

A Structural Model for Unity of Experience: Connecting User Experience, Customer Experience, and Brand Experience

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Abstract

Understanding customer experience from a holistic perspective requires examination of user experience in the context of marketing and branding. This study attempts to underpin the effects of UX on brand equity by developing and verifying a conceptual framework that connects user experience (UX), customer experience (CX), and brand experience (BX). A structural equation modeling test using data from smartphone users verified the effects of UX on brand equity mediated by CX. In the UX dimension, usability had a strong effect on brand equity, and affect and user value had an effect on customer experience. As a mediator, customer experience had an impact on brand equity with a high path weight. By implementing UX strategies that cohere with management strategies, companies can establish a high level of consumer perception of customer experience and brand value. The results and analyses of this research can help businesses establish a strategy for examining which element of UX is related to CX and BX.

Keywords

user experience, customer experience, brand equity, usability, affect



Introduction

The importance of user experience (UX) and its value for success in the market have been gaining more attention both from industry and academia. Understanding UX design from a business perspective is now a trend in the information technology industry and digital service market. An increasing number of successful user-centered firms are incorporating UX design into their marketing and branding strategies. For example, Apple has been well known for having an obvious competitive advantage in UX (Wan, Zhu, & Hou, 2013). Although the recent "Batterygate" controversy may have had a negative impact on sales, Apple has been the most valuable brand company listed by Forbes since 2010. Are these two highly positive perceptions of UX—design quality and brand value—just coincidental or related with each other?

A user who experiences a service or a product is, at the same time, a customer and consumer of a company that provides the goods and services. Then, is it possible to link UX to customer experience and to brand equity with a common underlying conceptual framework? Since an early study on the usability design of computer systems done in the 1970s (Baecker, 2008), human-computer interaction (HCI) has evolved into a cross-disciplinary approach to the user experience of interactions with digital devices, software, or websites. Now, HCI is one of the largest academic communities, encompassing the fields of computer science, visual design, cognitive science, communication, management information systems, marketing, and service science. Interestingly and coincidentally, the management field has been paying growing attention to the experience of the customer (Lanier & Rader, 2015; Rawson, Duncan, & Jones, 2013).

Once developed in the different fields of HCI, service, and marketing, the roles of a user, a customer, and a consumer now overlap each other; however, each role has distinguishing touchpoints with regards to the product (UX), service (CX), and brand (BX). Customer experience (CX), once initiated from the touchpoint operation of customer service in retail and service industry sectors, is now defined as the management of a complete journey of interactions between customers and the company in every consumer industry sector (Richardson, 2010). As proponents of *experiential marketing* argue, brand value is accumulated by the consumers' actual experiences with the company's products and services, and brand experience (BX) is defined as the consumer's perception of brand value evoked by sensory, affective, cognitive, and behavioral stimuli related to the brand (Brakus, Schmitt, & Zarantonello, 2009; Schmitt, 1999a, 1999b). Because modern customers are becoming increasingly dependent upon technology during everyday activities (including e-commerce), customer experience now concerns all consumer interactions and any touchpoints with a device and a brand (Heinonen et al., 2010; Klaus, 2013, 2014). As seen in the example of offline Apple Stores, creating a positive CX perception via all possible touchpoints with the customers is now accepted as a key strategy for brand differentiation.

However, there has been a lack of attempt in examining customer experience with the perspectives of UX and HCI. The human experience, regardless of different foci and goals of interaction design, service management, and marketing fields, may be an underlying conceptual lynchpin that connects UX, CX, and BX. Recently, through professional community blogs and business reports, several practitioners have claimed that UX, CX, and BX are not separate but related. The 360° Experience Circle by Holland (2013) illustrates logical links between UX, CX, and BX by defining UX as "the interaction of the user with the product," CX as "the collection of touchpoints throughout the sales and use cycle," and BX as "the cumulative result of market's CX that defines the brand value."

By emphasizing the equation of "Experience(X) = UX + CX + BX," Solis (2015) claimed that the boundaries between UX, CX, and BX are slipping away and that the sum of these fields is experienced as one connected discipline. There have been further arguments in the practitioners' community that the relationship between UX, CX, and BX should not be inclusive, but be concentric (Strong, 2016). However, it seems that there is an agreement that the field of UX should evolve into CX, which puts a spotlight on the business perspective. Kresten (2015) even claimed that the relationship among them is hierarchical and all elements of usability, UX, and CX have a nested effect on BX.

Following the questioning of practitioners, some scholars have tried to solve the problem academically. Kaasinen et al. (2015) identified brand as one of the UX goals that unites products under the company's high-level UX vision. Law and Lárusdóttir (2015) compared the concepts of user and customer, and suggested conceptual relations between user-centered design, UX, and CX. Despite those assumptions and conceptual linkages that UX improvement may increase business performance (Holland, 2013; Solis, 2015; Stewart, 2015), there has been a lack of a theoretical model for underpinning the relation between UX and brand value mediated by CX. Previously, the relationship between UX and CX (Petre, Minocha, & Roberts, 2006; Sirapracha & Tocquer, 2012) or between CX and BX has been investigated separately (Biedenbach & Marell, 2009; Lin, 2015), but all three dimensions of human experience have rarely been examined simultaneously.

Hence, it is necessary to develop a theoretical framework, and an empirical study is needed to verify whether the framework can be applied to real life. Therefore, the primary purpose of this study is to develop a model that combines UX, CX, and BX with a unity of human experience and to examine the proposed model empirically. In the following section we reviewed the definition of an experience by Dewey (1934) and Forlizzi and Battarbee (2004) to see whether multiple dimensions of human experiences can be understood from a single perspective. The segmentation of the human experience resulted from having different goals for each experience in HCI and business management because the goal of CX and BX enhancement is to increase the product sales and make a profit, whereas the purpose of improving UX is to increase user satisfaction.

The principal objective of this research is modeling the relationship among three domains of experience. For the model testing, we also attempted investigation of attributes and development of measurement scales of each experience dimension. As an exemplary experience, we selected the smartphone, which offers customer touchpoints with the product, service, and brand in daily interactions. Thus, we collected data from smartphone users and analyzed three dimensions of experience: as a user, customer, and consumer.

Background

The following sections provide a brief background discussion on different views of what experience means and how experience relates to users, customers, and a company's brand.

Unity of Experience

In all languages, the term "experience" has become an all-encompassing expression that is frequently used to imply every encounter that a person has in daily life (Caru & Cova, 2003). Dewey (1934), who was a scholar of pragmatism, suggested the existence of an intrinsic connection between natural or social experience and aesthetic form. Other scholars have also proposed various branches of experience, for example, *peak experiences* (Maslow, 1964), *epiphanic experiences* (Denzin, 1992), or *flow experiences* (Csikszentmihalyi, 1997).

Dewey's empiricism has been recently highlighted in the HCI and UX fields for several reasons (Kim, 2015). Firstly, Dewey (1986) identified two main principles of experience: continuity and interaction. Continuity means that past experiences influence each recent experience, which in turn influences future experiences simultaneously. Interaction refers to the exchange between the subject and object of an experience. In both HCI and marketing studies, which are the foci of this study, experience has continuity and interaction attributes: A user's past consumption behavior influences his/her current and future experiences. A user interacts with a product that has an interface, and a customer also interacts with the overall consumption environment through its touchpoints.

Secondly, distinct from common experience, Dewey (1934) suggested the concept of *real experience* that has an obvious start and end for the accomplishment of the intended goal. In the same vein, an experience in HCI and marketing studies can be defined using Dewey's real experience: User and customer experiences are distinct from a person's ordinary experiences; they have a start, an end, and a goal of the task accomplishment. This view is supported by Forlizzi and Battarbee (2004), who also distinguished "an experience" from typical experiences. They posited that an experience "may be characterized by a number of product interactions and emotions, but is schematized with a particular character in one's memory and a sense of completion" (Forlizzi and Battarbee, 2004, p. 261). This experience influences emotional and

behavioral changes of an individual through interactivity with a service/product or an environment in the market, which can influence a subsequent change of the customer's attitude and behavior. Although an experience has an obvious start and end, the end of an experience meets the start of another experience. In the context of mobile computing and communication, an experience occurs when people as the user, customer, and consumer interact with the smartphone and the company. An experience as a union can be divided into UX, CX, and BX. Considering an experience of a smartphone as a unity of "experience," we assume that UX, CX, and BX are the beginning, the process, and the end of an experience, respectively.

User Experience

This section reviews definitions of UX as a condition of real experience and examines key elements for the measurement scale development. Early studies in the field of HCI focused on usability that emphasizes performance, efficient accomplishment, and goal achievement. The UX, a wider and more complex approach compared to usability, now encompasses cognitive and emotional aspects of human experiences such as aesthetics, hedonism, and context among others (Beauregard & Corriveau, 2007; Hassenzahl & Tractinsky, 2006; Jordan 2002; Khalid & Helander, 2006; Swallow, Blythe, & Wright, 2005).

Reaching a common definition of UX has, however, proved difficult (Coursaris & Kim, 2011; Law, Schaik, & Roto, 2014; Sauro & Zarolia, 2017), but the core elements of user experience are mainly composed of usefulness, usability, and affect. According to a definition provided by the International Organization for Standardization (ISO), UX is "a person's perceptions and responses that result from the use or anticipated use of a product, system or service" (2010). Law et al. (2009) investigated the experts' understanding, scope, and definition of UX and tried to reach a consensual definition of UX. They emphasized that the user interface has to be included in products, services, and objects to interact with people (Law, Roto, Hassenzahl, Vermeeren, & Kort, 2009). Although differences of opinion still exist, there appears to be some agreement that UX refers to the interaction through various interfaces of products and services (Aabel & Abeywana, 2018; Arhipainen & Tähti, 2003; Desmet & Hekkert, 2007; Hassenzahl & Tractinsky, 2006; Law, van Schaik, & Roto, 2014).

Value, usability, and affect are the core components of the interactions and conditions of the holistic experience with products and services. Scholars have attempted to identify different dimensions or components of UX, and recent studies have highlighted that usability, affect, and value are the main components of UX. Desmet and Hekkert (2007) distinguished three components of user experience: aesthetic pleasure, emotional response, and attribution of meaning. Likewise, Kim (2015) suggested usability, affect, and usefulness as conditions of ideal UX, and Rauschenberger et al. (2013) proposed attractiveness, pragmatic, and hedonic as key elements of ideal UX. Hiltunen, Laukka, and Luomala (2002) claimed that the five elements of UX are utility, usability, availability, aesthetics, and offline issues. Utility refers to users' perceived value of service, usability is related to the ease of use and learnability, availability refers to the use at one's fingertips, aesthetics is related to a form and feeling of service, and offline issues mean brand or business processes. In the mobile context, Rubinoff (2004) suggested that branding, usability, functionality, and content (text, multimedia, image) are the elements of UX for mobile phones.

Customer Experience

If UX is the conditions of an experience, CX can be seen as a process of experience. As the quality of services and products has been standardized in the highly competitive consumer market, improving CX has recently become an issue of marketing method for the differentiation. Traditional differentials such as price, features, quality, and customer service are no longer able to differentiate a business. Emerged as a new approach or a paradigm in the field of marketing, experiential marketing is based on Pine and Gilmore's (1998, 1999) *experience economy* and Schmitt's (1999a) *strategic experiential model*.

From a business perspective, Pine and Gilmore (1998, 1999) coined the term of experience economy and defined the CX as an occurrence "between the staged event and the individual's state of mind" (Pine & Gilmore, 1998, p.99). They considered an experience as a concept that is superior to a service and a product. In particular, they classified experience into four categories: entertainment, educational, excerpts, and aesthetics (Pine & Gilmore, 1998).

Likewise, Schmitt (1999a), who suggested the new paradigm of experiential marketing, classified experience into five distinguishable elements according to a customer's direct and indirect contact with a brand. These were sense (sensory), feel (emotional), think (cognitive), act (behavioral), and relation (relational), and these values could replace functional values (Schmitt 1999a). Sense marketing motivates the customer to gain aesthetic pleasure, excitement, attractiveness, and a feeling of satisfaction through stimulating the five senses of sight, hearing, touch, smell, and taste, while feel marketing represents the business strategy and implementation of attaching influence to the enterprise and brand through experience providers (Schmitt 1999a). Think marketing provides creative and cognitive experiences that stimulate the customer's amazement, curiosity, and interest, while act marketing reflects the strategy that allows the customer to gain experience through direct experience and first-hand action (Schmitt 1999a). Finally, relate marketing "expands beyond the individual's private sensations, feelings, cognitions, and actions by relating the individual self to the broader social and cultural context reflected in a brand" (Schmitt 1999a, p. 171).

After Pine and Gilmore (1998), and Schmitt (1999a) suggested experiential marketing, many scholars have defined CX. LaSalle and Britton (2003), and Shaw and Ivens (2005) defined CX by emphasizing the interaction of a customer with a service/product, a company, or an organization. Gentile, Spiller, and Noci (2007) tried to synthesize prior definitions (LaSalle & Britton 2003; Schmitt 1999a, 1999b; Shaw & Ivens, 2005) of CX. To define CX, Meyer and Schwager (2007) and Verhoef et al. (2009) focused more on the internal state of customers, while Brakus, Schmitt, and Zarantonello (2009) and Sirapricha and Tocquer (2012) focused on the environment in which the interaction occurs.

Comparing two main conceptual frameworks of CX, Pine and Gilmore (1998) focused on classifying experiences, while Schmitt (1999a) concentrated on understanding the values that are provided by an experience. For this study, Schmitt's (1999a) concept of CX is suitable for several reasons. Firstly, CX, as a subset of the union of experiences, like UX, aims to build a holistic experience. Secondly, the beginning of this experience is considered the moment at which the values that the CX provides are met. The holistic experience can be measured as the sum of values. In other words, it consists of a construct that can mediate the relation between the parts of UX and those of BX. Therefore, our study defines CX based on Schmitt's (1999a) definition and proposes that CX represents interactivity between a customer and a service/product that provides sensory, emotional, cognitive, behavioral, and relational values to the customer; its ultimate goal is to build a holistic experience.

Brand Experience

Adopting Dewey's (1934) view of principles of experience and his concept of *real experience* the remainder of this literature review is focused on BX as the result of *an experience* and as CX and UX are considered as factors that influence BX.

BX is the consumers' perception at every contact moment with the brand (Alloza, 2008). Similarly, Brakus, Schmitt, and Zarantonello (2009) conceptualized BX as "subjective, internal consumer responses and behavioral responses evoked by brand-related stimuli that are part of a brand's design and identity, packaging, communications, and environments" (p. 53). Those definitions of BX highlight the interaction between consumer and brand as well as the internal and behavioral responses of the consumer that can be changed by the experience of the interaction. Those attributes of BX can match interaction and continuity, which are two main principles of experience suggested by Dewey (1934). According to the definitions of BX described above, we define BX as interactivity between a consumer and a brand that includes every brand-related stimulus; its ultimate goal is to strengthen the brand equity.

The value generated by the set of interactions between a company and its customers can influence the set of intangible properties of the company, for example, brand equity (Gentile, Spiller, & Noci, 2007). That is to say, BX can directly or indirectly influence brand equity, and it has been empirically investigated in several studies (Boo, Busser, & Baloglu, 2009; Chen, 2012; Ding & Tseng, 2015; Dolbec & Chebat, 2013; Lin, 2015; Zarantonello & Schmitt, 2013) Hence, brand equity can be used to measure the consequences of BX.

Since the late 1980s, scholars in the field of marketing have engaged in animated discussions about brand equity and concluded that the purchase cost reflects the brand value. For Aaker (1996b), brand equity refers to a set of assets and liabilities connected to a brand's name and

symbols that enable value to be added or deducted by a service or product. He also insisted that brand equity could increase or decrease the value of services, products, or companies (Aaker, 1996a). Many organizations have realized that their brand is one of their most valuable intangible assets; thus, branding has become their priority (Keller, 2002). Keller (1993) defined brand equity as the customers' discriminatory reaction to marketing activities and suggested the concept of brand knowledge that is similar in meaning to brand equity. Brand knowledge is defined as the degree of customer perception for a particular brand (Keller, 1993, 1998; Keller & Sood, 2003).

According to Aaker (1996a), elements of brand equity are classified as brand awareness, brand associations (or brand image), perceived quality, brand loyalty, and proprietary asset. Aaker's brand equity model, which focused on explaining the role and effect of each component, has been widely used because it contains various elements at the same level and hence can be easily applied in empirical studies. For example, Wang and Li (2012) developed a model for mobile value-added services using four core factors of Aaker's brand equity. From a brand equity perspective, they investigated the relationships among mobile-commerce attributes, brand equity elements, and customer behavior. The results of their study also showed that brand equity theories could be extended to the context of mobile service consumption.

Conceptual Model

Based on the review of the relevant literature on UX, CX, and BX, for this study we propose research for the construction of a structural model that would combine these dimensions of experience end to end and on the factors among elements and sub-elements of the effect of UX on CX and BX as antecedents. Following Dewey's (1934) definition of *real experience*, this study considers UX as the conditions of an experience, CX as the process of an experience, and BX as the result of an experience. In other words, as the conditions of *real experience*, we suggest three elements, that is, usability, affect, and user value, of UX as second-order constructs. Park et al. (2013) proposed sub-elements of these UX elements in hierarchically, and in this study, we adopted those sub-elements and their definitions (see sub-elements of usability, affect, and user value in Figure 1). We suggest CX as the process of an experience itself and a second-order construct that includes five constructs: sense, feel, think, act, and relate. Brand equity, as a result of an experience, includes brand loyalty, brand awareness, perceived quality, and brand associations.

The essential assumption of our study is that UX, CX, and BX are conceptually connected. Figure 1 shows the conceptual model. In a smartphone context in which a user needs to perform a customer role simultaneously, this conceptual model can help identify the effects of the experience as a user on the experience as a customer.

Although the direct and indirect relations between the elements of UX and partial marketing elements such as customer satisfaction (Mills, 2002; Uddin & Akhter, 2012; Yoon, 2010) and brand loyalty (Chou, 2013; Lee, Moon, Kim, & Yi, 2015) have been examined, this study considers CX and brand equity as constructs that include every element based on each theoretical model to link with UX. Moreover, based on studies that described the nature of experience, this study aims to understand parallels and distinctions among the three experiences and to fill the gaps between them.

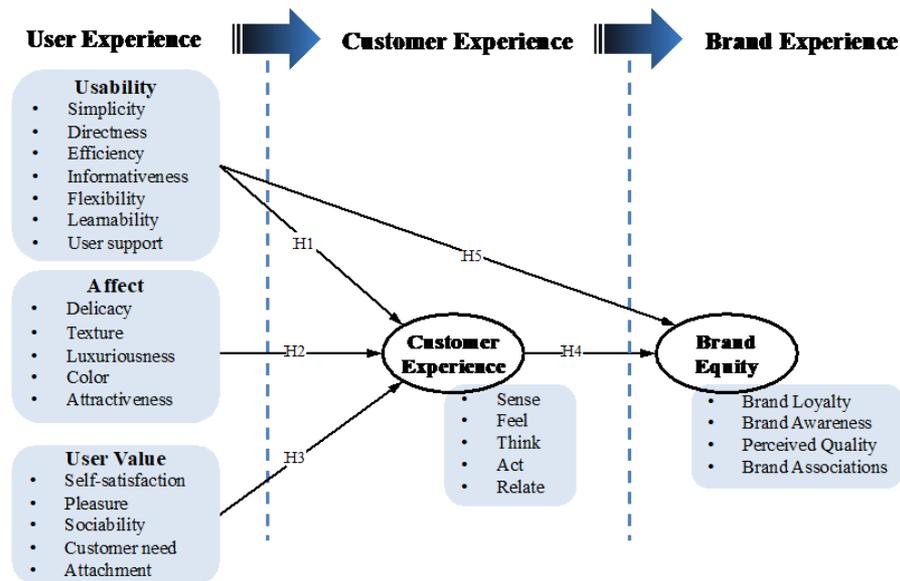


Figure 1. Conceptual model.

Research Hypotheses

In this section, we discuss the links between the customer experience (CX) and usability, affect, user value, and brand attitudes, and we also discuss usability and its connection to brand attitudes. We present our hypotheses in this section as well.

The Link Between Usability and CX

From the practitioners' perspective, CX is assumed to be closely related to UX (Sirapricha & Tocquer, 2012). Recent studies have tried to investigate the relationship between some elements of UX and CX. Klaus (2013) identified two main dimensions of online customer-service experience, which are functionality and psychological factors, and considered usability as one of the sub-dimensions of functionality. He insisted that the usability attributes that enable online consumers to feel comfortable using a web site have a direct and profound influence on the online customer's experience. S. Nambisan and P. Nambisan's (2008) study on virtual customer environments also noted that, regardless of the technological complexity, the ease with which customers can interact with and perform tasks shapes their overall experience.

Numerous studies have attempted to explain the relationship between ease of use, functionality, and other sub-elements of usability and CX or its outcome, such as customer satisfaction or purchase intention. Sheng and Teo (2012) found that ease of use and perceived usefulness applied from the Technology Acceptance Model (TAM) have a significant and positive effect on CX. In the context of online banking, Yoon (2010) similarly found transaction speed, information content, and customer support service to have a significant effect on customer satisfaction. These independent variables relate to sub-elements of usability, such as efficiency, informativeness, and user support. Considering all of these evidences, we expect usability to have a positive influence on CX. Therefore, the following hypothesis is proposed.

H1: Usability is positively related to CX.

The Link Between Affect and CX

In previous research, affect referred to a state of internal feeling (Russell & Carroll, 1999) and represented a general term used to indicate the collection of moods and emotions (Puccinelli et al., 2009). Russell (2003) defined affect as "a neurophysiological state consciously accessible as the simplest non-reflective feelings evident in moods and emotions" (p. 148).

Prior studies insisted on or identified that affect influences attitudes, evaluations, risk taking (Cohen, Pham, & Andrade, 2008), and the purchase of a product (Vanhamme & de Bont, 2008). The study of Puccinelli et al. (2009) on CX management in retailing also suggested that affect,

which is an element of consumer behavior, plays important roles during the consumer buying process. They insisted that affect clearly influences all stages of the customer decision process: need recognition, information search, evaluation, purchase, and post-purchase (Puccinelli et al., 2009). In other words, affect influences CX as a process of experience. Therefore, a link between affect and CX is hypothesized as follows.

H2: Affect is positively related to CX.

The Link Between User Value and CX

Perceptions of value include not only the functional aspects, but also social, emotional, and even epistemic value elements. A number of authors have considered the effect of perceived value on customer satisfaction. Yoo, Lee, and Park (2010) examined the effects of perceived utilitarian and hedonic value on overall customer satisfaction in an e-tailing context. In the service industry, McDougall and Levesque's (2000) study similarly found that perceived value is the most dominant driver of customer satisfaction. Additionally, in business-to-business service, Patterson and Spreng (1997) proved that perceived value has a significant effect on satisfaction. In the same vein, Anderson, Fornell, and Lehmann (1994) showed that value has a direct effect on customer satisfaction, and this type of satisfaction depends on value (Ravald & Grönroos, 1996). According to Bontis, Booker, and Serenko (2007), "customer satisfaction is the consumers' overall evaluation based on their overall experience" (p. 1428). Therefore, the following hypothesis is proposed.

H3: User value is positively related to CX.

The Link Between CX Value and Brand Equity

Prior research on branding has shown that CX has a significant effect on brand attitudes (Frow & Payne 2007; Ghose, 2007) and brand purchase choice (Bennet, Härtel, & McColl-Kennedy, 2005) and an indirect effect on overall brand equity (Berry, 2000). Additionally, numerous studies have attempted to reveal the direct and indirect effects of CX on brand loyalty (Bennett, Härtel, & McColl-Kennedy, 2005), brand associations, and awareness (Berry, 2000). In the strategic experiential models used by Biedenbach and Marell (2009), the researchers proved that CX has a significant and positive effect on brand loyalty, perceived quality, brand awareness, and brand associations in a business-to-business service setting. They emphasized the importance of interaction between the customer and service supplier. Many marketing studies have considered that brand equity consists of the four elements (loyalty, quality, awareness, and associations) proposed by Aaker (1991, 1996a, 1996b) and Keller (1993). Therefore, the following hypothesis is proposed.

H4: CX has a positive influence on brand equity.

The Link Between UX Value and Brand Equity

It is rare to find a theoretical framework or empirical research that directly connects elements of UX to the brand experience or related constructs such as brand awareness, brand involvement, brand attachment, or brand personality. However, there are some supporting studies on the link between usability and brand value. Concerning the mobile application usage context, Rondeau (2005) suggested that positive usability leads to a positive consumer evaluation of the quality of the mobile application, and the consumer can construe it as a favorable perception of the brand. In the same vein, Tarafdar and Zhang's (2008) study on web sites demonstrated empirically that usability has a significant and positive effect on brand loyalty.

Numerous studies have attempted to explain the relationship between product/service quality and brand equity. Dodds, Monroe, and Grewal (1991) and Grewal et al. (1998) revealed a strong and positive relationship between brand awareness and consumers' perceptions of service quality. According to Roberts et al. (2004), positive evaluation of quality leads to higher brand loyalty. For the application into the UX field, quality perception may be translated into usability perception because both can be defined as an overall judgment of the superiority or excellence of a service or a product (Zeithaml, 1988). Overall, in spite of the vacancy in the previous studies on the connection between brand equity and the other UX components such as affect and user value, there seems to be reasonable evidence to support a strong link between usability and brand equity. Therefore, the following hypothesis is proposed.

H5: Usability is positively related to brand equity.

Methods

The following sections discuss the development of the measurements used in this study, the pilot survey we used to extract significant variables from the measurements, and the methods used to collect data.

Measurement Development

The purpose of this study was to construct a model that would combine UX, CX, and BX systematically and logically and to verify the significant link between experiences. To accomplish these research goals and the proposed hypotheses, we used survey methods, which analyze responses at the individual perception level, because a survey is one of the most widely used ways of gathering data for user experience of specific products in HCI research (Kjeldskov & Graham, 2003). We developed an instrument to measure UX based on the study of Park et al. (2013), which proposed definitions of UX and its elements. Through prior literature review, user interviews, and indirect observations, they defined in detail not only the sub-elements that compose each UX element, but also subordinate concepts that constitute each sub-element. Moreover, Park et al. (2013) focused on mobile phones and services, which are consistent with this study; therefore, the measurement scale of each element and subset of UX were suitable for this study. We considered usability, affect, and user value as elements of UX as second-order constructs and regarded sub-elements of each element as first-order constructs. Using definitions of subordinate concepts in each sub-element, we developed more than three survey items for each first-order latent variable. The measurement development followed the procedures of Churchill (1979).

We adapted the CX items from Schmitt's (1999a) study that classified CX into five categories (i.e., sense, feel, act, affect, and relate) and Sheng and Teo's (2012) study that examined the mediating effects of CX on the relation between mobile product attributes and brand equity. We adapted ten brand equity items from Yoo and Donthu's (2001) study that measured brand equity by brand loyalty, perceived quality, brand awareness, and brand associations, and also from Sheng and Teo's (2012) study that employed Yoo and Donthu's (2001) brand equity measures to assess mobile brand equity.

In addition to gender and age questions, additional questions assessed the respondents' smartphone usage characteristics. The questions also assessed the brand and usage period of respondents' current smartphones, the average mobile communication fee per month, and ownership of other smart devices.

Pilot Test Exploratory Factor Analysis

We used an online survey to conduct the pilot survey, in which 59 respondents participated. Exploratory factor analysis (EFA) and Cronbach's alpha verified the validity and reliability of the instrument. The main purpose of using EFA was to extract significant variables and items from the newly developed measurements. Because items for CX and BX used in this study were derived from prior studies (Sheng & Teo, 2012; Yoo & Donthu, 2001), we skipped EFA for these items and only conducted a reliability test. We indirectly measured three second-order constructs of UX using sub-elements, which may be correlated with each other; therefore, the EFA in this study used oblimin rotation, which is an oblique rotation method. The results of EFA revealed that three items underlined each construct, according to the factor loadings. After extracting significant items using EFA, we analyzed reliability on all variables, including CX and brand equity constructs, using Cronbach's alpha. All constructs exceeded a threshold value of 0.70, except associations. Eliminating one item showed acceptable levels that exceeded 0.80. The final developed measurement items are listed in the table of Appendix A.

Sampling and Data Collection

We administered the main survey of this study online using 7-point Likert scale measurement items (see Appendix A) and collected samples from a survey agency's panel pool. We had two criteria for pre-screening respondents: age between 20 and 64, and current smartphone usage. We omitted smartphone users younger than 20 because this group tends to have weak purchasing power. Because this survey was intended for typical smartphone users, we also omitted people over 60 because they can subscribe to mobile communication fees for the elderly and are therefore associated with separate marketing targets. To analyze the squared equation using Amos, a statistical SEM tool with maximum likelihood estimation procedure by default, more than 200 samples were required (Hair, Black, Babin, & Anderson, 2010). We

eliminated 10 of the 270 respondents due to incomplete questionnaires. Thus, the final sample comprised 260 respondents. Of the 260 respondents in the sample, 41.5% were men and 58.5% were women. The participants' ages ranged from 20 to 63, and the average age was 34.56. A large portion of respondents used Samsung or LG smartphones with an Android OS. Only 10.8% of the respondents used Apple smartphones. Most respondents (93.5%) had been using their current smartphone for more than three months.

Results

The following sections discuss the results of the factor analysis and the assessment of the structural model.

Confirmatory Factor Analysis with Measurement Model

The initially proposed research model included 23 constructs. Among those, five second-order constructs were not measured directly, but by other constructs of which they were composed. We used three second-order constructs as exogenous variables in the UX dimension: usability, affect, and user value. Usability was measured by efficiency, informativeness, learnability, and user support; affect was measured by simplicity, delicacy, and luxuriousness; and user value was measured by self-satisfaction and sociability.

In the CX dimension, CX served as a mediator variable and second-order construct that was composed of and measured by sense, feel, think, act, and relate. Brand equity, as a dependent variable in the BX dimension, was also a second-order construct that was composed of and measured by loyalty, quality, awareness, and associations. Each first-order construct was composed of more than two observed variables.

Before testing the structural model to verify the hypotheses, we conducted a confirmatory factor analysis (CFA) to verify the statistically convergent validity and discriminant validity with the proposed measurement model. Convergent validity evaluates whether the degree of different observed variables can measure the same latent variable, and discriminant validity evaluates whether the specific latent variable can be adequately distinguished from other latent variables in the same model (Straub, Boudreau, & Gefen, 2004). Then using Cronbach's alpha, we tested each construct's reliability which evaluates the extent to which the observed variables composed of one latent variable fit together, as well as the internal consistency of the observed variables. Using composite reliability (CR) and average variance extracted (AVE), we also tested unidimensionality.

Out of the 50 initial indicators, we eliminated three whose factor loadings were lower than 0.7. After CFA, we calculated CR and AVE to assess the reliability and unidimensionality of each latent variable. Most of the latent constructs exceeded or were close to the suggested CR value of over 0.6 and AVE value of over 0.5 (Nunnally & Bernstein, 1994), but both the CR and AVE of user support were slightly lower than the suggested criteria. Therefore, we decided to eliminate the user support construct from the research model. After changing the affiliation of "simplicity" and eliminating some indicators and a latent variable, we re-examined the remaining indicators and constructs for their validities and reliabilities.

Descriptive statistics, Cronbach's alpha, and confirmatory factor loadings for all the first-order constructs are presented in the table of Appendix B. Hair et al. (2010) recommended an appropriate convergent validity of each item loading being above 0.70, and all of the indicators in the model exceeded this criterion. Nunnally and Bernstein (1994) suggested that Cronbach's alpha should be above 0.7. All of the constructs' Cronbach's alpha were higher than 0.7 and identified reliability.

Appendix C presents the correlations among the first-order constructs and the square root of the AVE scores. To possess a valid discriminant, the square root of AVE should be higher than its correlation coefficients with other constructs (Gefen, Straub, & Boudreau, 2000). By comparing the values, we verified that the variables had good discriminant validity.

We recalculated the CR and AVE of all first-order and second-order constructs after revising the measurement model. The table in Appendix D lists the results of CR and AVE of the latent variables. Most of the latent constructs exceeded or were close to the suggested CR value of over 0.6 and the AVE value of over 0.5 (Nunnally & Bernstein, 1994), but some AVEs are slightly lower than 0.5. Despite these insufficiencies, those constructs were deemed acceptable

because the gaps between insufficient AVEs and criteria were not excessive, and because this study is partly exploratory research.

The table in Appendix E compares the fitness of the initially proposed measurement model with that of the revised measurement model: Chi-square and Chi-square/d.f. In general, we used GFI, AGFI, SRMR, RMSEA, NNFI, and CFI as goodness-of-fit (GOF) indices, so the table provides most of the GOF indices. Of the fit indices for the initial measurement model, only χ^2 and $\chi^2/d.f.$ were acceptable according to the recommended criteria. After changing and eliminating some variables, we finalized the refined measurement model with 44 indicators for 17 first-order latent variables and five second-order constructs; all the fit measures for the revised measurement model were better than those for the initial measurement model. The GFI and AGFI were slightly lower than the criteria. However, χ^2 , SRMR, RMSEA, NNFI, and CFI, which were suggested as key fit indices of GOF by Hair et al. (2010), were all acceptable.

Assessment of Structural Model

After finalizing the measurement model, we carried out a structural model test as the method of verifying the hypotheses. Based on the results of CFA and the refined measurement model, we revised the structural model from the initial research model.

Figure 2 shows diagrams of the structural model with the standardized path weights as a result of the structural analysis of the developed structural model. All of the paths between first-order and second-order constructs were significant at the level of $p < 0.001$ except the fixed loading construct. Among the standardized path weights between usability and components, only simplicity was marginally lower than the others. The standardized path weight between user value and self-satisfaction was remarkably higher (path coefficient = 0.93) than sociability (path coefficient = 0.67).

Interestingly, usability in the UX dimension had no significant effect on CX (see H1 in Figure 2). However, affect and user value in the UX dimension had a significant effect on CX (see H2 and H3 in Figure 2). Therefore, Hypothesis 1 was not supported whereas Hypotheses 2 and 3 were supported by the analysis of the structural model. The path weight between CX and user value (path coefficient = 0.64, $p < 0.001$, see H2 in Figure 2) was almost twice that associated with affect (path coefficient = 0.33, $p < 0.01$, see H2 in Figure 2). As a mediator and second-order construct, CX affected brand equity with a high path weight (path coefficient = 0.85, $p < 0.001$, see H4 in Figure 2). Therefore, Hypothesis 4 was supported. However, usability, which had no significant effect on CX, had a significant effect on brand equity (path coefficient = 0.24, $p < 0.01$, see H5 in Figure 2). Therefore, Hypothesis 5 was supported.

Squared multiple correlations between latent variables in SEM are similar to R^2 in regression analysis that is regarded to as the coefficient of determination (Jöreskog, 2000). The value refers the ratio of how much a specific variable is explained by other variables (Hair et al., 2010). Therefore, from the results (see note in Figure 2), approximately 79% of CX was explained by the elements of UX, and approximately 66% of brand equity was explained by UX elements and CX.

The GOF measures of the structural model are presented in Table 1. According to the given fit indices, all of the fit statistics were acceptable (χ^2 , $\chi^2/d.f.$, RMSEA, NNFI, and CFI) or slightly lower than the criteria (GFI and AGFI). As with the fit measures for the measurement model, χ^2 , SRMR, RMSEA, NNFI, and CFI, which Hair et al. (2010) suggested as key fit indices of GOF, were all acceptable.

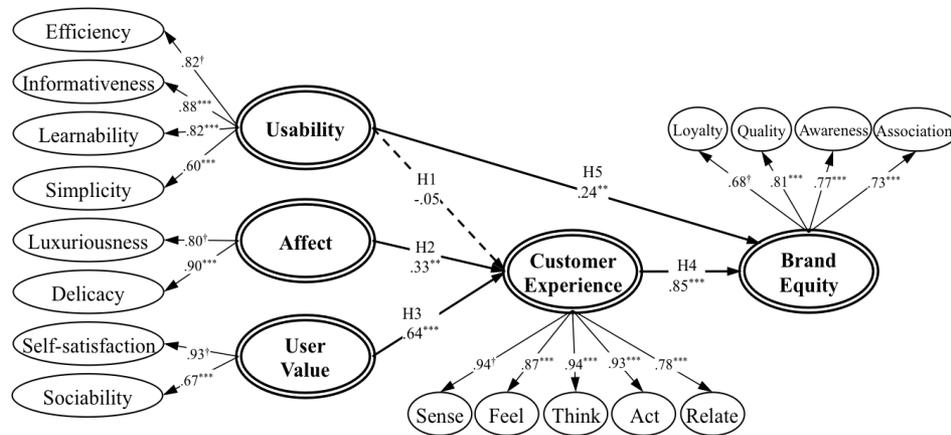


Figure 2. Result of structural model analysis.

* $p < .05$, ** $p < .01$, *** $p < .001$

†loading was set to 1.0 to fix construct variance

Note: R2 (squared multiple correlations) of CX = .79, R2 (squared multiple correlations) of Brand Equity = .66

Table 1. Fit Measures for the Structural Model

Fit index	Recommended criteria	Structural model
χ^2	$\geq .05$	1315.19*** (d.f. = 833)
$\chi^2/d.f.$	≤ 3.0	1.57
GFI	$\geq .90$	.82
AGFI	$\geq .80$	.78
SRMR	$\leq .08$	.06
RMSEA	$\leq .05$	.04
NNFI	$\geq .90$	.93
CFI	$\geq .90$	.94

* $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

With more focus on the customer experience as a process of a holistic experience, several interesting results emerged from this study. Firstly, among the hypotheses this study proposed, only H1, the effect of usability on CX, was not supported. The concept of usability originally highlighted the functional aspect of smartphones at the introductory and growth stages of the market cycle. Since the release of the iPhone 3S in 2007, the smartphone market has reportedly reached maturity stage in 2016 (Bradshaw, 2016). Currently, customers of smartphones may no longer consider the functionality as a determinant of satisfaction with the touchpoints with the company. Customers might be taking the high functionality of smartphones for granted because smartphone functions have been improving to the point of saturation and standardization. In addition, as users accumulate experiences of controlling interfaces on their smartphones, learnability may have a diminishing impact on the perception of customer experience. However, the effect of usability was found on brand equity. This means that when smartphone consumers evaluate a brand's quality and form a brand loyalty, the experience of

ease of use has an impact. Considering the smartphone market is divided into two different OS platforms, that is iOS and Android OS, consumers' familiarity with the current interface styles and interaction modes can reinforce the loyalty and awareness of a brand.

Secondly, user value and affect elements of UX affected CX. Because the concept of CX is something that slowly accumulates in the customer's mind (Schmitt 1999a), affect and user value, which contribute to a long-term perception of experiences, might have a stronger influence on customers than does usability. As supporting evidence, we have observed that the smartphone marketing of market leaders such as Apple and Samsung has utilized a strategy of highlighting user experiences rather than technical features, and many TV commercials have illustrated emotional touchpoints and user value of ordinary people in everyday life contexts (Straker & Wrigley, 2016).

Thirdly, CX affected brand equity as a mediator of UX. The perception of brand value, BX, is influenced by touchpoints and interactions between customers and the company. Notably, Apple has become a retailer itself in order to better control its BX (Dolbec & Chebat, 2013). The Apple Store is a successful example of direct touchpoints with the customers and many pundits believe that the experience of interacting with the new devices and helpful staffs contributes to building a differential brand value for the company (Meyer & Schwager, 2007).

Theoretical Implications

The major implication from this research is the theoretical modeling of customer experience with the combination of user experience. The primary purpose of this study was to combine UX, which has been examined mainly in the HCI or interaction design fields, with CX and BX, which have been investigated mainly in the fields of marketing and business research. Although partial relations between UX, CX, and BX have been examined in previous studies (Chou, 2013; Lee et al., 2015; Mills, 2002; Uddin & Akhter, 2012; Yoon, 2010), a holistic approach based on the unified conceptual framework of human experience has been called for from the field where design, marketing, and service management meet. Endeavoring to find a solution for this cross-disciplinary convergence, this study proposed a theoretical model of combining UX, CX, and BX. Through an empirical testing with smartphone users, the effects of UX on brand equity mediated by CX were verified. In terms of methodology, this study also contributed to the development of measurement scales for three dimensions of experience using structural equation modeling.

Managerial Implications

This study may provide strategic guidance to practitioners seeking to effectively enhance customer experience and brand equity. Various innovative devices or systems, such as AI speakers, home IoTs, and autonomous cars, are being released or are ready to be introduced into the market. Given that most smart devices are advancing with a growing emphasis on UX, establishing a high level of consumer perception of customer experience and brand value may be the performance returns that should be planned together with the coherent design of UX. The results and analyses of this research can help businesses establish a strategy for examining which element of UX is related to CX and BX.

Business managers can also measure and analyze the UX design's return on investment. The main practical contribution of this research may be the finding of a link between HCI and marketing fields. Moreover, the results of this study may help businesses make better decisions. The results show that usability has an effect on brand equity, whereas affect and user value have an effect on CX. When a business establishes its marketing strategy, the decision may differ depending on whether it concentrates more on brand or CX management. For example, in the case of brand commercial, advertising that promotes the superiority of usability may be more effective. On the other hand, for in store marketing or the customer service stage, affect and user value may stimulate consumers.

Recommendation

This study highlights some interesting future research agendas:

- Future research on the role of brand effect can consider the current smartphone brand of respondents as control variables. It would be interesting to compare the brand effects of smartphones because the element of UX may be different for each smartphone brand.
- Because this study gathered data from smartphone users, future studies should also consider other smart devices or systems using the unity model of this study for verification and adaptation. The research model needs to apply to IoT, smart car, display embedded home appliances, and AI speakers that take not only the traditional roles but also extended UX.
- As important as it is for UX studies to consider a context, the research model must be tested in various market contexts. The conceptual model of CX creation, as suggested by Verhoef et al. (2009), includes various elements that assume influences on CX such as social environment, service interface, retail atmosphere, and price.
- Emerging constructs of affect or user value such as "coolness" (Bruun, Raptis, Kjeldskov, & Skov, 2016; Raptis, Bruun, Kjeldskov, & Skov, 2016) should be added into the UX measurement. Further research is required to consider these factors in the updated model.

Conclusion

As many service providers find themselves facing a new business reality where the digital lifestyle has become the future of both technology and traditional industries, most innovative products in the contemporary market such as smartphones, IoT, VR, and AI speakers are embedded with offline or online services for the realization of customer value. Thus, customer experience is established from the harmonious combination of product and service. Apple, for example, has a well-known story of the best customer experience through multiple touchpoints with the product (iPhone), offline store (Apple Store), and online open-market retail services (AppStore & iTunes). Many pundits agree that the components of user experience design have greatly contributed to the success of achieving the highest level of customer experience and brand equity. However, the lack of consideration of the core components of UX such as usability, affect, and user value into the customer experience may cause a gap for proper understanding and practice of service marketing strategy. The current research is the first to attempt to build a holistic and theoretical framework which defines UX as the condition, CX as the process, and BX as the consequence of consumer experience. We believe that this unity model of experience is not limited to technology products, but is also applicable across service contexts in the real or virtual world.

Tips for Usability Practitioners

The following points highlight how UX practitioners can use the evidence in this study to support the value of viewing UX through a combined customer and brand experience perspective:

- Many UX design decision are governed by the business perspectives. Because user research and design renovation require company resources of time, human capital, and money, UX practitioners need to prove return on investment (ROI) of usability and design works. The findings of this study may be used as an evidence of UX's contribution to the business performance in customer satisfaction and brand equity.
- Customer satisfaction can be strengthened by better interface design of aesthetics and usefulness factors. UX practitioners should participate in the decisions on the experiential marketing strategy for better touchpoints with the product or service of a company. This study provided empirical evidence of positive link between UX and customer experience.

Better brand equity can be achieved by UX. Usability leads to the positive evaluation of the brand and other UX factors also contributes to the brand equity through customer

experience design. UX practitioners may acclaim user-centered and coherent design principles as a core value to the brand equity.

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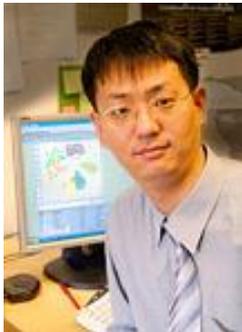
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Appendix A. Questionnaire Items

Note: These items were translated from the Korean language questionnaire we used in our study.

Constructs	Statements
Efficiency	Using my smartphone, I can do the desired task successfully with no effort.
	Using my smartphone, I can complete the desired task successfully without wasting time.
	Using my smartphone, I can complete the desired task accurately.
Informativeness	The smartphone interface sufficiently displays the current status information.
	The smartphone interface properly presents the necessary information to me.
	The information on my smartphone interface is highly visible.
Learnability	The use method of my smartphone is familiar.
	When I start a task on my smartphone, the following screen is mostly predictable.
	My smartphone interface is intuitive.
User Support	When I make a mistake while using my smartphone, an error message clearly notifies me.
	My smartphone prevents an error situation before it occurs.
	When using my smartphone, feedback information (action confirmation, error alarm, etc.) is helpful.
Simplicity	My smartphone has a simple design.
	The way to use my smartphone looks simple.
	It looks like my smartphone is uncomplicated.
Delicacy	It looks like my smartphone was made elaborately.
	It looks like my smartphone was made delicately.
	It looks like a skillful expert made my smartphone.
Luxuriousness	My smartphone looks luxurious.
	My smartphone looks expensive.
	My smartphone looks superior in quality.
Self-Satisfaction	My smartphone represents my personality.
	When using my smartphone, I feel a sense of accomplishment.
	I feel a sense of pride when using my smartphone.
Sociability	Using my smartphone, I can express my emotions to other people.
	Using my smartphone, I can share my feelings with other people.
	Using my smartphone, I can have friendly relations with other people.
Sense	My smartphone appeals to my senses.
	My smartphone stimulates my senses.
Feel	My smartphone evokes feelings in me.

Constructs	Statements
	My smartphone allows me to respond to others in an emotional manner.
Think	My smartphone intrigues me.
	My smartphone helps to stimulate my curiosity.
	My smartphone helps me think creatively.
Act	My smartphone helps me think about my lifestyle.
	My smartphone sends reminders to me of the activities I can do.
	My smartphone helps me think about my behavior.
Relate	My smartphone helps me think about bonds with other people.
	I can relate to other people using my smartphone.
	My smartphone helps me think about relationships.
Loyalty	I consider myself to be loyal to the brand of my smartphone.
	Another smartphone from my current brand would be my first choice.
	I will not buy a smartphone from other brands if smartphones from this brand are unavailable at the store.
Quality	The quality of my smartphone is extremely high.
	The quality of the functions on my smartphone are very high.
Awareness	I can recognize a smartphone that was released by this brand among other competing brands.
	I am aware of the brand of my smartphone.
Associations	I can quickly recall some characteristics of my smartphone brand.
	I can quickly remember the logo or symbol of my smartphone brand.
	I can imagine a smartphone from this brand in my mind.

Appendix B. Results of Confirmatory Factor Analysis and Key Statistics

Second-order Constructs	Latent Constructs	Indicators	Mean	SD	Confirmatory Factor Loadings	Cronbach's α
Usability	Efficiency	EFF_1	4.92	1.32	.88 [†]	.89
		EFF_2	4.96	1.24	.91 ^{***}	
		EFF_3	4.94	1.32	.77 ^{***}	
	Informativeness	INF_1	4.98	1.30	.76 [†]	.81
		INF_2	5.16	1.13	.82 ^{***}	
		INF_3	5.09	1.18	.72 ^{***}	
	Learnability	LRN_1	5.75	1.19	.79 [†]	.80
		LRN_2	5.43	1.15	.82 ^{***}	
		LRN_3	5.08	1.04	.73 ^{***}	
Simplicity	SPL_2	5.07	1.20	.80 [†]	.75	
	SPL_3	5.03	1.31	.76 ^{***}		
Affect	Delicacy	DLC_1	4.93	1.30	.84 [†]	.90
		DLC_2	4.80	1.43	.88 ^{***}	
		DLC_3	5.21	1.29	.83 ^{***}	
	Luxuriousness	LXR_1	4.53	1.49	.90 [†]	.89
		LXR_2	4.38	1.58	.89 ^{***}	
		LXR_3	4.40	1.55	.95 ^{***}	
User Value	Self-Satisfaction	SST_1	4.23	1.47	.76 [†]	.87
		SST_2	4.17	1.44	.85 ^{***}	
		SST_3	4.05	1.59	.87 ^{***}	
	Sociability	SCB_1	4.35	1.24	.80 [†]	.84
		SCB_2	4.54	1.34	.83 ^{***}	
		SCB_3	4.86	1.21	.77 ^{***}	
CX	Sense	C_SEN_1	4.00	1.38	.79 [†]	.82
		C_SEN_2	3.83	1.40	.87 ^{***}	
	Feel	C_FEE_1	3.63	1.31	.86 [†]	.86
		C_FEE_2	3.84	1.43	.88 ^{***}	
	Think	C_THI_1	4.28	1.40	.78 [†]	.85
		C_THI_2	4.22	1.44	.82 ^{***}	
		C_THI_3	3.82	1.50	.76 ^{***}	
	Act	C_ACT_1	4.42	1.37	.79 [†]	.84
		C_ACT_2	4.68	1.30	.84 ^{***}	
		C_ACT_3	4.30	1.41	.76	
Relate	C_REL_1	4.41	1.21	.78 [†]	.81	

Second-order Constructs	Latent Constructs	Indicators	Mean	SD	Confirmatory Factor Loadings	Cronbach's α
		C_REL_2	5.03	1.18	.72***	
		C_REL_3	4.61	1.22	.79***	
BX	Loyalty	B_LOY_1	4.18	1.73	.79 [†]	.83
		B_LOY_2	4.38	1.78	.88***	
	Quality	B_QUA_1	4.85	1.43	.89 [†]	.87
		B_QUA_2	4.87	1.35	.88***	
	Awareness	B_AWA_1	4.93	1.36	.82 [†]	.81
		B_AWA_2	5.00	1.34	.82***	
	Associations	B_ASS_1	4.74	1.38	.86 [†]	.80
		B_ASS_2	5.22	1.42	.77***	

* $p < .05$, ** $p < .01$, *** $p < .001$

[†]Loading was set to 1.0 to fix construct variance

Appendix C. Correlations of the Latent Constructs and the Square Root of AVE

Latent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)EFF	(.79)																
(2)INF	.61***	(.71)															
(3)LRN	.64***	.56***	(.75)														
(4)SPL	.37***	.43***	.50***	(.70)													
(5)LXR	.26***	.30***	.19**	.11	(.77)												
(6)DLC	.36***	.49***	.38***	.41***	.65***	(.78)											
(7)SST	.20***	.34***	.19**	.13*	.69***	.55***	(.71)										
(8)SCB	.26***	.30***	.30***	.27***	.34***	.35***	.51***	(.73)									
(9)SEN	.18**	.30***	.18**	.13*	.65***	.49***	.68***	.48***	(.79)								
(10)FEE	.10	.23***	.08	.13*	.47***	.38***	.60***	.42***	.71***	(.80)							
(11)THI	.19**	.31***	.22***	.12*	.57***	.50***	.68***	.39***	.74***	.75***	(.69)						
(12)ACT	.28***	.40***	.29***	.21***	.48***	.55***	.65***	.50***	.64***	.64***	.64***	(.70)					
(13)REL	.26***	.31***	.27***	.28***	.31***	.48***	.49***	.65***	.51***	.49***	.50***	.64***	(.70)				
(14)LOY	.16**	.32***	.19**	.23***	.41***	.48***	.48***	.20***	.39***	.42***	.50***	.44***	.37***	(.67)			
(15)QUA	.27***	.32***	.31***	.32***	.59***	.70***	.54***	.35***	.48***	.38***	.49***	.51***	.47***	.59***	(.80)		
(16)AWA	.39***	.41***	.38***	.24***	.46***	.52***	.44***	.37***	.39***	.31***	.36***	.47***	.46***	.44***	.55***	(.78)	
(17)ASSOC	.33***	.39***	.36***	.19**	.46***	.52***	.42***	.37***	.39***	.30***	.37***	.44***	.38***	.40***	.53***	.77***	(.78)

* $p < .05$, ** $p < .01$, *** $p < .001$

(1)EFF=Efficiency, (2)INF=Informativeness, (3)LRN=Learnability, (4)SPL=Simplicity, (5)LXR=Luxuriousness, (6)DLC=Delicacy, (7)SST=Self-Satisfaction, (8)SCB=Sociability, (9)SEN=Sense, (10)FEE=Feel, (11)THI=Think, (12)ACT=Act, (13)REL=Relate, (14)LOY=Loyalty, (15)QUA=Quality, (16)AWA=Awareness, (17)ASSOC=Associations

Note: The square root of the AVE is shown in parenthesis on the diagonal

Appendix D. CR and AVE of Latent Variables

	Latent variables	Composite reliability	AVE
Usability	Efficiency	.83	.62
	Informativeness	.75	.50
	Learnability	.79	.57
	Simplicity	.66	.50
<i>Second order</i>		.86	.62
Affect	Luxuriousness	.82	.60
	Delicacy	.82	.61
<i>Second order</i>		.77	.62
User Value	Self-satisfaction	.75	.51
	Sociability	.77	.54
<i>Second order</i>		.77	.63
CX	Sense	.76	.62
	Feel	.78	.64
	Think	.73	.48
	Act	.74	.49
	Relate	.74	.49
<i>Second order</i>		.94	.77
Brand Equity	Loyalty	.62	.45
	Quality	.79	.65
	Awareness	.76	.62
	Associations	.76	.61
<i>Second order</i>		.86	.61

Appendix E. Fit Measures for the Measurement Model

Fit index	Recommended criteria	Initial measurement model	Refined measurement model
χ^2	$\geq .05$	2402.21*** (d.f.=1147)	1244.81*** (d.f.=828)
$\chi^2/d.f.$	≤ 3.0	2.09	1.50
GFI	$\geq .90$	.71	.82
AGFI	$\geq .80$	.68	.79
SRMR	$\leq .08$	.08	.06
RMSEA	$\leq .05$	.06	.04
NNFI	$\geq .90$	.85	.94
CFI	$\geq .90$	.86	.95

* $p < .05$, ** $p < .01$, *** $p < .001$