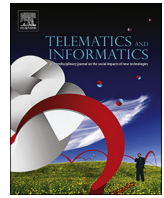




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Predicting continuance intention toward mobile branded apps through satisfaction and attachment

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ABSTRACT

An increasing number of companies have created branded apps to communicate with and satisfy the needs of target audiences. The interactive features of smartphone apps strengthen the brand–consumer relationship and help consumers develop positive brand attitudes. However, few studies incorporate the brand–consumer relationship into the branded apps context. Through integrating brand attachment into the expectation confirmation model, the current study investigates the antecedents of continuance intention toward branded apps. Data collected from 497 users of MyStarbucks are analyzed by using structural equation modeling. The findings reveal the brand attachment–satisfaction relationship is nonrecursive and that both these factors positively influence continuance intention. Expectation confirmation also influences brand attachment and perceived usefulness. Moreover, perceived usefulness influences continuance intention directly or indirectly through satisfaction. Finally, brand–self congruity influences brand attachment, whereas perceived complementarity influences satisfaction and perceived usefulness.

1. Introduction

The rapid development of the smartphone market has been followed by an expansion in the diversity of smartphone applications (apps). Smartphone apps that extend the capabilities of phones enable users to perform particular tasks (Wotrich et al., 2018). The worldwide smartphone app market is estimated to reach US\$188.9 billion by 2020 (Statistica, 2017). Because smartphone apps provide a convenient and pleasant consumer experience, they can be considered specific marketing tools (Kim et al., 2014; Hyeuk, 2016; McLean et al., 2018). An increasing number of companies have recently shown interest in creating branded apps to communicate with and fulfill the requirements of target audiences.

The success of smartphone apps is determined by consumers' adoption of such apps (Chen et al., 2012). Several studies apply widely used approaches, including the technology acceptance model (Shen, 2015; Rigopoulou et al., 2017; Okumus et al., 2018), theory of planned behavior (Carter and Yeo, 2016; Park et al., 2014), and value-based adoption model, to understand customers' initial adoption of smartphone apps (Kang, 2014; Zheng et al., 2013; Kim et al., 2016). However, information system initial adoption is different from the postadoption behavior, such as continuance intention, because postadoption behavior represents conscious decisions from previous experience and considers how usage behavior changes with time (Zheng et al., 2013). Although first-time use is crucial for a new system success, long-term viability is determined by continued use and not by initial adoption (Bhattacharjee, 2001). Because customers can easily switch to an alternative in the context of mobile services, service providers must concentrate on

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the continued use.

Studies examine the determinants of continuance behavior toward web-based applications or services (Osah et al., 2017; Oghuma et al., 2016; Fang, 2017; Zhou, 2013), e-learning or web-based learning (Lee, 2010; Chiu and Wang, 2008; Lin, 2012; Wu and Chen, 2017), and virtual communities (Zhao et al., 2013; Gong et al., 2018; Huang et al., 2018). The expectation confirmation model (ECM) suggested by Bhattacharjee (2001) can be regarded as the most adopted approach for investigating users' continuance behaviors (Ambalov, 2018). Accordingly, this study applies the ECM to explore the determinants of continuance intention in the context of branded apps.

The focus of research conducted on ECM shifts from cognition to affection. Many studies extend the ECM by incorporating affective components, such as enjoyment and playfulness (Wen et al., 2011; Mouakket, 2015; Oghuma et al., 2016). Lee and Kwon (2011) propose that these affective factors are temporary and can be changed easily depending on the research context; they thus recommend that a consistent affective factor must be determined. The current study considers a branded app as a strategic communication weapon that is adopted by companies for promoting their brand identity and customer-brand interaction (Tseng and Lee, 2018). By enhancing customer engagement with brand-related content, a branded app establishes an emotional connection with its customers (Fang, 2017). The attached brand name may prompt loyal customers to repeatedly use the app because of the close relationship with the brand. The interactive features of smartphone apps strengthens the customer-brand relationship and helps consumers to develop positive brand attitudes (Kim et al., 2015). However, the number of studies exploring self-based brand-consumer relationship in the branded apps context is relatively less. Given that the concept of the self delineates how one processes information and behaves, self-relevance plays an essential role in the customer-brand relationship (Park et al., 2013). Hew et al. (2017) indicate that brand attachment represents a consumers' affections for and self-recognition with a brand. They argued that the persistent effect of an enduring brand-consumer relationship warrants further consideration in the context of branded apps usage. Accordingly, the current study considers brand attachment as an affective factor to represent brand-customer relationship.

Because firms face the challenge of capturing consumers' attention by promoting their continued use of branded apps, this study integrates brand attachment into the ECM to investigate the antecedents of consumers' continuance intention. In addition to the relationships between satisfaction, perceived usefulness, confirmation, and continuance intention, this study explores the effect of confirmation on brand attachment, which may further influence continuance intention. The current study further investigates the effect of perceived complementarity on satisfaction and perceived usefulness and that of brand-self congruity on brand attachment. Moreover, this study explores not only the reciprocal relationships between brand attachment and satisfaction, but also their influences on continuance intention toward branded apps.

The current study differs from previous research in three major respects. First, branded apps are developed by companies to promote their brand, and they represent a new means of strengthening brand-consumer relationships (Kim et al., 2015). Several studies have examined attitudes and purchase intentions toward brands (Bellman et al., 2011), crucial attributes of branded apps (Kim et al., 2013), strategies underlying branded apps (Zhao and Balagué, 2015), interaction-based benefits of branded apps (Alnawas and Aburub, 2016), and brand experience or engagement (Hyeuk, 2016; Kim and Yu, 2016). However, relatively few studies have focused on self-based brand-consumer relationships in the context of branded apps. By integrating brand attachment and the ECM, this study empirically examines brand-consumer relationships to investigate consumers' continuance intention.

Second, branded apps provide a channel for marketing as well as communicating and interacting with consumers and represent a novel method for enhancing brand image and service satisfaction (Kim and Yu, 2016). According to task-technology fit theory (Goodhue and Thompson, 1995), a user attempts to complete a task by using technology with features that correspond with the task requirements. Branded apps can be considered to constitute an extension of the primary product that provide complementary services. Consumers tend to use branded apps when the online services they provide match offline services offered at a retail store. Consumers engage in behaviors that reinforce their self-concept; thus, brand-consumer fit cannot be neglected. This study explores the mechanisms through which the complementarity of online and offline services influences satisfaction. It also examines the mechanisms through which brand-consumer congruity facilitates brand attachment.

Third, research regarding whether attachment is a predictor of satisfaction (or vice versa) remains contradictory and ambiguous. For example, Prayag and Ryan (2012) confirm the relationship between place attachment and satisfaction. Levy and Hino (2016) indicate that customers' emotional attachment positively influences their satisfaction level. The current study verifies the non-recursive relationship between satisfaction and brand attachment. Although nonrecursive structural equation models are less frequently applied than are recursive mediated models, relevant studies have recommend that researchers elucidate the satisfaction-attachment relationship (Ramkissoon and Mavondo, 2015). The current study develops a comprehensive research framework to understand the mechanisms through which product benefits and the brand-consumer relationship affect consumers' continuance intention toward branded apps. This understanding may assist practitioners develop strategies for the effective development of brand-consumer relationships through the use of branded apps.

The rest of this paper is organized as the following. Section 2 provides the theoretical background of this study, and Section 3 presents the development of hypotheses. Section 4 illustrates the methodology and research design, and Section 5 presents the analysis results. Finally, Section 6 discusses the research findings, theoretical implications, managerial implications, as well as research limitations for future research.

2. Theoretical background

2.1. Branded apps

Branded apps designed by a brand firm prominently display brand identity during customer interactions (Bellman et al., 2011; Fang, 2017). Branded apps deliver product information to consumers, which strongly encourages consumer–brand interactions (Jin, 2016). In particular, branded apps have transformed consumer–brand interaction mechanisms from being conversation-centric to instant consumer actions (Kim and Yu, 2016). For example, branded apps feature a high degree of consumer engagement and interactive communication in which consumers have the ability to control the apps using their mobile devices. Furthermore, smartphone apps provide pull marketing opportunities; thus, companies face the challenge of capturing consumer attention in the context of mobile services (Zhao and Balagué, 2015; Jung, 2014). Several global brands, such as McDonald's, Volvo, Levis, Pizza Hut, BMW, and Louis Vuitton, have developed and distributed branded apps to engage with consumers. Therefore, branded apps can be an effective tool for developing brand relationships.

2.2. Overview of ECM

Expectation confirmation theory proposed by Oliver (1980) posits that perceived performance and expectations engender post-purchase satisfaction, which subsequently leads to repurchase intention. Bhattacharjee (2001) argues that repurchase decision is similar to continuance intention; thus, Bhattacharjee extends the ECM according to the expectation confirmation theory. According to the ECM, three variables, namely satisfaction, expectation confirmation, and perceived usefulness, determine continuance intention toward an information system. Satisfaction refers to the ex post evaluation of using an information system (Mouakket, 2015). It can be reflected in users' perceptions as positive, indifferent, or negative. Expectation confirmation refers to users' perceptions of the congruity between their expectations and the actual performance of the information system. Finally, perceived usefulness represents users' perceptions of the degree to which they can benefit from using the information system (Bhattacharjee, 2001). Expectation confirmation influences perceived usefulness and satisfaction, and perceived usefulness influences satisfaction (Bhattacharjee, 2001). Satisfaction and perceived usefulness directly influence continuance intention (Bhattacharjee, 2001).

The representativeness of the ECM has been verified in several studies (Oghuma et al., 2016; Gao and Bai, 2014; Chang and Wang, 2019). Studies on information technology or systems, including mobile apps (Hsu and Lin, 2015), e-learning (Lee, 2010; Lin, 2012; Chow and Shi, 2014), electronic textbooks (Stone and Eveleth-Baker, 2013; Joo et al., 2017), and mobile or web-based services (Lee and Kwon, 2011; Oghuma et al., 2016; Mouakket, 2015; Nascimento et al., 2018), have adopted the ECM. More specifically, the ECM has been widely used to explore continuance intention in various mobile service contexts. Applying the ECM framework to the context of branded apps is appropriate because repeated app usage represents continuance intention. This study explores consumers' continuance intention by applying the ECM because mobile apps can be considered a type of consumer product.

2.3. Brand attachment

The original definition of attachment is the mutual relationship between a mother and child (Bowlby, 1969). According to attachment theory, an individual remains in the proximity of specific objectives to evade threats and to seek affective consolation (Pedeliento et al., 2016). When an individual is highly attached to an object, the individual is strongly inclined to make efforts to establish proximity to and connect with the object. Because attachment represents an affectional bond linking a person with an object, it is transformed in marketing through concepts, such as place attachment (Ramkissoon and Mavondo, 2015; Gu and Ryan, 2008; Brocato et al., 2014; Chung and Han, 2017), intangible service marketing (Mende et al., 2013), and brand attachment (Smaoui and Temessek Behi, 2011; Zhang et al., 2015).

Consumers may develop attachment to several targets, such as people (Bowlby, 1969), social media (VanMeter et al., 2015), products (Pedeliento et al., 2016), and places (Ramkissoon and Mavondo, 2015). Brand attachment represents an individual's perceptions toward a brand (Malär et al., 2011). Brand love, affection, and connection underpin the attachment between a brand and a customer (Thomson et al., 2005). Strong or enduring feelings, including connection, affection, and passion, strengthen the customer–brand relationship. Compared with other consumer behavior constructs, such as engagement and commitment, brand attachment focuses on the customer–brand relationship; it explains the complex customer–brand relationship and constitutes consumer loyalty behavior (Bahri-Ammari et al., 2016). Moreover, brand attachment is an emerging construct, representing emotional connections between a consumer and a brand (Smaoui and Temessek Behi, 2011). Researchers, including Chung et al. (2016), and Japutra et al. (2018), apply attachment theory to explore the customer–brand relationship. Because brand attachment is a brand–consumer relationship construct and can be considered an emotional factor associated with user experience, this study uses brand attachment to explore consumers' continuance intention toward branded apps.

2.4. Online–offline service fit and brand–consumer relationship fit

Task–technology fit theory proposed by Goodhue and Thompson (1995) states that the fit between a task and the technology used for task implementation determines the success of an information system. As the degree of task–technology fit increases, the performance of a particular task is enhanced (Dang et al., 2018). Branded apps are tools that help customers to perform a particular task; thus, task–technology fit must be considered during the exploration of consumers' continuance intention. This study uses perceived

complementarity to replace the notion of task–technology fit for the following two reasons: First, branded apps are used to acquire complementary services and not to complete a task. For example, consumers are able to receive the latest news or monitor their personal accounts by using MyStarbucks app; however, they must visit a Starbucks store to buy coffee. Second, the concept of complementarity explains task–technology fit (Nicolaou, 2002). As suggested by Xu et al. (2013), complementarity can be employed for exploring task–technology fit. Moreover, three types of complementarity are proposed: complementarity of software and hardware platforms, complementarity of a software and its applications, and complementarity of services and applications. To align the application of task–technology fit with the research context, the current study elucidates the fit between applications and services. Perceived complementarity refers to users' perceptions of the congruity between an extended product and a parent brand in satisfying their requirements (Henseler et al., 2010; Tseng et al., 2018). Branded apps can be considered to constitute an extended product that provides complementary services to the primary product. For example, consumers can check accumulated points through MyStarbucks app, without visiting the corresponding stores or requiring staff members' assistance. Perceived complementarity is considered a critical determinant that drives consumers to adopt branded apps. In this study, perceived complementarity represents the fit between branded apps (online services) and services at retail stores (offline services).

To understand consumers' continuance intention toward branded apps, this study considers not only the fit between online and offline services but also a consumer's perceived fit between their self-concept and a brand. Brand–self congruity represents the degree to which a brand image or personality fits an individual's self-concept (Sirgy, 1982). Consumers pursue self-expression by forming attachments to brands (Peng et al., 2014); however, if consumers' beliefs and behaviors are inconsistent, consumers may develop an unpleasant or inconsistent attitude toward the brand. A stronger connection with a brand results in stronger attachment (Pedeliento et al., 2016). Consumers' self-perceptions direct their behaviors and reinforce their self-concept (Moliner et al., 2018). Self-congruence facilitates the development of brand attachment; this is because brand attachment is achieved by evaluating consumers' self-concept and the brand (Thomson et al., 2005). Moreover, attachment is a sign of differentiation from others and an expression of self-concept (Chung et al., 2016). Therefore, this study considers brand–self congruity as a determinant of brand attachment.

3. Hypothesis development

The ECM posits that users perceive high levels of satisfaction and usefulness when the actual performance of a product meets their expectations of using an information system. Several studies, such as those by Oghuma et al. (2016), Ayanso et al. (2015), and Lee (2010) have proposed that confirmation influences perceived usefulness in various information system usage contexts, such as of electronic medical records, e-learning technologies, and mobile- or web-based services. The validity of the ECM has been confirmed across a wide range of information technology products and services (Hsu and Lin, 2015), and its extension in the context of branded apps is appropriate. If the performance of a branded app meets consumers' expectations, then the consumers perceive the usefulness of the branded app. Accordingly, the following hypothesis is proposed.

H₁: Expectation confirmation exerts positive effects on the perceived usefulness toward using a branded app.

Based on the ECM, expectation confirmation influences satisfaction in the information system usage context. Various studies have observed the positive impact of expectation confirmation on satisfaction. For instance, Lee and Kwon (2011) indicate that confirmation of initial expectations of a web-based service leads to subsequent satisfaction. Lin et al. (2012) propose that consumers' expectations are confirmed if they are satisfied with Internet Protocol television. Nascimento et al. (2018) posit that when the initial expectation is similar to users' actual expectation, users exhibit higher levels of satisfaction with smartwatches. Similar to other information system usage contexts, consumers tend to be satisfied with the app when the performance of a branded app is consistent with their expectations. Thus, this study proposes the following hypothesis.

H₂: Expectation confirmation exerts positive influences on satisfaction with a branded app.

The utility of the information system enhances user satisfaction in the ECM. Stone and Eveleth-Baker (2013) observe that the perceived usefulness of e-texts is positively related to satisfaction with the e-texts. Ayanso et al. (2015) indicate that physicians' perceived usefulness is associated with satisfaction in the context of electronic medical records systems. In the current research context, consumers may benefit from using the branded app, such as receiving the latest news or locating the nearest stores. The more benefits consumers derive from the branded apps, the higher their level of satisfaction. Therefore, the following hypothesis is proposed.

H₃: Perceived usefulness exerts positive effects on satisfaction with a branded app.

According to the ECM, perceived usefulness influences continuance intention toward information systems (Bhattacharjee, 2001). Numerous studies, such as those by Gao and Bai (2014), Oghuma et al. (2016), and Nascimento et al. (2018), have suggested that perceived usefulness positively influences continuance intention. Similarly, when consumers perceive the usefulness of branded apps, they tend to continue to use them. Thus, the following hypothesis is proposed.

H₄: Perceived usefulness exerts positive effects on continuance intention.

The ECM proposes that continuance intention is determined by an individual's satisfaction with an information system. Several studies implemented the ECM to explore users' continuance intention. For instance, Zheng et al. (2013) suggest that user satisfaction in a virtual community influences users' continuance intention to consume and contribute in the virtual community. Ramkissoon and Mavondo (2015) propose that visitors' satisfaction with a place is positively related to their proenvironmental behavioral intention. Nascimento et al. (2018) observe that users may intend to continue using a smartwatch when they derive satisfaction from the smartwatch. Because branded apps can be seen as information technology tools, the ECM can be applied to the context of branded apps. When consumers are satisfied with the services provided by the branded apps, they tend to continue using them. Therefore, this study proposes the following hypothesis.

H₅: Satisfaction exerts positive influences on continuance intention.

Products with complementary functions and services are valuable to consumers because the availability of these functions enhances consumers' perception of goal achievement. Perceived complementarity enhances consumer satisfaction because consumer satisfaction is markedly determined by value (Deng et al., 2010). Chiu et al. (2013) suggest that providing complementary apps for social networking sites stimulates user satisfaction. Gao and Bai (2014) and Zhao and Lu (2012) indicate that apps that increase the availability of complementary products improve user satisfaction toward web-based services. Relevant studies have mainly focused on the complementary supporting tools provided to users. However, this study analyzes the fit between branded apps (online services) and services at retail stores (offline services). In the context of this study, the MyStarbucks app offers complementary functions for consumers at Starbucks stores or on websites. User satisfaction improves when consumers perceive that branded apps provide complementary services. Therefore, the following hypothesis is proposed.

H₆: Perceived complementarity exerts positive influences on satisfaction with branded apps.

Perceived complementarity denotes the availability of functions provided by mobile apps aimed at substituting for offline services. With increased perceived complementarity, consumers ability to acquire complementary functions and services increases (Zheng et al., 2017). Complementary services improve users' utility perceptions with higher levels of complementarity (Lin and Lu, 2011). Furthermore, Gao and Bai (2014) and Kang and Namkung (2016) have observed that perceived complementarity positively influences perceived usefulness in the context of social network sites. Complementarity in either online or offline setting provides complementary services to consumers. Being able to derive additional information from branded apps, such as through monitoring personal accounts or locating the nearest stores positively influences consumers' perceived usefulness of the branded apps. Specifically, branded apps that provide complementary information are valuable offer additional value to consumers, and this value further improves consumers' perceived usefulness. Therefore, the following hypothesis is proposed.

H₇: Perceived complementarity exerts a positive influence on perceived usefulness.

Brand-self congruity can be achieved when a brand helps consumers maintain their self-image or improve their self-esteem (Phua and Kim, 2018). Consumers are motivated to establish a personal identity that distinguishes them from others (Sirgy et al., 1991); therefore, if a brand helps consumers display their individuality and uniqueness, then consumers may develop a positive emotional connection with the brand. Brand-self congruity improves consumers' affective responses to a brand. For example, Islam et al. (2018) suggest that the brand-consumer emotional bond is strengthened when a brand is perceived as a part of a consumer and reflects their behavior. Pedeliento et al. (2016) argue that a strong brand-consumer connection can evoke feelings of attachment. This study assumes that a brand-consumer relationship would not differ between online and offline settings because the concept of brand-self congruity has been verified by several studies conducted in online stores (e.g., Badrinarayanan et al., 2014) or at offline shopping malls (e.g., El Hedhli et al., 2017). When consumers perceive a strong degree of congruity with a brand, they tend to develop an emotional bond with the brand. Accordingly, the following hypothesis is proposed.

H₈: Brand-self congruity exerts a positive effect on brand attachment.

Expectation confirmation refers to the fit between the actual performance of branded apps and consumer expectations of using them. It is similar to functional congruence, which signifies the degree of correspondence between product functions and the functions expected by consumers (Sirgy et al., 1991). Expectation confirmation and functional congruence refer to consumers' evaluation of the discrepancies between their expectations and the actual performance of products. Huber et al. (2010) suggest that the quality of consumer-brand relationships improves when consumers' perceived functional congruence increases. Customer-brand relationship quality improves if consumers perceive that a product's functional attributes meet their expectations. Park et al. (2010) suggest that brand attachment is the ultimate objective of the customer-brand relationship. Jahn et al. (2012) argue that partner quality represents the strength of a sense of "we-ness," which refers to consumers' perceptions of being wanted and cared for. They further propose that partner quality is an antecedent of brand attachment. Specifically, functional congruence improves the customer-brand relationship, thereby further enhancing brand attachment. Few studies have explored the influence of expectation confirmation on brand attachment; therefore, this study proposes that when a branded app satisfies consumers' functional requirements, consumers tend to rely on the brand, thus increasing the degree of attachment. Therefore, the following hypothesis is proposed.

H₉: Expectation confirmation exerts a positive influence on brand attachment.

A consumer's emotional dependency on a brand is reflected by their emotional attachment with the brand (Theng So et al., 2013). Consumers invest time, resources, and effort in maintaining a connection with a brand if they experience a high degree of attachment (Smaoui and Temessek Behi, 2011). Moreover, emotional considerations regarding consumers' experience influence their purchasing decisions. Therefore, brand attachment determines consumers' behavioral reactions, such as purchase intentions and brand extensions (VanMeter et al., 2018). Hwang et al. (2019) also propose that brand attachment motivates consumers to interact with a brand and cultivates customer loyalty, thereby promoting purchase and use decisions. This study investigates the direct influence of brand attachment on continuance intention. Accordingly, emotional attachment between a brand and consumers encourages continuance intention decisions. Therefore, the following hypothesis is proposed.

H₁₀: Brand attachment exerts positive effects on continuance intention.

Few studies have explored the nonrecursive relationship between brand attachment and satisfaction. According to Bhattacharjee (2001), satisfaction refers to consumers' ex post evaluation, and it can be presented as negative, positive, or indifferent. Satisfaction is an emotional evaluative response (Hsu and Lin, 2016). Consumers with strong brand attachment positively evaluate their service experience. Belaid and Temessek Behi (2011) propose that stronger attachment with a brand leads to higher levels of customer satisfaction. Dennis et al. (2016) and Levy and Hino (2016) determine that consumers strongly attached to their institution have high levels of satisfaction. Similarly, consumers attached to a brand have positive perceptions of its branded apps. Therefore, the following hypothesis is proposed.

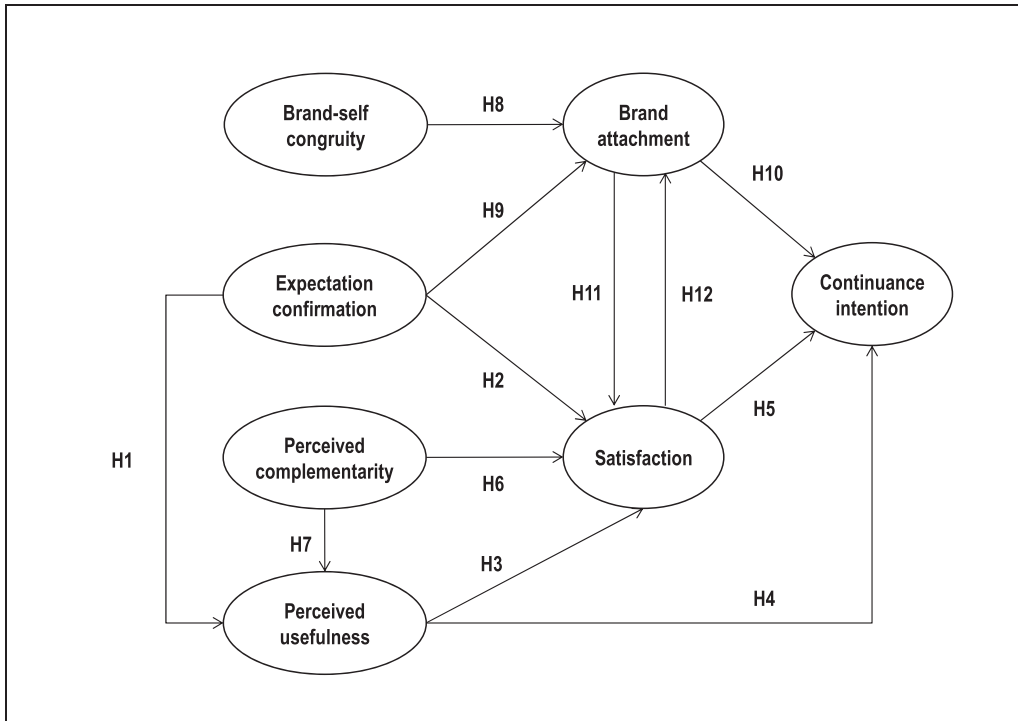


Fig. 1. The Research Framework of this Study.

H₁₁: Brand attachment exerts positive effects on satisfaction.

When a brand satisfies consumer expectations, the consumers identify with that brand (Kuenzel and Halliday, 2008). High levels of identification enhance the brand–customer relationship. Specifically, consumers tend to develop attachment to a brand if the brand meets their expectations (Thomson et al., 2005). In addition, satisfaction refers to the cumulative experience of consumers and the quality of their relationship with the brand. Satisfied consumers tend to use symbols related to a brand to express brand personality (Chiu et al., 2010); thus, brand personality influences consumers’ brand attachment (Orth et al., 2012). Higher degrees of brand satisfaction engender higher degrees of brand attachment. Orth et al. (2012) and Bahri-Ammari et al. (2016) suggest that brand attachment can be explained by customer satisfaction. Therefore, when consumers are highly satisfied with a brand, they develop a strong attachment to it. Accordingly, the following hypothesis is proposed.

H₁₂: Satisfaction with branded apps exerts a positive effect on brand attachment.

Fig. 1 shows the research model.

4. Methodology

4.1. Measurement development

Most measurement scales used in this study are obtained from relevant studies and adapted accordingly. As suggested by Wieland et al. (2018), scale purification improves the measurement properties of newly developed or existing scales. Employing a structured and comprehensive process of developing measurement models is imperative. Accordingly, a scale purification process based on one introduced by Churchill (1979) is developed for the questionnaire survey used in this study. Following Wieland et al. (2018), statistical and judgmental criteria are adopted to assist in making decisions pertaining to scale purification. Statistical criteria involve using statistical tests for quantitative data to compare the results of a calculation with a cut-off value, whereas judgmental criteria involve the conduction of qualitative assessments to test the appropriateness of the constructs and their scales.

The questionnaire items in this study are evaluated using a seven-point Likert-type scale, with anchors ranging from one (“strongly disagree”) to seven (“strongly agree”). To correct ambiguous wordings and justify the instrument length, a pretest is performed with 1 manager of Starbucks, 2 employees of Starbucks, and 10 respondents familiar with branded apps. Additionally, a pilot test is conducted with 2 professors specializing in information management and 30 users of branded apps; the feedback obtained from this test is used to refine the instrument. The Appendix lists the questionnaire items.

4.2. Questionnaire administration

Data in current study are collected through an online survey. The unit of analysis is customers who use “MyStarbucks” (a branded

mobile app by Starbucks) in Taiwan. MyStarbucks is used in this study because it is a trendsetter in mobile marketing and a successful branded app worldwide (Hyeuk, 2016). In addition, Starbucks is a famous enterprise in Taiwan, with its branded app being downloaded more than 1 million times from Google Play and the App Store. The app enables customers to pay for their favorite drinks and food rapidly and easily, in addition to enabling them to tip the barista digitally or download the free pick of the week.

The developed questionnaire is distributed online between September 20 and November 10, 2017. Customers experienced in using MyStarbucks are invited to participate in the survey and are recruited from fan pages and chat rooms on Facebook and other virtual communities. To restrict the data to responsive customers, only respondents with at least one transaction on MyStarbucks are selected. A total of 497 questionnaires are determined to be valid after the elimination of duplicates and incomplete responses. The sample analysis indicates that 55% of the respondents are female individuals and that 52% have a university education. More than 61% of the respondents are aged between 20 and 34 years, and nearly 58% have 1–2 years of experience using MyStarbucks. Approximately 37% of the respondents spend more than 2 h on the app every day, corresponding to the demographics of app users in Taiwan (MIC, 2016).

Multiple tests are conducted to examine the validity of the survey data. To detect nonresponse bias, the responses of early and late returned surveys are compared (Armstrong and Overton, 1977). The differences between the two groups detected using a *t*-test are not significant, with the corresponding confidence interval being 99%. Furthermore, common method bias is examined using the analysis proposed by Harman (1967). The results reveal common method bias is not likely to be a major concern; this is because single factor is not observed, and most of the variances are not explained by the first factor.

4.3. Nonrecursive model

A nonrecursive relationship incorporates a feedback loop between two variables in a structural model. Nonrecursive approaches can be tested in a cross-sectional survey to present the viability of reality (Hsu et al., 2012). Accordingly, the current study evaluates the reciprocal brand attachment–satisfaction relationship by using a nonrecursive model. According to Wong and Law (1999), a nonrecursive model with cross-sectional data can be identified using the following three criteria: First, two reciprocal paths are available between two endogenous constructs in a nonrecursive model. One endogenous construct can be predicted by one exogenous variable called “instrumental variable.” Second, the effects of instrumental variables on endogenous constructs are expected to be similar. If the effects are not similar, the findings may be biased because a relatively large disturbance term is produced for endogenous constructs with a weak instrumental variable. Third, because two endogenous constructs are interdependent, the disturbance terms of two endogenous constructs can be correlated in the nonrecursive model.

5. Results

5.1. Assessment of measurement model

This study executes structural equation modeling (SEM) through AMOS 22.0 to test the measurement model and proposed hypotheses. Before applying SEM, multivariate normality assumption testing is necessary. If the assumption is not satisfied, then the interpretation of results may be difficult and will require a transformation of the original data set or the use of an alternative estimation method, such as maximum likelihood estimation. This study assesses normality using skewness and kurtosis indices, for which each should have values between the absolute value of 3 and 10 (Kline, 2005). The skewness index represents the equivalence of distribution, and the kurtosis index represents the peakedness of a distribution (Singla et al., 2018). In this study, the skewness index is in the range of -0.654 to 1.570 and the kurtosis index is in the range of -0.526 to 2.144 , which indicates that the data distribution does not depart from normality.

A confirmatory factor is conducted for the analysis for the measurement model, and a chi-square (χ^2) value of 627.016 with 167 degrees of freedom (df) is derived. In addition to the χ^2 test, the goodness of fit index (GFI), comparative fit index (CFI), adjusted goodness of fit index (AGFI), root mean square error of approximation (RMSEA), and normed fit index (NFI) are assessed to evaluate model fit. The χ^2/df ratio is 3.76, which is lower than the suggested criterion of 5 (Bagozzi and Yi, 1988); however, a comparison of all indices with the corresponding recommended levels (i.e., RMSEA = 0.07, GFI = 0.89, AGFI = 0.85, CFI = 0.94, and NFI = 0.91) indicates a satisfactory model fit. Although the AGFI of 0.85 is slightly lower than 0.9, the acceptable criterion of 0.8 is suppressed (Etezadi-Amoli and Farhoomand, 1996). To detect internal construct consistency and validity, this study examines composite reliability (CR), Cronbach's alpha, and the average variance extracted (AVE). Table 1 reveals that Cronbach's alpha ranges between 0.79 and 0.94; all CR statistics are higher than 0.7; and the AVE values are higher than 0.5. Therefore, these results thus demonstrate the convergent validity of the model. Finally, following the procedures recommended by Fornell and Larcker (1981), this study assesses discriminant validity. As illustrated in Table 2, sufficient discriminant validity is achieved because all interconstruct correlations are smaller than the square root of the AVE of each construct.

5.2. Assessment of structural model

According to Bagozzi and Yi (1988), a model fit with a GFI, NFI, and CFI of more than 0.9, an AGFI of more than 0.8 (preferably higher than 0.9), and a RMSEA of less than 0.08 can be considered to be satisfactory. In this study, the χ^2/df ratio is 2.89. Moreover, the structural model fits the data (RMSEA = 0.06, GFI = 0.92, AGFI = 0.88, CFI = 0.96, and NFI = 0.94). Although the AGFI of 0.88 is lower than 0.9, it is higher than the acceptance threshold of 0.8 (Etezadi-Amoli and Farhoomand, 1996).

Table 1
Factor Loadings and Reliability.

Construct	Loading	Cronbach's α	CR	AVE
Brand-self congruity		0.71	0.83	0.63
A1	0.72			
A2	0.77			
A3	0.88			
Brand attachment		0.90	0.94	0.84
B1	0.92			
B2	0.95			
B3	0.88			
Perceived usefulness		0.79	0.86	0.61
C1	0.74			
C2	0.79			
C3	0.80			
C4	0.79			
Expectation confirmation		0.80	0.88	0.71
D1	0.88			
D2	0.86			
D3	0.78			
Perceived complementarity		0.94	0.97	0.94
E1	0.97			
E2	0.97			
Satisfaction		0.81	0.89	0.72
F1	0.91			
F2	0.79			
F3	0.85			
Continuance intention		0.91	0.95	0.85
G1	0.93			
G2	0.94			
G3	0.90			

Table 2
Correlations among Major Constructs.

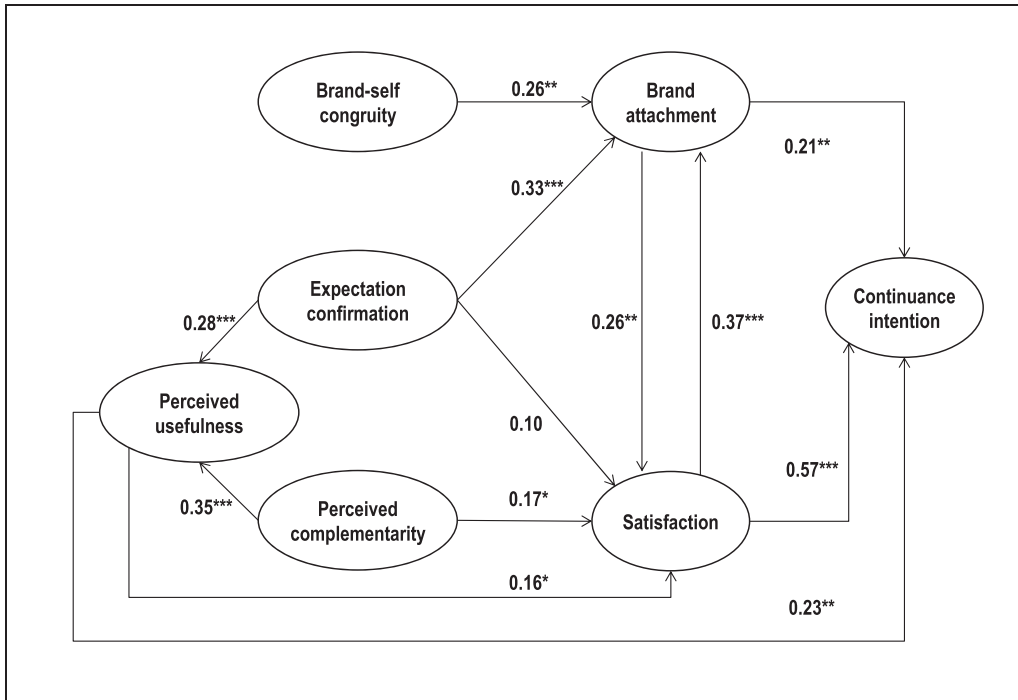
Variable	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(a) Brand-self congruity	0.79						
(b) Brand attachment	0.63	0.92					
(c) Perceived usefulness	0.48	0.45	0.78				
(d) Expectation confirmation	0.61	0.66	0.45	0.84			
(e) Perceived complementarity	0.60	0.62	0.50	0.59	0.97		
(f) Satisfaction	0.51	0.48	0.35	0.52	0.50	0.85	
(g) Continuance intention	0.53	0.51	0.49	0.46	0.62	0.56	0.92
Mean	5.20	4.93	5.12	4.64	4.97	4.62	5.01
SD	0.45	0.43	0.47	0.58	0.46	0.54	0.45

Note: Diagonal elements are the square root of AVE of the reflective scales. Off-diagonal elements are correlations between construct.

In this study, brand-self congruity, expectation confirmation, and perceived complementarity are defined as exogenous constructs, whereas satisfaction, brand attachment, perceived usefulness, and continuance intention are defined as endogenous constructs. On the basis of Kline (2005), instrumental variables can be added to a nonrecursive model for model estimation. Brand-self congruity and perceived complementarity are instrumental variables, which ensure that the model can be estimated for the nonrecursive path between brand attachment and satisfaction. In addition, the construct-level error terms of brand attachment and satisfaction can be correlated with others for model specification. Accordingly, the reciprocal brand attachment-satisfaction relationship satisfies the conditions of the nonrecursive model.

This study uses four descriptive statistical variables as control variables, namely age, gender, income, and experience using MyStarbucks, to explain the influence of extraneous factors. Fig. 2 shows that expectation confirmation exerts positive influences on perceived usefulness ($\beta = 0.28, p < .001$); however, it does not have a direct influence on continuance intention ($\beta = 0.10, p > .05$). Perceived usefulness influences satisfaction ($\beta = 0.16, p < .05$) and continuance intention ($\beta = 0.23, p < .01$). Therefore, H₁, H₃, and H₄ are supported, but H₂ is not supported. Furthermore, perceived complementarity exerts positive influences on perceived usefulness ($\beta = 0.35, p < .001$) and satisfaction ($\beta = 0.17, p < .05$), and satisfaction further influences continuance intention ($\beta = 0.57, p < .001$). Therefore, H₅-H₇ are supported.

Fig. 2 shows that brand-self congruity ($\beta = 0.26, p < .01$) and expectation confirmation ($\beta = 0.33, p < .001$) exert positive



Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Fig. 2. Results for the Proposed Model.

influences on brand attachment. Furthermore, brand attachment significantly influences consumers’ continuance intention ($\beta = 0.21$, $p < .01$). Therefore, H_8 – H_{10} are supported. As hypothesized, the relationship between brand attachment and satisfaction is non-recursive. Brand attachment significantly and positively influences satisfaction ($\beta = 0.26$, $p < .01$). Similarly, consumers’ satisfaction with the product significantly and positively influences their brand attachment ($\beta = 0.37$, $p < .001$). Thus, H_{11} and H_{12} are supported. Overall, the predictors account for 33%, 54%, 54%, and 68% of the variations in perceived usefulness, satisfaction, brand attachment, and continuance intention, respectively.

6. Research suggestions and implications

6.1. Research findings

This study produces several findings. First, expectation confirmation exerts positive influences on usefulness perceptions. Perceived usefulness significantly has influences on continuance intention or indirectly influences continuance intention through satisfaction. These findings are consistent with the ECM (Bhattacharjee, 2001), which states that perceived usefulness is determined by users’ expectation confirmation. Perceived usefulness, expectation confirmation, and satisfaction are determinants of continuance intention toward information systems (Hsu and Lin, 2015). However, this finding contradicts our prediction that expectation confirmation may predict satisfaction. A possible explanation is that expectation confirmation may directly influence perceived usefulness, which subsequently strengthens satisfaction. More specifically, the impact of expectation confirmation on satisfaction is mediated by perceived usefulness.

Second, brand–self congruity and expectation confirmation exert a positive influence on brand attachment. As proposed by Phua and Kim (2018), brand-self congruity is a crucial predictor of consumer behavior, such as choices and brand identity. When a consumer’s self-image is consistent with a brand image, their relationship with the brand is strengthened. This finding is similar to the suggestions of Malär et al. (2011) that brand a self congruity is a strong precursor of brand attachment. Additionally, perceived complementarity positively influences perceived usefulness and satisfaction toward the branded app. The complementary functions provided by branded apps offer additional services and value to consumers, thus enhancing consumers’ perceived usefulness and satisfaction levels. This finding is consistent with those of Chiu et al. (2013), who reveal that perceived complementarity tends to significantly influence consumer satisfaction with social networking sites. Moreover, brand attachment exerts positive influences on continuance intention. The finding is consistent with the claim of Peng et al. (2014), who propose that brand attachment can influence consumer behaviors and lifelong brand commitment. Accordingly, consumers with strong brand attachment are reluctant to replace a brand and thus have stronger continuance intention.

Finally, the findings suggest that the nonrecursive model is tenable because the reciprocal paths for brand attachment and

satisfaction are not equal and significantly differ from zero. Specifically, the brand attachment–satisfaction relationship is non-recursive. Consumers with brand attachment exhibit strong satisfaction with the branded app. In addition, consumers satisfied with the branded app have strong attachment to the brand. This cycle is repeated until all feedback loops are mitigated. These results confirm the findings of [Belaid and Temessek Behi \(2011\)](#), who propose an individual with higher levels of brand attachment tends to enjoy the consumption experience and thus evaluate the product favorably. The current study shows that satisfaction engenders brand attachment, which is consistent with the consideration of [Chinomona \(2013\)](#).

6.2. Managerial implications

The current study provides suggestions for the promotion of branded apps. First, the relationship between brand attachment and satisfaction is nonrecursive. With an increase in consumer satisfaction because of strengthened brand attachment, satisfaction is improved. Managers can initiate a feedback loop by enhancing consumer evaluations of the product or strengthening the brand–consumer relationship. Although continuance intention may originate from satisfaction with a branded app or attachment to a brand, the influence of brand attachment on continuance intention ($\beta = 0.37$) is stronger than that of satisfaction ($\beta = 0.26$). Brand attachment has the potential to strongly distinguish brands ([Park et al., 2010](#)), and establishing a long-term relationship with users is more crucial than offering short-term product value. Therefore, when organizational resources are limited, managers should focus on bolstering the brand–consumer relationship rather than satisfaction.

Second, consumers' brand attachment is the result of congruity between the brand and consumers. Although branded firms cannot manipulate consumers to have a personality similar to the brand image, they can position themselves to attract consumers by initiating marketing activities that deliver a strong portrayal of their brand image. For example, if firms target consumers who are interested in efficient mobile shoppers, they may promote their branded apps by advertising its money-saving mechanisms, such as accumulating points and offering rewards. For customers attracted to the latest technology, managers may design branded apps that provide rich sensory experiences through virtual, augmented, or mixed reality technology. A product that satisfies consumers' functional expectation may contribute to the attachment they experience. Specifically, a product that provides utility to satisfy customer needs is not sufficient; the product must outperform its competitors. Therefore, a brand manager must consider the usefulness of a branded app and ensure its sustained superiority.

Third, expectation confirmation may influence consumers' satisfaction with a branded app indirectly through perceived usefulness. Notably, expectation confirmation is not a determinant of satisfaction. A positive functional evaluation of consumer experiences with a branded app is a prerequisite to facilitate satisfaction. Expectation confirmation is adjusted in accordance with consumer expectations and performance evaluations. In practice, firms occasionally use marketing strategies that exaggerate the advantages of a product to attract consumer attention. However, flamboyance may boost customer expectations and reduce the possibility of consumer satisfaction. Accordingly, managers must deliver honest messages to ensure that consumers have modest product expectations. Furthermore, the perceived usefulness of branded apps may influence continuance intention directly or indirectly through consumer satisfaction. Managers must understand consumers' expectations and evaluations of the functional benefits of a branded app. For example, to enhance customer experience, a branded app providing an online payment mechanism must account for the possible inconveniences.

Finally, mobile applications may cost millions of dollars to develop ([Hoehle and Venkatesh, 2015](#)). Because technology utilization is determined by the congruity between the technology and the tasks it supports, the complementary service provided by branded apps must be compatible with other online (official website) and offline (in-store) services. Brand managers can provide supplementary services through branded apps to supplement insufficiencies in retail stores. For example, to reduce waiting time, customers may use a branded app to observe the number of people in front them instead of standing in line. A customer can browse the menu, order food or drinks online, and arrive at the restaurant at the estimated time. Therefore, in addition to superior functionality and usability, the fit between a branded app and other services must be considered by a branded firm. In summary, a consumer's continuance intention toward a branded app may result from the positive product evaluation and brand attachment of the consumer. Understanding the mechanisms through which a brand and branded app influence consumer behavior could help online retailers to manage brand strategies that successfully attract customers.

6.3. Research limitations and further research directions

The current study has several limitations. First, although current study integrates the ECM with brand attachment to investigate consumers' continuance intention, it does not explore other branded app variables, such as user interfaces and interactivity. Second, this study is conducted in Taiwan. Cross-cultural factors can be included in future studies in order to enhance result generalizability. Third, this study selects one of the most popular branded apps as the research context. Different branded apps may reveal different results; therefore, future studies should consider other branded apps.

Declaration of Competing Interest

None.

Appendix

Questionnaire items

Brand-self congruity (adapted from Zhang et al., 2015)

A1 Starbucks is similar to me.

A2 I feel a personal connection to Starbucks.

A3 Starbucks reflects who I am.

Brand attachment (adapted from Pedeliento et al., 2016)

C1 I feel emotionally connected to Starbucks.

C2 I have a personal bond with Starbucks.

C3 I feel emotionally attached to Starbucks.

Perceived usefulness (adapted from Lin and Bhattacharjee, 2008)

D1 MyStarbucks enables me to pay directly at the Starbucks store.

D2 MyStarbucks enables me to find the nearest Starbucks stores.

D3 MyStarbucks enables me to receive the latest news (e.g., promotions, new products).

D4 MyStarbucks allows me to see my account information (e.g., accumulated stars).

Confirmation (adapted from Roca et al., 2006)

E1 My experience using the MyStarbucks app has been better than expected.

E2 The service level provided by the MyStarbucks app is better than I expected.

E2 Most of my expectations of the MyStarbucks app have been confirmed by use.

Satisfaction (adapted from Roca et al., 2006)

F1 I am satisfied with the performance of the MyStarbucks app.

F2 I am pleased with the experience of using the MyStarbucks app.

F3 My decision to use the MyStarbucks app was a wise one.

Perceived complementarity (adapted from Zhao and Lu, 2012)

F1 The services provided by the MyStarbucks app work well with the services on the Starbucks website.

F2 The services provided by MyStarbucks app work well with the services at Starbucks locations.

Continuance intention (adapted from Roca et al., 2006)

G1 I will use MyStarbucks on a regular basis in the future.

G2 I will frequently use MyStarbucks in the future.

G3 I strongly recommend that others use MyStarbucks.

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