and applications to support that new IT product. Providing a variety of accessories and applications to customers for supporting the incumbent IT product can increase sunk costs. IT vendors could provide incentives to attract early adopters and increase early termination fees, thus, the adopters would form inertia and become reluctant to consider alternatives. Making customers feel comfortable with the products and feel stress if they have to change can relieve the effects of low satisfaction levels.

IT vendors must understand and manage their customers' expectations and design products that can meet or even surpass these expectations in order to increase customer satisfaction. Customers' needs constantly change, and their expectations vary accordingly. IT vendors must be flexible and continuously improve their technology in order to enhance user satisfaction. If the enterprise wants to be competitive, it needs to perform a so-called "expectation management strategy" (Shapiro & Varian, 1999). For example, companies can adopt the strategy of introducing vaporware, pre-announcing upcoming products as soon as possible so as to freeze their rivals' sales. The strategy will influence consumer expectations and reduce the attraction of other products. If consumers know the vendor will release a new product very soon, they are less likely to switch to another vendor. Shapiro and Varian (1999) also suggested that the most direct way to manage expectations is by assembling allies and making grand claims about your product's current or future popularity. In other words, consumers should be made to believe that the vendor will always support the product and continuously invest in it.

The present study has found that relative advantage of IT product is positively related to loyalty. An IT vendor must provide considerable advantages that outstrip all other products available on the market. Success in market competition is the result of the product's performance (e.g., retail price, overall quality, and innovative features) relative to all other products available on the market (Shamsie, Phelps, & Kuperman, 2004). Both iPhones and Android phones have their own advantages. For instance, Apple's iPhone provides a better user experience by integrating hardware, software, services and user interfaces. This advantage attracts consumers to use the iPhone and spend more time with their devices. Google's offering of the Android operating system as open source software provides manufacturers and developers with considerable freedom, so a lot of interrelated devices and apps have been developed. Android smartphones are available from various manufacturers and come with a wide variety of options. Customers can freely choose the Android phone that best suits their needs.

Customers can demonstrate their loyalty in several ways. They can choose to stick with a firm, ignore the attractiveness of others brands and increase or upgrade their purchases. Because loyal customers make those valuable contributions, their value always exceeds that of new customers. Thus, vendors should build customer loyalty, identify, contact and lock in loyal customers.

6.3. Limitations and future research

This research is a cross-sectional study. A longitudinal study of competitive products would have clearer results and is thus recommended for future research. This study selected smartphones as its empirical context. Although smartphones possess the main technology features of IT products, other types of IT products need to be investigated to improve the generalizability of the proposed model. Moreover, this study adopted an Internet survey that may encounter self-selection biases.

This study has discovered the major determinants of loyalty to IT product including both dedication and constraint factors. The predictors of these factors need to be investigated further. For instance, switching cost is a significant source of inertia, but it explains only 19.3 percent of inertia. Other sources of inertia should be determined and examined. Alternative sources of the other predictors of satisfaction and relative advantage are also worthy of future research. Moreover, the connection between conative loyalty and action loyalty is worthy of future research. Action loyalty is commitment to the action of rebuying. Consumers convert intentions to actions need an additional desire to overcome obstacles that might prevent the act (Oliver, 1999). Prior studies have confirmed the positive relationship between conative loyalty and action loyalty (Kim, Kim, Jolly, & Fairhurst, 2008; Martinelli & Balboni, 2012). However, how a consumer moves from conative loyalty to action loyalty and how IT vendors facilitate this, need further investigations.

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