


The Effects of Task Service Fit on Brand Loyalty: A Study of Branded Apps

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ABSTRACT

Motivated by the role that branded apps play in enhancing customer perceptions of brands, this paper is developed to provide a better understanding of the extent to which task-service fit associated with branded apps influence brand attitudes. The primary research objective is to determine how perceptions of task-service fit associated with branded apps enhances branded app experience and to explore brand co-creation and ultimately brand loyalty. Using data from 573 branded app users, the authors were able to identify the following relationships: perceptions of task-service fit and co-creation were found to influence brand loyalty. Also, task-service fit and branded app experience influenced co-creation. Finally, results also confirm that branded app experience and brand co-creation are mediators of the relationship between task-service fit and brand loyalty.

KEYWORDS

Brand Co-Creation, Brand Loyalty, Branded App Experience, Branded Apps, Mobile Branding, Task-Service Fit

INTRODUCTION

Consumer behavior researchers have long sought to understand the factors which influence brand loyalty, since brand loyalty has been tied to a variety of organizational success factors including post purchase satisfaction (Nam et al., 2011) and repurchase intention (Chinomona & Maziriri, 2017). Traditional consumer behavior researchers have noted that in the absence of complete information about the ability of a product or service to meet a need or desire, brands serve as a heuristic by which consumers could estimate the quality and effectiveness of a product or service to meet that need, and thus make the consumer feel more comfortable making a purchase decision (Maheswaran et al., 1992). In the digital age, information shortages and information inaccessibility regarding product and service characteristics have been replaced by information excess and cognitively overloaded consumers (Furner & Zinko, 2017). In addition to the dearth of information available online, modern consumers must contend with false or misleading information regarding products or services, which may stem

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from “fake” online reviews (Luca & Zervas, 2016; Zinko et al., 2020). As such, the reliance on brand perceptions to reduce uncertainty regarding purchase decisions did not dissipate as information became for plentiful and accessible, rather, it increased.

Since brand perceptions influence purchase decisions, even when information is abundant and accessible, brand holders in the digital age have sought to strengthen brand perceptions using the technology of their time, from their own websites (Van Noort et al., 2012) to spam e-mails (Moustakas et al., 2006), review platforms (Kostyra et al., 2016) and social media (Choi, 2019). Now, as more consumers are using their mobile devices for news consumption, social media participation and shopping, brand holders recognize the potential to influence brand perceptions using branded mobile applications. While the potential to influence brand perceptions via mobile applications has been demonstrated (e.g. Kim et al., 2013), mobile computing differs from traditional and even web computing in a variety of ways. Specifically, mobile users experience more navigation challenges, must contend with a small focus area and are often multitasking or distracted (Furner, Racherla, et al., 2018). As such, some of the cognitive models that researchers have developed to explain consumer behavior in a traditional or even e-commerce context may not apply in a mobile context. This study is motivated by the potential for mobile apps to influence brand perceptions, and seeks to understand the extent to which mobile app characteristics and traditional brand characteristics influence brand attitudes.

Specifically, we investigate antecedents of brand loyalty in a branded mobile app context. Our research objective is to determine how brand holders can increase brand loyalty in the mobile computing environment. Our research questions are as follows:

- RQ1:** Do the relationships between consumer perceptions and brand loyalty hold in a mobile environment?
- RQ2:** Do the relationships between consumer perceptions and co-creation hold in mobile environment?

To answer these questions, we build a model of brand loyalty and co-creation in which perceptions of task-service fit and experience with a mobile app influence co-creation as well as brand loyalty. This paper proceeds as follows: First, our model is developed and relevant literature is reviewed. Next, we describe the research method and report the results. These results are then discussed in terms of practical and research implications. Summarizing remarks conclude the paper.

LITERATURE REVIEW

In order to develop a model of brand loyalty in a mobile application context, relevant literature related to branded apps, service dominant logic and our outcomes variables: brand loyalty and brand co-creation are reviewed.

Brand Loyalty

Given the impact of repeat purchases on the financial performance of organizations (Keisidou et al., 2013), practitioners actively seek to foster brand loyalty while researchers endeavor to understand the drivers of the phenomenon (Kim et al., 2003). Brand loyalty refers to a feeling of attachment that a consumer has to a specific brand (Aakers, 1991), and is associated with repurchase intention (Said, 2014). Research on brand loyalty can be traced back to Copeland’s (1923) conceptualization of ‘brand insistence,’ where consumers espouse a preference for purchasing products associated with a particular brand and are willing to request those products from retailers by name, and continues to be an extensively researched area of consumer behavior today (Santoro et al., 2019).

Brand loyalty is a complex, multifaceted construct and as such, a variety of topologies exist for studying the topic. For example, Rundle-Thiele and Bennett (2001) describe a topology of

brand loyalty in which the measurement of the construct depends on characteristics of the market. Specifically, in consumable markets characterized by high switching costs, lower levels of risk and involvement, behavioral measures of brand loyalty are more appropriate. On the other hand, the authors found that when markets are more volatile, involvement and risk result in attitudinal measures becoming appropriate.

While research on brand loyalty has been tied to a variety of consumer outcomes, extensive research on the topic has sought to understand the individual cognitive drivers of brand loyalty. Individual characteristics such as personal values (Quester et al., 2006), risk aversion, (Matzler et al., 2008), stock ownership (Schoenbachler et al., 2004) brand trust and network effects (Laroche et al., 2012) have been shown to influence brand loyalty. Also, Brand characteristics such as perceived quality (Nguyen et al., 2011), brand personality (Ramaseshan & Stein, 2014), brand reputation (Zoghلامي et al., 2018) and online community sentiment (Jang et al., 2008) have also been shown to influence brand loyalty. Variables tied to consumer experience with the brand and its affiliated products and services have also been tied to brand loyalty, including satisfaction (Bloemer & Kasper, 1995) and relationship quality (Francisco-Maffezzoli et al., 2014). Shrivastava (2016) describes co-creation as a mechanism for developing brand loyalty. In the following subsection, we review relevant literature on the topic of co-creation.

Brand Co-Creation

Co-Creation refers to an approach by which organizations involve consumers in the development of products or services (Hsiao, 2019), with the goal of facilitating consumer-centric innovation. Hatch and Schultz (2010) adapt the frameworks and concepts associated with co-creation to brands, and develop a theory of brand co-creation in which dialog and engagement are central drivers of brand co-creation. Hatch and Schultz (2010) note that research on brand communities which predated their 2010 study also highlighted the role of consumers communities in the development and brand value. This study points to calls by Fournier and Lee (2009) and Muniz and O'guinn (2001) for organizations to establish ties with communities of consumers with the goal of influencing the community's' construal of brand value.

Brand co-creation benefits brand holders in two primary ways. First, brand holders are able to make informed decisions regarding product and service features and design, based on information provided directly by consumers (Fang et al., 2008; Sawhney et al., 2005). Second, consumers who participate in brand co-creation activities often develop a stronger sense of relationship with the brand (Füller, 2010), and perceptions of relationship and attachment have been tied to a variety of positive consumer behavior outcomes (Labrecque, 2014; Zhou et al., 2012).

For example, Hsieh and Chang (2016) note growth in the efforts to facilitate co-creation (alongside crowdsourcing and open innovation) and examines consumer psychological drivers of brand co-creation, finding that brand self-connection along with perceptions of co-creation benefits (autonomy, relatedness and competence) motivate consumers to participate in brand co-creation efforts. The authors also find that participation in brand co-creation campaigns leads to increased purchase intention, help intention and feedback intention, implying a positive feedback loop associated with brand co-creation engagement. Other researchers have investigated the consumer motivators of co-creation activities, and explanations include perceptions of virtually community social status or respect (Nambisan & Baron, 2009), altruism (Füller et al., 2012) and the belief that consumers who make a good impression may receive priority consideration should the brand holder decide to hire in the future (Lerner & Tirole, 2002).

While brand co-creation research is relatively new, the phenomenon is facilitated via online collaborative technology, and thus research on brand co-creation is often conducted in the virtual community context. The influence co-creation in the mobile computing context remains largely unexplored.

Branded Mobile Applications¹

Brand holders engage in brand management in order to create and sustain brand equity over time, with the goal of increasing sales and financial performance (Kapferer, 2008). Brand management is an ongoing endeavor in which brand holders attempt to influence consumer attitudes using the media that consumers use. As consumer media choices have expanded and information consumption increased, brand holders have had to maintain a presence on more media platforms, from the world wide web to multiple social media (Chan-Olmsted, 2006). Brand holders do so to seek out first mover benefits on those platforms, while mitigating any threats of brand erosion (Kasemsap, 2015). Since 2007, mobile computing, including mobile commerce has become more common (Tseng & Wei, 2020) and more brand holders are developing mobile applications with the objective of both fostering more consumption and of influencing consumer behavior. We refer to mobile applications developed by brand holders for these purposes as branded apps.

Research on new media and user behavior necessarily trails the adoption of that media, and this lag is observable in the mobile computing context (Furner et al., 2015). 14 years after the release of the first smartphone, several studies have examined the influence of branded apps on consumer behavior. For example, Wang (2020) examined the post branded app adoption behaviors of consumers using a retail loyalty program (the author indicates that two-thirds of Canadians participate in the program). By examining the purchase behavior of over 112,000 app users and 105,000 non app users, she finds that consumers who use the branded app are more likely to respond to e-mail promotional offers and spend more than non app users. In a study of 228 app consumers, Bellman et al. (2011) identified a relationship between app use and brand attitude, as well as app characteristics (user-centered design) and purchase intention. In a qualitative study of 29 consumers, Pantano and Priporas (2016) found that drivers of branded app use include increased likelihood of promotions (price discounts) and convenience while on-the-go. The influence of convenience on branded app use is supported by Wang et al. (2018), who found that consumers liked having convenient access to focused product information on branded apps.

In summary, research generally finds that branded apps improve consumer brand perceptions and purchase intention. As such, brand holders are motivated to convince consumers to download their apps. However, according to Furner, Racherla, et al. (2018), apps are frequently deleted very soon after being downloaded, highlighting the importance of developing apps which consumers choose to keep installed on their devices. Bellman et al. (2011), following Hoffman & Novack's (1996) study on website adoption, identified two categories of apps based on the motivation for a consumer to download the app: Informational and Experiential. Information apps are those which meet a utilitarian need for information, such as navigation apps, stock widgets and food ordering apps, while experiential apps such as games convey intrinsic enjoyment by their use. App developers seek to appeal to either an informational need or an experiential opportunity to not only entice consumers to download an app, but to keep the consumer coming back to that app. If app developers can design the apps such that consumers choose to return to the app over time, not only do opportunities to facilitate purchases and collect data increase, but opportunities to influence brand perceptions increase as well (Furner & Zinko, 2018).

Task-Service Fit

The concept of fit has been explored in several organizational contexts. In human resource management, job satisfaction results in part from a fit between the characteristics of the employee and requirements of the job (Caldwell & O'Reilly III, 1990), or even a fit between the characteristics of the employee and the organizational culture (Cable & Judge, 1996). In management information systems, task-technology fit is a construct which assesses the extent to which a technology tool (i.e. software) is appropriate for working on a business task. When the fit is stronger, individual performance on that task tends to improve (Goodhue & Thompson, 1995). In service dominant logic, the economic theory in which value is created via the exchange of services between actors (Lusch & Vargo, 2006), task-

service fit refers to “... the extent to which service supports consumers in performing their portfolio of tasks” (Fang, 2017b, p. 575). Lusch and Vargo (2006) are careful to stress that the term “service” does not exclude products or “goods,” rather service refers to objects of exchange in a under the economic theory of service dominant logic.

Information systems researchers have been quick to adopt the concept of task-service fit, perhaps because of its resemblance to the task-technology fit. Both constructs describe a degree of congruence between characteristics of the tasks that need to be accomplished and the solution that will be applied to those tasks, and contend that this congruence can influence task outcomes. In a mobile application selection and continuance study, Fang (2017b) surveyed 671 users of branded apps and found that perceptions of task-service fit increased continuance intention partially mediated the relationship between app experience and purchase intention.

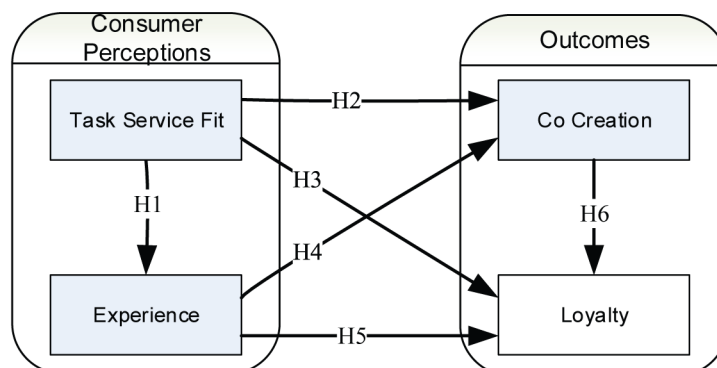
Having reviewed relevant literature, our research model is presented in Figure 1. Each hypothesis is developed in order in the following section.

RESEARCH MODEL AND HYPOTHESES

Task-service fit refers to the degree to which the service a branded app provides supports customers in accomplishing various tasks (Fang, 2017b; Vargo & Lusch, 2004). These tasks can be navigating through the city, checking the weather forecast, or even finding a romantic partner. When the characteristics of the branded app fit the requirements for accomplishing these tasks users get adequate and appropriate service from the app and consider the app to be helpful, sufficient, and capable. Additionally, Zhou (2015) claims that branded apps provide users with opportunities to save time and effort on information search. Thus, such apps better meet the needs of their users and form memorable, cognitive and emotional interactions with them, which translates into a positive *branded app experience* (Fang, 2019; Fang & Li, 2016).

For example, home design and remodeling app Houzz provides an opportunity to virtually check how their products would look in your apartment. This feature is very helpful and attractive for the users as one of the main reasons they use this app is to search and purchase the interior design items. Therefore, the app is successful in delivering information on products and stimulating interests towards the brands, thereby facilitating positive experiences. On the other hand, if the branded app provides inadequate or inappropriate information it fails to uphold its promises. These apps are useless for accomplishing the tasks they are created for and users get disappointed or even annoyed; thus, forming perceptions of the negative app experience.

Figure 1. Research Model



H1: Task- service fit is positively associated with the experience.

In service-dominant logic, companies possess the necessary resources and serve as passive value facilitators by developing and offering value propositions to their existing and potential customers (Vargo & Lusch, 2004). Following this logic rather than passively receiving the value, customers actively participate in its creation (Bruns & Jacob, 2014). During this process of co-creation customers and companies interact with each other and exchange opinions. This interaction helps them to mutually develop knowledge on how to develop the services or improve the ones that already exist (Vargo et al., 2010).

Value co-creation is an important concept in the context of branded mobile apps. By sharing the information customers design, develop, and deliver customized solutions and co-create the value of branded apps (M. Zhang et al., 2016). However, this outcome is only achieved if users first user and continue using the apps. According to the task-service fit model, users employ apps if they help perform a portfolio of tasks and make their activities easy and efficient (Goodhue & Thompson, 1995).

The more congruency between the characteristics of tasks and the features of services (i.e. the higher the task-service fit), the more likely users are to use and continue to use the service (Zigurs & Buckland, 1998). In other words, Thus, it is follows that the better the apps serve their users more likely the users are to download and/or continue using them. While using these apps, users share insights on how the brands could better serve them. These interactions between users and branded apps ultimately result in improved value co-creation (Lusch & Vargo, 2014). This relationship is supported by the Uses and Gratification Theory, which suggests that audiences intentionally select media that satisfy their needs (Katz, 1974). Thus, we argue the following hypothesis.

H2: Task- service fit is positively associated with co-creation.

We hypothesize that task-service fit not only positively influences the experience and co-creation but it also contributes to building brand loyalty. Brand loyalty is usually manifested by brand recommendations and repurchase (K. Z. Zhang et al., 2016). When apps provide adequate, appropriate, and sufficient service, users derive value in using these apps. The scientific literature not only well establishes the link between value and loyalty (Fang, 2019) but it also suggests that value perceptions are the most important determinant of the brand loyalty (Choi et al., 2016; Floh et al., 2014). For example, the Nike SB app provides a unique digital skating experience to its users. The app helps skaters improve their skills, connect with like-minded individuals, and share videos. These features fit perfectly to with interests of users who download and use this app and thereby generate value for them. Increased value perceptions and continuous and pleasant exposure to brand content will most likely increase the loyalty to the brand.

This argumentation is also supported by the usability-loyalty model for websites, which suggests the website usability positively predicts continued usage and referral intentions, which indicate higher levels of brand loyalty (Baek & Yoo, 2018). Understanding this relationship, many companies pay excessive attention to their mobile apps and seek to attract on-the-go customers and their brand loyalty (K. Z. Zhang et al., 2016). Based on this we hypothesize the following.

H3: Task- service fit is positively associated with brand loyalty.

Fang (2019) described branded app experience is a memorable, cognitive, and emotional interaction that can generate value (Fang, 2019). By different means, such as interactivity, personalization and responsiveness, branded mobile apps offer a positive experience to their users, and encourage them to continue using the app (Moynagh & Worsley, 2002). The more users use the

apps, the motivated they are to express their opinions and suggest how to improve already existing services or develop new ones.

Facebook's app is a good example of the positive relationship between branded app experience and co-creation. Using an algorithm, the app customizes the feed and provides personalized relevant content to assure a positive experience of its users. Since app users understand how important this is for the company, how hard it tries to deliver the customized content, and appreciate its effort, they feel encouraged to report any irrelevant or upsetting content shown on their timelines. Most likely, this would not be the case for the apps that deliver negative experience by continuously spamming their users. In such cases, users would simply stop using these apps and find alternatives. Thus, we hypothesize the following.

H4: Experience is positively associated with co-creation.

The ultimate goal of organizations that develop apps is to translate their efforts into profit. To do so, companies endeavor to not only encourage users to download their apps but also open and use them daily. The more frequently users open a branded app, the more likely they are to report higher levels of recommendation and purchase intent (Fang, 2017a). In other words, this leads to brand loyalty- an increased likelihood of recommending the brand and purchasing from it.

The key to nurturing brand loyalty through mobile apps is in to deliver positive experiences. Positive experience with a branded app contributes to a positive inference that the brand itself is efficient, reliable, and dependable (Wu et al., 2017). Moreover, customers derive value from their memorable and unique experiences of using branded apps (K. Z. Zhang et al., 2016). Branding literature suggests that these value perceptions are the most important antecedents of brand loyalty (Choi et al., 2016; Floh et al., 2014). Hence, those users who hold a positive experience of using the app are more likely to revisit it and voluntarily expose themselves to the company's marketing content. This would lead to increased brand loyalty and repurchase intentions (Fang, 2017a). From the preceding reasoning, we hypothesize the following.

H5: Branded app experience is positively associated with brand loyalty.

Value co-creation is the joint creation of value by the company and the customer through joint problem definition and solving (Prahalad & Ramaswamy, 2004). In the process of co-creation consumers actively participate with companies to improve existing solutions or develop new ones. Through these interactions and dialogue, mutual knowledge and understanding are developed which help companies to provide more customized offerings. At the same time, this process empowers customers to adjust or adapt these offerings to fit their needs and wants. With this increasing frequency and duration of interaction, the relationship between the company and its customers becomes stronger and more sustainable.

According to the involvement-commitment model, customers who are involved in designing and delivering services are likely to invest even more time adjusting these services to their needs (Beatty et al., 1988). When customers actively participate in the service development process they develop feelings of devotion to the brand (Polo Peña et al., 2014). A possible explanation of this effect is that self-designed products and services better fit with the needs and wants of the customers than standardized ones do. Increased the fit between customer needs and product and service characteristics leads to increased purchase frequency and reduced search of alternatives (Yang et al., 2014). Based on this argumentation we hypothesize the following.

H6: Value co-creation is positively associated with brand loyalty.

As earlier explained, task-service fit is positively associated with branded app experience, which in turn affects brand loyalty, therefore we propose that branded app experience mediates the relationship between task-service fit and brand loyalty (H7a). Alternatively, task-service fit is positively associated with branded app experience, which leads to brand co-creation, and, ultimately enhances brand loyalty. Thus, we suggest that both branded app experience and brand co-creation mediate the relationship between task-service fit and brand loyalty (H7b). Similarly, task-service fit is positively associated with brand co-creation, which in turn leads to brand loyalty, we postulate that brand co-creation mediates the relationship between task-service fit and brand loyalty (H7c). Formally:

H7a: Branded app experience mediates the relationship between task-service fit and brand loyalty.

H7b: Both branded app experience and brand co-creation mediate the relationship between task-service fit and brand loyalty.

H7c: Brand co-creation mediates the relationship between task-service fit and brand loyalty.

Having outlined the development of our model, we now describe our research methodology.

RESEARCH METHODOLOGY

A survey was used to test our model. This section describes the data collection and analysis methodology.

Research Instrument

All the measurement scales were adopted from established literature and adjusted to fit the branded app context: Task-service fit (Lin & Huang, 2008), branded app experience (Fang, 2019), brand co-creation (Nysveen & Pedersen, 2014), and brand loyalty (Yoo et al., 2000). Following Downen et al. (2018) all questions used a seven-point Likert scale with 1 being “strongly disagree” and 7 being “strongly agree.” The instrument is presented in Table 1.

At the beginning of the survey, participants were provided with the following definition of branded apps: “A *branded app* is a mobile application created by a company to promote its brand. Branded apps typically reflect the brand’s identity and feature its values, colors, logo, visual identity and style, slogan, and more. With a branded app, companies can increase brand exposure, stay connected with customers and give customers more access to companies’ business.” Subjects were then asked if they had used a branded app in the past.

Only participants who had used a branded app in the past were qualified to proceed to a next step where each respondent was presented with a list of publicly available branded apps, including Candy Crush, Clash of Clans, Dischord, ESPN Fantasy Sports, Facebook, iFunny, Instagram, Netflix, Roblox, Skype, SnapChat, TikTok, Tinder, Twitter, Youtube. Users were also given the option to select “Other” and enter their own app name. Those apps were selected from a pretest where participants were asked to identify popular branded apps that they had used, with the goal of including utilitarian, hedonic and social apps, thus reflecting various computing motivations (Kettunen et al., 2020). Participants were then asked to choose from the list one app that they used recently. After the app was selected, participants were then reminded that they would answer the subsequent questions based on the app they chose. Then participants completed the questionnaire and finished with demographic questions. All were thanked for participation.

Data

The survey was administered using Qualtrics and data were collected from students at two public universities in the United States. Out of 650 responses collected, 573 responses were completed and analyzed. Demographic data showed that 85% respondents were between 20 and 30 years old, 53.7%

Table 1. Research Instrument Description

Construct	Code	Item
Brand Co-Creation	COC1	I often express my personal needs to the brand
	COC2	I often suggest how the brand can improve its services
	COC3	I participate in decisions about how the brand offers its services
	COC4	I often find solutions to my problems together with the brand
	COC5	I am actively involved when the brand develops new solutions for me
	COC6	The brand encourages customers to create solutions together
Task Service Fit	TSF1	Use of the branded app service is adequate
	TSF2	Use of the branded app service is appropriate
	TSF3	Use of the branded app service is compatible with my task
	TSF4	Use of the branded app service is helpful
	TSF5	Use of the branded app service is sufficient
	TSF6	In general, the service of the branded app best fits the task
Brand Loyalty	LOY1	I consider myself to be loyal to this brand.
	LOY2	This brand would be my first choice.
	LOY3	I will not buy other brands if this brand is available.
Brand Experience	EXP1	It is a memorable experience for me (i.e., my memory of the use process lasted for quite a while).
	EXP2	It is possible for me to browse what's new in the use process (e.g., know the newest information or latest trend).
	EXP3	It is possible for me to experience new things (e.g., experience new services or look at new products).
	EXP4	Using the branded app stimulates my interest to learn more about the brand.

were male, 80.2% had a bachelor degree or lower, 97% used free apps, and 69.8% spent one hour to five hours on apps each day.

Statistical Methods

Two statistical approaches could be used to estimate causal relationship models: covariance-based approach (Jöreskog, 1978; Jöreskog & Sörbom, 1982) and partial least squares structural equation modelling (or PLS-SEM in short) (Ringle et al., 2012; Wold, 1974). We elected to use PLS-SEM for this study for two reasons: (1) the conceptual model is relatively complex that captures direct effects and indirect effects, and (2) this method is not strictly bound by the normal distribution assumption. Although PLS-SEM does not produce the model fit as the covariance-based counterpart does, what this approach can do is to maximize the explained variance of latent variables and use this as a sufficient alternative fit index (Sarstedt et al., 2014). Furthermore, strategic management and marketing researchers have employed PLS-SEM extensively (Hair et al., 2012), as have management information systems researchers (Ringle et al., 2012). This study examines the influence of task-service fit on brand loyalty via branded app experience and brand co-creation. We employ a variance-based predictive approach using PLS-SEM. We use SmartPLS3 to estimate our model.

The measurement model was assessed through two steps. In step 1, following Hernaes et al. (2012), we evaluated three criteria to assess internal consistency: Cronbach's alpha, composite reliability and factor loadings. Cronbach's alpha for brand co-creation, branded app experience, brand loyalty,

and task-service fit were 0.873, 0.722, 0.801, and 0.933, respectively. Composite reliability for brand co-creation, branded app experience, brand loyalty and task-service fit were 0.907, 0.826, 0.882, and 0.947, respectively. All factor loadings were higher than 0.7, except COC1 (0.621) and COC6 (0.600). To decide whether those items were kept or not, we reviewed other criteria including Cronbach's alpha, composite reliability, and average variance extracted (AVE) (see below). The finding confirmed that all criteria were satisfactory even though both items were included. Therefore, we decided to keep them. The results showed that all criteria used met or exceeded the requirements outlined by Hair et al. (1998). So internal consistency was established.

In Step 2, construct validity was assessed with two dimensions: Convergent and discriminant validity. First, average variance extracted (AVE) was employed to test convergent validity. The results showed that AVE values for brand co-creation, branded app experience, brand loyalty, and task-service fit were 0.626, 0.543, 0.715, and 0.751, respectively. All AVE values were greater than 0.5, lending evidence that convergent validity was established. Next, discriminant validity was evaluated using two criteria: Fornell and Larcker and HTMT. First, applying the guideline from established literature (Fornell and Larcker (1981), we assessed discriminant validity by comparing the squared correlations of the constructs and AVE. All squared correlations of the constructs were smaller than AVE. Second, HTMT was used to test discriminant validity (Hair et al., 2017). All HTMT values were smaller than 1, hence, discriminant validity was established.

RESULTS

Table 2 reports Chronbach's α and Average Variance Explained for each variable. The results of our hypothesis tests are reported in the next subsection.

Assessment of Structural Model

Following Hair et al. (2016), we assessed the structural model using two criteria: Path coefficients and coefficients of determination (R^2). First, R^2 for brand co-creation, branded app experience, and brand loyalty are 0.704, 0.036, and 0.374, respectively which indicated weak to substantial predictive power for corresponding constructs (Hair et al., 2017). Second, path coefficients were used to test hypotheses (Hair et al., 2017). Among the hypotheses predicting main effects, all hypotheses were supported, except H5 (branded app experience is positively associated with brand loyalty). Particularly, task-service fit positively impacted branded app experience, brand co-creation and brand loyalty ($\beta = 0.156$, $p < .01$, $\beta = 0.199$, $p < .01$, $\beta = 0.218$, $p < .01$, respectively). Therefore, H1, H2, and H3 were supported. Branded app experience had a positive influence on brand co-creation ($\beta = 0.542$, $p < .01$), but not on brand loyalty ($\beta = 0.062$, $p > .01$). Therefore, H4 was supported, but H5 was not. And brand co-creation positively impacted brand loyalty ($\beta = 0.388$, $p < .01$). Thus, H6 was supported (see Table 3, and Figure 2).

Table 2. Results

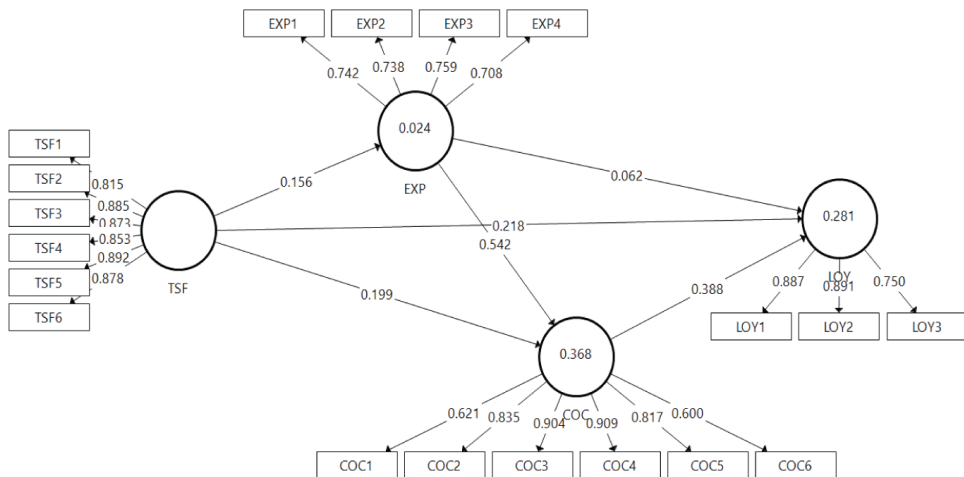
Variable	No of Items	Mean	Chronbach's α	CR	AVE	AVE>Cor ²
Brand Co-Creation	6	4.70	0.873	0.907	0.626	0.626>0.329
Experience	4	4.71	0.772	0.826	0.543	0.543>0.329
Brand Loyalty	3	4.87	0.801	0.882	0.715	0.715>0.235
Task Service Fit	6	5.51	0.933	0.947	0.751	0.751>0.114

Table 3. Testing Hypotheses

Path	Coefficient	Samle Mean	SD	T Value	P Values	Hypotheses
TSF -> EXP	0.156	0.158	0.047	3.337	0.001	H1: supported
TSF -> COC	0.199	0.199	0.038	5.201	0.000	H2: supported
TSF -> LOY	0.218	0.219	0.042	5.123	0.000	H3: supported
EXP -> COC	0.542	0.544	0.029	18.563	0.000	H4: supported
EXP -> LOY	0.062	0.062	0.052	1.205	0.228	H5: not supported
COC -> LOY	0.388	0.388	0.048	8.090	0.000	H6: supported

Note: COC: Brand Co-Creation, TSF: Task Service Fit, EXP: Experience, LOY: Brand Loyalty

Figure 2. Model Testing



Mediation Test

We used a serial multiple mediator model to examine if branded app experience and brand co-creation mediated the impact of task-service fit on brand loyalty (Hair et al., 2016). We tested three specific indirect effects: TSF -> EXP -> LOY (H7a), TSF -> EXP -> COC -> LOY (H7b), and TSF -> COC -> LOY (H7c). The result indicated that out of the three effects, two indirect effects were significant: TSF -> EXP -> COC -> LOY ($\beta = 0.033$, $p < .01$), and TSF -> COC -> LOY ($\beta = 0.077$, $p < .01$), while one indirect effect was not TSF -> EXP -> LOY ($\beta = 0.010$, $p > .05$). In other words, H7a was not supported while H7b, and H7c were supported (See Table 4).

Table 4. Mediation Test

Indirect Effect	Coefficient	Samle Mean	SD	T Value	P Values	Hypotheses
TSF -> EXP -> LOY	0.010	0.010	0.009	1.053	0.292	H7a: not supported
TSF -> EXP -> COC -> LOY	0.033	0.033	0.011	3.078	0.002	H7b: supported
TSF -> COC -> LOY	0.077	0.077	0.018	4.330	0.000	H7c: supported

CONCLUSION

Summary of Research

Building on task-service fit, (Fang, 2017b; Vargo & Lusch, 2004), this paper seeks to better understand of the extent to which consumer perceptions of task-service fit derived from branded apps influences brand attitudes. Data are collected from students at two public universities using an online survey. The conceptual model is tested employing partial least squares structural equation modeling. The result from 573 branded app users shows that all hypotheses are supported except H5 (branded app experience is positively associated with brand loyalty) and H7a (branded app experience mediates the relationship between task-service fit and brand loyalty). The study also confirms that branded app experience and brand co-creation are mediators of the relationship between task-service fit and brand loyalty.

Theoretical Implications

Brand loyalty has been a topic of primary interest among consumer behavior researchers for decades, and relatively recent trends toward globalization and e-commerce have removed many of the switching costs and increased the number of purchase options for consumers (Furner, 2013; Keith et al., 2016). Since consumers have more purchase options and lower switching costs than before, the importance of building a strong theoretical understanding of brand loyalty is highlighted. Our study advances this goal in two novel ways. First, it examines determinants of brand loyalty in an emerging and increasingly relevant context: Mobile computing. More and more computing is done from mobile devices and as such, traditional models of brand loyalty may not behave the same in this new context, which is characterized by a limited focus area, limited dexterity and distracted consumers (Furner, Racherla, et al., 2018). If this trend continues, then now is the time to develop an understanding of how mobile computing influences relationships between brand, experience factors and brand loyalty. Our findings that task-service fit (H3) and co-creation (H6) influence brand loyalty in a mobile context represents an early attempt at understanding brand loyalty in this emerging context. Further, our failure to find support for a relationship between experience and brand loyalty in the mobile context (H5), when this relationship had been demonstrated in the traditional commerce and e-commerce contexts, suggests that perhaps there are some characteristics of the mobile experience which influence well established consumer behavior outcomes. Further research on this question is warranted.

Second, academic interest in the co-creation phenomenon has grown substantially during the digital revolution, since the distributed nature of consumers represents a challenge to co-creation which can be overcome via web-based technologies (Oliveira & Panyik, 2015). As co-creation efforts are expected to continue to increase, understanding the factors which influence consumers' proclivity to engage in co-creation campaigns is increasingly important, and with proliferation of mobile apps and the data that they collect, brand holders enjoy new opportunities to identify and solicit participation in co-creation activities. Our findings that task-service fit (H2) and experience (H4) do influence co-creation and that co-creation influences brand loyalty (H6) in the mobile context contributes to this paradigm and raises a new research question: What mobile app characteristics can increase consumer proclivity to engage in co-creation activities?

Managerial Implications

This study offers several practical insights, which are vital as they can guide brands in designing and developing apps to strategically enhance brand loyalty.

First, we found that task-service fit positively influences brand loyalty (H3). Brand loyalty represents the deeply held commitment to rebuy and recommend a specific product, service, or company (Oliver, 1999; K. Z. Zhang et al., 2016). Loyal consumers resist the situational and marketing efforts of other companies that try to induce switching behavior (Oliver, 1999). Thus, loyalty is important for the brand's long-term success, and to increase it further, app developers should focus on

really understanding why and how the users use the apps and make sure their apps provide adequate support for accomplishing these specific tasks. The first step for companies is to collect the data. This can be done in many different ways, such as surveying existing and potential users, employing eye-tracking to check how users navigate through the app, or conducting focus group discussions. The second step would be to use the insights gained through data and deliver adequate, appropriate, and sufficient service through the app; for example, by using novel technologies, such as artificial intelligence or requesting systems (Fang, 2019).

Second, our results inform managers that task-service fit positively influences co-creation (H2), which ultimately leads to increased brand loyalty (H6). Co-creation is a customer's participation in developing already existing products and services or solving the problems for creating mutually valued outcomes. When it comes to branded apps this may be a challenge as it means that brands should not only persuade their customers to download the app, but also to actively use it and provide feedback. Thus, brands need to invest in understanding what increases the perceptions of task and service fit, which would encourage the process of co-creation. Studio Connect, a proprietary app by Target, is a good example. Using this app Target encourages co-creation by allowing designers to interact with people while developing products. It also stimulates conversations, which allows understanding what products customers want to buy, what are their thoughts and experiences regarding existing products, or what are optimal locations for opening new shops. Among these outcomes, our study finds that co-creation leads to increased brand loyalty. Thus, customers who actively participate in the development and sophistication of products and services develop feelings of devotion to the brand (Polo Peña et al., 2014).

Third, our study established a positive relationship between task-service fit and experience (H1) but we did not find support for a link between experience and brand loyalty (H5). Thus, when focusing on leveraging brand loyalty, brands can direct their efforts to increase task-service fit and encourage co-creation rather than enhance app experience. However, as app experience is important and literature associates it with many positive outcomes it is wrong to conclude that less attention can be paid to it.

Limitations and Future Research

Despite theoretical and managerial implications, the findings of this paper should be interpreted with caution for multiple reasons. First, the data collected for this study came from students. Although students are branded app users, our results could be biased because of characteristics of this sample such as income and lifestyle. Future research should expand the sampling population, so a more representative sample will be collected. That said, research has shown that university students tend to score high in terms of mobile self-efficacy, and are frequently used as sampling populations in mobile computing for this purpose. Indeed, brand holders who are engaged in mobile brand management are likely targeting those with high mobile self-efficacy, which suggests that a sampling population of students is appropriate. Along this line, research on mobile self-efficacy suggests that some users are more comfortable and more effective at navigating apps than others (Furner, Zinko, et al., 2018), future studies may consider either controlling for or modeling mobile self-efficacy.

Second, since the survey was conducted in a single national culture – America, generalizability questions may arise (Zinko et al., 2017). Understandably, customers from different cultures may have different attitudes toward using particular branded apps, or different behaviors including relationships with brands via branded apps, or purchasing brands through branded apps. Therefore, future endeavors to examine the impact of social motivation of branded apps on brand-based outcomes beyond American culture should be considered. Specifically, a cross cultural study could be implemented to diagnose the similarities and differences across cultures.

Finally, the fact that users in this study were exposed to a list of pre-selected branded apps (with one option “other” where users free to name an app that they used if they could not find an app in the list) may create internal consistency concerns. Further research could investigate both well-established and new, or less well known, branded apps to paint a broader picture.

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ENDNOTE

- ¹ Throughout this paper, the terms branded app, branded mobile app and mobile app are used interchangeably. The terms value co-creation, brand co-creation and co-creation are also used interchangeably.

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