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Branded app atmospherics: Examining the effect of pleasure–arousal–dominance in brand relationship building

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ABSTRACT

Given the incredible ability to interact with consumers, branded apps have become a new important brand relationship building platform for marketers. However, despite the remarkable growth of app users, many brands are still struggling to attract continuous usage among user. Past research emphasized on the functional perspective of branded apps usage, yet emotional factors have received less attention. Therefore, to address the research gap, present research draws from the conceptual lens of pleasure-arousal-dominance (PAD) model from environmental psychology to examine the emotional factors of branded apps. The objective of this research is to investigate the drivers of branded app atmospherics in brand relationships. We recruited 408 users by an online survey. Results identify atmospherics cues that influence the experiential emotions of pleasure, arousal and dominance, which generates usage intention. This research contributes knowledge by extending PAD model to branded app context and provide an important ground where practitioners can design atmospherics cues that create emotional experience in branded app to foster brand relationship.

1. Introduction

The widespread adoption of mobile apps is transforming consumers' interactions with brands. Mobile apps are software applications developed to run on smartphones that provide content such as online shopping, instant messaging, games, and navigation. In 2016, the number of mobile app downloads reached 140 billion, and this number increased to 204 billion by 2019 (Statista, 2020). Worldwide, consumers spent US $37.8 billion on mobile apps during the second quarter of 2020 (Statista, 2020). These numbers reflect a rapidly growing interest among consumers, who adopt and search through a wide assortment of apps that can be accessed anytime and anywhere.

Given the incredible ability of mobile apps to facilitate interaction with consumers, marketers have seized the opportunity to employ them as an additional communication channel to build brand relationships (Wang et al., 2016). Thus, marketers are increasingly developing branded apps to provide enjoyable user experiences and foster brand relationships with consumers on the go. However, despite the strong growth in app users and the promising opportunities that branded apps should provide, many brands still struggle to maintain continuous usage. Without continuous usage, brands cannot establish a relationship with customers. Approximately 25% of mobile apps are abandoned after merely one use (Statista, 2019). Thus a vital question arises: what are the key factors that drive the continuous usage of branded apps? In other words, in the context of an enjoyable app experience, some emotional experiences may encourage customers to continue using an app, thus leading to brand loyalty. Hence, this study investigated the establishment of brand relationships in the branded app environment.

Most research investigating the continuous usage intention of mobile apps has emphasized the functional perspective by examining the utility that mobile apps provide to users, including the different effects of perceived usefulness, perceived ease of use, and satisfaction among various groups of users (Shang and Wu, 2017); the influence of perceived usefulness and task-service fit (Fang, 2017); the effects of convenience, compatibility, and perceived ease of use on adoption (Ozturk et al., 2016). However, few studies have examined the emotional factors that influence the continuous usage adoption of branded apps, such as experiences of pleasure, fun, stimulation, and a sense of control that may induce consumers to use a branded app. Recent literature on hedonic shopping emphasized the importance to examine the emotional factors induced by the usage of mobile app (Lee and Kim, 2019). For instance, perceived enjoyment can drive app usage intention

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(McLean et al., 2020). Entertainment gratification can facilitate reuse intention of apparel mobile apps (Lee and Kim, 2019); entertainment experience in branded app can foster brand attitude and brand relationship (van Noort and van Reijmersdal, 2019). Despite the importance of the emotional factors, our understanding on its effect on branded app is still far from comprehensive. Branded app provides an environment where individuals can interact with brand, thus environmental cues are likely to exert influence on individual emotions in the usage experience. Therefore, there is a need for a further theoretical investigation that provides a more comprehensive perspective to elucidate the important emotional determinants that influence branded app usage experience. Such a critical examination can provide directions for marketers to more effectively enhance brand relationship building. In response to this research gap, the present study proposes an integrative framework that investigate the significant role of emotional factors in influencing consumers' continuous usage intentions of branded apps and consequential brand loyalty.

The present study draws on the theoretical foundations of environmental psychology, which posit that the atmosphere created by environmental cues affect customer's attitudes. Mehrabian and Russell (1974) proposed a model based on three kinds of emotions: pleasure, arousal, and dominance (PAD). The PAD model illustrates the emotional dimensions created by environmental stimuli, which affect individuals' behavior. Previous studies have adopted environmental psychology to demonstrate the impact of a website's environmental cues on customer's online behavior (Hsieh et al., 2014; Mazaheri et al., 2011); however, environmental cues have seldom been investigated in a branded app context. Although websites and mobile apps are similar in terms of how users can search for information, make online purchases, and seek entertainment, the effects of environmental cues provided by branded apps may exhibit notable differences. Mobile devices provide a uniquely personal setting that exhibits distinctive features, such as ubiquitous access to information and services (Okazaki and Mendez, 2013). Moreover, many brands incorporate gamification designs into their apps to promote entertainment and stimulation (Huotari and Hamari, 2017), thereby considerably enhancing the perceived control, pleasure, and arousal experienced when using smartphone and branded apps. Therefore, to address the research gap, the present study draws from the PAD model (Mehrabian and Russell, 1974) to examine the drivers of branded app atmospherics on the continuous usage intention of branded apps and consequent brand relationships. The proposed framework advances understanding in branded app research and offers valuable managerial implications.

2. Theoretical framework and research hypotheses

2.1. Branded apps

Mobile phone apps are among the most important topics in marketing today because of their substantial potential to reach consumers. A branded app is conceptually defined as "software downloadable to a mobile device which prominently displays a brand identity, often via the name of the app and the appearance of a brand logo or icon, throughout the user experience" (Bellman et al., 2011, p. 191). Because mobile apps require consumers to deliberately download them, these apps may be seen as "non-push marketing contacts" (Shankar and Malthouse, 2007). Because consumers must first opt in by downloading the apps, advertising to mobile users is considered a "pull" instead of a "push" strategy (Bellman et al., 2011). Although mobile apps and websites share some similarities, mobile apps possess some distinctive features. For consumers to access information on a brand website, they need to use an Internet search engine. However, to use a mobile app, customers must download and install the app on their mobile phones. Once the app has been downloaded, customers no longer need to use the search engine to access the brand website; instead, by merely opening the downloaded app, they can have direct and immediate access to the brand's information. Enabled by smartphone features such as touchscreens and location sensitivity, branded apps can create value for customers that surpasses that of websites (Li and Fang, 2019). Furthermore, mobile devices demonstrate unique integration by providing personalization and customization, social connection, and text and visual communication capabilities as well as mobility all in one device (Larivière et al., 2013). From a marketing communication perspective, mobile devices enable marketers to broadcast location-specific messages.

Prior research has primarily employed the technology acceptance model to examine the usage adoption of mobile apps (Choi et al., 2014; Lee et al., 2012; Li et al., 2014). These studies view mobile apps as technology products that provide utility value to users. Therefore, the main focus of previous research has been the utilitarian value that mobile apps provide to users, such as perceived usefulness, ease of use, and cost savings (Choi et al., 2014; Lee et al., 2012; Li et al., 2014). Bellman et al. (2011) investigated the effect of branded apps on consumers' brand attitude and purchase intention and found that the usage of branded apps can increase users' brand interest. Furthermore, they observed that information/user-centric apps demonstrate a stronger positive effect on purchase intention. Kim et al. (2013) research on branded apps revealed that apps' interactive features can increase engagement, postulating that the "anytime, anywhere" interactivity and ease of control of mobile devices allows them to be used more effortlessly than computer websites, thereby increases the perceived effectiveness. The differences in the types of value that branded apps provide (information versus entertainment) lead to different cognitive and affective responses (van Noort and van Reijmersdal, 2019). Lariviere et al. (2013) asserted that the characteristics of branded apps allow them to provide various advantages to customers, including access to information, where customers can easily search for information; convenience and monetary value, such as obtaining sales promotions and economic benefits from coupons and discounts; and social value from interacting and sharing experiences with others.

A second stream of research has focused on the consumer–brand relationship perspective by examining factors that affect branded app adoption, such as brand identification, brand attachment, and perceived value (Peng et al., 2014); the relationship path of parasocial interaction and usage intention (Tseng and Lee, 2018); and how brand attachment and satisfaction drive continuance intention (Li and Fang, 2019). However, despite these studies, limited research has examined emotional factors, such as the experiences of pleasure, stimulation, arousal, and sense of control that may be created by atmospheric cues in the branded app environment to influence customer's usage attitude. Thus, the present study aims to close this research gap and draw from environmental psychology to explore the emotional states that may affect the consumers' intentions for the continuous usage of branded apps and consequential brand loyalty.

2.2. Pleasure arousal dominance model (PAD) model

According to environmental psychology, atmospherics created by environmental cues can exert an impact on customers' purchasing decisions. Mehrabian and Russell (1974) proposed Stimulus-Organism-Response (S–O-R) paradigm, which postulates that three basic emotional states mediate approach–avoidance behaviors in environmental situations. They assert that in any environment, a stimulus cue from the atmosphere may produce an emotional state in an individual that can be characterized according to the three PAD dimensions (pleasure, arousal, and dominance). When the PAD emotional states are established, the individual is likely to adopt an approach behavior in the environment. Pleasure describes the degree to which an individual feels joyful, happy, or satisfied with the environment. Arousal indicates the degree to which an individual feels excited, stimulated, alert, or active in a situation. Dominance indicates the degree to which an individual feels in control of or free to act in a situation. Drawing from information theory, Mehrabian and Russell (1974) proposed the

concept of the information rate or "load" of an environment, which represents the stimulus factors that influence an individual's emotional states. The load of an environment reflects the extent of its novelty and complexity; thus, a high-load environment provides stimulation and incites feelings of surprise and excitement. By contrast, a low-load environment induces a sense of calmness and relaxation. Mehrabian and Russell (1974) posited that all responses to an environment can be characterized as either approach or avoidance behaviors.

Related studies have adopted environmental psychology in both online and offline retail contexts to illustrate how store environments and atmospheric effects influence the behaviors of consumers (Baker et al., 1994; Turley and Milliman, 2000). Eroglu et al. (2001) proposed that the atmospheric cues of an online store can influence the responses of online shoppers through their affective and cognitive states. In an online environment, website atmospheres focus on the computer interface (Hausman and Siekpe, 2009), where users cannot experience the smell or texture of the store; thus, the aesthetic design, fonts, colors, and multimedia features contribute to creating atmosphere cues (Ha and Im, 2012).

Although studies that illustrate the effects of environmental cues in physical and online retail environments, few have utilized the PAD model to investigate their impact on branded app usage adoption. Computer websites and mobile apps are similar in how users search for information, but they may exhibit significant differences in terms of the effect of environmental cues. Smartphones have very small screens, which presents greater challenge to create engagement through branded apps. Nevertheless, mobile devices provide a unique setting because of their personal and mobile nature. Moreover, many brands incorporate gamification designs into their apps to enhance fun and stimulation, thereby improving the perceived dominance, fun, and pleasure of using the branded app. However, the emotional dimension of the PAD model has not been investigated in a mobile context, Stimulus-Organism-Response (S–O-R) paradigm. Therefore, grounded on the foundation of PAD model from environmental psychology, the present study seeks to establish a research model that identifies the driving factors of perceived dominance (perceived ubiquity, personalization, informativeness), perceived pleasure (aesthetic design, entertainment) and perceived arousal (gamification) to provide a comprehensive understanding of the continuous usage of branded apps.

2.3. Antecedents of perceived dominance

2.3.1. Perceived ubiquity and perceived dominance

The ubiquity of mobile devices has changed the paradigm of retail (Shankar and Balasubramanian, 2009). Barnes et al. (2019) asserted that the ubiquitous interactivity of smartphones provides users with more control in terms of what they read or hear. Because mobile phones are accessible to people beyond the reach of computers, the ubiquity of mobile devices represents a new space for marketing (Watson et al., 2002). Mobile marketing, which is based on ubiquitous networks, is characterized by network ubiquity, universality, uniqueness, and unison (Watson et al., 2002). Ubiquity as the "anywhere, anytime" characteristic of mobile commerce (Balasubraman et al., 2002).

Perceived ubiquity encompasses the notions of continuity, immediacy, portability, and searchability. Continuity indicates a continuous state, which is analogous to being "always on" (Okazaki and Mendez, 2013). The ability of mobile devices to provide continuous access to services is a unique characteristic that distinguishes it from traditional channels (Kleijnen et al., 2007). Thus, branded apps that exhibit the characteristics of continuity and simultaneity provide users with seamless information access and services, thereby enhancing users' perceived ease of use. Related research has demonstrated that atmospheric cues in website environments affect the establishment of the PAD emotional dimensions. Atmospheric cues in the environment can have high and low task relevance. Cues with high task relevance help an individual to complete task achievement objectives; an example is information relevant to the product (Eroglu et al., 2001). In m-commerce, perceived ubiquity refers to the ability individuals have to access services and information provided by a branded app that enable them to be involved in anytime and anywhere (Zhou, 2016). Thus, it is likely that the seamless and ubiquitous connections that branded apps provide to help users obtain information and services may facilitate the users' perceived dominance. Hence.

H1. Perceived ubiquity is positively related to the establishment of perceived dominance.

2.3.2. Personalization and perceived dominance

Personalization is the creation of a one-to-one relationship with customers by providing relevant content (Ardissono et al., 2002). Mobile phones are an ideal personalized medium for contacting and interacting with consumers. However, due to the small screen size of mobile phones, which can only display a limited amount of information, continuous scrolling up and down is required to read messages. This can cause individuals to lose patience with irrelevant or useless information. Therefore, providing personalized and relevant information is vital for engaging customers and capturing consumer interest in an environment with abundant information (Fink et al., 2003).Through personalization, the content of a message can be customized according to an individual's interest, making it an effective means for mobile service providers to attract more consumers to subscribe to brand information. Subscriptions are associated with an enhanced positive attitude toward the mobile service provider (Kang and Namkung, 2019).

Branded apps that allow marketers to send messages to customers provide a platform where personalization can be created. Previous studies have observed that personalized messages and memorable usage experiences increase the continuous usage intention of mobile apps (Fang, 2019; Ranjan and Read, 2016). Personalization allows marketers to contact and interact with potential customers in an individualized manner, which is positively associated with m-commerce and enhances brand relationships. For example, when a branded app interacts with users by directly referring to them by name, a sense of personalization is established. Moreover, when individuals are sent push notifications that are customized according to their interests, they are more likely to feel a sense of personalization and control, which enables them to act more freely. Perceived dominance refers to the extent to which individuals believe that they are in control in a given situation (Mehrabian and Russell, 1974). Thus, branded apps that provide personalization information are likely to be seen as more relevant, which in turn may facilitate individuals' perceptions of active control and dominance. Thus.

H2. Personalization is positively related to the establishment of perceived dominance

2.3.3. Informativeness and perceived dominance

Informativeness describes the perceived quality of information that is provided by a website. Information must be useful for completing consumers' tasks. A previous study defined information quality by using several dimensions, namely believability, which refers to the extent to which the information is seen as credible; completeness, which refers to the breadth and depth of the information for the task at hand; appropriate amount, which refers to whether the volume of information is adequate for the task; accessibility, which refers to the degree to which the information is available or easy to retrieve; and timeliness, or whether the information is sufficiently up to date (Kahn et al., 2002). Branded apps are used by consumers as a source of useful brand information. If the information on a branded app is perceived as helpful, then individuals' confidence in their purchase decisions may be increased (Flavián et al., 2016).

The intangible nature of shopping online may create uncertainty regarding whether products will perform according to consumer expectation. This uncertainty is related to consumer risk because the actual product performance can only be confirmed after purchase.

Hence, the quality of product-related information can reduce this uncertainty (Weathers et al., 2007). In an online environment, higher perceived control is likely to reduce uncertainty and enhance users' satisfaction (Van Dolen et al., 2007). Thus, the informativeness provided by the branded app enables users to generate a greater sense of control and perceived dominance in the process. A related study posited that the highly task-relevant cues of online retail websites (Eroglu et al., 2001) can enhance perceived dominance. Offering quality information helps consumers to complete their shopping tasks. Thus, it is likely that the informativeness of branded apps may facilitate an individual's perceived dominance. Thus.

H3. Informativeness is positively related to the establishment of perceived dominance.

2.4. Antecedents of perceived pleasure

2.4.1. Aesthetic design and perceived pleasure

Visual design determines the balance, emotional appeal, or aesthetic of a website (Cyr et al., 2006) through colors, shapes, font type, or animation. Appearance creates an engaging experience; thus, the aesthetic design influences the atmosphere of the online environment (Cyr et al., 2006). Cues such as color, background patterns, typestyles, and fonts not only serve the function of making the verbal content easy (or difficult) to read but also create a mood or an image for the site (Mazaheri et al., 2011). Techniques of converting web-based graphics for compatibility with mobile devices require deliberate design beyond the simple adaptation of technology to suit the smaller screens of mobile devices. Hence, the importance of interface design has gained increasing attention as mobile apps compete for user attraction and repeated visits. Research has indicated that perceived affective quality, which is related to the aesthetic design of a website, has a significant positive impact on usage experience (Zhang and Li, 2004).

The sensory cues that individuals experience in online environments can also influence whether they will stay (Rosen and Purinton, 2004), and the design aesthetics of a website were found to increase individuals' trust (Li and Yeh, 2010). Van der Heijden and Verhagen (2004) proposed the concept of "perceived attractiveness," which describes the extent to which a website is perceived as aesthetically pleasing and observed that the visual attractiveness of a website can positively enhance perceived enjoyment. Pleasure indicates the degree to which an individual feels joyful, happy, or satisfied with the environment. The stimulus cues of the environmental atmosphere can influence individuals' emotional state, which in turn affects their approach or avoidance response (Mehrabian and Russell, 1974). A study on mobile commerce environments revealed that perceived visual attractiveness has a significant effect on promoting enjoyment and pleasure (Cyr et al., 2006). Hence, it is likely that in a mobile context, the aesthetic design of the branded app can provide atmospheric cues that facilitate individuals to feel enjoyment and pleasure. Therefore.

H4. Aesthetic design is positively related to the establishment of perceived pleasure

2.4.2. Entertainment and perceived pleasure

People are increasingly on the move, which has led to growing numbers of individuals seeking entertainment on their mobile devices, which are particularly capable of providing a platform for entertainment, connection, and communication. One study indicated that individuals with entertainment- and information-seeking motivations are more likely to use mobile services (Lee et al., 2012). Entertainment provided by mobile apps may include videos, pictures, or music (Richard et al., 2010). Entertainment, which delivers notable value for websites, exhibited a positive impact on users' involvement levels and attitudes (Richard et al., 2010). A successful website's entertainment value can be described as "fun, exciting, cool, imaginative, entertaining, and flashy" (Chen and Wells, 1999, p. 32). Moreover, entertainment may also provide an incentive for users to browse the Internet (Chen and Wells, 1999), and the interactivity and entertainment increases positive attitudes toward the websites (Chen and Wells, 1999; Papacharissi and Rubin, 2000). Mobile apps are characterized by their interactivity, which allows users to have active control, obtain an immediate response (Van Noort, 2012). It is likely that the interactivity of branded apps also enhances their entertainment value which increase fun and pleasure (Gan and Balakrishnan, 2017). Thus, the entertainment delivered by branded apps can provide atmospheric cues that prompt individuals to feel enjoyment and pleasure. Therefore.

H5. Entertainment is positively related to the establishment of perceived pleasure.

2.5. Antecedent of perceived arousal

2.5.1. Gamification and perceived arousal

Gamification is defined as "the use of game design elements to enhance non-game goods and services by increasing customer value and encouraging value-creating behaviors such as increased consumption, greater loyalty, engagement, or product advocacy" (Hofacker et al., 2016, p.26). These game elements are the building blocks of a game (Deterding et al., 2011; Zichermann and Cunningham, 2011). These elements may consist of rewards, levels, points, stories, or challenges (Huotari and Hamari, 2012). Academic studies have revealed increasing interest in adopting gamification on mobile platforms to strengthen consumer interactions and marketing effectiveness. It is likely that by creating gamified experiences, the service will increase preferred behavioral outcomes (Huotari and Hamari, 2017). Most people possess a natural playfulness; thus, by providing games and prizes, branded apps can facilitate participation and interaction. The creation of a stimulating gamified experience exerts a positive effect on the usage process (Huotari and Hamari, 2017).

With their ubiquitous ability and portability, mobile devices are an especially suitable platform for incorporating gamification into the branded service to increase consumer engagement and retention (Hofacker et al., 2016). Arousal refers to the emotional state of feeling stimulation, excitement, attentiveness, or surprise (Mehrabian and Russell, 1974). Research in gaming has suggested that game environments often present people with arousing and challenging experiences (Eppmann et al., 2018; Hsu et al., 2017). Thus, branded apps that incorporate gamification can stimulate arousal during the usage process because of the excitement of the game-like design. Therefore.

H6. Gamification is positively related to the establishment of perceived arousal.

2.6. Outcomes of perceived pleasure, arousal and dominance

Mehrabian and Russell (1974) postulated that three basic emotional states of PAD mediate approach–avoidance behaviors in environmental situations. Approach–avoidance behaviors related to an environment refer to an individual's desire to remain in and explore or avoid the environment. They also describe an individual's intention to engage in interaction with others in the environment. The emotional state of PAD facilitates individuals' adoption of approach behaviors.

Perceived dominance refers to the extent to which an individual feels that he or she is in control, autonomous, and free in relation to the environment (Mehrabian and Russell, 1974). One study revealed that a sense of perceived control affects individuals' behaviors, such as their purchase intentions (Song and Zahedi, 2005). Empirical evidence was also gathered in an online environment and suggested that greater perceived control can reduce product uncertainty and increase satisfaction (Weathers et al., 2007). This finding can be attributed to the sense of autonomy and freedom gained in browsing webpages. In a similar vein, in the context of mobile devices, branded apps can offer ubiquitous connections, personalization, and quality information,

allowing them to increase individuals' perceived dominance and thereby instilling a sense of control. This quality is particularly important to individuals during online shopping because in the process of purchase considerations, no salesperson is present to provide explanations. Hence, when individuals perceive that they are in control, they can accomplish their tasks more easily, which encourages their continuous usage intention. Thus, it is hypothesized that when individuals experience the emotional state of perceived dominance, they are more likely to adopt branded app approach behaviors such as willingness to return, continuous usage intention, and brand loyalty intention.

Pleasure indicates the degree to which an individual feels joyful, happy, or satisfied with the environment. Arousal indicates the degree to which an individual feels excited, stimulated, alert, or active in a situation. The emotional states of pleasure and arousal are related to patronage intention variables in both online and offline store environments (Eroglu et al., 2001). Furthermore, pleasure and arousal in relation to website characteristics have been found to enhance approach behaviors such as purchase intention, attitudes, and satisfaction (Ha and Lennon, 2010; Hsieh et al., 2014). Likewise, we suggest that branded apps that provide the emotional states of pleasure and arousal are also likely to have a positive effect on branded app approach behaviors such as continuous usage intention and brand loyalty intention. Consequently, we suggest that the emotional states of PAD experienced when using a branded app are likely to encourage branded app continuous usage intention and brand loyalty intention. Thus.

H7a: Perceived dominance is positively related to continuous usage intention.

H7b: Perceived dominance is positively related to the brand loyalty intention.

H8a: Pleasure is positively related to continuous usage intention.

H8b: Pleasure is positively related to brand loyalty intention.

H9a: Arousal is positively related to continuous usage intention.

H9b: Arousal is positively related to brand loyalty intention.

The conceptual model is shown in Fig. 1.

3. Method

3.1. Sample and data collection

The present study selected popular branded apps with high usage rates to use for empirical testing. The Starbucks app, Nike app (Nike Run Club), and Under Armour app (MyFitnessPal) were selected with reference to data from SimilarWeb, an analysis tool for the world's most popular websites and applications (Myllylahti, 2018; Suksida and Santiworarak, 2017) because they have all been adopted by a large number of users and are well known for their gamification features (Brown, 2020; Gaudiosi, 2018). To encourage engagement, Starbucks gamified their apps by providing Starbucks Rewards, where members can achieve "challenges" and earn stars when they use the mobile app to pay. Users are granted different statuses and star levels, which results in different rewards such as free food and beverages. On the Nike Run Club app, by recording and updating the user's running scores, the app can help to retain user engagement. By displaying how close users are to achieving the next level, the app encourages continuous usage. Furthermore, users can receive a corresponding cheer when the running distance reaches different mileage goals, which also enhances the fun during the usage process. In addition, by allowing users to visibly track the routes they run and share this information with friends, the app can increase users' sense of achievement. Under Armour's MyFitnessPal app incorporates a calorie counter and fitness tracker for those who wish to lose weight and start a new diet. To understand food nutrients, users can scan the barcodes of food items and find information in the app's large database. By allowing users to accurately know what they ate, the app can motivate them to strive for the next level of fitness.

An online questionnaire link was posted on Amazon Mechanical Turk (MTurk) to recruit consumers with experience using the target branded apps. MTurk has been widely adopted in behavioral research because of it helps in recruiting respondents with diverse demographic backgrounds (Goodman et al., 2013). Respondents were asked to complete the questionnaire based on their most frequently used branded app. Respondents received a small monetary reward for completing the

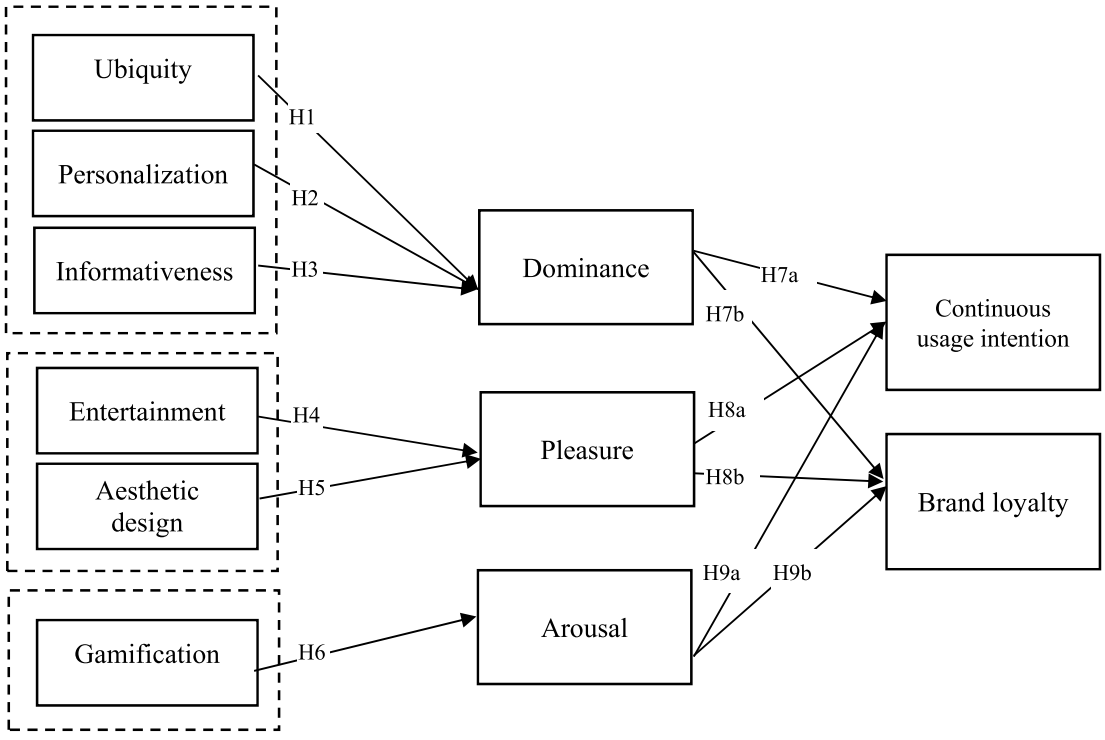

Fig. 1. Conceptual model.

survey. We included two attention tests and adopted the attention filter suggested by Oppenheimer et al. (2009) to identify respondents who did not pay close attention to the survey questions as their responses will affect the quality of the survey data. The questionnaire was designed as follows. The cover page provided the purpose of the survey, the definition of a branded app, and an assurance of respondent confidentiality. The first portion of the questionnaire comprised questions related to branded app usage behavior; this was followed by questions regarding key constructs and then demographic variables.

In total, 448 questionnaires were collected. Respondents without experience of using one of the target branded apps and those that failed the attention tests were excluded from the analysis. A total of 40 questionnaires were eliminated, resulting in 408 valid responses. Of all respondents, 42.4% were female. Most respondents were in the age group of 21–40 years (75.2%). Regarding education level, most of the participants possessed a college degree (56.9%). Of all the branded apps, 35.8% used the Starbucks app, 37.0% used the Nike app, and 27.2% used the Under Armour app. Most respondents had used the branded app for at least 6 months (74.3%), and nearly half of the respondents had used the branded app for at least 6 h a week, indicating that the respondents in this study possessed adequate usage experience with branded apps. The sample characteristics are summarized in Table 1.

3.2. Measures

Dominance, pleasure, and arousal are measured adapting items from Mazaheri et al. (2011). Items measuring ubiquity are adapted from Choi et al. (2014). Personalization is measured by adapting items from Xu (2006). Items measuring informativeness and gamification are adapted from Peng et al. (2014) and Li (2018) respectively. Scales for design aesthetics are adapted from Cyr et al. (2006) and Merikivi et al. (2017); and entertainment are adapted from Tsang et al. (2004). Items measuring brand loyalty are adapted from Chaudhuri and Holbrook (2001); and Jang et al. (2008). Continuance is measured using items from Fang (2017). All of the constructs are reflective, as indicated by the above studies. All of the item responses are rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A pre-test was conducted to improve the quality of the measurement. Based on the feedback of the expert interview, ambiguous items (those with inappropriate/confusing wording) were modified based on the consensus of the participants. Table 2 displays the final measurement items.

Table 1
Sample characteristics.

Variables	Categories	Frequency	Proportion (%)
Gender	Male	235	57.6
	Female	173	42.4
Age	21–30	188	46.0
	31–40	119	29.2
	41–50	63	15.4
	51–60	33	8.1
	Over 61	5	1.3
Education Level	Higher Secondary School	65	15.9
	College Degree	232	56.9
	Graduate Degree or above	111	27.2
Branded App	Starbucks Rewards	146	35.8
	Nike Run Club	151	37.0
	Under Armour	111	27.2
Usage Duration	Shorter than 6 months	105	25.7
	6 months to less than 1 year	80	19.6
	1 to less than 1.5 years	88	21.6
	1.5 to less than 2 years	68	16.7
	2 to less than 2.5 years	45	11.0
	2.5–3 years	15	3.7
	More than 3 years	7	1.7
Usage Time per Week	Less than 1 h	76	18.6
	1–5 h	131	32.1
	6–10 h	106	26.0
	11–15 h	41	10.0
	16–20 h	31	7.6
	21 h and above	23	5.7

Notes: Valid sample size is 408.

3.3. Analytical methods

In this study, partial least squares structural equation model (PLS-SEM) was adopted for data analysis as PLS-SEM can meet the goals of prediction and verification modelling, and it has a wide range and flexibility in theory and practice (Richter et al., 2016). The analysis was run by using SmartPLS 3 (Ringle et al., 2015). The results of PLS-SEM were reported following the guidelines (Hair et al., 2017). Measurement and structural models are assessed. A measurement model is assessed by examining standardized item loadings, internal consistency reliability, convergent validity, and discriminant validity (Hair et al., 2012; Ringle et al., 2012). Given acceptable measurement model, the structural model is evaluated.

4. Results

4.1. Measurement model

Cronbach's alpha and composite reliability (CR) are used to assess internal consistency reliability for constructs. As shown in Table 2, all alpha coefficients and CR values are greater than the 0.70 threshold (Hair et al., 2017), indicating acceptable construct reliability. All standardized factor loadings are greater than 0.70 (Hair et al., 2017). Average variance extracted (AVE) values are all greater than the 0.50 threshold, which achieves the convergent validity (Hair et al., 2017). From Tables 3 and 4, discriminant validity is achieved since correlation coefficients are smaller than the corresponding square root of the AVE values for all pairs of constructs (Chin, 1998) and Heterotrait-Monotrait (HTMT) ratios are all smaller than the threshold value of 0.90 (Henseler et al., 2015).

The degree of common method variance (CMV) is evaluated since the data is self-reported. Following Mossholder et al. (1998), Harman's one factor test was conducted using confirmatory factor analysis. A common method factor was created where all items loaded on the factor. The results showed that the fit is poor ($\chi^2 = 4815.443$, df = 902, $p < 0.001$, $\chi^2/df = 5.34$; GFI = 0.578; CFI = 0.688; NNFI = 0.673; RMSEA = 0.103). Thus, CMV problem is not a big concern.

4.2. Structural model

Structural model is assessed given adequate measurement model. All variance inflation factor (VIF) values are smaller than 5, ranging from 1.00 to 2.04 (Hair et al., 2017). Thus, multicollenearity is not a big concern.

R^2 values, path coefficients and their corresponding level of significance are reported in Fig. 2. R^2 values of the endogenous constructs are assessed. The threshold values for substantial, moderate, and weak predictive power are 0.67, 0.33, and 0.19, respectively (Chin, 1998). All the endogenous constructs are adequately predicted since R^2 value for dominance is 0.56, for pleasure 0.56, for arousal 0.39, for brand loyalty 0.55, and for continuance 0.43.

Ubiquity ($\beta = 0.35$, $p < 0.001$), personalization ($\beta = 0.21$, $p < 0.001$), and informativeness positively influence dominance ($\beta = 0.33$, $p < 0.001$). Design aesthetics ($\beta = 0.45$, $p < 0.001$) and entertainment ($\beta = 0.38$, $p < 0.001$) positively influence pleasure. Gamification positively influences arousal ($\beta = 0.63$, $p < 0.001$). Dominance ($\beta = 0.34$, $p < 0.001$), pleasure ($\beta = 0.37$, $p < 0.001$), and arousal ($\beta = 0.15$, $p < 0.01$) positively influence brand loyalty. Continuance is positively influenced by dominance ($\beta = 0.27$, $p < 0.001$), pleasure ($\beta = 0.26$, $p < 0.001$), and arousal ($\beta = 0.26$, $p < 0.001$). All the hypotheses are supported by data.

Table 2
Measurement model evaluation.

Item	Loading
Design aesthetics (α = 0.92, CR = 0.94, AVE = 0.69)	
The screen design (i.e., colors, boxes, menus, etc.) of this branded app is attractive.	0.88***
This branded app has good graphic design.	0.80***
This branded app has visually appealing overall look and feel.	0.85***
Overall, I find that this branded app looks attractive.	0.86***
This branded app looks professionally designed.	0.77***
The graphics in this branded app are meaningful.	0.78***
The overall look and feel of this branded app is visually appealing.	0.86***
Entertainment (α = 0.81, CR = 0.89, AVE = 0.72)	
I feel that the branded app is enjoyable and entertaining.	0.90***
To me, it is amusing to use the branded app.	0.78***
I feel that it is pleasant to use the branded app.	0.86***
Gamification (α = 0.88, CR = 0.91, AVE = 0.67)	
With branded app, the relationship between purchasing and rewards is clear.	0.83***
With branded app, rewards vary with events.	0.79***
With branded app, I get automatic notifications of my progress or status.	0.84***
With branded app, statistics about my progress or status and consumption experience are retrievable.	0.85***
Branded app enables me to show my progress or status to others.	0.78***
Informativeness (α = 0.87, CR = 0.90, AVE = 0.61)	
The branded app is informative.	0.82***
The branded app is intelligent.	0.70***
The branded app is knowledgeable.	0.75***
The branded app is resourceful.	0.84***
The branded app is useful.	0.74***
The branded app is helpful.	0.82***
Personalization (α = 0.84, CR = 0.91, AVE = 0.76)	
I feel branded app displays personalized message to me.	0.85***
I feel branded app can be personalized for my usage.	0.88***
There are personalized contents in the branded app.	0.89***
Arousal (α = 0.89, CR = 0.95, AVE = 0.90)	
When I use this branded app, I felt relaxed–stimulated.	0.95***
When I use this branded app, I felt calm–excited.	0.95***
Item	Loading
Pleasure (α = 0.85, CR = 0.90, AVE = 0.69)	
When I use this branded app, I felt unhappy–happy.	0.85***
When I use this branded app, I felt annoyed–pleased.	0.83***
When I use this branded app, I felt dissatisfied–satisfied.	0.82***
When I use this branded app, I felt despairing–hopeful.	0.82***
Dominance (α = 0.78, CR = 0.86, AVE = 0.61)	
I felt that I had a lot of control over my usage experiences at this branded app.	0.81***
While I was on this branded app, I could choose freely what I wanted to see.	0.81***
While using the branded app, my actions decided the kind of experiences I got on this app.	0.74***
While I was on this branded app, I controlled what happened in my online information searches.	0.76***
Ubiquity (α = 0.85, CR = 0.90, AVE = 0.69)	
I can use the branded app anytime.	0.84***
I can use the branded app while on the road.	0.76***
I cannot use the branded app anywhere (R).	0.87***
I expect that the branded app would be available to use whenever I need it.	0.85***
Continuous usage intention (α = 0.81, CR = 0.89, AVE = 0.73)	
I intend to continue using the branded app rather than discontinue its use.	0.89***
I intend to increase my use of the branded app in the future.	0.77***
If I could, I would like to continue my use of the branded app.	0.90***
Brand loyalty (α = 0.80, CR = 0.88, AVE = 0.72)	
I will be loyal to this brand.	0.89***
This brand would be my first choice.	0.88***
I will not consider other brands if this brand is available in the marketplace.	0.76***

Notes: ***$p < 0.001$; standardized factor loadings are reported.

5. Discussion

The objective of this research is to elucidate the drivers of branded app atmospherics in building brand relationships. Most of prior studies on branded apps have adopted the functional perspectives to examine continuance usage intention. Despite the importance of the emotional factors, our understanding on its effect on branded app usage is still limited. In response to the research gap, this study conceptualizes and examines the notion of app atmosphere and examine its effect on branded app. The present study adopted an environmental psychology perspective and PAD theory to validate the significant role of environment-induced emotions (pleasure, arousal and dominance) in driving branded app behavioral outcomes and identify the determinants that drive app atmospheric cues. This research examination makes substantial theoretical and managerial contributions by extending PAD theory to branded app environment and provide an important ground where practitioners can design atmospherics that create emotional experience in branded app to foster brand relationship. Theoretical and managerial implications are discussed below.

5.1. Theoretical implications

Our research offers several theoretical contributions. First, although website and mobile apps share some resemblance in how users can search for information, the influence of environmental cues delivered by branded apps may have significant differences. Thus, the present study

Table 3
Mean, standard deviation, and correlation matrix of the constructs.

Construct	1	2	3	4	5	6	7	8	9	10	11
1. Design Aesthetics	**0.83**										
2. Entertainment	0.63	**0.85**									
3. Gamification	0.62	0.45	**0.82**								
4. Personalization	0.46	0.56	0.50	**0.87**							
5. Ubiquity	0.62	0.55	0.37	0.39	**0.83**						
6. Arousal	0.64	0.46	0.63	0.44	0.43	**0.95**					
7. Continuance	0.63	0.47	0.55	0.40	0.56	0.53	**0.85**				
8. Dominance	0.64	0.58	0.46	0.53	0.65	0.54	0.57	**0.78**			
9. Informativeness	0.77	0.60	0.64	0.54	0.65	0.67	0.67	0.67	**0.78**		
10. Brand loyalty	0.65	0.54	0.53	0.53	0.56	0.52	0.64	0.66	0.65	**0.85**	
11. Pleasure	0.69	0.66	0.52	0.57	0.55	0.50	0.56	0.63	0.71	0.66	**0.83**
Mean	4.46	4.16	3.87	3.99	4.55	4.31	4.42	4.30	4.44	4.20	4.42
SD	0.97	1.03	1.26	1.05	0.92	1.44	1.01	0.88	0.89	1.10	0.93

Notes: The square root of average variance extracted (AVE) estimates are the values on the diagonal (in bold).

Table 4
HTMT ratios.

Construct	1	2	3	4	5	6	7	8	9	10
1. Design Aesthetics										
2. Entertainment	0.71									
3. Gamification	0.68	0.54								
4. Personalization	0.51	0.68	0.58							
5. Ubiquity	0.70	0.65	0.42	0.47						
6. Arousal	0.70	0.54	0.71	0.51	0.50					
7. Continuance	0.72	0.58	0.66	0.48	0.67	0.63				
8. Dominance	0.73	0.72	0.55	0.66	0.79	0.64	0.70			
9. Informativeness	0.85	0.71	0.73	0.63	0.75	0.76	0.79	0.81		
10. Brand loyalty	0.74	0.65	0.62	0.65	0.67	0.60	0.78	0.81	0.76	
11. Pleasure	0.77	0.79	0.60	0.68	0.64	0.57	0.67	0.77	0.83	0.79

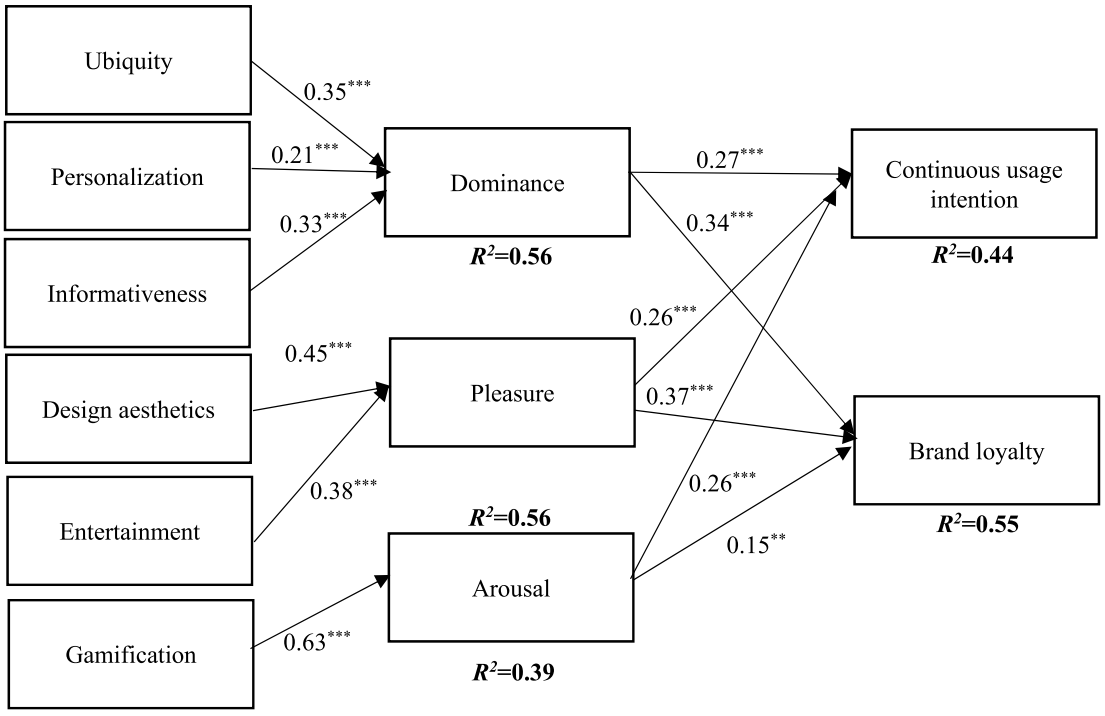

Fig. 2. Hypotheses test results. Notes. **p < 0.01 ***p < 0.001.

contributes by proposing a comprehensive framework to identify the key factors that drive the atmosphere cues in branded apps that elicit PAD emotional experiences. The results demonstrate that all three environment-induced emotions can generate brand loyalty and continuance intention, which further extends the understanding of PAD model in a branded app context (Mehrabian and Russell, 1974).

Second, the present study shows that the emotional experience of dominance in branded apps is generated by ubiquity, personalization, and informativeness. Prior studies have shown the importance of ubiquity in mobile commerce (Zhou, 2016) and location-based services (Lee,

2017); however, the present study provides a more comprehensive view by revealing that personalized, real-time contextual information made possible by the ubiquitous service of branded apps creates an environment that reduces uncertainty and encourages the emotional experience of dominance. The significant role of dominance in PAD model is prominent in branded app usage as it relates to providing active control. Past studies on PAD have focused on pleasure and arousal and examined their effects on outcomes (Eroglu et al., 2001; Jeong et al., 2009). However, the role of dominance has received less attention. Thus, this study moves beyond previous findings to demonstrate the important emotional role of dominance in branded apps and extend understanding on this topic by identifying the driving factors that facilitate dominance to drive brand loyalty and branded app continuance.

Third, this study identifies design aesthetics and entertainment as the drivers of pleasure in branded apps. Prior research revealed that in an online gaming context, hedonic experiences can facilitate pleasure (Huang et al., 2017). Because design aesthetics and entertainment are related to hedonic experiences when individuals use branded apps, our research findings are consistent with those of Huang et al. (2017). However, the present study further extends understanding by revealing the specific driving components of hedonic experiences that increase the emotional experience of pleasure, namely design aesthetics and entertainment. Furthermore, the results show that pleasure induced by the app environment can facilitate brand loyalty and continuance. These findings are in line with those of past studies on PAD in an online shopping context (Eroglu et al., 2001; Ha and Lennon, 2010). However, the present study differs from prior research by verifying the effects of PAD in a branded app context. Pleasure is conceptually related to enjoyment; thus, the findings of the present study corroborate recent research on mobile apps by emphasizing the role of enjoyment in driving app usage intention (McLean et al., 2020). This research further contributes to reveal the drivers of pleasure emotions by showing that the environmental cues of design aesthetics and entertainment can enhance the emotional experience of pleasure, which leads to brand loyalty and app continuance usage.

Finally, this study demonstrated that gamification is a key driver of the emotional experience of arousal. This corroborates prior studies that the gamification mechanics of challenge and fantasy facilitate emotional arousal in mobile apps (Poncin et al., 2017; Steinberger et al., 2017). Additionally, Li (2018) showed that gamification contributes a pull effect for branded app adoption, which can decrease app-switching intention. The present study builds upon this finding by revealing that gamification leads to the emotional experience of arousal, which in turn leads to continuous usage intention. Furthermore, the results of this study indicate that arousal can generate brand loyalty and branded app continuance. This validates past studies in an online shopping context (Eroglu et al., 2001; Ha and Lennon, 2010). However, the role of arousal has not been directly examined in a branded app context. Past research has posited that gamification may have a positive effect on brand experience, thereby enhancing satisfaction and adoption intention (Lee and Jin, 2019). The present study extends understanding by illuminating gamification drives arousal, which is an important component of brand experience that in turn encourages brand loyalty and positive app attitudes.

5.2. Managerial implications

This study reveals the importance of emotions induced by branded app environments in driving positive outcomes, and this finding has some significant managerial implications.

First, it is central that practitioners enhance the emotional experience of dominance, which involves increasing branded app users' sense of control. This can be achieved by increasing the perceived ubiquity, personalization, and informativeness of the app. Companies can provide location-based information to users that can be accessed regardless of time or place and cooperate with various companies highly integrated into the lives of consumers, such as convenience stores, gas stations, post offices, and banks, to provide free to act and a sense of control to enhance perceived dominance. Alternatively, a notification function may be included so that the branded app can notify consumers of nearby stores where the branded app may be used to obtain valuable deals. For instance, the Burger King app notifies consumers of nearby restaurants when they open the app in a McDonald's to receive a coupon for a Whopper. Regarding personalization services, companies can develop artificial intelligence (AI) chatbots to manage customer service more efficiently and deliver personalized information to consumers. For example, Ocado, a British online grocery store, use of an AI chatbot allows the company to respond to users with personalized messages (Clarke, 2018). Furthermore, companies can improve the personalization of their branded apps by allowing consumers to design the environment of the branded app, such as the background pictures, position of the menu, and font size. Alternatively, companies can collect big data from the app, develop prediction models, and deliver personalized information to consumers. In terms of informativeness, a discussion forum may be connected to the branded app to provide consumers with a platform for sharing helpful information and knowledge. A review mechanism can be added whereby other consumers can evaluate the degree of helpfulness of the advice provided. For example, on the Agoda app, consumers are invited to share lodging experiences, and consumers can rate the helpfulness of each review.

Second, marketers need to create an emotional experience of pleasure so that consumers feel pleasant when using branded apps. This can be achieved by improving the aesthetic design and entertainment value of branded apps. Companies can increase the visual attractiveness of an app design by enhancing its meaningfulness. Marcus (2002) revealed that cuteness is a path to pleasure; thus, marketers can incorporate cute design elements that are small, round, and light in color to elicit attraction and pleasure. Consumers can also participate in designing parts of the branded app's interface, which would also increase the entertainment value. To further enhance the entertainment of branded apps, companies can use humorous appeal by sending fun stories to consumers in the app on a regular basis. Design aesthetics can be employed to illicit feelings of pleasure in consumers. Because consumers tend to browse branded apps during the pre-consumption stage before they make their purchase decisions, the branded app might be the brand's first contact point with customers. Therefore, a positive and pleasant first impression should be developed by incorporating design aesthetics of the branded app to appeal to customers' emotions. Branded apps can incorporate various technological features, such as specific colors, shapes, images, animation, music, and games (Björk, 2010; Lam and Lim, 2004) to foster positive emotions in customers. For instance, beautiful, enchanting pictures of scenery or fun and enjoyable images can be included in branded apps to promote sense of pleasure.

Third, marketers need to establish the emotional experience of arousal, which involves stimulating or generating excitement in users. This can be achieved by integrating gamification into branded apps. Clear goals and reward structures can be used to remind consumers of their status and progress. Marketers can launch an "achievement biography." When consumers achieve a new status, they can obtain corresponding rewards (e.g., points and badges), which they can share with other consumers in their social network. Companies can integrate online and offline rewards, such as virtual badges and real store coupons, to further create feelings of excitement. Moreover, when users have completed all of the available tasks, they can receive an ultimate reward, such as a prestigious certificate from the brand. For example, consumers who use Starbuck Rewards accumulate stars as they make purchases. As they accumulate stars, their membership status icon turns into a green star and finally into a gold star. To promote interaction, companies can integrate augmented reality technology into the activities and attract attention through small games. Gamified apps create a fun and interesting environment that provide stimulating experiences and promote a sense of excitement toward using branded apps, thereby enhancing

continuous usage intention.

5.3. Limitation and future research

This research has several limitations that pose additional research opportunities. First, this is a cross-sectional study, and the causal relationships documented are tentative. Future studies can empirically test this research model by adopting a longitudinal design. Second, the present study was the first to examine branded app outcomes based on the PAD framework. Future studies could explore the applicability of other theories in environmental psychology. For example, attention restoration theory (Kaplan, 1995) could be used to investigate the restorative potential of branded apps. Third, this study investigated the effect of app environments on consumer responses. Future studies could examine moderators such as situational involvement (Hsieh et al., 2014). Because consumers with high situational involvement tend to focus on environmental cues, the relationships of environmental antecedents with emotional states are likely to be stronger for consumers with high levels of situational involvement than for those with low levels of situational involvement. Future studies could investigate this difference. Fourth, emotional factors driving usage experience differ between hedonic and utilitarian brands; hence, future studies are encouraged to adopt the present research model to examine the differences between the branded apps of hedonic and utilitarian brands. Finally, this research developed an atmospheric model from the perspective of PAD theory using three representative branded apps with gamification features. Because few studies on branded apps have adopted an environmental psychology perspective, future studies can use this model as a basis for developing additional atmospheric models for general mobile apps and to identify the respective atmospheric cues of pleasure, arousal, and dominance. The interaction between environmental cues and its effect on consumer responses can be examined.

Despite these limitations, the present research highlight the important role of environmental induced emotions in driving branded app outcomes and identify app atmospheric cues that drive brand relationship. By establishing this model, present research may work as an important foundation on which further studies can build.

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Declaration of competing interest

None.

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