Identification of two decision-making paths underpinning the continued use of branded apps

Identification of Two Decision-Making Paths Underpinning

The Continued Use of Branded Apps

Abstract

This research investigates two decision-making paths that underpin the continued use of branded apps. One path originates from past use of a category of apps and leads to continued use of a branded app from that category via recognition. The second path also starts with past use, but leads to continued use through the evaluation of the app's benefits. Two empirical studies test and subsequently validate the resulting conceptual model, confirming that both paths underpin continued use; however, the strength of the theoretical links varies and the two paths warrant separate investigation. These outcomes support the generalizability of the proposed model, highlighting its potential as a tool to advance the understanding of consumer decision-making leading to the continued use of branded apps. The findings of this research also yield practical relevance, especially for the delineation of strategies to enhance the chances of market survival of branded apps.

Key words: *Branded Mobile Apps; Consumer decision-making; App Continued Use; Past Behavior; Brand recognition; Brand Evaluation.*

1. Introduction

The landscape of mobile apps continues to evolve, and while some apps succeed at generating staggering intangible value (e.g., the Spotify app is worth US$20 billion, The Guardian, 2018), many do not generate profit and rapidly exit the market due to failing to attain continued use (Kübler et al., 2018). Indeed, recent statistics indicate lower usage levels of apps among consumers (e.g., global apps' downloads increased by 11% between 2017 and 2018, versus 13.1% between 2016 and 2017 – Sensortower, 2019) and only one in three apps installed is recurrently used (Statista, 2019), with most consumers spending the majority of time using only three apps (Alnawas and Aburub, 2016). These trends threaten the effectiveness of *branded apps* – i.e., apps made available to consumers via a distinct brand identity (Bellman, Potter, Treleaven-Hassard, Robinson & Varan, 2011).

Existing research on branded apps has concentrated on understanding the discovery (or adoption) and use stages of consumer decision-making (Racherla, Furner & Babb, 2012). In contrast, research examining the drivers of the continued use of branded apps (or outcome stage) is less extensive, which is concerning given that continued use is essential to the market survival and profitability of apps. Moreover, extant research that strived to understand what entices consumers to continue using an app has concentrated on factors such as positive consumer perceptions (e.g., Alavi & Ahuja, 2016); well-established drivers of technology acceptance and use (e.g., ease of use and usefulness, see Byun, Chiun & Bae, 2018); and apps' unique characteristics such as ubiquity and opportunities for personalization (e.g., Kim, Baek, Kim & Yoo, 2016). Thus, existing research is based on the underlying assumption that consumers' continued use of branded apps is the result of a thoughtful evaluation, whereby the

consumer ascertains if the app's characteristics match the benefits sought (see Xu, Peak & Prybutok, 2015; Tseng & Lee, 2018; Fang, 2017). However, the low switching costs and the high number of alternative apps available to consumers (Lee & Raghu, 2014; Jung, Kim & Chan-Olmsted, 2014) suggest that this assumption may be flawed, highlighting a key gap of theoretical and managerial relevance that represents the focus on the present research. Specifically, the key factors that past studies have omitted and that this research concentrates on are as follows: i) the feedback from past behavior, which has been seldom considered in research on mobile apps; and ii) a simple recognition-based stimulation that results from enhanced branded app's awareness – an aspect that past studies have largely omitted. These two factors are examined in conjunction with the evaluation process known to underpin the continued use of branded apps, with one key underlying research aim: to advance the understanding of the cognitive and psychological aspects that characterize the consumer decision-making process inherent to apps' utilization.

To attain this aim, this research presents two separate empirical studies. Study 1 compares two possible theoretical paths that lead to continued use of branded apps using sample of Australian consumers (N=): i) a *recognition path,* where continued use of a specific app is the outcome of past (or recent) use and frequency of use of a given category of branded apps and ii) an *evaluation path*, where consumers' appraisal of utilitarian and hedonic app benefits (see also Xu, Peak & Prybutok, 2015) mediates the relationship between past use and continued use of a specific branded app. Study 2 validates these two theoretical paths using panel data from Italy (N=2,473). Accordingly, the contribution that this research makes is twofold. From a theoretical point of view, it goes beyond the established conventions that explain continued use of branded apps to explore the role of app recognition. In doing so, this research also appraises the

important role of both decision-making paths as mediators of the link between past use and (future) continued use. As such, it advances existing knowledge of what influences the continued use of branded apps, beyond the appraisal of the benefits offered to consumers and beyond apps' discovery (or adoption). Moreover, branded apps are a very popular marketing and communication tool known to drive persuasion, consumer engagement, loyalty and satisfaction (Bellman et al., 2011; Kim, Kim & Wachter, 2013; Wang, Kim & Malthouse, 2016; Alnawas & Aburub, 2016; Baek & Yoo, 2018). They are also at the heart of many successful business ventures whereby the app is the key digital offering being marketed (see the aforementioned example of the Spotify app). Therefore, the findings of this research can be translated into practical guidelines for managers and app developers. Such guidelines are crucial, in view of shrinking margins and the pressure for app monetization, and the more general strain for market survival (Dinsmore, Dugan & Wright, 2016; Dinsmore, Swani & Dugan, 2017; Kübler et al., 2018; Appel, Libai, Muller & Shachar, 2019) – all of which hinge on ensuring that consumers continue using apps.

The following sections present the conceptual background of this research, followed by the methodology and analysis. Finally, the findings are discussed, discussing in more detail the theoretical and practical contributions that this research makes.

2. Conceptual Background

2.1 The Decision-Making Process Leading to Continued Use of Branded Apps

Unlike consumer decision-making pertaining to other branded offerings, the utilization of a certain app is characterized by a series of choices re-occurring beyond the initial adoption. Specifically, after the initial decision-making process leading to the discovery and uptake of an app, the consumer will routinely face additional decisions concerning whether or not to continue using the app in response to various needs, selecting it from a multitude of apps installed on one's mobile device. Racherla, Furner and Babb (2012) outlined the key stages of the consumer decision-making process leading to the *continued use* of branded apps, i.e. the decision to retain an app for continued use. In more detail, they distinguished between: i) the *discovery and download stage*, which begins when the need to perform a certain task arises, as a response to marketing or non-marketing stimuli; ii) the *use and navigation stage*, which concerns the actual use of an apps and to perform the task; and ii) the *outcome stage*, which corresponds to making the *decision to continue using the app*, and is indicative of *stickiness* or loyalty towards the app (i.e., time spent using the app and the frequency of use). Unfortunately, besides highlighting the ephemeral nature of the process, Racherla et al. (2012) did not discuss in great detail which factors promote the advancement from one stage to the next. Moreover, the vast majority of extant research on mobile apps (including studies that have concentrated on the specific instance of branded apps) focused on the first two stages of the decision-making process.

Empirical research that examined the factors likely to drive continued use is much more confined and has focused primarily on the consumer evaluation of utilitarian and hedonic app benefits likely to entice continued use (e.g., Xu, Peak & Prybutok, 2015).

The present research expands this focus and considers other possible underlying mechanisms essential to the continuation of the consumer decision-making process leading to the continued use of branded apps. In particular, this study aims to advance the understanding of the cognitive and psychological processes inherent to the decision-making process leading to the continued use of branded apps by exploring the role of past behavior and recognition. These aspects are also linked to and compared against the consumer evaluation of apps' benefits, in order to delineate between different decision-making paths leading to the continued use of branded apps.

2.2 The Underlying Impact of Past Behavior

The underlying impact of past behavior on future behavior is a widely established assumption inherent to many consumer decision-making accounts. In particular, the feedback of past behavior is a key assumption of Ehrenberg and Goodhardt's (1970) repeat purchase model (see also Goodhardt, Ehrenberg and Chatfield, 1984) and, more broadly, research that has concentrated on the habitual nature of low involvement purchase decisions that consumers routinely face (Ehrenberg, Barnard & Sharp, 2000; McDonald & Sharp, 2000; Wright, Sharp & Sharp, 2002; Meyer-Waarden & Benavent, 2006; Singh, Ehrenberg & Goodhardt, 2008; Sharp et l., 2012; Dawes, Meyer-Waarden & Driesener, 2015; Anesbury et al., 2020). Under these premises, forecasts of behavior continuation are primarily (if not solely) based on past occurrences of such behaviors. Nonetheless, the feedback effect of past behavior on future behavior is also accounted for within other lines of enquiry, including more detailed paradigms of consumer decision-making that evaluate additional (exogenous and endogenous) factors impacting future behavior, or take into consideration the sequential nature of

consumption (e.g., Keeney, 1982; Rassuli & Harrell, 1990; Sheth, Newman & Gross, 1991; Smith & Rupp, 2003; Court et al., 2009).

In the specific instance of mobile apps, past research has seldom considered the influence of past behavior and, when accounting for it, it has been considered primarily as a determinant of apps' adoption and usage. For example, a few studies have highlighted mobile experience and browsing behavior (e.g., Kim et al., 2017); acquisition frequency and recency (Liu et al., 2017); usage frequency and recency (Viswanathan et al., 2017; Newman et al., 2018); and active app usage or consumer voluntary participation (Chung, 2016; Mäki & Kokko, 2017) as important drivers of apps' discovery and use. Moreover, empirical studies based on the analysis of panel data revealed that many categories of apps are characterized by high levels of usage concentration. Specifically, similarly to other digital media, consumers spend most of their time using a few top (or preferred) apps, and have small repertoires of apps that they habitually use (Lee & Raghu, 2014; Jung et al., 2014).

In line with the reasoning presented so far, it is reasonable to assume that the decision to continue using these apps will be a reflection of what the consumer has done in the past – e.g., recent and perhaps more frequent use of one of these apps. Hence:

> ***H1a****: Recency of use of a category of branded apps impacts the continued use of individual branded apps from that category.*
>
> ***H1b****: Past frequency of use of a category of branded apps impacts the continued use of individual branded apps from that category.*

Furthermore, the present research contends that the recency and frequency of past use of a branded app's category will be the origin of two decision-making paths likely to lead

to the continued use of a certain branded app from that category. In mobile apps research, it is not uncommon to consider and compare different theoretical paths. For example, Tseng and Lee (2018) compared an affective path and a utilitarian path as two possible courses to brand loyalty via the use of branded apps. The empirical results revealed comparable importance for both paths. Similarly, Fang (2017) compared a utilitarian path and an engagement path as possible conceptual routes for strengthening consumer engagement behaviors directed at the brand powering the app. By doing so, the author found some differences between the two paths. The present research follows a similar approach and compares two theoretical paths that originate from past behavior (recency and frequency of use of a category of apps) and are likely to underpin the continued use of a certain branded app: a *recognition path* (newly introduced) and an *evaluative path* (adapted from past research).

2.3 The Recognition Path

Several studies highlighted mobile apps' power as 'brand in the hand' and staple tactic in a brand's promotional efforts (Rohm, Gao, Sultan & Pagani, 2012), and potential source of brand equity (Wang & Li, 2012). Wang, Kim and Malthouse (2016) also remarked that branded apps trigger frequent context-based brand recall, promulgating changes in consumer habits. Although a lot is known in relation to attaining branding goals via apps for existing brands, very little is known in relation to the effects of branding apps. This omission is likely to yield several practical implications, given the heightened levels of competition for market survival and profitability that most branded apps face (Kübler et al., 2018). Therefore, in absence of guidance on these matters, the present research considers general literature on the role of a brand in the consumer decision-making

process leading to continued use. This is based on the assumption that a brand is a brand, irrespective of the context where it is executed (Christodoulides et al., 2006).

On a basic psychological level, a brand works as a clear and simple 'signal' that attracts consumer attention and facilitates the cognitive effort inherent to different tasks, including decision-making. For example, a brand (or brand name) works as 'universal cue', which enhances the selection and appraisal of goods and services (Hoeffler & Keller, 2003). In particular, a brand has the potential to over-ride other factors, including attributes signaling quality (van Osselaer & Alba, 2000). Even in instances of blind evaluations based on highly differentiating factors (e.g., design), a brand can influence consumer decisions by enhancing positive evaluations of those factors (Kristensen, Gabrielsen & Zaichkowsky, 2012). On a more complex psychological level, a brand can serve as *heuristic,* i.e. consumers might use it as a mental shortcut or 'rule of thumb' to simplify the accomplishment of a certain task, including decision-making (Kahneman, 2003). This occurs in line with the *Recognition Heuristic* (RH) model, according to which individuals having to pick between two items will evaluate more positively the one that they recognize (Gigerenzer, Todd & the ABC Research Group, 1999). According to Gigerenzer and Goldstein (2011), the RH model can withstand numerous tests, and is often put in motion 'spontaneously' – i.e., an individual determines the suitability of basing decision-making on recognition within the confines of the task itself, as a reflection of: i) whether recognition occurred in memory or not; and ii) in response (or adaptation) to ecological situations. Moreover, as Thoma and Williams (2013) confirmed, the RH model is also applicable to preferential choices (non-compensatory), such as choosing between different branded items.

To gauge the mechanism through which a brand exerts the influence discussed so far, this study focuses on the notion of *brand recognition*. Authors such as Hoyer and

Brown (2001) described it as the cognitive mechanism indicative of the consumer ascertaining that they previously came across the brand. As such, brand recognition confirms prior exposure to the brand resulting from the cueing (Keller 2007). For example, there is brand recognition if a consumer is able to determine whether they have seen or have heard of the brand in past (Aaker, 2010). Importantly, brand recognition implies a top-level reflection of the brand's relevance in relation to the key consumption need inherent to the product category (Percy & Rossiter, 1992). Thus, it can impact consumer decisions when it matters the most – e.g., at the point of purchase, or anytime and anywhere a consumer is tasked to choose between multiple alternatives. Brand recognition also differs from other related notions such as *brand recall*, which captures the cognitive mechanism through which a brand is evoked in response to a consumption need prior to purchase (Percy & Rossiter, 1992).

According to seminal branding research (e.g., Keller, 1993), brand recognition is a crucial facet of *brand awareness*. In this capacity, brand recognition is considered in conjunction with brand recall and appraised as a key driver (or dimension) of Customer Based Brand Equity – see the empirical studies evaluating brand equity for web-based technologies and social media (e.g., Rios & Riquelmen, 2008; Al-Hawari, 2011; Bruhn, Schoenmueller & Schäfer, 2012; Shivinski & Dabrowski, 2015; Barreda Bilgihan, Nusair & Okumuset, 2015; Gil-Saura, Ruiz-Molina & Berenguer-Contri, 2016; Godey et al., 2016; Langaro, Rita & de Fatima Salgueiro, 2018). In such instances, brand recognition is conceptualized and measured as brand awareness and, rather than being distinguished from brand recall, it is examined in terms of *unaided* (i.e., spontaneous or 'top-of-mind') and *aided* recognition. For example, authors such as Romaniuk, Wight and Faulkner (2017) delineate between: i) *unaided (or unprompted) brand awareness*, which can be inferred from the consumer ability to spontaneously mention the brand when prompted

with a single cue (e.g., the product category); and ii) *aided (or prompted) brand awareness*, which can be ascertained from the consumer ability to confirm prior exposure to the brand when shown the brand or elements of it (e.g., logo or packaging).

Irrespective of being unaided or aided, brand awareness (and thus brand recognition) has a strong bearing on consumer decisions, including, most likely, the decision to continuously use a mobile app. Moreover, it is a consensus that consumers are not able to recognize all brands with comparable ease (Tybout & Calkins, 2005). In fact, a brand can facilitate (or inhibit) the ease of brand recognition, causing a spill-over effect on consumer responses (van Grinsven & Das, 2016). Therefore, as Crommelin, Gerber and Terblanche-Smit (2014) argue, building and maintaining brand recognition (or brand awareness) is challenging, yet vital to maintaining repeat patronage (see also Aaker, 2010). In line with this reasoning, the present study contends that recognizing a branded app is likely to exert a *direct* influence on the continued use of that app, in a fashion akin to the recognition heuristic model, and irrespective of originating via unaided or aided brand awareness. Put more formally:

> ***H2****: A branded app's unaided* ***(a)*** *and aided* ***(b)*** *awareness impact the continued use of individual branded apps from a category of branded apps.*

Moreover, to further advance knowledge of what underpins continued use of branded apps, this study also appraises the possible *indirect* effect of recognition on continued use. Specifically, this research explores the overall theoretical importance of a recognition path by determining whether recognizing a certain branded app from that category may allow the influence of past habits to unfold in the future by enhancing continued use. This translates into the following research question:

RQ1*: Does a branded app's recognition mediate the impact of past use of a category of branded apps (frequency and recency of use) on the continued use of individual branded apps from that category?*

2.4 The Evaluative Path

Within extant research on mobile apps, there are several empirical studies that have considered apps' continued use as the result of an evaluative process. Specifically, extant research has associated continued use of mobile apps to various *benefits* that consumers see in these apps and shape *perceptions of value*. For example, past research predicted continued use as the outcome of: i) apps' unique characteristics such as interactivity (Furner, Racherla & Babb, 2014), ubiquity and personalization potential (Kim et al., 2016); ii) apps' affordances (i.e. relational notions that signal the tie between the app and the user – see Fang, 2019), usability (Baek & Yoo, 2018) and aesthetic appeal (Kumar, Purani & Viswanathan, 2018); and iii) utilitarian and hedonic benefits that apps offer (e.g., Xu et al., 2015). Research that explored the factors underpinning apps' stickiness focused on similar aspects (e.g., Kim et al., 2016; Ahmed, Beard & Yoon, 2016), amid highlighting more explicitly the importance of perceptions of value and customer satisfaction (Chang, 2015; Xu et al., 2015). Moreover, there is a substantial body of research that focused on *consumer engagement* with apps – i.e., the 'motivational state' emerging from the thoughts and feelings triggered by the experience of pursuing personal goals via apps (Kim, Ling & Sung, 2013; Stocchi, Michaelidou, Pourazad & Micevski, 2018). Among these studies, authors such as Wu (2015) illustrated that the consumer perceptions of an app's performance in relation to basic factors (e.g., effort and performance) and emotion-laden factors (e.g., social influence and identification with the brand powering the app) underpin continuance use intention. Similarly, Tarute,

Shahrokh and Getautis (2017) argued that apps should bolsters individual participation via a combination of basic functionalities compatible with consumers' lives that facilitate the attainment of goals, while also fulfilling hedonic aspects (e.g., design/aesthetics and perceived quality). At the same time, Viswanathan et al. (2017) showed that the impact of consumer perceptions of value of the mobile app intensifies, as the continued use of mobile apps increases. Similar conclusions can be derived from studies aimed at understanding consumer overall evaluations of mobile apps in relation to: i) service quality and satisfaction (e.g., Lin & Wang, 2006; Peng, Chen & Wen, 2014; Chang, 2015); ii) apps' utility (e.g., Chopdar & Sivakumar, 2018); and iii) customer experience and/or 'value in use' (e.g., McLean, Al-Nabhani & Wilson, 2018; Lee, 2018; Fang, 2019). Building upon the studies reviewed so far, the present research considers the direct and indirect influence of the evaluation of an app's benefits (perceived value). However, in doing so, it puts forward the following assumptions.

First, this research maintains a distinction between utilitarian and hedonic benefits (see also Xu et al., 2015; Tseng & Lee, 2018), due to the following reasons. Peng et al. (2014) linked perceived value of mobile apps to specific outcomes for brands powering the app. Specifically, they conceptualized perceived value as an overall assessment of utility based on consumer perceptions, some of which would be utilitarian in nature and others hedonic. At the same time, Alnawas and Aburub (2016) explored four different types of benefits that branded apps offer: i) utilitarian or learning benefits (i.e., solutions to problems and information provision); ii) social integration benefits (i.e., for socialization and networking); iii) personal integrative benefits (i.e., making a difference to one's life); and iv) hedonic benefits (i.e., positive feelings). Interestingly, social integration benefits did not have an impact on mobile apps' effectiveness, and personal integrative benefits and hedonic benefits converged.

Second, the present research assumes that the fulcrum of consumer evaluations of a branded app originates from a 'bundle' of perceptions of utilitarian and hedonic benefits that the app offers. However, it is unnecessary to distinguish, conceptually, which specific utilitarian and hedonic benefits form this 'bundle', due to the following reasons. When consumers consider and evaluate branded offerings for choice, they do so on the basis of whichever option comes to mind when thinking about certain benefits sought (see Nedungadi, 1990). In fact, sometimes the only benefit recalled and used in the decision correspond to a single underlying need associated with the basic category or schema superseding those offerings (Percy & Rossiter, 1992). Therefore, for market survival, it is desirable that branded offerings are associated with a multitude of benefits and/or ideas that can make them accessible in memory and qualify them as suitable options for choice. That is, the likely impact on consumer choices will depend on the strength of the links between a branded offering and an array of benefits, rather than unique links with specific benefits (see also Romaniuk & Sharp, 2004). Intuitively, this makes the selection of benefits to be considered as drivers of continued used of branded mobile apps somewhat irrelevant. Accordingly, for each type of benefit, this research focuses on a selection of typical benefits that past studies have recurrently examined. For example, for the utilitarian benefits, this research focuses on *ease of use* and *usefulness*, which are well-known drivers of technology acceptance and use (e.g., Byun et al., 2018; Veríssimo, 2018); it also considers *practical relevance* (or interpersonal utility), given its documented impact on the intention to use apps (e.g., Stocchi, Michaelidou & Micevski, 2019). In terms of hedonic benefits, this research concentrates on *self-enhancement* (e.g., Zhu, So & Hudson, 2017; Scholz & Duffy, 2018), *entertainment* (e.g., Gao, Rohm, Sultan & Pagani, 2013; van Noort & van Reijmersdal, 2019) and the *visual (or aesthetic) appeal/layout* of the app (e.g., Kumar et al., 2018).

Finally, in terms of the proposed direct impact of utilitarian and hedonic benefits on continued use of a specific branded app, the present research puts forward a third and final assumption, as follows. Fang (2017) argued that utilitarian factors are well-established predictors of apps usage and engagement, and engagement behaviors directed at the brand powering the app. Comparatively, non-utilitarian factors (i.e., factors yielding value for the consumer beyond plain utility) are less understood, despite being likely to enhance the effectiveness of mobile apps. For example, Fang (2017) found that interactivity and social presence explained about half the variance in engagement behaviors. At the same time, Fang et al. (2017) linked three types of consumer perceptions of mobile apps' benefits - utilitarian, hedonic and social - to psychological reactions indicative of engagement. Although all three types benefits returned robust predictions of behavioral engagement intention (e.g., the intention to stay 'member' of an app and continue activities with it), the empirical difference between hedonic and social benefits was minimal. Therefore, this research assumes utilitarian benefits and hedonic benefits of an individual branded app to be equally likely to have a *direct* impact on continued use, since both may provide consumers with reasons to continue using the app. These reflections lead to the following hypotheses:

> ***H3****: The evaluation of a branded app's utilitarian benefits such as ease of use* ***(a)****, usefulness* ***(b)*** *and practical relevance* ***(c)*** *impact the continued use of individual branded apps from a category of branded apps.*
>
> ***H4****: The evaluation of a branded app's hedonic benefits such as self-enhancement potential* ***(a)****, entertainment* ***(b)*** *and visual (or aesthetic) appeal/layout* ***(c)*** *impact the continued use of individual branded apps from a category of branded apps.*

In terms of the outline of the evaluative path leading to continued use, similarly to the recognition path, this research contends that there could also be an *indirect* effect. Specifically, in the possible indirect configuration of this path, this research examines whether the consumer evaluation of a branded app's utilitarian and hedonic benefits explicates the predisposition to continue using the app resulting from past behavior. This is summarized in the following research question:

> ***RQ2****: Does the evaluation of a branded app's utilitarian and hedonic benefits mediate the impact of past use of a category of branded apps (frequency and recency of use) on the continued use of individual branded apps from that category?*

2.5 Additional Considerations

To enhance the theoretical and managerial implications offered, the present research is finally concerned with comparing, empirically, the strength of the two proposed theoretical paths presented so far. However, in carrying out the comparison of the two theoretical paths, this research deploys a *deductive-inductive* approach, which is not uncommon in research aimed at advancing the understanding of a certain phenomenon (see Ormerod, 2010). Specifically, rather than assuming *a priori* one to be superior or stronger than the other, conclusions will be drawn *ex post* on the basis of the empirical results obtained. Accordingly, this research addressed the following third and final research question:

> ***RQ3****: Between the recognition path and the evaluative path, which path has the strongest explanatory power over the impact of past use of a category of branded apps (frequency and recency of use) on the continued use of individual branded apps from that category?*

Figure 1 presents the conceptual model, inclusive of all (direct and indirect) theoretical paths underpinning continued use of branded apps. The next section outlines the two empirical studies conducted to test (Study 1) and validate (Study 2) the model.

*** Insert Figure 1 about here

3. Study 1

3.1 Methodology

Data for Study 1 were collected via an online survey, distributed to a random sample of Australian consumers in collaboration with commercial providers of online market research services. The key conditions for taking part to the survey were the following: i) being 18 years of age or older; and ii) being a current user of portable devices powering apps (e.g., smartphone or tablet). The start of the survey informed respondents that they would be participating in a study investigating consumers' views and behaviors in relation to mobile apps. Afterwards, the survey presented participants with a series of questions designed to collect information to measure the study's main constructs including past and continued use of branded apps, app recognition and the evaluation of the app's benefits. Respondents (N=781) revealed a demographic profile well aligned with the average characteristics of Australian mobile users – i.e., respondents were distributed evenly across genders (49% male, 51% female) and age brackets (12% 18-24; 16% 25-34; 18% 35-44; 17% 45-54; 17.5% 55-54 and 19.5% more than 65yo).

3.1.1 Measures

All measures employed in this study were adapted from past research. First, in line Ehrenberg, Uncles & Goodhardt (2004), *past (or recent) use of three categories of branded apps* (i.e., social media apps, health and fitness apps, work and productivity apps) was measured by asking respondents whether they used any of these categories of apps over the past four weeks (dichotomous variable). Similarly, *frequency of use of certain categories of branded apps* was captured by tasking respondents to state the frequency of past usage of those categories of apps (e.g. 'All the time', 'Once a day', 'Once a week' etc.). Second, adapting Romaniuk et al.'s (2017) guidelines, *individual branded apps' unaided recognition* and *individual branded apps' aided recognition* were measured, respectively, via: i) analyzing and coding the open-end verbatim responses to questions such as: 'When thinking of social media apps, which is the first app that comes to your mind?' and 'Which other social media apps can you think of?' (i.e., second, third, fourth etc. mentioned app); and ii) asking respondents whether they recognized or not a certain branded app, upon showing to them the logos of nine examples of popular branded apps within each of the three categories considered (e.g., Facebook, Twitter, Instagram etc. for social media apps; Seven Minutes Workout, Calm, FitBit etc. for health and fitness apps, and so on). Third, *consumer evaluations of individual branded apps' utilitarian and hedonic benefits* were appraised for the same individual branded apps prompted in the measurement of aided awareness by adapting the measures of *ease of use* and *usefulness* (Byun et al., 2018; Veríssimo, 2018), and *practical relevance* (or interpersonal utility – see Stocchi et al., 2019). For hedonic benefits, this study adapted the measures of *self-enhancement* (or self-efficacy) from Zhu et al. 2017 and Scholz and Duffy (2018); *entertainment* from Gao et al. (2013) and van Noort and van Reijmersdal

(2019); and the *visual (or aesthetic) appeal/layout* of the app from Kumar et al. (2018). In doing so, as opposed to deploying complex multi-item measurements for each benefit, this study used 'pick-any' survey questions (see also Boivin, 1986; Driesener & Romaniuk, 2006) tasking respondents to indicate, for each individual branded app, whether they felt that the app had those benefits. Past research shows that this approach can lead to effective evaluations of the quantity and strength of the attributes that consumers associate with a certain brand, and the relative impact that these associations yield on consumer decisions (e.g., Romaniuk & Sharp, 2003; 2004). Finally, the present research inferred *continued use* of individual branded apps for the three categories of branded apps considered (same apps as the ones featuring in the other measurement items) by using an 11-points probability scale and by asking respondents to state the chance to continue using the app in the near future (adapted from Wright & MacRae, 2007).

3.2 Data Analysis

Following a similar approach to Fang (2017), this study used a two-steps approach to analyze the data. First, several tests were undertaken to establish the reliability and validity of the measures, and to evaluate the structural relationship amongst the latent constructs. Second, a formal empirical evaluation of the proposed conceptual model was carried out through partial least square structural equation modeling (PLS-SEM) (Hair, Ringle & Sarstedt, 2011), performed with SmartPLS 3 (Ringle, Wende & Will, 2005). In doing so, this study maintained minimal restrictions on measurement scales, sample size and residual distribution (Chin & Newsted, 1999). The data analysis also entailed controlling for the possible effect of respondents' age and gender.

3.2.1 Measurement Model

This study operationalized all research variables by aggregating the respective dichotomous values relating to each branded app across the three categories of apps considered, which resulted in three indicators corresponding to each latent construct. These constructs were treated as formative factors in the PLS model, due to the fact that the contributing indicators are not interchangeable; were assumed to be not correlated; and distributed to maximize the explained variance in the latent construct. The analysis then followed Hair, Hult, Ringle and Sarstedt (2016) approach to test the validity of these constructs – i.e., it entailed examining the constructs' VIF measures, outer weights (relative importance) and outer loadings (absolute importance). In terms of collinearity, Hair et al.'s (2016) guidelines suggest that the VIF measures must be higher than 0.20 and lower than 5. When an indicator's outer weight is significant (or if it is not significant yet the outer loading is high, i.e. exceeding 0.50), the indicator was retained for further analysis; otherwise, it was removed. Following this procedure, two indicators were removed (see Table 1). In addition, as the VIFs for the formative constructs were within the recommended threshold (see Diamantopoulos & Siguaw, 2006), it was concluded that multicollinearity did not represent a serious concern.

***Insert Table 1 about here

3.2.2 Hypotheses Testing

When examining the structural paths, this study focused on the R^2 scores of endogenous variables to ascertain the predictive power of the model, where all latent constructs

collectively explained 33% of the variance in continued app usage. The model also explained 23% of the variance in unaided awareness. However, in order to demonstrate the global quality of the structural PLS modeling, the analysis involved a blindfold approach, which revealed that the Q^2 values for all constructs were positive and yielded significant predictive relevance, except aided recognition (Q^2 = -0.002). This outcome led to the decision to remove aided recognition from further analysis.

Table 2 presents the results of all hypotheses testing. In terms of the effect of past usage of a certain category of branded apps (comprising of recent usage and usage frequency) on continued use of specific instances of branded apps from that category, results were significant, and supported H1a and H1b. The results concerning the theoretical links between recognition (unaided branded app awareness) and continued use of specific branded apps were also significant, thus supporting H2a. At the same time, the path analysis revealed that the links between utilitarian benefits (ease of use, usefulness and practical relevance) and continued use were not significant, leading to the rejection of H3a, H3b and H3c. Finally, with respect to the impact of hedonic benefits on continued use, self-enhancement and entertainment were influential (supporting H4a and H4b), while layout was not impactful (H4c was rejected).

***Insert Table 2 about here

In terms of the analysis of the mediation effects (see Table 3), the key findings were as follows. The total indirect effect from past usage of a certain category of branded apps (i.e., recency and frequency of past use) on continued use of specific instances of branded apps from that category was 0.122. Out of this, the recognition path represented a value of 0.076. Specifically, unaided recognition significantly mediates the

link between recent category usage and continued use, but fails to mediate the link between frequency of category use and continued use. In addition, to enhance the robustness of the conclusion derived, this study also entailed the appraisal of the serial mediation effects of unaided recognition and evaluative variables (see Table 3). These effects represent a third possible non-hypothesized path, whereby recent category usage and frequency of category use first impact unaided recognition; then impact ease of use, usefulness, practical relevance, self-enhancement, entertainment and layout, all of which influence continued use. However, the results did not highlight any significant serial mediation. Therefore, overall, in response to the first research question, it can be concluded that recognition of a branded app mediates the link between past usage of a certain category of branded apps and continued use of that specific branded app. Comparatively, the evaluative path explained a value of 0.046. More specifically, out of the utilitarian or hedonic benefits, only self-enhancement and entertainment mediated the link between recent category use and continued use. However, since the overall indirect effect (0.046) is significant, in response to the second research question, the consumer evaluation of the utilitarian and hedonic benefits that a certain branded apps offers mediates the link between past use of the category of branded apps and continued use of that specific app. Moreover, since the direct relationship between past category use and continued use was also significant, the mediation effects were partial. Finally, in response to the third research question, the recognition path explained the majority of the theoretical links underpinning the continued use of a branded app.

***Insert Table 3 about here

4. Study 2 (Validation Study)

4.1 Methodology

The present research also includes a second study conducted to validate the conceptual model tested in Study 1. In more detail, Study 2 is based on the analysis of a set of panel data collected in Italy from consumers regularly surveyed in relation to their habits and perceptions of digital technologies, including mobile apps. The key advantage of examining panel data lies in 'greater capacity for modeling the complexity of human behavior' (Hsiao, 2007, p.2). Additionally, the choice of a sample from another country allowed taking into account the views of consumers with different habits in relation to mobile apps usage (e.g., in terms of frequency and/or types of apps used); thus, it allowed competently validating the conceptual model in a different usage context. For example, according to Nielsen's reports (2013), the two countries vary in the usage of mobile for apps (e.g., Australia 59%, Italy 49%) and types of apps used, since more Australians (32%) use banking/finance apps compared to Italians (17%). Moreover, the usage of apps for news is higher in Italy (33%) than Australia (25%).

The sample consisted of 2,473 current users of digital technologies of 16 years of age and older. The respondents' demographic profile was consistent with the average Italian mobile user, as follows. Over half of the sample (56%) were males and, in terms of the distribution of age cohorts, 25% were between 25 and 34 years old; 22% between 16 and 18; 20% between 35 and 44; and 17% between 18 and 25.

4.2 Data Analysis

The approach used in Study 2 was consistent with Study 1, with two small exceptions, as follows. First, in light of the insignificant results obtained in Study 1, there was no

measure of individual branded apps' aided awareness. Second, although embracing the same three categories of branded apps (i.e., social media, health and fitness and work and productivity), the actual individual instances of branded apps considered were different, minus some overlap for a few very popular apps (e.g., Facebook, WhatsApp, Instagram etc.). This difference simply reflects dissimilarities in terms of which branded apps were popular at the times of data collection, and had no bearing on the evaluation of the conceptual model.

4.2.1 Measurement Model

Like Study 1, Study 2 utilized PLS-SEM (using SmartPLS3) to empirically evaluate the measurement model. By aggregating the respective dichotomous values for each construct, this study operationalized unaided recognition, recent category usage and frequency of category usage. As a result, these constructs were treated as observed variables. The other variables (ease of use, usefulness, practical relevance, entertainment, layout and continued use) were operationalized by aggregating the respective dichotomous values indicated by the respondents relating to each individual branded app across two groupings – i.e., free and paid apps. This resulted in two indicators corresponding to each latent construct, treated as formative factors. Following a similar approach to Study 1, this study then involved testing the validity of these formative constructs based on Hair et al. (2016). Table 4 shows that all indicators returned outer weights significant at 0.05 level, with corresponding outer loadings exceeding 0.6. Hence, all indicators were retained for further analysis. Moreover, in regard to the predictive power of the model, all latent constructs collectively explained 64% of the variance in continued use; however, the model only explained 5% of the

variance in unaided recognition. In addition, the Q^2 values for all constructs were positive, which indicates that the model yields significant predictive relevance.

***Insert Table 4 about here

4.2.2 Hypotheses Testing

Table 5 presents the results of Study 2. Similar to Study 1, the links between past usage of free and paid branded apps (comprising of recent usage and usage frequency) on continued use were significant (supporting H1a and H1b). Moreover, unaided branded app awareness exerted a positive influence on continued use (supporting H2a). With respect to the impact of utilitarian and hedonic benefits on continued use, the results supported most links, except for layout (supporting H3a, H3b, H3c, H4a and H4b).

***Insert Table 5 about here

The results of the mediation analysis (see Table 6) showed that out of the total indirect effect of past usage of a category of branded apps on continued use of individual instances of branded apps from that category (overall path coefficient = 0.140), the recognition path represented a value of 0.027. This outcome suggests that recognition of a branded app mediates the link between past usage of a certain type of branded apps (free and paid) and continued use of that specific branded app (positive answer to RQ1). In contrast, the evaluative path explained a value of 0.113. More specifically, most utilitarian and hedonic benefits mediated the impact of frequency of category use and recent category use on continued use, except layout. Therefore, in response to the

second research question, this study also returned a positive answer. Since the direct relationships between recency and frequency of past category use and continued use were significant, the mediation effects were partial. Finally, referring to the third research question, Study 2 revealed an opposite outcome than Study 1, since the evaluative path explained the majority of the theoretical mechanisms underpinning the continued use of a branded app. Nonetheless, to enhance the robustness of these conclusions, similar to Study 1, Study 2 also entailed testing the serial mediation effects combining both the recognition and the evaluative paths. The results (see Table 6) indicate that practical relevance (T stat. = 2.791), ease of use (T stat. = 2.398), usefulness (T stat. = 3.209) and entertainment (T stat. = 3.740) are significant mediators in the relationship between frequency of category usage and continued use, along with unaided awareness. This outcome suggests that in Study 2 it was possible to detect a third path that combines the recognition and evaluative paths, whereby a chain of mediation effects explains the link between past use of a category of branded apps indirectly impacts the continued use of specific instances of branded apps.

***Insert Table 6 about here

Considering the aims of this research, it seems reasonable to conclude that Study 2 validates the conceptual model presented in Study 1, offering good indication of possible generalizability. In fact, Study 1's main findings were reproduced in Study 2, amid revealing differences in terms of which path had the strongest bearing. Moreover, the identification of a significant serial mediation effect corroborates the importance of both paths in explaining what drives the continued use of branded mobile apps.

5. General Discussion

This research examined two underlying decision-making paths that shape the continued use of branded apps. Past research has omitted to examine a recognition-based mechanism, and has focused primarily on an evaluative path or decision-making mechanism based on apps' benefits, assumed to drive continued use of certain branded apps. This research extended this line of thought by modeling, empirically testing (Study 1) and validating (Study 2) both decision-making paths. The empirical results indicate that both mechanisms are key to understanding the continued use of branded apps, but varied strength. Namely, in Study 1 consumers' continued use of branded apps appeared to promulgate from unaided recognition of the app, which also mediated the impact of past usage and frequency of past usage in driving continued use of apps. Likewise, results pertaining to the evaluative path showed that the benefits that a branded app offers aided the continued use of that app, especially hedonic attributes relating to self-enhancement and entertainment. This suggests that consumers are more likely to continue using apps that facilitate self-enhancement (e.g., social media apps that are aspirational, such as Instagram) and entertaining apps (e.g., health and fitness apps with an element of gamification or competition).

Study 2 validated the conceptual model, corroborating that both paths directly impact the continued use of branded apps, and mediate the relationship between past usage and continued use. Importantly Study 2's results suggest that unaided recognition shapes the continued used of a branded app, while most aspects of the evaluative decision-making path (utilitarian and hedonic) are important in directly driving the extent to which consumers will continue to use a certain branded app. This further indicates that consumers may continue using branded apps that 'come to mind' thanks

to being associated to salient benefits such as ease of use, usefulness, practical relevance, self-enhancement and entertainment. Furthermore, to enhance the robustness of the conclusions derived, this research also included the additional verification of the combination of the two paths leading to the continued use of branded apps. The serial mediation analysis was significant only in Study 2; however, on the basis of this outcome, it is reasonable to conclude that the recognition-path and the evaluation-path are warrant separate appraisal. Doing so extends the current understanding of plausible cognitive and psychological mechanisms that characterize the decision-making leading to the continued use of branded apps.

Comprehensively, the results summarized so far yield novel theoretical and practical contributions, as follows.

5.1 Theoretical and Managerial Contributions

The theoretical contribution that this research made is twofold and advances current knowledge of what drives the continued use of apps. First, this research added to the line of enquiry that has attempted to empirically evaluate continued use, going beyond the decision-making processes inherent to technology acceptance and initial use, which is a necessity for moving forward mobile apps research (see also McLean, Osei-Frimpong, Al-Nabhani & Marriott, 2020). In particular, this research conceptualized and empirically tested two important cognitive psychological mechanisms inherent to the consumer decision-making process leading to the continued use of branded apps, extending the conceptual lens beyond benefits sought. It also revealed that these important cognitive and psychological mechanisms are configured as two distinct paths, both worth examining. Specifically, although both paths originate from past behavior (recency and frequency of use of the category of branded apps), this research

highlighted that they can each have a bearing in leading to continued use: on occasion, past behavior becomes reinforced by recognition and is sufficient to entice continued use; on other occasions, past behavior is followed by an evaluation of the app's value vis-à-vis the benefits that the consumer seeks in order to continue using the app. Second, a key original aspect that further distinguishes the present research from extant knowledge concerns the basic mechanism that characterizes the continued use of branded apps, linking past and future behavior with consumer evaluations of branded apps' benefits. As shown, this is a simple recognition-based stimulation, akin to the recognition heuristic model (Gigerenzer & Goldstein, 2011). To the best of the authors' knowledge this has not been previously combined and compared in extant research on mobile apps. However, by shedding light on this aspect, this research has advanced the scholarly understanding of the effects of branding mobile apps, which is comparatively much more confined than knowledge of the effects of branding via apps. This is important, given that authors such as Picoto, Duarte and Pinto (2019) have called for more research that identifies different 'routes' to apps success, beyond sales ranks.

In addition to the above, the results of the two studies presented also yielded two important practical implications. Given that market survival for apps is becoming a real challenge and the pressure for monetization is high, there is a need to understand how managers and mobile app developers can drive continued use of branded apps. In this regard, the outcomes of this research suggest that managers and app developers can drive the continued use of apps by enhancing an app's spontaneous (or unaided) recognition, since it directly influences the continued use of branded apps and mediates the relationship between past usage of a category of branded apps and continued use of apps from that category. This mechanism has the potential to override consumers' evaluations of the app's benefits; thus, it represents an alternative strategy to drive the

use of their branded apps. For example, managers and app developers could encourage app recognition via advertising the app (e.g., via other apps, on social media, in the app store, online, in-print etc.). In fact, although attaining awareness for apps can be challenging (Picoto et al., 2019), advertising an app is documented to be instrumental to the effectiveness of monetization strategies (Dinsmore et al., 2017).

The results of this research further suggest that the benefits that an app offers should be taken into consideration as they too, albeit to a lesser extent, shape continued use. Above all, it seems very important to convey the app's benefits via *ad hoc* market positioning strategies, especially hedonic attributes such as self-enhancement and entertaining potential. Doing so has the potential to enhance the chance that a branded app will 'come to mind' and will be positively evaluated for continued use, thanks to being associated to salient benefits sought that add to the underlying feedback-effect from past usage. For example, fast food chains like McDonald's have positioned their branded apps in relation to a mixture of instant gratification (discount and free food) and entertainment or gamification. These aspects are conveyed through the design, look and feel of the app, and through the promotion of the app, which notoriously hinges on claims like 'Hungry for offers' and 'Play to win'. Combined, these practical implications corroborate the importance of branding apps and of considering different determinants of app's market performance (and survival) (see also Picoto et al., 2019).

5.2 Limitations and Future Research Directions

Like any other research, the present work is not free of limitations. For example, in examining the recognition path, this research assumed that the brand attached to the app works as heuristic; future studies may want to consider the role of other cues, such as the app's price. At the same time, although this research controlled for age and

gender, future works may wish to take into further account other individual level variables. For instance, there is scope for future replications of this research by taking into accounts individual variables that could be linked to consumer evaluations of mobile apps, such as personality traits (see Dinsmore et al., 2016; 2017), or user experience and motivations (see Stocchi et al., 2018). Indeed, different motives may shape the continued use of branded apps for self-expression and entertainment purposes – two benefits likely to be salient in on-going decisions.

Future studies could also consider additional outcomes beyond continued use (e.g., in-app spending, E-WOM and satisfaction with the app). By doing so, there could be scope for more clearly delineating between the adoption and usage phases, especially if employing longitudinal analyses (see McLean et al., 2020). Lastly, to validate the proposed conceptual model, Study 2 used data from a different country than Study 1. While this presents a different context (e.g., in terms of frequency of apps use, and types of apps used), further research might replicate the analysis with data from other countries, perhaps also considering the role of culture.

Tables

Table 1. Study 1: Results of assessing the validity of formative constructs

	VIF	*Outer weights*	*P Values*	*Outer loadings*	*Decision*
Past (recent) use category 1	1.187	0.812	0.000	0.948	Retained
Past (recent) use category 2	1.077	0.102	0.088	0.359	Removed
Past (recent) use category 3	1.159	0.312	0.000	0.620	Retained
Frequency of use category 1	1.015	0.877	0.001	0.923	Retained
Frequency of use category 2	1.061	0.317	0.211	0.439	Retained
Frequency of use category 3	1.06	0.162	0.615	0.314	Removed
Unaided awareness categ 1	1.183	0.737	0.000	0.912	Retained
Unaided awareness categ 2	1.12	0.331	0.000	0.598	Retained
Unaided awareness categ 3	1.067	0.269	0.000	0.485	Retained
Aided awareness category 1	4.396	-1.742	0.262	-0.181	Removed
Aided awareness category 2	2.378	1.240	0.261	0.472	Retained
Aided awareness category 3	4.029	0.741	0.304	0.134	Removed
Ease of use category 1	1.46	0.961	0.000	0.997	Retained
Ease of use category 2	1.347	-0.040	0.704	0.381	Removed
Ease of use category 3	1.618	0.095	0.393	0.597	Retained
Usefulness category 1	1.296	0.811	0.000	0.917	Retained
Usefulness category 2	1.374	-0.068	0.493	0.468	Retained
Usefulness category 3	1.215	0.434	0.000	0.664	Retained
Practical relevance categ 1	1.235	0.725	0.000	0.912	Retained
Practical relevance categ 2	1.258	0.095	0.399	0.509	Retained
Practical relevance categ 3	1.292	0.404	0.003	0.718	Retained
Self-enhancement categ 1	1.316	0.480	0.001	0.799	Retained
Self-enhancement categ 2	1.629	0.194	0.264	0.727	Retained
Self-enhancement categ 3	1.593	0.549	0.000	0.866	Retained
Entertainment category 1	1.269	0.943	0.000	0.992	Retained
Entertainment category 2	1.482	0.147	0.186	0.527	Retained
Entertainment category 3	1.418	-0.034	0.764	0.395	Removed
Layout category 1	1.497	0.905	0.000	0.991	Retained
Layout category 2	1.77	-0.003	0.985	0.547	Retained
Layout category 3	1.892	0.162	0.293	0.650	Retained
Continued use category 1	1.96	0.692	0.000	0.953	Retained
Continued use category 2	2.022	0.382	0.000	0.841	Retained
Continued use category 3	1.993	0.026	0.809	0.710	Retained

Table 2 – Study 1: Analysis of the direct effects

Direct theoretical links		Path Coef.	Std. Dev.	T Statistic	P-Value
H1a	Recent category usage -> Continued use	0.130	0.040	3.229	0.001**
H1b	Frequency of category usage -> Continued use	-0.086	0.045	1.930	0.054*
H2a	Unaided branded app awareness -> Continued use	0.192	0.036	5.271	0.000**
H2b	Aided branded app awareness -> Continued use	*Not tested*			
H3a	Ease of use -> Continued use	-0.029	0.045	0.651	0.515
H3b	Usefulness -> Continued use	0.041	0.046	0.882	0.378
H3c	Practical relevance -> Continued use	-0.057	0.047	1.214	0.225
H4a	Self-enhancement -> Continued use	0.095	0.050	1.909	0.056*
H4b	Entertainment -> Continued use	0.084	0.044	1.928	0.054*
H4c	Layout -> Continued use	0.034	0.050	0.683	0.494

Note: **significant at 0.05 level * significant at 0.10 level

Table 3 – Study 1: Analysis of the indirect effects

Indirect theoretical links	Path Coef.	Std. Dev.	T Statistics	P Values
Frequency of category usage -> Unaided branded app awareness -> Continued use	-0.013	0.009	1.508	0.132
Recent category usage -> Unaided branded app awareness -> Continued use	0.089	0.018	4.957	0.000**
Recent category usage -> Ease of use -> Continued use	-0.015	0.023	0.648	0.517
Recent category usage -> Usefulness -> Continued use	0.018	0.021	0.871	0.384
Recent category usage -> Practical relevance -> Continued use	-0.023	0.019	1.212	0.226
Recent category usage -> Self-enhancement -> Continued use	0.025	0.014	1.794	0.073*
Recent category usage -> Entertainment -> Continued use	0.036	0.019	1.894	0.058*
Recent category usage -> Layout -> Continued use	0.013	0.019	0.669	0.504
Frequency of category usage -> Ease of use -> Continued use	0.000	0.002	0.168	0.867
Frequency of category usage -> Usefulness -> Continued use	0.001	0.003	0.468	0.640
Frequency of category usage -> Practical relevance -> Continued use	-0.003	0.003	0.744	0.457
Frequency of category usage -> Self-enhancement -> Continued use	-0.001	0.006	0.192	0.848
Frequency of category usage -> Entertainment -> Continued use	-0.004	0.004	0.891	0.373
Frequency of category usage -> Layout -> Continued use	-0.001	0.004	0.200	0.842
Frequency of category usage -> Unaided branded app awareness -> Ease of use -> Continued use	0.000	0.001	0.416	0.677
Recent category usage -> Unaided branded app awareness -> Ease of use -> Continued use	-0.003	0.004	0.584	0.559
Frequency of category usage -> Unaided branded app awareness -> Entertainment -> Continued use	-0.001	0.001	0.842	0.400
Recent category usage -> Unaided branded app awareness -> Entertainment -> Continued use	0.006	0.004	1.615	0.106
Frequency of category usage -> Unaided branded app awareness -> Layout -> Continued use	0.000	0.000	0.428	0.668
Recent category usage -> Unaided branded app awareness -> Layout -> Continued use	0.001	0.002	0.636	0.525
Frequency of category usage -> Unaided branded app awareness -> Practical Relevance -> Continued use	0.000	0.001	0.669	0.504

Recent category usage -> Unaided branded app awareness -> Practical Relevance -> Continued use	-0.003	0.003	1.058	0.290
Frequency of category usage -> Unaided branded app awareness -> Self-enhancement -> Continued use	0.000	0.000	0.311	0.756
Recent category usage -> Unaided branded app awareness -> Self-enhancement -> Continued use	0.001	0.002	0.410	0.682
Frequency of category usage -> Unaided branded app awareness -> Usefulness -> Continued use	0.000	0.000	0.519	0.604
Recent category usage -> Unaided branded app awareness -> Usefulness -> Continued use	0.002	0.003	0.805	0.421

Note: **significant at 0.05 level * significant at 0.10 level

Table 4. Study 2: Results of assessing the validity of formative constructs

	VIF	*Outer weights*	*P Values*	*Outer loadings*	*Decision*
Continued use (free apps)	1.201	0.457	0.000	0.752	Retained
Continued use (paid apps)	1.201	0.722	0.000	0.909	Retained
Ease of use (free apps)	1.032	0.332	0.000	0.489	Retained
Ease of use (paid apps)	1.032	0.887	0.000	0.945	Retained
Usefulness (free apps)	1.028	0.394	0.000	0.535	Retained
Usefulness (paid apps)	1.028	0.857	0.000	0.921	Retained
Practical relevance (free apps)	1.085	0.326	0.000	0.566	Retained
Practical relevance (paid apps)	1.085	0.859	0.000	0.950	Retained
Entertainment (free apps)	1.063	0.425	0.000	0.621	Retained
Entertainment (paid apps)	1.063	0.808	0.000	0.911	Retained
Layout (free apps)	1.103	0.369	0.000	0.621	Retained
Layout (paid apps)	1.103	0.823	0.000	0.936	Retained

Note: **significant at 0.05 level * significant at 0.10 level

Table 5 – Study 2: Analysis of the direct effects

Direct theoretical links		**Path Coef.**	**Std. Dev.**	**T Statistic**	**P-Value**
H1a	Recent category usage -> Continued use	0.285	0.034	8.308	0.000**
H1b	Frequency of category usage -> Continued use	-0.056	0.012	4.748	0.000**
H2a	Unaided branded app awareness -> Continued use	0.120	0.019	6.455	0.000**
H2b	Aided branded app awareness -> Continued use	*Not tested*			
H3a	Ease of use -> Continued use	0.151	0.034	4.392	0.000**
H3b	Usefulness -> Continued use	0.270	0.029	9.178	0.000**
H3c	Practical relevance -> Continued use	0.121	0.027	4.482	0.000**
H4a	Self-enhancement -> Continued use	*Not tested*			
H4b	Entertainment -> Continued use	0.145	0.025	5.734	0.000**
H4c	Layout -> Continued use	-0.023	0.029	0.793	0.428

Note: **significant at 0.05 level * significant at 0.10 level

Table 6 – Study 2: Analysis of the indirect effects

Indirect theoretical links	Path Coef.	Std. Dev.	T Statistics	P Values
Frequency of category usage -> Unaided branded app awareness -> Continued use	0.000	0.002	0.129	0.897
Recent category usage -> Unaided branded app awareness -> Continued use	0.027	0.006	4.319	0.000**
Frequency of category usage -> Ease of use -> Continued use	0.039	0.009	4.319	0.000**
Frequency of category usage -> Usefulness -> Continued use	0.092	0.012	7.609	0.000**
Frequency of category usage -> Practical relevance -> Continued use	0.030	0.007	4.138	0.000**
Frequency of category usage -> Entertainment -> Continued use	0.040	0.007	5.402	0.000**
Frequency of category usage -> Layout -> Continued use	-0.006	0.007	0.790	0.430
Recent category usage -> Ease of use -> Continued use	-0.016	0.005	3.220	0.000**
Recent category usage -> Usefulness -> Continued use	-0.042	0.007	5.742	0.000**
Recent category usage -> Practical relevance -> Continued use	-0.012	0.004	3.184	0.000**
Recent category usage -> Entertainment -> Continued use	-0.015	0.004	3.883	0.000**
Recent category usage -> Layout -> Continued use	0.003	0.004	0.786	0.432
Frequency of category usage -> Unaided branded app awareness -> Practical relevance -> Continued use	0.000	0.000	0.123	0.902
Recent category usage -> Unaided branded app awareness -> Practical relevance -> Continued use	0.003	0.001	2.791	0.005**
Frequency of category usage -> Unaided branded app awareness -> Ease of use -> Continued use	0.000	0.000	0.117	0.907
Recent category usage -> Unaided branded app awareness -> Ease of use -> Continued use	0.003	0.001	2.398	0.017**
Frequency of category usage -> Unaided branded app awareness -> entertainment -> Continued use	0.000	0.000	0.126	0.900
Recent category usage -> Unaided branded app awareness -> Entertainment -> Continued use	0.004	0.001	3.209	0.001**
Frequency of category usage -> Unaided branded app awareness -> Layout -> Continued use	0.000	0.000	0.084	0.933
Recent category usage -> Unaided branded app awareness -> Layout -> Continued use	-0.001	0.001	0.762	0.446
Frequency of category usage -> Unaided branded app awareness -> Usefulness -> Continued use	0.000	0.001	0.126	0.900
Recent category usage -> Unaided branded app awareness -> Usefulness -> Continued use	0.007	0.002	3.740	0.000**

Note: **significant at 0.05 level * significant at 0.10 level

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Figures Legend

Figure 1 - Proposed Conceptual Model