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Xiong, Bingqing; Tan, Chee-Wee; Wang, Weiquan; Lim, Eric; Zhao, Zheng

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Resolving the Innovation Diffusion Paradox in Mobile App Stores: A Brand Equity Perspective

Bingqing Xiong

City University of Hong Kong & University of Science and Technology of China, bxiong2-c@my.cityu.edu.hk

Chee-Wee Tan

Copenhagen Business School, cta.itm@cbs.dk

Weiquan Wang

City University of HongKong, weiquan@cityu.edu.hk

Eric Lim

UNSW Sydney, e.t.lim@unsw.edu.au

Zheng Zhao

University of Science and Technology of China, z_zhao@ustc.edu.cn

See next page for additional authors

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Authors

Bingqing Xiong, Chee-Wee Tan, Wei-quan Wang, Eric Lim, Zheng Zhao, and Yugang Yu

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Bingqing Xiong

City University of Hong Kong & University of Science and
Technology of China
bxiong2-c@my.cityu.edu.hk

Weiquan Wang

City University of Hong Kong
weiquan@cityu.edu.hk

Zheng Zhao

University of Science and Technology of China
z_zhao@ustc.edu.cn

Chee-wee Tan

Copenhagen Business School
cta.itm@cbs.dk

Eric T.K. Lim

UNSW Sydney
e.t.lim@unsw.edu.au

Yugang Yu

University of Science and Technology of China
ygyu@ustc.edu.cn

ABSTRACT

The growing number of apps released on a daily basis has contributed to an innovation diffusion paradox whereby the frequency and intensity by which innovations are crowdsourced are stymieing their own diffusion. In mobile app stores, consumers are often constrained in their selection due to the abundance of apps and multitudinous promotional information. To this end, this study proposes branding as a strategy to tackle the innovation diffusion paradox. Specifically, we construct a research model that posits consumers' brand awareness as an antecedent affecting their brand association and quality which, when taken together, affect their knowledge of affiliated apps and download intentions in mobile app stores. Based on data gathered via a preliminary online survey administered on consumers belonging to one of the largest mobile app stores in China, we attest to the impact of branding on consumers' knowledge of affiliated apps and download intentions.

Keywords

Brand equity; mobile applications; affiliated knowledge; brand relevance

INTRODUCTION

Mobile app stores (e.g., Apple App Store and Google Play) constitute one of the fastest-growing segments within the downloadable software market. Accompanying the explosion in downloads is the corresponding growth in the number of newly released apps. Statistics generated from tracking monthly submissions to Apple App Store revealed that there were 85,280 submissions in December 2016

alone, representing an average of 2,843 submissions per day¹.

The popularity of mobile technology has greatly amplified firms' ability to collaborate with consumers in developing innovative products. Mobile app stores not only intensify collaborative innovation by facilitating bilateral interactions between firms and consumers, but it also allows the latter to develop their own apps by lowering barriers to entry. Conceivably, mobile app stores can be deemed as a platform for both professional and amateur developers to create and disseminate innovative apps.

Yet, the huge number of apps and their accelerated growth rate has culminated in challenges for both consumers and developers. For consumers, the burgeoning number of apps implies that it is practically impossible to peruse the entire collection of newly released apps and they are constantly exposed to a mere fraction of such apps. Likewise, for developers, it is difficult to introduce consumers to newly released apps. Unless the release rate of new apps slows down, there appears to be an innovation diffusion paradox in the mobile app ecosystem: the climate of open and collaborative innovation has led to a frenzied crowdsourcing of innovations, but the ferocity and intensity by which innovation are crowdsourced also stymied their own diffusion. The mobile app ecosystem seems to be heading towards a situation in which resources are being squandered on the development of apps that may never catch the attention of consumers. Consequently, the core challenge in the mobile app store is to increase the visibility of apps to consumers, focusing primarily on attention capture for both developers and consumers in the app store platform.

<http://www.pocketgamer.biz/metrics/app-store/submissions>

Past studies have examined the effects of promotional techniques and product presentation formats in e-commerce stores. For instance, Jiang and Benbasat (2007) have investigated the impact of online product presentation formats on consumers' product knowledge and purchase intentions. Nevertheless, promotional techniques targeted at individual products are inadequate to cope with the ever-increasing number of newly released apps in mobile app stores. While developers are adept at promoting an individual app to consumers, the broader and more elusive question is how mobile app stores could expose consumers to personally relevant apps among the thousands of apps being released daily.

One strategy of breaking through the clutter is to bolster the exposure of app developer brands in mobile app stores. Certain mobile app stores have carved out an area called the brand zone to recommend high-quality developers. Branding is viewed as an effective means of attracting consumers' attention (Pieters & Wedel, 2004). A new customer may pay greater attention to and learn more about the products belonging to a brand with which they are familiar (Hoeffler & Keller, 2003). To this end, we construct a research model that posits brand equity and its constituent dimensions as factors affecting consumers' knowledge of apps affiliated with a select developer. These factors in turn influence their download intentions towards these apps. The research model was empirically validated via a preliminary online survey administered on registered consumers belonging to one of the largest mobile app store in China. In doing so, we endeavor to provide an answer to the following research question: *What are the effects of brand equity on consumers' knowledge of affiliated apps and download intentions in mobile app store?*

THEORETICAL FOUNDATION

Brand equity denotes the added value bestowed by a brand onto the family of products it represents (Buil, de Chernatony, et al., 2013). According to Aaker (1991), brand equity is a multidimensional concept comprising the four dimensions of brand awareness, brand association, brand quality, and brand loyalty. Synthesizing extant literature, we delineate brand equity into three main constituent dimensions, namely brand awareness, brand association, and brand quality (Buil, de Chernatony, et al., 2013). We have chosen to omit brand loyalty from our theorization of brand equity because scholars have countered that brand loyalty should be treated as a consequence rather than a constituent dimension of brand equity (Chaudhuri & Holbrook, 2001).

Brand Awareness, Association and Quality

Brand awareness is the first step to inducing brand perceptions (Cobb-Walgren et al., 2013). Consumers must first be aware of a brand before they can engage in brand association by mentally connecting information related to the same brand (Aaker, 1991). Because the relationships among the constituent dimensions of brand equity have been validated in prior marketing research (Buil, de

Chernatony, et al., 2013), we expect the effects of brand awareness to hold in the context of mobile app store:

Hypothesis 1: Brand awareness has a positive influence on developers' brand association.

Hypothesis 2: Brand awareness has a positive influence on developers' brand quality.

Affiliated Product Knowledge

Product knowledge refers to memorable attributes of products from consumers' standpoint (Rao & Monroe, 1988). Product experience is derived from prior product experience, which include information search and usage experience (Bettman & Park, 1980). In the context of our study, we advance the concept of affiliated product knowledge to capture consumers' knowledge of affiliated apps belonging to a select developer. This knowledge includes familiarity with related apps, information about the attributes of such apps and variations in the performance of these attributes across brands. In this sense, affiliated product knowledge can be construed as consumers' knowledge of shared attributes and overlapping operations of all apps related to a select developer. Distinct from previous definitions of product knowledge which are primarily concentrated on one's knowledge about a single product (Bian & Moutinho, 2011), we introduce the notion of affiliated product knowledge to reflect the common ground spanning all related apps.

Past studies have linked consumers' familiarity with a brand to their product knowledge because brand familiarity has better encoding ability and culminates in more extensive product knowledge (Johnson & Russo, 1984). Smith et al. (2007) found that brand promotion can draw attention to a given brand, which in turn motivates consumers to source for information on related products with the brand. For this reason, brand association plays a critical role in enhancing consumers' appreciation of affiliated products: a consumer may pay greater attention to, and learn more about products with which he/she is familiar (Hoeffler & Keller, 2003):

Hypothesis 3: Brand association has a positive influence on consumers' affiliated product knowledge.

Brand quality relates to a consumer's perception towards the overall brand experience (Zeithaml, 1988). Higher brand quality could hence bolster the valuation of affiliated products by increasing consumers' willingness to search for and acquire knowledge about apps developed by select developer. That is, a consumer, who associates a select developer with higher quality, is more likely to feel reassured by this developer and in turn, source for information about apps affiliated with this developer:

Hypothesis 4: Brand quality has a positive influence on consumers' affiliated product knowledge.

Multiple studies have found a correlation between product knowledge and purchase intentions (Lin & Chen, 2013). Prior research concluded that consumers who possess product knowledge differ from those with low product knowledge when making purchase decisions (Rao & Monroe, 1988).

Moore and Lehmann (1980) demonstrated that consumers' product knowledge has a positive impact on his/her efforts in information search. Consistent with extant literature, we posit a direct relationship between affiliated product knowledge and purchase intention. Because affiliated product knowledge mirrors a consumer's knowledge about the apps by a select developer under consideration, we expect that it will impact the consumer's information search efforts and evaluation of app performance from the developer. This in turn should translate into an increase in consumers' download intentions:

Hypothesis 5: Consumers' affiliated product knowledge has a positive influence on their download intention.

Brand Relevance

Brand relevance influences the degree to which the brand plays a role in consumers' decision making process (Backhaus *et al.*, 2011). Studies have shown that the level of brand relevance not only governs consumers' cognitive and behavioral processes when making choices, but it also drives their satisfaction with a brand (Aaker, 2012). As brand relevance increases, consumers are likely to recognize the brand and remember information about products belonging to the brand (Aaker, 1991). Therefore, consumers exhibiting high levels of brand relevance are likely to possess correspondingly high levels of recollection about the brand, which in turn should translate into heightened affiliated product knowledge about the brand.

Furthermore, when consumers harbor favorable attitudes toward a brand, they tend to be much more patient in sourcing for information about products affiliated with this brand. Consumers are thus more likely to gravitate towards apps with brand association and quality:

Hypothesis 6: Brand relevance will reinforce the positive relationship between brand association and consumers' affiliated product knowledge.

Hypothesis 7: Brand relevance will reinforce the positive relationship between brand quality and consumers' affiliated product knowledge.

METHODOLOGY

We conducted a preliminary online survey in cooperation with one of the most popular mobile app stores in China. Doing this enables us to gain access to targeted respondents and conduct our empirical inquiry in conjunction with daily usage patterns.

Measurement items for the three dimensions of brand equity were elicited from past studies (Aaker, 1991;

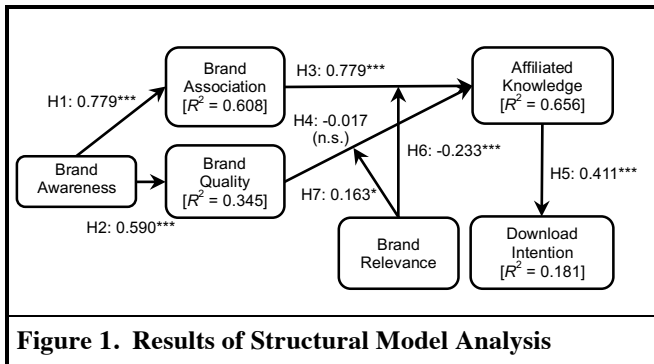
Lehmann *et al.*, 2008; Shah, 2012; Yoo *et al.*, 2017), the affiliated knowledge and brand relevance were adapted from the work of Lehmann (2008) and items for download intention were obtained from Erdem and Swait (1998). For the actual survey, we randomly push a notification link to consumers who were browsing the app store. Among the 140 responses, 36 incomplete questionnaires were discarded, leaving a sample of 104 valid responses for our data analysis.

Data Analysis

SmartPLS 3.2 was utilized to validate the measurement of our research model (Chin, 1998). As the data in our study was collected via a single survey questionnaire, common method bias could be a potential threat to the internal validity of the study. To check for common method bias, we performed the one-factor extraction test by conducting Exploratory Factor Analysis (EFA) of the 18 variables. Four salient components with eigenvalues greater than 1.00 emerged with no single factor accounting for more than 50% (i.e., largest four factors account for 39.15%, 10.20%, 9.25%, and 6.97% of the total variance explained respectively). To assess the measurement model, we compute the reliability, convergent validity, and discriminant validity of our scale. We scrutinized the internal consistency of our latent constructs by inspecting the Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). After dropping one measurement item due to low factor loading ($< .70$), all latent constructs exceed prescribed thresholds. Furthermore, based on the loading and cross-loading matrix generated via PLS analysis, all measures load higher on the construct they supposedly reflect, thus supporting convergent validity. Similarly, discriminant validity appears to hold since the square root of the AVE for each latent construct exceeds its correlation with all other constructs (see Figure 1).

Results from PLS analysis of the structural model, including path coefficients and their statistical significance, are illustrated in Figure 1. As depicted in Figure 1, brand awareness exerts positive and significant effects on both brand associations ($\beta = 0.779, p < .001$) and brand quality ($\beta = 0.590, p < .001$), corroborating Hypotheses 1 and 2. *Brand association* ($\beta = 0.563, p < .001$) has an impact on *affiliated product knowledge* whereas *brand quality* ($\beta = -0.017, p > .05$) does not. Hypotheses 3 is hence supported, but not Hypothesis 4. In addition, *brand relevance* ($\beta = 0.443, p < .001$) has a significant effect on *affiliated product knowledge*. Together, *brand association*, *brand quality*, and *brand relevance* account for 67% of the variance in *affiliated product knowledge*. In turn, *affiliated product knowledge* ($\beta = 0.411, p < .001$) drives consumers' *download intentions* in mobile app store, accounting for 18% of the variance in the latter. Hypotheses 5 is thus substantiated. Contrary to our anticipation, *brand relevance* was observed to attenuate the positive effect of *brand association* on *affiliated product knowledge* ($\beta =$

0.411, $p < .001$). As such, we did not find empirical support for Hypothesis 6. Finally, *brand relevance* reinforces the positive impact of *brand quality* on *affiliated product knowledge*, which in turn validates Hypothesis 7. In addition, we also controlled for the effects of *demographics* on *download intentions*. Results testify to the robustness of our research model in that respondents' *age* ($\beta = 0.010, p > .05$), *education* ($\beta = 0.046, p > 0.05$), *gender* ($\beta = 0.003, p > 0.05$) and *income* ($\beta = -0.099, p > 0.05$) do not exert an impact on *download intentions*.



DISCUSSION

In this study, we explore the effects of brand equity on consumers' knowledge of affiliated apps and eventual download intention in mobile app stores. Additionally, we scrutinized the role of brand relevance in mitigating the impact of brand association and brand quality on consumers' knowledge of apps affiliated with a familiar developer. Findings from our empirical investigation raise several points of interest. First, our study reveals that consumers' brand association will affect their affiliated product knowledge while brand quality does not. One plausible explanation for this contradictory finding might be that for most consumers, mobile apps represent low-risk products which are readily available free of charge or for just a nominal fee.

Second, contrary to our expectations, findings illustrate that heightened levels of brand relevance reduce the effects of brand association on consumers' affiliated product knowledge. A possible reason could be that consumers are less willing to rely on brand association when selecting a certain developer with whom they are personally involved. As noted by Maheswaran et al. (1992), when consumers are not personally involved with a brand, their previous associations exert greater influence on product evaluations.

Finally, enhancing consumers' brand relevance will reinforce the relationship between brand quality and affiliated product knowledge. This could be due to the fact that consumers are more inclined to source for information about affiliated apps of comparable quality when they perceived relevance.

Implications for Theory and Practice

From a theoretical standpoint, this study extends the theories of brand equity and product knowledge to the

mobile app context by constructing a research model that sheds light on the effect of branding on consumers' download intentions by delineating brand equity into its constituent dimensions. Our findings suggest that consumers who engage in brand association are more likely to possess knowledge about apps affiliated with a select developer, which in turn will drive their download intentions towards these apps. Furthermore, this study complements prior research about product knowledge by expanding the theorization of product knowledge from a singular product to affiliated knowledge with a family of products belonging to the same producer. Furthermore, we verify the impact of brand equity on affiliated product knowledge. Last but not least, findings from this study point to the inconsistent role played by brand relevance in shaping consumers' affiliated knowledge. Consumers are more likely to emphasize brand quality over brand association when they are personally involved with the product. That is, with heightened levels of brand relevance, brand quality is much more influential in driving consumers' affiliated product knowledge. Brand association, on the other hand, only comes in useful under conditions of low brand relevance.

Findings of our study also offer practical insights for both app developers and mobile app stores. This study not only aids app developers and mobile app stores in deciphering the pivotal role of branding when promoting newly released or updated apps, but it also provides a viable solution for resolving innovation diffusion problems caused by an unmanageable number of newly released apps. Findings suggest that for mobile app stores, enhancing consumers download intention can be achieved by conducting brand promotion activities. Likewise, for app developers, bundling affiliated apps under a recognizable brand would be beneficial as compared to running promotional campaigns for individual apps. Moreover, findings on the adverse effect of brand relevance on affiliated products also give mobile app store providers some food for thought when recommending apps to consumers. When recommending apps of high personal relevance to consumers, it is probably much more desirable to promote those from developers with high brand quality.

Follow-up Research Plans

Since this study marks the first step towards a broader study of the effects of brand equity in mobile app stores, findings will inform the next steps of our research plan in three ways. First, the sample of this study consists of only 104 respondents. Admittedly, the sample is rather small and the next logical step would be to replicate the study with a larger sample to bolster the external validity of our findings. Second, since we employ online survey for data collection, spurious causal effect inferences may exist due to the cross-sectional nature of this study. Consequently, we intend to supplement our survey responses with objective data in the form of historical behavioral records. We have negotiated with the mobile app store to access historical behavioral data of the survey respondents for

further analysis. Finally, we also plan to broaden our research model by incorporating potential design features that we can manipulate to induce brand awareness in mobile app stores. We are in the process of designing an experimental study to investigate consumers' reactions to novel design features for improving consumers' brand awareness.

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