Product attributes and brand equity in the mobile domain: The mediating role of customer experience

Margaret L. Sheng [a,*], Thompson S.H. Teo [b,c,1]

[a] National Taiwan University of Science and Technology, School of Management, Department of Business Administration, 43, Keelung Road, Section 4, Taipei 106, Taiwan
[b] National University of Singapore, School of Business, Department of Decision Sciences, Singapore
[c] School of Computing, Department of Information Systems, Singapore

ARTICLE INFO

ABSTRACT

There are studies showing that utilitarian (perceived ease of use and perceived usefulness) and hedonic (entertainment and aesthetics) attributes of products are two fundamental resources that ensure brand equity in the mobile domain. However, few studies examine the attributes of products and how and why such resources influence mobile brand equity. In this study, a survey was carried out on 262 mobile users in Taiwan to examine the mediating effects of customer experience on the relationship between product attributes on mobile brand equity. Our findings suggest that utilitarian and hedonic attributes of products affect mobile brand equity through customer experience. In other words, perceived ease of use, perceived usefulness, entertainment, and aesthetics may not be intrinsic value; their value on mobile brand equity is realized through customer experience. However, whereas the effect of perceived ease of use on mobile brand equity is partially mediated, perceived usefulness, entertainment, and aesthetics are fully mediated by customer experience. By showing the differential effects of product attributes on mobile brand equity, this study provides a more refined understanding of the interplay among product attributes, customer experience, and mobile brand equity. The results suggest that by overlooking the mediating role of customer experience, previous research may have provided an overly optimistic view of the value of product attributes in mobile brand equity.

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1. Introduction

Mobile services, such as short messaging service, mobile data service, and contactless m-payment, have significant potential in serving customers in wireless environments. The rapid proliferation of mobile devices including mobile phones, web-enabled personal digital assistants, and other handheld computers is resulting in the growth of such items at an astonishing rate. In terms of mobile domain, consumers consider both hedonic and utilitarian product attributes.

The literature has established brand equity for the mobile domain. Mobile brand equity or m-brand equity is enhanced by two distinct, yet highly complementary, factors: product attributes (Chitturi, Rajagopal, & Vijay, 2008; Dhar & Klaus, 2000; Kivetz & Itamar, 2002; Okada, 2005; Strahilevitz & John, 1998; Voss, Spangenberg, & Grohmann, 2003) and customer experience (Gentile, Spiller, & Noci, 2007; LaSalle & Britton, 2003; Shaw & Ivens, 2005). Product attributes refer to utilitarian (practical, functional)

and hedonic (playful, joyful) benefits of products. Customer experience refers to the interaction with customers that ensures the derivation of utilitarian and hedonic value.

Although the contributions of previous studies are substantial, extant research is lacking in three aspects. First, the brand equity underscores the importance of several different attributes of products in brand equity, namely, entertainment and aesthetics, particularly in the mobile domain. There is, however, little insight into the relative importance of the different attributes of products as drivers of brand equity. This study makes contributions in highlighting entertainment and aesthetics of product attributes in mobile brand equity.

Second, previous studies have focused almost entirely on the effects of product attributes on brand equity. No detailed explanations are, however, offered as to how and why customer experience matters in these relationships. Yet it is often implicitly assumed that customer experience is a salient factor in transforming product attributes into brand equity. The current state of the literature is lacking and inconsistent because a key assumption is that it is not the product itself, but rather its interaction with customers, that drives brand equity. This study offers the empirical evidences of how and why customer experience mediates the relationship between product attributes and brand equity in the mobile domain.

* Corresponding author. Tel.: +886 2 27303285.
E-mail addresses: msheng@mail.ntust.edu.tw, shen0024@yahoo.com (M.L. Sheng), bizteosh@nus.edu.sg (T.S.H. Teo).
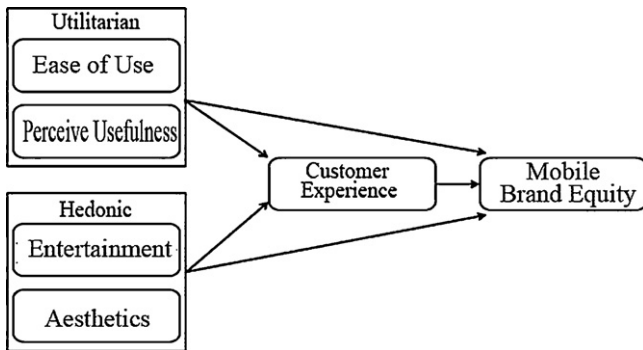1 Tel.: +65 6516 3036.

Fig. 1. Conceptual model.

Third, customer experience has traditionally been positioned as a moderator in the relationship between product attributes and brand equity. However, because product attributes may make communication difficult, interaction becomes a key factor that determines the nature of customer experience designs. This view implies that product attributes affect brand equity through their effects on the design of customer experience.

The extant research has paid little attention to these different perspectives of the role of customer experience. The moderating view suggests that product attributes are inherently valuable, so that customer experience determines the strength of their effect on brand equity. In contrast, the mediating view suggests that product attributes are not inherently valuable and that the product attributes could affect brand equity through their effects on customer experience. If the role of customer experience is that of a mediator rather than a moderator, we may need to reevaluate our stance toward the role of product attributes in brand equity. In examining the mediating view of customer experience, our findings also shed light on the level of importance researchers and managers need to place on the inherent value of product attributes.

2. Theoretical background, research model, and hypotheses

Fig. 1 presents our conceptual model. The model indicates that utilitarian and hedonic product attributes affect customer experience which in turn affects mobile brand equity.

2.1. Customer experience

Customer experience originates from Pine and Gilmore's book "Experience Economy" in 1999, whose authors present the "experience" as a new economic offering, which emerges as the next step after commodities, goods and services. Customer experience is defined as a set of interactions between a customer and a product, a company, or any part of an organization, which provokes a reaction (LaSalle & Britton, 2003; Shaw & Ivens, 2005). Its evaluation depends on a comparison between customers' expectations and the stimuli coming from the interaction with the company and its offerings that correspond to the different moments of contacts or touch-points.

Customer experience is a renewed way to consider the well-known concept of consumption: it has become a holistic experience which involves a person – rather than a customer – as a whole at different levels and in every interaction between such a person and a company, or a company's offer (LaSalle & Britton, 2003). Based on this perspective, the creation of value is not only about selling memorable experiences but also enabling the customers to live all the moments of the relationship with a company in an excellent way, even beyond their expectations. Prahalad and Ramaswamy

(2004) indicate that customer experience involves co-creating their own unique experience with the company. Companies provide artifacts and contexts that are conducive to experiences and which can be properly employed by consumers to co-create their own, unique experiences (Caru & Cova, 2003, 2007). Co-creation plays an important role in developing an outstanding or perfect customer experience. When a co-creation approach is adopted, the customer engages in a dialogue and interaction with suppliers during product design, production, delivery and subsequent consumption.

Gentile et al. (2007) believe that customer experience is a new lever to create value for both company and customer and a good experience must holistically and consistently involve a person at different levels. The psychological and behavioral studies (Anderson, 1995; Brakus, 2001; Fiske & Taylor, 1991; Schmitt & Simonson, 1997) distinguish three basic systems – sensation, cognition and affect – each with its own structures, principles and mutual interactions. Verhoef et al. (2009) found that the customer experience construct is holistic in nature and involves the customer's cognitive, affective, emotional, social and physical responses. When considering a person per se, these studies take into account the set of a customer's actions, the system of values and beliefs (from which lifestyles and behaviors are derived) and relationships. Being modified from Schmitt (1999) and with the dimension of pragmatic experience added, Gentile et al. (2007) form holistic customer experience and identify six experiential components: a sensorial component (sense); emotional component (feel); cognitive component (think); pragmatic component; lifestyle component (act); and relational component (relate). Customers perceive each experience as a complex feeling, and each component as being hardly distinguishable from the others; sometimes there are relevant overlapping areas and clear interrelations.

2.2. Direct effect of product attributes on customer experience

The utilitarian and hedonic attributes have been a fertile area in the study of customer preference in product attributes (e.g., Chitturi, Rajagopal, & Vijay, 2007; Dhar & Klaus, 2000; Kivetz & Itamar, 2002; Okada, 2005; Voss et al., 2003). The utilitarian benefit refers to the functional and instrumental value of consumption offerings and the hedonic benefit refers to their pleasure and experiential value (Strahilevitz & John, 1998). In the context of mobile devices, for example, the device's battery life and sound volume are utilitarian benefits, whereas appeals to aesthetics based on its shape and color are hedonic benefits.

Schmitt (1999) and Gentile et al. (2007) concluded by stating that the module of customer experience includes the utilitarian and hedonic attributes. Recently, the technology acceptance model (TAM) was applied in a consumer context with the addition of a "hedonic" factor that relates to user pleasure when utilizing it. The TAM (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) is often used in the measurement of utilitarian benefit (Bruner & Kumar, 2005; Cyr, Head, & Ivanov, 2006; Wakefield & Whitten, 2006), while aesthetics and entertainment fall into the hedonic category (Cyr et al., 2006; Varshney & Vetter, 2000; Wei, 2008; Wong & Hiew, 2005). Mobile services have been suggested to have both utilitarian and hedonic dimensions and vendors can create aesthetically rich interfaces that customers enjoy. Moon and Kim (2001) referred to experience in mobile contexts and suggested that there is a positive relationship between the utilitarian/hedonic dimension and customer experience. They found that when individuals are in the state of playfulness, they will find the interaction intrinsically interesting: they are involved in the activity for pleasure and enjoyment rather than for extrinsic rewards.

2.3. Perceived ease of use, perceived usefulness, and customer experience

Studies have used two determinants of TAM (perceived ease of use (PEOU) and perceived usefulness (PU)) to explore the adoption of mobile devices (Cyr et al., 2006; Bruner & Kumar, 2005; Wakefield & Whitten, 2006). Rajgopal et al. (2001) used the TAM to measure customer experience on websites. Gentile et al. (2007) used the utilitarian attribute as an experience and pointed out the similarity to the concept of pragmatism. The concept of utility is integrated into one type of customer experience. Thus, we propose

H1(a). Perceived ease of use is positively and significantly related to customer experience.

H1(b). Perceived usefulness is positively and significantly related to customer experience.

2.4. Entertainment and customer experience

Wolf (1999), in his capacity as economic advisor, claims that entertainment – not autos, not steel, and not financial services – is fast becoming the driving wheel of the new world economy. Entertainment has been understood not so much as a product (a film, a show, a book, etc.) or as a feature of such a product, but rather as a response to a product. Vorderer, Klimmt, and Ritterfeld (2004) identify three motives of entertainment. The first motive is escapism. The reason people seek entertainment is because they desire to escape from the social world in which they actually live. Katz and Foulkes (1962) pointed out that the mass media in general are expected to serve the public's need to detach themselves from their real lives and to escape into a dream-like world. The second motive is mood management. The motive to regulate one's own moods underlies modifying one's own stimulus environment. As entertainment offerings are one part of such environments, individual selection is an appropriate and obvious way to enhance or perpetuate an already positive or negative mood. The third motive is achievement. The desire to be challenged, whether that means competing with others, with a program, or even with one's own previous achievements (e.g., a score in an online game) is probably the single most important motive for interactively entertaining oneself (Vorderer, Hartmann, & Klimmt, 2003). Vorderer et al. (2004) have speculated that the center of the entertainment is a "pleasant" experiential state, which includes physiological, cognitive, and affective components. At the core of entertainment, most researchers have located customer experience that is usually linked to positive terms such as playfulness, enjoyment, and even delight (Bosshart & Macconi, 1998). Thus, we propose,

H1(c). Entertainment is positively and significantly related to customer experience.

2.5. Aesthetics and customer experience

Pine and Gilmore (1999) pointed out that the difference between aesthetics and entertainment is that the aesthetics dimension involves a more proximal or intense experience of sensory stimuli than the entertainment dimension. Aesthetics is often seen as a visual sensory response. Hekkert and Leder (2008) briefly discussed some misunderstandings in the use of the aesthetics concept. They pointed out that aesthetics is not limited to the visual domain, is not a matter of styling only, and is not an aspect, property or element of something. Fiotre and Kimle (1997) pointed out that a total aesthetic experience includes the appreciation of the formal, expressive and symbolic quality of a product, appearance or environment. The formal quality is the sensory stimulation from the product and includes aspects such as color, texture, line, form,

rhythm, balance, and proportion. The expressive quality is related to certain inherent human emotional experience (e.g., a specific color provides a feeling of warmth) or because it is an acquired association (e.g., green could be a reflection of the restfulness of nature). The symbolic quality of a product does not only satisfy the cognitive experience, but also satisfy the relationship between that experience and the customer. Postrel (2002) suggests that the use of aesthetics as a differentiating factor resembles similarly crowded markets where aesthetics is often the only way to make a product stand out and enhance customer experience. Thus, we propose,

H1(d). Aesthetics is positively and significantly related to customer experience.

2.6. Mobile brand equity

Brand equity has many definitions and forms, such as favorable impressions, attitudinal dispositions, and behavioral predilections (Rangaswamy, Burke, & Oliva, 1993). Ambler et al. (2002) define a brand as everything existing in the minds of customers and include brand awareness, brand attachment, brand attitude, brand activity, or experience. Konecnik and Gartner (2007) emphasized the importance of brand image and used it to measure brand equity. In line with the definition of brand equity for mobile services or mobile brand equity, brand image also depends on brand awareness, brand association, brand quality, and brand loyalty (Yoo & Donthu, 2001).

Branding has existed for centuries as a way of distinguishing the goods of one producer from those of another. A brand can be treated as a legal instrument, logo, company, identity system, image, personality, relationship, and/or as adding value (Konecnik & Gartner, 2007). In the past, branding focused on the differentiation of products or services (Thomsin, 2006). However, a brand can be viewed from an output perspective, as in the way customers interpret and use it to enhance their personal experience (Konecnik & Gartner, 2007). Therefore, branding is not so much about advertising and conventional brand-related activities, but rather about building processes to support the customer experience (Frow & Payne, 2007).

Several studies confirm that product trial experience is a powerful tool for the formation of brand beliefs and attitudes. Brand beliefs derived from direct experience are stronger, are held with greater confidence, and are better predictors of behavior than those generated by indirect experience such as advertising (Fazio & Zanna, 1978; Smith, 1993; Smith & Swinyard, 1988). Previous studies portray the direct and indirect impact of customer experience on brand loyalty (Bennett, Härtel, & McColl-Kennedy, 2005), brand associations, and awareness (Berry, 2000). Cheng and Chieng (2006) found that a strategic experiential module including personal experience and shared experience is positively related to a brand associative network. Biedenbach and Marell (2010) also proved that customer experience directly affects the brand equity and emphasized the importance of interaction between the customer and service supplier. Through the interaction, the customer experience will help the mobile brand equity. The above studies have shown that customer experience has a positive effect on all dimensions of brand equity. Schmitt (1999) also suggested that the greatest brand is the supplier of experience, and he also claimed that branding is equal to the experience. Thus, we propose,

H2. Customer experience is positively and significantly related to mobile brand equity.

2.7. Direct effect of product attributes on mobile brand equity

The utilitarian and hedonic benefits provide more opportunities for the differentiation among brands in the consumers'

minds (Keller, 2003) and increase the brand association (Bendixen, Bukasa, & Abratt, 2004). Voss et al. (2003) concluded that the two dimensions of utilitarian/hedonic conceptualization accounted for greater variances than the traditional uni-dimensional brand attitude measures. If the utilitarian and hedonic benefits can improve the attitude toward the brand from the point of view of the customers, they can affect the customer's acts or retentions, therefore enhancing brand equity (Ambler et al., 2002; Cheng & Chieng, 2006; Konecnik & Gartner, 2007).

2.8. Perceived ease of use, perceived usefulness, and mobile brand equity

The utilitarian benefit is almost an essential factor when consumers choose the brand. Grimm (2005) observed that utilitarian motives dominate the choice process. The utilitarian benefit will affect the evaluation of brand performance and influence the perceived quality of the brand. If the perceived ease of use and perceived usefulness are great, they can positively influence the customers' attitude and increase the brand equity (Ambler et al., 2002; Homer, 2008; Konecnik & Gartner, 2007). Cyr et al. (2006) also found that perceived ease of use and perceived usefulness positively influence mobile brand loyalty. Thus, we propose,

H3(a). Perceived ease of use is positively and significantly related to mobile brand equity.

H3(b). Perceived usefulness is positively and significantly related to mobile brand equity.

2.9. Entertainment and mobile brand equity

Thorbjornsen and Supphellen (2004) found that when customers browse the Internet, the entertainment motivation will affect brand loyalty and increase the frequency with which they view the page. Tsang, Ho, and Liang (2004) indicated that the entertainment advertising is usually more acceptable and has a positive influence on the customer's attitude toward the brand. Hackley and Tiwsakul (2006) pointed out that when brands are subsumed within entertainment experiences, the brand that is featured and the brand that serves as the entertainment mutually reinforce each other and provide a powerfully resonant discursive resource for identity formation. Hence, this identity can link the brand with the customer's mind and improve the product's brand awareness, thereby enhancing the formation of brand association (Ambler et al., 2002; Biedenbach & Marell, 2010; Keller, 2003).

H3(c). Entertainment is positively and significantly related to mobile brand equity.

2.10. Aesthetics and mobile brand equity

Aesthetics is one of the criteria for choosing and designing brand elements and building brand equity (Keller, 2003). For instance, the unique aesthetic design of the iMac generated abundant profits for Apple (Mitchell, 1999). Orth and Malkewitz (2008) indicated that product designs with different aesthetic elements will lead the brand to develop a different brand image. Cyr et al. (2006) pointed out the design aesthetics can improve the mobile loyalty and that loyalty will affect consumer behavior and intentions, thus creating brand equity (Konecnik & Gartner, 2007). Through aesthetics, brand identities serve the product in the unique definition of self (Schau & Muniz, 2002).

H3(d). Aesthetics is positively and significantly related to mobile brand equity.

2.11. Mediation effect of customer experience on mobile brand equity

The direct-effects arguments for the impacts of product attributes on brand equity for mobile services are persuasive. However, a careful inspection indicates that the arguments implicitly assume a role for customer experience. As we argued previously, product dimensions constitute factors that determine the customer experience. Indeed, it is neither their utilitarian nor hedonic attributes, but rather their interactions with customers that ensures brand equity for mobile services. Specifically, customer experience ensures brand equity because it enhances the likelihood of interactions with customers. Implicit in this argument is the notion that customer experience connects product attributes with brand equity. By designing a formal structure for interactions, customer experience also provides a common forum for periodic feedback, for example. Hence, product attributes affect brand equity indirectly through their effects on customer experience. This discussion suggests the following hypotheses:

H4. Customer experience mediates the effects of (a) perceived ease of use, (b) perceived usefulness, (c) entertainment, and (d) aesthetics on mobile brand equity.

3. Research method

In this study, a variance-based partial least squares (PLS) method was chosen over covariance-based methods such as LISREL, as it supports both exploratory and confirmatory research (Chwelos, Benbasat, & Dexter, 2001). PLS does not generate an overall goodness-of-fit index as LISREL, and so model validity is assessed by examining structural paths and R-square values (Fornell & Bookstein, 1982).

3.1. Sample and data collection

An online survey targeting general mobile phone users was utilized to collect data in the capital of Taiwan, Taipei. The questionnaire was pre-tested with 50 mobile users and there were no major problems with understanding and wording. The survey was announced through email, newsgroups, online forums, search engines, and online banner. The survey took place over a period of three weeks in order to obtain public responses. Respondents who participated in the study and completed the questionnaire were received a gift certificate NT$200 as a token of gratitude. We received 262 useable questionnaires and the demographics of the sample are given in Table 1.

3.2. Instrument

We measured the perceived ease of use and perceived usefulness based on five items for each construct, adapted from Davis (1989). Entertainment with 6 items was adapted from Vorderer et al. (2004) who suggested three motivation of entertainment (escapism, mood management, and achievement). Aesthetics with 7 items was adapted from Fiotre and Kimle (1997) who suggested three quality of aesthetics (formal, symbolic, and expressive). Customer experience with 15 items was adapted from Schmitt (1999) who included five types of strategic experience (sense, feel, act, affect, and related) and Gentile et al. (2007) who suggested additional pragmatic experience. Mobile brand equity with 10 items was adapted from Yoo and Donthu (2001) who included brand awareness, brand association, perceived quality, and brand loyalty

Table 1
Demographics of sample.

		Frequency	Proportion
Gender	Man	117	44.7%
	Woman	145	55.3%
Age	Less than 15	1	4%
	15–18	1	4%
	19–23	49	18.7%
	24–28	151	54.6%
	29–35	52	19.8%
	36–42	7	2.7%
	More than 42	1	4%
Education	High school	7	2.7%
	Technical school	14	5.3%
	College	127	48.5%
	Master/doctorate	114	43.5%
Marital status	Married	91	35%
	Single	171	65%
Internet experience			100%
Time owned a cell phone			6.7 years
Mobile internet browsing experience			53%

to measure brand equity. All items were assessed on a seven-point Likert scale ranging from "1 = strongly disagree" to "7 = strongly agree" in Appendix A.

3.3. Reliability and validity

Construct reliability was assessed using Cronbach's alpha. In Appendix A, alpha values range from 0.878 (mobile brand equity) to 0.938 (aesthetics). Nunnally (1994) recommended Cronbach's alpha above 0.7 as the appropriate reliability level. All our constructs possess adequate reliability of 0.7 or above. To assess convergent validity, Fornell and Larcker (1981) proposed examining: (1) the item reliability of each construct, (2) the composite reliability (CR) of each construct, and (3) the average variance extract (AVE) of each construct. Item reliability was assessed through principal components analysis as recommended by Straub (1989). Table 2 shows the results of the principle components analysis with varimax rotation for the constructs. Hair, Black, Babin, Anderson, and Tatham (2006) suggest the factor loadings of all individual items exceed 0.5. Fornell and Larcker (1981) suggest CR value be over 0.6 and AVE value be greater than 0.5 in each dimension. The constructs in the survey demonstrate convergent validity in Table 2. On the basis of Fornell and Larcker's (1981) work, we tested for the discriminant validity of the constructs by examining whether the square root of the AVE of each construct was greater than the highest correlation between the latent variable involving the focal constructs (shown above the diagonal in Table 3), suggesting discriminant validity.

4. Analyses and results

4.1. Direct effects

We test the direct effects of perceived usefulness, perceived ease of use, entertainment, and aesthetics on customer experience and mobile brand equity. As Table 4 (Model 1) shows, perceived usefulness ($b = .145$, $p < .01$), perceived ease of use ($b = .148$, $p < .01$), entertainment ($b = .317$, $p < .001$), and aesthetics ($b = .440$, $p < .001$) have positive and significant effects on customer experience. These results support H1(a), H1(b), H1(c) and H1(d). The aesthetics shows the largest coefficient in customer experience in Model 1. The results in Model 2 show that perceived usefulness ($b = .226$, $p < .001$), perceived ease of use ($b = .251$, $p < .001$), entertainment ($b = .185$, $p < .01$), and aesthetics ($b = .199$, $p < .01$) have positive and significant effects on mobile brand equity. These results support

Table 2
Factor loading, CR, AVE.

	Factor loading		Composite reliability	AVE
PEOU	PEOU 1	0.6216	0.889	0.768
	PEOU 2	0.7694		
	PEOU 3	0.6814		
	PEOU 4	0.6716		
	PEOU 5	0.6844		
PU	PU 1	0.806	0.925	0.697
	PU 2	0.7954		
	PU 3	0.7975		
	PU 4	0.7892		
	PU 5	0.7913		
Aes	Aes 1	0.8234	0.949	0.729
	Aes 2	0.829		
	Aes 3	0.8932		
	Aes 4	0.9002		
	Aes 5	0.8684		
	Aes 6	0.8013		
	Aes 7	0.8596		
Ent	Ent 1	0.851	0.943	0.735
	Ent 2	0.8867		
	Ent 3	0.8948		
	Ent 4	0.8884		
	Ent 5	0.7666		
	Ent 6	0.8516		
CE	CE 1	0.7099	0.935	0.592
	CE 2	0.7211		
	CE 3	0.7056		
	CE 4	0.7535		
	CE 5	0.7868		
	CE 6	0.772		
	CE 7	0.7689		
	CE 8	0.6961		
	CE 9	0.6929		
	CE 10	0.7892		
	CE 11	0.6704		
	CE 12	0.6781		
	CE 13	0.6667		
	CE 14	0.5107		
	CE 15	0.5227		
MBE	MBE 1	0.5754	0.866	0.586
	MBE 2	0.7211		
	MBE 3	0.7541		
	MBE 4	0.6694		
	MBE 5	0.5875		
	MBE 6	0.6057		
	MBE 7	0.6892		
	MBE 8	0.7384		
	MBE 9	0.7813		
	MBE 10	0.808		

H3(a), H3(b), H3(c) and H3(d). The perceived ease of use shows the largest coefficient in mobile brand equity in Model 2.

4.2. Mediating effect of customer experience

We followed the three-step regression procedure that Baron and Kenny (1986) recommended in examining the mediating effect

Table 3
The correlation coefficient and squared root of AVE.

	Aes	Ent	CE	MBE	PU	PEOU
Aes	**0.853**					
Ent	0.462**	**0.857**				
CE	0.699**	0.630**	**0.769**			
MBE	0.394**	0.396**	0.507**	**0.766**		
PU	0.442**	0.452**	0.558**	0.376**	**0.835**	
PEOU	0.329**	0.301**	0.462**	0.411**	0.506**	**0.876**

The bold of diagonal is the squared root of AVE and the others are correlation coefficients.

** $p < .01$.

Table 4
Results.

	Mediator CE	Dependent variable MBE	VIF[d]
Model 1			
PEOU	.148**		1.375
PU	.145**		1.633
Aes	.440***		1.411
Ent	.317***		1.413
F	123.176***		
R^2	.658		
adj R^2	.653		
Model 2			
PEOU		.251***	1.375
PU		.226***	1.633
Aes		.185**	1.411
Ent		.199**	1.413
F		25.369***	
R^2		.284	
adj R^2		.273	
Model 3			
PEOU		.210**	1.439
PU		.060	1.695
Aes		.064	1.977
Ent		.112	1.707
CE		.276**	1.977
F		22.902***	
R^2		.310	
adj R^2		.296	
ΔR^2		.026**	

d Variance inflation factor.
** $p < .01$.
*** $p < .001$.

of customer experience. As we showed previously, four product attributes (perceived usefulness, perceived ease of use, entertainment, and aesthetics) have positive and significant effects on customer experience. In addition, four product attributes have positive and significant effects on mobile brand equity. When customer experience is included in Model 3 (Table 4), it reveals a positive and significant effect on mobile brand equity, in support of H2 ($b = .276$, $p < .001$). The inclusion of customer experience leads to a slight decrease in the effect size of perceived ease of use (from .251 to .210), but remains significant, suggesting partial mediation. It means that the perceived ease of use has a direct effect (through customer experience) on mobile brand equity. The effect of perceived usefulness, entertainment, and aesthetics on mobile brand equity is not significant, suggesting full mediation. It means that perceived usefulness, entertainment, and aesthetics influence mobile brand equity through customer experience. Model comparisons based on the chi-square difference test indicate that Model 3 performs better than both Model 1 and Model 2. Therefore, overall, the model fit is superior when customer experience is included.

5. Theoretical contributions

This study contributes to mobile brand equity in three main ways. First, the study shows that customer experience plays an important role in mobile brand equity by partially mediating the effect of perceived ease of use and by fully mediating the effects of perceived usefulness, entertainment, and aesthetics on mobile brand equity. In other words, four product attributes may not be intrinsically valuable; their value on mobile brand equity is realized through customer experience. This is an important finding as it indicates that customer experience is an important mediator in the relationship between product attributes and mobile brand equity. Second, four product attributes have

different effects on mobile brand equity. The full mediating role of customer experience on the mobile brand equity indicates that perceived usefulness, entertainment, and aesthetics are completely through customer experience. The partial mediating role of customer experience on the mobile brand equity indicates that perceived ease of use by itself, does contributes directly to mobile brand equity. The direct effect of perceived ease of use on mobile brand equity sheds light on the importance ascribed to the perspective of customer experience in mobile brand equity. Third, the objective of our study is to develop and validate a model for brand equity in a mobile domain. Our model builds on past literature by combining validated utilitarian, hedonic construct, and customer experience in a new context of mobile domain.

5.1. Managerial implications

Our study calls on managers to consider the attributes (perceived ease of use, perceived usefulness, entertainment, and aesthetics) they use in developing new products and in properly designing customer experience. These attributes of products appear to influence the design of customer experience, which in turn affects mobile brand equity. Thus, the new insight for managers is that product attributes are inherently valuable for mobile brand equity, but emphasizing the customer experience may be detrimental to mobile brand equity. In this respect, our measures of product attributes could serve as guides for managers who want to collect and use utilitarian and hedonic benefits in line with these attributes. From a practitioner's perspective, the objective of this study has been to provide practical insights into ways of enhancing brand equity in the mobile domain. In addition to utilitarian attributes, hedonic attributes of products also play a critical role here. Accordingly, the design of the interface may be central in determining the level of entertainment (to meet the motivation of escapism, mood management, and achievement) and aesthetics (to reach formal, symbolic, and expressive quality) and thereby establish holistic customer experience.

Our study also provides some insights into the relative importance of various product attributes in enhancing customer experience and mobile brand equity. Specifically, hedonic attributes are more important than utilitarian attributes in determining customer experience (as shown in Model 1). In contrast, when we consider the direct effects of product attributes on mobile brand equity (Model 2), utilitarian attributes appear to be more salient than hedonic attributes.

5.2. Limitations and future research directions

This study has several limitations that should be considered in the interpretations of the findings. First, only mobile phone was investigated. Services that are more utilitarian in nature (such as mobile banking) may result in different relationships between the constructs of our model. Second, it may be worthwhile for future research to assess the role of individual differences in the ability to judge the entertainment and aesthetic attributes of products. Third, the data was collected in a single country. There was no evidence of sampling bias, but future studies would benefit from inclusion of a wider geography scope. Our findings also underscore the need for researchers to examine other factors that may also be antecedents of brand equity and customer experience.

Appendix A. Questionnaire

Factors	% of total variance explained by each factor	Reliability
Perceived ease of use (8.597%)	EOU1: Using this mobile phone is easy to me. EOU2: Using this mobile phone to do what I want to do is easy. EOU3: The interface of this mobile phone is clear. EOU4: Using this mobile phone is flexible. EOU5: I feel this mobile phone is easy to use.	0.889
Perceived usefulness (8.105%)	PU1: This mobile phone can make me more efficient. PU2: This mobile phone can improve my work performance. PU3: This mobile phone can make me more effective. PU4: This mobile phone can make me more productive. PU5: This mobile phone is useful for me.	0.925
Entertainment (15.531%)	Ent1: The entertainment provided by the mobile phone lets me forget everything temporarily. Ent2: The entertainment provided by the mobile phone lets me escape from real life temporarily. Ent3: This mobile phone can adjust my mood. Ent4: This mobile phone can continue my positive mood. Ent5: The entertainment provided by the mobile phone is challenging for me. Ent6: The entertainment provided by the mobile phone can satisfy my achievement.	0.938
Aesthetics (15.154%)	Aes1: The design of this mobile phone is appealing. Aes2: I like the shape of this mobile phone. Aes3: This mobile phone can make my senses joyful. Aes4: This mobile phone can give me a sense of superiority. Aes5: The design of the mobile phone can inspire my positive emotions. Aes6: This mobile phone can symbolize my status. Aes7: This mobile phone can show my style.	0.928
Customer experience (11.141%)	CE1: This mobile phone is focused on sensory appeal. CE2: This mobile phone tries to excite my senses. CE3: This mobile phone tries to be emotional. CE4: This mobile phone tries to be affective. CE5: This mobile phone tries to intrigue me. CE6: This mobile phone tries to stimulate my curiosity. CE7: This mobile phone causes me to think creatively. CE8: This mobile phone tries to make me think about my lifestyle. CE9: This mobile phone tries to remind me of the activities I can do. CE10: This mobile phone gets me to think about my behavior.	0.924

Factors	% of total variance explained by each factor	Reliability
	CE11: This mobile phone tries to make me think about bonds. CE12: I can relate to other people through this mobile phone. CE13: This mobile phone tries to get me to think about relationships. CE14: It is easy and comfortable to use this mobile phone. CE15: This mobile phone can transfer files as simply and rapidly as a PC.	
Mobile brand equity (7.411%)	BE1: I consider myself to be loyal to the brand of this mobile phone. BE2: This mobile phone would be my first choice. BE3: I will not buy other brands if this mobile brand is unavailable at the store. BE4: The quality of this mobile phone is extremely high. BE5: The functions of this mobile phone are very high. BE6: I can recognize this brand of mobile phone among other competing brands. BE7: I am aware of this brand of mobile phone. BE8: Some characteristics of this mobile phone come to my mind quickly. BE9: I can quickly recall the symbol or logo of this mobile brand. BE10: I have difficulty imagining the brand of mobile phone in my mind.	0.878

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Thompson S.H. Teo holds joint appointments at the National University of Singapore as an Associate Professor in the Department of Decision Sciences at the School of Business and in the Department of Information Systems at the School of Computing. His research interests include the strategic use of IT, e-commerce, adoption and diffusion of IT, strategic IT management and planning, offshoring and sustainability. He has published more than 100 papers in international refereed journals. He has formerly served as Senior Associate Editor for the European Journal of Information Systems and is currently serving as the Regional Editor (Asia and Pacific) for the International Journal of Information Management. Thompson is also on the editorial boards of Communications of the AIS, and Omega. He has co-edited four books on IT and e-commerce, and is also a three-time winner of the SIM Paper Awards Competition.

Margaret L. Sheng obtained her PhD degree from the University of Minnesota at Twin Cities. She currently holds a position at the National Taiwan University of Science and Technology (NTUST) as an Assistant Professor in the Department of Business Administration at the School of Management. Before Joining the NTUST, she served as an Assistant Professor at the Hamline University in Minnesota, USA. Her research interests include global marketing, internet marketing, MNC's innovativeness, and knowledge management. Her papers have been published in Technovation, International Journal of Information Management, and Industrial Management & Data Systems.