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Drivers and Outcomes of Branded Mobile App Usage Intention

Abstract

Purpose: This study examines the drivers and outcomes of the usage intention of branded mobile applications (apps), revealing findings of theoretical and practical relevance. First, it uncovers the specific technological features that underpin the perceived usefulness and ease of use of branded apps driving (directly and indirectly) usage intention. Second, it outlines two key outcomes that are relevant to the strategic management of branded apps: willingness to recommend the app and willingness to pay to continue using the app.

Approach: This study uses data randomly derived from a panel of one million UK consumers, analyzed via structural equations modeling. The unit of analysis was individual apps prominently displaying a brand identity. The study tested indirect relationships between the key drivers considered and usage intention, via perceived usefulness and ease of use.

Findings: Consumers who view branded apps as protecting their privacy, customizable and compatible with what they do, will have stronger perceptions of usefulness and ease of use, and greater intention to use the app. These effects also occur indirectly. Furthermore, usage intention drives the willingness to recommend the app and to pay to continue using it.

Practical implications: To influence usage intention, managers can improve the perception of usefulness of branded apps by protecting consumer privacy, and improving the app's design and its compatibility with people's needs and lifestyle. Managers can also enhance the perception of ease of use of the branded app by heightening its security and ubiquity. Combined, these factors can enhance (directly and indirectly) the intention to use the app, which will lead to the willingness to recommend the app and pay for it.

Originality/value: This study extends previous research by examining factors driving the intention to use branded apps and the resulting outcomes. It also offers a model that yields predictions for individual branded apps (not the brand powering the app), thus providing practical recommendations on how to manage, in general, apps with a brand identity.

Keywords: *Branded Mobile Applications, Technology Adoption, Post-Adoption Outcomes, Mobile Marketing.*

1. Introduction

Mobile applications (thereafter *apps*) play a vital role in supporting consumer acceptance and use of mobile technologies (Tojib and Tsarenko, 2012). Apps also provide organizations with countless opportunities for establishing relationships with customers, which is in line with Sultan and Rohm's (2005) original definition of apps as "brands in the hand". More recently, Taivalsaari and Mikkonen (2015) describe the "brandification" of apps as the process of substituting the more simplistic functions available on mobile devices, such as messaging, camera and music players with custom-build apps. Such apps often become commercially popular either as standalone offers (see the example of the Spotify app for music streaming), or as extensions of existing offline brands (e.g., the Facebook app). For example, Newman, Wachter and White (2017) highlight that many retailers have the chance to reacquire or reinforce their competitive advantages through apps, especially if they are able to deliver value to consumers across multiple 'touch-points' – i.e., via ensuring that apps complement and extend physical and virtual channels. While there is still quite a long-way before apps will result in the demise of Web as a software platform, the prominence of apps in present day business ecosystems is undeniable.

Unsurprisingly, as Kim and Yu (2016) highlight, the use of branded apps as mobile communication marketing tools is increasingly common among many corporations. This strategic shift seems justified, at least in part, by the documented effect that branded apps have in relation to brand loyalty and purchase intention. In fact, branded apps are an attractive marketing tool for engaging consumers and interacting with them in a manner that has clearly surpassed the opportunities that the traditional web format can offer. However, with 3.8 million apps currently available to consumers via the Google Play Store (Statista, 2018), managers need to know which

factors can be leveraged to encourage consumers to use branded apps, and the potential outcomes of adoption that can yield concrete economic returns. Also, as Ahmed *et al*. (2016) mention, consumers download on average approximately 40 apps, but regularly use a mere 15 or fewer, with only some of them branded. This is because consumers spend half of their time using only about three favorite apps. In fact, Tarute, Nikou and Gautis (2017) remark that although the number of apps available to consumers continue to increase margins remain relatively low, possibly due to not focusing sufficiently on meeting the evolving needs of technology users. Therefore, as Bellman *et al*. (2013) highlight, the most prominent challenge for branded apps is to remain in the short-list of apps that consumers continue to use, because of their particular usefulness. Accordingly, more insights concerning branded apps are needed for businesses to make informed strategic decisions when planning the introduction of an app linked to an existing offer *or* the launch of a new branded app – e.g., to start a new business venture (see also Stocchi et al., 2017). The need for more insights concerning branded apps is also highlighted in other recent works such as Tarute *et al.* (2017) and Newman *et al.* (2017), where it is implied that although research efforts have intensified the understanding of cause and effects relationships is still rather limited.

Existing research in the mobile context can be categorized into works discovering drivers of technology adoption vs. works examining post-adoption outcomes (Nysveen *et al*., 2015). Research on adoption has been significant, although it has primarily concerned the uptake of mobile technology in general and/or specific instances of mobile technologies, such as mobile data services, mobile payments, mobile marketing and, of course, mobile apps. Importantly, as Alnawas and Aburub (2016) remark, many scholars have drawn upon the Technology Acceptance Model (Davies *et al*., 1989) to understand how and why consumers adopt apps. This

strand of research has consistently highlighted that *perceived usefulness* and *ease of use* are the key drivers of attitudes, intention to use, and actual use of mobile apps (see Kim, Yoon and Han, 2016; Tojib and Tsarenko, 2012; Yang, 2013). However, these aspects have not been explored in relation to *branded apps*, i.e. apps clearly showing a brand identity (Bellman *et al*., 2011). Moreover, drivers of adoption are often understood in relation to the brand or organisation powering the app (e.g., Chen *et al*., 2012; Chong, 2013; Cyr, Head and Ivanov, 2006), rather than for the app itself.

At the same time, existing frameworks have failed to consider important outcomes, such as satisfaction and purchase intentions, and have focused too narrowly on predicting the intentions to use the app or to continue using the app. Other outcomes beyond acceptance, such as engagement, are not fully understood. In contrast, research on post-adoption have focused on the factors that motivate consumers to continue to use the technology, and have extended the confines of the TAM model by combining it with other theoretical bases (e.g., motivation theory and expectancy theory). For example, Yang (2016) considers brand attachment and self-congruence theory, while Kim, Ling and Sung (2013), Wu (2015), and Wang, Kim and Malthouse (2016) draw on brand engagement theory. As a result, to date, there is no framework comprehensively explaining the drivers and outcomes of branded app usage intention.

Furthermore, findings of studies that examine the effectiveness of branded apps as advertising medium (c.f. Bellman *et al*., 2011) confirm the need to understand more about the drivers and consequences of branded apps usage. Finally, as Morosan and DeFranco (2016) suggest, the understanding of mechanisms that characterize consumer interactions with branded apps is becoming increasingly difficult, given that consumer–firm interactions occur seamlessly

and simultaneously across multiple channels. This is one of the reasons why scholars have been called to intensify research efforts examining branded apps.

In light of the above, understanding of the full potential of branded apps from a strategic marketing perspective clearly comes across as an underexplored issue of theoretical and practical relevance for a number of reasons. Above all, branded apps can deliver important outcomes that can yield economic returns – e.g., in the form of positive attitudes, purchase intentions, advertising response and consumer engagement (Seitz and Aldebasi, 2016; Yang, 2016). Furthermore, branded apps represent tools that firms can use to establish new connections with customers and to reinforce existing ones, creating unique customer experiences (Kim, Lin and Sung, 2013; Peng, Chen and Wen, 2014). Moreover, branded apps differ to some extent from other mobile technologies, given the considerable potential for consumer engagement and interconnectivity (e.g., Seitz and Aldebasi, 2016; Yu, 2013).

The present study contributes to existing knowledge of consumers' adoption of branded apps, focusing on technology-specific characteristics of mobile apps such as privacy, security, design characteristics, ubiquity, and compatibility as antecedents of perceived usefulness and ease of use. At the same time, it examines outcomes such as word-of-mouth (WOM) recommendation and willingness to pay for extra app features. Lastly, this study also considers indirect connections between these factors (mediation) to further enhance the understanding of the drivers and outcomes of branded app usage intention. These insights emerge from the analysis of a set of consumer panel data gathered in the UK featuring demographic information, consumer perceptions and other relevant information (e.g., intention to use, willingness to pay for the app, and willingness to recommend). The result is a robust framework that generates predictions for individual branded apps, as opposed to the brand powering the app. The

framework offers insights that are applicable to two important scenarios: i) instances of existing brands wanting to launch an app to communicate with their customers and engage them; and ii) instances of branded apps being offered and marketed to consumers as standalone offers. Accordingly, this study delivers a range of practical outcomes that offer some guidance to managerial tactics in the mobile context, especially in relation to determining product and brand management strategies that, when applied to apps, can yield economic returns.

2. Background

2.1 Existing Research on Branded Apps

Bellman *et al*. (2011) define *branded apps* as mobile apps prominently displaying a brand identity. Such apps retain the baseline technological features of mobile apps in general, while functioning also as advertising medium (see Bellman *et al*., 2011), especially in the instance of branded apps linked to an existing brand (e.g., the Facebook app). Branded apps may also compete in the marketplace as standalone offers, if inherently branded via a logo or other branded elements (e.g., color or trademark) and not linked to any existing brand (e.g., the Candy Crush Saga app; see Stocchi *et al*., 2017).

Several researchers have argued that branded apps differ from the more generic domain of mobile services and warrant separate research. Ahmed *et al*. (2016) argue that branded apps differ from other facets of mobile marketing because they are most effective at engaging consumers and facilitating brand-driven communication. Just like traditional advertising, branded apps are often impersonal and sponsored forms of communication aimed at persuasion. However, unlike traditional advertising, branded apps are ideal for interactive, controlled and

highly personalized communication, whereby the consumer becomes much more actively engaged (see also Bellman *et al*., 2011). In fact, as Kim, Lin and Sung (2013) explain, branded apps can facilitate engagement thanks to their vividness and novelty. Branded apps can also motivate consumers, thanks to features that enable control, customization and feedback mechanisms, across multiple platforms. For these reasons, as an advertising medium, apps can be highly influential (see also Calder *et al*., 2009).

According to Seitz and Aldebasi (2016), branded apps enable firms to communicate, interact and deliver messages to consumers. *Interactivity* is particularly important, as it is crucial to brand-related outcomes, such as: i) the establishment of positive attitudes towards the brand and the enhancement of purchase intention (Yu, 2013), ii) the reinforcement of relational dimensions of brand equity (Hoogendoorn, 2013), and iii) bolstering advertising response and persuasion (Bellman *et al*., 2011). Yang (2016) argues that branded apps offer a closer connection with the brand through hand-held devices embedded in consumers' lives, such as smart phones and tablets, increasing the familiarity and accessibility of brands, and offering multiple experiences to consumers. These factors, combined, ultimately result in brand attachment, and reinforce consumer-brand relationships through *engagement* and the establishment of emotional connections. Importantly, Yang (2016) elaborates that these outcomes may be obtained through the fulfillment of affective needs and self-identification. Accordingly, branded apps can create new bonds between brands and consumers, and reinforce existing relationships (Peng, Chen and Wen, 2014); they also provide unique experiences associated with the brand (Kim, Lin and Sung, 2013). In a similar vein, Jin (2016) argues that the role of branded apps has evolved beyond the provision of information and the promotion of goods and services. Namely, branded apps are often entrenched in people's lifestyle to the point

of delivering *unique brand experiences* that strengthen the connection between consumers and brands through instantaneous interactions. In light of such an enhanced role, Jin concludes that it is imperative to determine the drivers of branded apps' effectiveness.

Bellman *et al*. (2013) present some additional reflections on the importance of branded apps as advertising medium. For example, the authors highlight that branded apps favour '*pull*' *advertising strategies* and by-pass the need for opt-in permission marketing, since technically consumers access apps on their own initiative. Furthermore, branded apps provide firms with the advantage of tailored marketing, through localized and personalised information. Bellman and colleagues therefore conclude that branded apps can enhance persuasion by means of facilitating the processing of brand-related information and strengthening consumer-to-brand interactions.

The unique characteristics of branded apps described thus far add to the widely accepted belief that mobile apps, in general, create a realm of opportunities beyond the scope of the traditional mobile marketing strategies (Kim, Yoon and Han, 2014). Specifically, mobile apps have transformed the way firms communicate to consumers (Racherla *et al*., 2012) by offering personalized content that facilitates consumer engagement (Watson *et al*., 2013). As such, apps are a powerful strategic marketing tool that can generate cross-channel synergies alongside other digital advertising media, web advertisement, search-engine optimization and emails (Wang, Kim and Malthouse, 2016). Above all, since they are heavily embedded into consumers' lives, apps can achieve "what other channels cannot", such as: i) actively prompting context-dependent brand recall on a frequent basis, ii) altering the way consumers access a brand's offering by means of integration in existing routines such as repeat purchasing, and iii) triggering new consumption habits and/or reinforcing behavior.

In general, however, literature specifically examining branded apps is seriously limited (see Table 1), especially in comparison to the vast array of studies considering mobile technologies as a whole and even in comparison to research focused on mobile apps as specific instance of mobile digital technology.

Empirical research that has focused on the adoption of branded apps includes Peng *et al.* (2014). Extending the line of thought of Bellman *et al.*'s (2011) work, Peng and colleagues (2014) examine how branded apps might reinforce the pre-existing relationship between consumers and the brand powering the apps via the provision of additional stimuli and touch-points. The authors study the factors that drive the adoption of a branded app (intention to use) from the perspectives of brand relationship and consumption values, using a different theoretical basis to the widely accepted Technology Acceptance Model (TAM) (see Legris *et al.*, 2003; Porter and Donthu, 2006; Venkatesh *et al.*, 2007). Later on, Seitz and Aldebasi (2016) research consumer attitudes towards branded apps, and the relative influence on purchase intentions and usage. However, Seitz and Aldebasi's (2016) work is based on a very small student sample and their outcome variable relates to the brand providing the app, not to the app itself. Jin (2016) considers the brand powering the app as well as the branded app itself, and sheds light on some interesting dynamics. For example, branded apps often offer both cognitive and behavioral experiences. The cognitive side is fulfilled by the provision of information and knowledge about the brand powering the app and its products or services, and the behavioral side is often addressed via rich sensory experiences offered virtually. Yet, Jin's results are based on the analysis of only two branded apps, which limits significantly the scope of the implications drawn.

Empirical research examining post-adoption behavior and focusing on branded apps is relatively more substantial. However, it utilizes more disparate theoretical bases that differ substantially from the core body of research examining technology adoption through the TAM. Yang's (2016) study is a partial exception and seems to be the only work concerned with understanding the post-adoption of branded apps by extending the TAM framework through the inclusion of theoretical relationships concerning brand attachment and self-congruence. However, like Bellman *et al*. (2011) and Seitz and Aldebasi (2016), the dependent variable that Yang (2016) uses related to the brand offering the app, not to the app. Similarly, Natarajan, Balasubramanian and Kasilingam (2017) also draw upon the TAM framework to explore post-adoption matters, but focus exclusively on mobile commerce apps linked to retailers and do not clarify whether they focused on specific branded apps as opposed to apps as a whole. Their findings were also limited to one specific context (India), whereby the uptake of technology has experienced abnormal growth rates.

Morosan and DeFranco (2015, 2016) explore the value of branded apps in the context of the hospitality industry and in relation to the likely marketing functions that apps can satisfy such as advertising, distribution, CRM and so forth. These authors argue that the key rationale for hotel brands to deploy apps is the need to: i) simplify and enhance the interactions with customers and ii) acquire and manage rich information about customers. These two factors, combined, can result in the provision of a broad range of ancillary services that are also uniquely personalised and superior in quality. Yet, Morosan and DeFranco recognise that little is known in relation to what motivates consumers to share their information in exchange for personalised services that may not be entirely clear to them prior to usage. Accordingly, they focus on this particular issue and do not examine other aspects of post-adoption of branded apps. In a similar

vein, Veríssimo (2018) focuses exclusively on health-related apps (supposedly branded) and the likely effectiveness that they can have in relation to leading to better clinical decision-making, via enhancing app usage intensity.

Kim, Wang and Malthouse (2015) test empirically whether using a branded app can actually increase spending in relation to the brand powering the app, in light of rather stable pre-adoption spending patterns. However, their analysis is based on the case of one single app and post-adoption was captured within the customer base of a loyalty program; hence, their results might not be generalizable to different consumer segments and/or other branded apps.

Tarute *et al.* (2017) focus on the likely effects of consumer engagement on continued use intention for branded apps, albeit considering only a limited set of characteristics that apps might have (e.g., design and quality of the information provided) and asking research participants to think of one specific app that they routinely use, without specifying whether it had to be branded or not. In contrast, Wu (2015) presents a formalized model of customer engagement with branded apps and identifies performance expectancy (underpinned by the relationship between perceived interactivity and effort expectancy), social influence and brand identification as key drivers of continue use intention. Similarly, Alnawas and Aburub (2016) evaluate the benefits (learning, social integrative, personal integrative and hedonic) resulting from consumer interactions with branded apps – i.e., in terms of customer satisfaction and purchase intentions. Accordingly, they claim that their findings corroborate the assumption that it is essential to consider the primary motives and benefits likely to drive the use of branded apps and what consumers do with the app. Kim and Yu (2016) examine the effects of the holistic experiences that branded apps offer when it comes to fostering the relationship between consumers and brands. They draw upon a different conceptual background (i.e., brand experience theory) and by

taking into account consumer involvement. They found that affective, cognitive, behavioral and relational experiences have a significant impact on brand loyalty, moderated by involvement. Crucially, however, Wu (2015), Alnawas and Aburub (2016) and Kim and Yu (2016) offer conclusions exclusively in relation to the brand offering the app, not to the branded app itself. As mentioned earlier, this limits the scope of the implications of the results, given that many branded apps available to consumers are not necessarily linked to existing brands.

In contrast, Ahmed *et al*. (2016) and Fang (2017) focus on both the brand powering the app as well as on the branded app itself. In more detail, Ahmed *et al*. (2016) show that attitudes towards the branded app are the strongest driver of app effectiveness (captured in terms of intention to use the branded app and purchase intentions), especially directly. Accordingly, they conclude that marketers should constantly strive to improve the characteristics of the app in order to improve consumer attitudes and purchase intentions. At the same time, brand-related information should not be neglected, because it drives consumer attitudes towards the brand powering the app, which also feed into the intention to use the branded app and purchase intentions. Fang (2017) explores how the potential for consumer engagement of branded apps influences repurchase-intention for the brand powering the app and the intention to continue using the app. Although thoroughly discussed and well justified, Fang's results were effectively based only on two branded apps. In contrast, Stocchi *et al*. (2017) examine a large number of branded apps, including free and paid ones, and including apps linked to existing brands as well as standalone apps. However, they focus on a different theoretical and practical aspect, studying the relationship between app usage and app image.

Research specifically focused on branded apps also includes three conceptual studies. For example, Kim, Ling and Sung (2013) discuss on-going engagement with branded apps and

identify a number of app characteristics likely to drive the desire to "proceed to the next level" from a consumer perspective (i.e., vividness, novelty, motivation, control, customization, feedback, multi-platforming, and resonance). Zhao and Balagué (2015) present a series of assumptions concerning objectives and features that branded apps should have in order to maximize outcomes. Wang, Kim and Malthouse (2016) present a systematic literature review, but do not include any empirical result.

*** Insert Table 1 about here

In light of the above, further research is needed to fully understand and conceptualize the relationships underpinning adoption and post-adoption of branded apps. The decision to consider, simultaneously, adoption and post-adoption in the present study is based on the notion of *app lifecycle* (Böhmer *et al*., 2011; Racherla *et al*., 2012), which includes: i) adoption or discovery of apps, ii) subsequent and ongoing use of apps, and iii) outcomes of usage (e.g., making transactions, word-of-mouth etc.). Moreover, to enhance the theoretical soundness, this study introduces a theoretical framework that is drawn upon the most widely used conceptual basis, i.e. the TAM model and subsequent adaptations. The TAM model comprise of valid, reliable, responsive and easy-to-operationalize constructs (Legris *et al*., 2003; Porter and Donthu, 2006; Venkatesh *et al*., 2007) and, despite its limitations (e.g., Benbasat and Barki, 2007), it is the dominant theory, because it explains more variance in consumer intention to use and actual usage of technologies (Porter and Donthu, 2006; Venkatesh and Bala, 2008). Additionally, recent research has used the TAM model to explain the adoption of mobile services, interactive media and social media technologies in multiple contexts (Childers *et al*., 2002; Koenig-Lewis *et al*.,

2015; Muk and Chung, 2015; Siamagka *et al*., 2016; Tojib and Tsarenko, 2012). However, as Peng *et al*. (2014) state, the majority of existing studies have focused on understanding the drivers of the adoption of apps and mobile commerce in general, as opposed to focusing on understanding the likely impact of branded apps on a broader range of outcomes. Therefore, the present study introduces a comprehensive framework for examination of the drivers and outcomes of branded app usage intention, and the indirect relationships between these. Importantly, to extend the scope of the implications of this line of research, the framework includes outcomes in relation to the branded app, not the brand powering the app. Accordingly, the results may apply to a wider range of branded apps currently available to consumers.

2.2 Drivers and Outcomes of Branded App Usage

Previous research draws on TAM constructs to examine adoption of mobile marketing as a whole (e.g., Gao *et al*., 2013; Rohm *et al*., 2012), mobile commerce (e.g., Cyr *et al*., 2006; Sultan *et al*., 2009; Wu and Wang, 2005; Yang, 2005), specific services offered by mobile apps (e.g., mobile payments) (Koenig-Lewis *et al*., 2015), and mobile apps in general (e.g., Kim, Yoon and Han 2016; Tojib and Tsarenko, 2012; Yang, 2013). Lately, Yang (2016) and Fang (2017) include TAM-like theoretical links in their frameworks investigating outcomes of the adoption of branded apps, albeit focusing more markedly on outcomes for the brand powering the apps (not the app itself). Natarajan *et al.* (2017) do the same, albeit considering outcomes for the app as well. Seitz and Aldebasi (2016) have also examined mobile app usage and impact on attitude and intention to buy the brand powering the app.

In addition, extant studies have also analyzed individual factors as determinants of adoption, such as risk, personal attachment, social influence, innovativeness, product reviews by app users, sharing content, and accessing content (Gao *et al*. 2013; Kim *et al*., 2016; Koenig-

Lewis *et al*., 2015; Sultan *et al*., 2009). For example, Gao *et al*., (2013) focus on individual factors such as innovativeness, attachment and risk avoidance as moderators of the relationships between ease of use and perceived usefulness and attitude towards mobile marketing (see also Bauer *et al*., 2005; Bruner and Kumar, 2005; Pedersen *et al*., 2002; Shankar *et al*., 2010; Sultan *et al*., 2009; Tojib and Tsarenko, 2012). In a similar line, Koenig-Lewis *et al*. (2015) and Kim *et al*. (2016) examine mobile payments and usage of apps (respectively), including TAM constructs in their adoption models. Accordingly, this present study draws on the substantial body of evidence concerning basic TAM-like constructs and inherent conceptual relationships to outline the key elements of a new framework, which encompasses antecedents and outcomes of branded app adoption. The rationale for this conceptual assumption is the following. Regardless of the peculiarities of branded apps, discussed amply in the previous section, it is plausible to assume that like any other technology, perceived usefulness and ease of use of branded apps should provide the impetus to consumer motivations, perceptions, and behavioral reactions.

2.2.1 Perceived Usefulness and Perceived Ease of Use

Perceived usefulness reflects the extent to which the use of a specific technology (e.g., branded app) is advantageous, whereas perceived ease of use relates to the effortlessness and/or convenience of the use of a specific technology (Davis *et al*., 1992; Ha and Stoel, 2009; Tojib and Tsarenko, 2012). Previous research conceptualizes antecedents of *perceived usefulness* and *perceived ease of use* focusing on two streams of thought (Porter and Donthu, 2006). First, research focuses on psychological or personal traits as direct predictors (or as moderators) of perceived usefulness. For example, Gao *et al*. (2013) look at innovativeness and personal attachment as moderators of perceived usefulness and attitude towards mobile marketing. Second, other works focus on technology attributes, such as ubiquity (Lee, 2005; Tojib and

Tsarenko, 2012), as antecedents of usefulness and ease of use. This present study follows the second stream and considers the following antecedents of branded app usage as predictors of perceived usefulness and perceived ease of use: *privacy*, *security*, *design characteristics*, *ubiquity* and *compatibility*.

Perceived usefulness and perceived ease of use predict attitude and intention to use and can lead to the adoption of mobile technologies, including apps (e.g., Kim *et al*., 2016; Koenig-Lewis *et al*., 2015; Tojib and Tsarenko, 2012; Yang, 2013; Natarajan *et al.*, 2017). However, some studies have highlighted that perceived usefulness is a stronger predictor relative to perceived ease of use (Koufaris, 2002; Pavlou, 2003; Porter and Donthu, 2006; Shih, 2004). More specifically, research in digital technology contexts suggests that perceived usefulness explains over 50% of variance in intention (Xiao, 2010), implying that individuals use technology products due to their functionality, as opposed to their ease of use (e.g., Venkatesh and Bala, 2008).

In the instance of branded apps, Fang (2017) has recently confirmed that perceived usefulness embodies the value that users seek, which often translates (conceptually) into the outcomes of usage – e.g., improvement of task effectiveness and efficiency (labeled "utilitarian path" in Fang's research). This is why Fang (2017) recommends including perceived usefulness in the formulation of hypotheses aimed at predicting outcomes in relation to branded apps, since it is a vital driver facilitating continuance intention and repurchase intention. Nevertheless, the literature seems to model both perceived usefulness and ease of use as predictors of intention to use certain technologies, including mobile apps (Kim *et al*., 2016; Koenig-Lewis *et al*., 2015; Venkatesh and Davis, 2000). This can be better explicated if one considers the following concrete examples of branded apps. Consumers might wish to use branded apps powering

helpful functions including access to bank accounts (e.g., HSBC app) or online catalogues (e.g., Specsavers' app with which consumers may browse and even 'try on' frames) on the basis of whether the apps are in fact useful to them (e.g., they actually wish to do banking via the app or to find new eyewear) and how easy they are to operate (i.e., depending on whether the tasks/objectives that they want to accomplish are easily manageable, in the form of taking little time or being relatively intuitive). Further, ease of use is likely to enhance the consumer's perception of how useful the branded app is (e.g., if the banking app is easy to operate, it is quite likely that the consumer using it will also consider it useful). Further evidence of the relevance of usefulness and ease of use in relation to the intention to use branded apps can be drawn from recent findings by Natarajan *et al.* (2017), who highlighted that both factors drive consumer intentions in relation to apps linked to retailers (thus branded); and Veríssimo (2018) who found the same for health-related apps (supposedly branded). Also, Tarute *et al.* (2017) have suggested that poor usability is a key factor that encourages consumers to delete or not use an app. These aspects, combined, will underpin the intention to use branded apps in the near future. Put more formally:

H1: The more useful a branded app is perceived to be, the greater the intention to use it.

H2: The easier to use a branded app, the greater the intention to use it.

H3: The easier to use a branded app, the greater its perceived usefulness.

2.2.2 Branded App Characteristics

General as well as context-specific functional characteristics shape perceptions of usefulness and ease of use of a particular technology (Kim and Garrison, 2009; Lu *et al*., 2003; Looney *et al*., 2004; Sarker and Wells, 2003). Within this study, the focus is on privacy, security, design

characteristics, ubiquity and compatibility, considered as antecedents of perceived usefulness and perceived ease of use for branded apps. As mentioned earlier, these characteristics should be inherently prominent and flexible to manage through branded apps, given their potential for interactivity and engagement (Peng *et al*., 2014; Seitz and Aldebasi, 2016). Moreover, according to Ahmed *et al*. (2016), perceptions of a branded app are a strong driver of the app effectiveness. Hence, the authors argued that marketers should constantly strive to improve the characteristics of the app in order to improve consumer attitudes and purchase intentions. The next sections present more details of the rationale supporting the theoretical links between individual characteristics of apps and the perceived usefulness and ease of use.

2.2.2.1 Privacy and Security

Scholars have examined the notions of privacy and security (e.g., Gao *et al*., 2013; Ha and Stoel, 2009; Shankar *et al*., 2010; Vijayasarathy, 2004;) and have concluded that, although related, security and privacy are conceptually distinct (Vijayasarathy, 2004). Privacy denotes the extent to which a technology is perceived to compromise privacy, while security indicates whether a technology is secure from unauthorized third parties (Ha and Stoel, 2009; Miyazaki and Fernandez, 2001; Udo, 2001).

Previous research on online shopping conceptualizes privacy and security as antecedents of usefulness and ease of use (Amin, 2007; Chen, 2008; Ha and Stoel, 2009; Pikkarainen *et al*., 2004; Polasik and Wisniewski, 2009; Wu and Wang, 2005). Similarly, Gao *et al*. (2013) conceptualize loss of privacy and security (i.e., risk avoidance) as moderators of relationships between perceived usefulness and attitudes towards mobile marketing. Shankar *et al*. (2010) argue that heightened perceptions of privacy and security can increase perceived usefulness, leading to usage intention. Furthermore, in a study examining the adoption of Internet banking,

privacy and security have been modeled as antecedents of both perceived usefulness and ease of use, and are highlighted as highly correlated (Lallmahamood, 2007). Additionally, Natarajan *et al.* (2017) confirmed that perceived risk (i.e., consumer uncertainty resulting from the perceptions of likely negative outcomes) has a negative impact on the intention to use apps linked to retailers.

More generally, branded apps that facilitate transactions, such as the Uber app or the Amazon app, have an obligation towards consumers to retain and protect sensitive information, such as credit card and billing details, phone numbers etc. Equally, social media apps, such as the Facebook and Instagram apps, offer features that protect consumers from the possible threat of third unauthorized parties accessing private information, such as photos and videos saved on their devices. To do so, branded apps use security protocols, such as pin codes, to avoid presenting users with a request to enter personal or account information every time they use the app. Such safety measures would make a branded app easy to use, limiting the cognitive effort required. This reduction in effort, in turn, may intuitively influence the perceived usefulness of the app, and most likely influence the intention to use the app. In a similar line, the extent to which a branded app ensures privacy and security of personal information stored within the app should impact the perceptions of usefulness and ease of use, leading to increased usage intentions. Importantly, Morosan and DeFranco (2016) argue that branded apps are characterized by a paradoxical combination of personalization and privacy, whereby one is not possible without bypassing the other (at least to a certain extent). Surprisingly, as they claim, the privacy-personalization dyad is not well understood and the two elements are often treated as separate (at least from a conceptual perspective), failing to mimic a fundamental aspect of any m-commerce ecosystem. Morosan and DeFranco also successfully confirm that perceptions of personalization

and privacy as well as consumer characteristics, such as innovativeness and, more general privacy concerns, predict the intention to use branded apps in the hospitality industry. Hence:

H4a/b: The higher the perceptions of (a) privacy and (b) security of a branded app, the higher the perceived usefulness.

H4c/d: (c) Privacy and (d) security of the branded app indirectly impact usage intention, through perceived usefulness.

H5a/b: The higher the perceptions of (a) privacy and (b) security of the branded app, the higher the perceived ease of use.

H5c/d: (c) Privacy and (d) security of the branded app indirectly impact usage intention through perceived ease of use.

2.2.2.2 Design Characteristics

Venkatesh and Bala (2008) argue that design characteristics or features of a technology impact acceptance (Davis, 1993). Design characteristics involve information or system-related features (DeLone and McLean, 1992) that meet users' needs and enable them to exercise control. Meeting consumer needs and empowering consumers, in turn, typically impact the perceived usefulness and perceived ease of use. For example, design characteristics of websites (e.g., options offered and customization of navigation features and browsing preferences) often allow more control over navigation, and have been found to shape user acceptance and adoption of a certain technology (Pituch and Lee, 2006; Thong *et al.*, 2002; Wu, 2014). In fact, Tarute *et al.* (2017) consider, more broadly, design solutions (e.g., in terms of aesthetics and functionalities)

among the likely characteristics of apps that can drive engagement with apps, ultimately underpinning continued usage intention.

Fang (2017) argues that beyond valuable utility, branded apps can connect consumers with brands in a different way to traditional online and mobile advertising, and branded app interactivity increases the effectiveness of brand related messages and the opportunities for customization. These two factors, in turn, strengthen the relationship between the consumer and brand, and generate greater levels of engagement (see also Kim, Lin and Sung, 2013). Intuitively, this greater potential for engagement originates from the fact that branded apps include a variety of features that allow users to customize the app in order to meet individual needs. For instance, many branded apps powering games such as the Candy Crush Saga app enable consumers to customize the app (e.g., to save their gaming preferences and scores, game avatar name, best performances, statistics on games won etc.). Similarly, branded apps linked to retailers such as Zara and H&M allow saving of browsing preferences (e.g., favorite products and styles, price ranges etc.) and past shopping lists. Thus, branded apps designed in a way that presents consumers with features for customization will result in stronger perceptions of usefulness and ease of use, and subsequently to higher usage intention. Therefore:

H6a/b: Design characteristics of the branded app are positively related to the (a) perceived usefulness of the app, and (b) perceived ease of use of the app.

H6c/d: Design characteristics of the branded app indirectly impact usage intention through the (c) perceived usefulness of the app, and (d) perceived ease of use of the app.

2.2.2.3 Ubiquity and Compatibility

Ubiquity refers to the ability of mobile devices to allow consumers to access services and applications anywhere, everywhere and when needed (Looney *et al*., 2004; Lu *et al*., 2003; Tojib and Tsarenko, 2012). Specifically, Kim and Garrison (2009) define ubiquity as an "individual's perception regarding the extent to which [a wireless technology] provides personalized and uninterrupted connection and communications between the individual and other individuals and/or networks" (p. 326). Recent research concerning advanced mobile services (which therefore include, by definition, apps) shows that ubiquity of mobile technologies positively impacts ease of use as well as perceived usefulness through the provision of convenience, efficiency and experiential value in achieving the task – conditions that ultimately increase the likelihood of app usage (Tojib and Tsarenko, 2012). Importantly, Fang (2017) hypothesizes two utilitarian factors, localization and ubiquity, which can influence apps continuance intention and brand repurchase intention through perceived usefulness. However, Fang's (2017) findings show that the role of ubiquity in increasing perceived usefulness was much more prominent.

Branded apps assisting consumers with their productivity (e.g., the Evernote app, the Outlook app, the Dropbox app, etc.) and fitness apps (e.g., Sweat with Kayla app, 7-Minutes workout app, etc.) exemplify the prominent role of ubiquity in the perception of usefulness and ease of use. The possibility to effortlessly and efficiently accomplish certain tasks will most likely result in stronger perceptions of perceived usefulness and ease of use of the branded app, and subsequently in stronger usage intentions than opportunity for localization. Therefore:

H7a/b: There is a positive relationship between the ubiquity of the branded app and its (a) perceived usefulness, and (b) perceived ease of use.

H7c/d: Ubiquity indirectly impacts usage intention through (c) perceived usefulness, and (d) perceived ease of use.

Compatibility is another characteristic that the information technology literature has examined extensively in relation to its impact on perceived usefulness and perceived ease of use (Chau and Hu, 2001; Wu and Wang, 2005). Compatibility captures notions of *operational compatibility* as well as *normative compatibility* (e.g., compatibility with the needs of the user) (Karahanna *et al*., 2006; Tornatzky and Klein, 1982). Operational or practical compatibility refers to the compatibility with what individuals do (Karahanna *et al*., 2006). Normative compatibility refers to what individuals feel or think about a technology (Moore and Benbasat, 1991; Tornatzky and Klein, 1982) and/or how it fits with their lives (Kleijnen *et al*., 2004). However, normative conceptualizations of compatibility may be confounded with perceived usefulness, since it is unlikely that individuals would perceive a technology as useful if it does not reflect a level of consistency with what they think or perceive (i.e., a relative advantage, see Karahanna *et al*., 2006; Moore and Benbasat, 1991). Previous research in the context of mobile marketing suggests that compatibility may represent either a facilitator or an inhibitor of mobile technology adoption (Shankar and Balasubramanian, 2009). Additionally, Kang *et al*. (2015) argue that compatibility of mobile apps enhances perceptions underpinned by utilitarian motives (e.g., functionality and usefulness). Thus, the extent to which individuals perceive an app to be operationally compatible and "fitting with their needs and preferences" (Kang *et al*., 2015, p. 46) will impact perceptions of usefulness and ease of use, leading to a stronger intention to use the app. Consumers perceive apps more useful and easy to use in instances where apps assist with routine tasks or activities such as accessing social media sites and news (e.g., Twitter app or BBC news app), or even

exchanging instant messages with other individuals (e.g., via messaging apps such as WhatsApp app), ultimately leading to higher usage intention. Therefore:

H8a/b: There is a positive relationship between the compatibility of the branded app and (a) perceived usefulness, and (b) perceived ease of use.

H8c/d: App compatibility indirectly impacts usage intention through (c) perceived usefulness, and (d) perceived ease of use.

2.2.3 Intention to Use Branded Apps

Conventional thought (Davis, 1989; Fishbein and Ajzen, 1981) confirms that usage intention underpins the adoption or uptake of a technology. This has also been tested in relation to branded apps and other mobile technologies (Bellman *et al*., 2011; Kim, Kim and Wachter 2013; Seitz and Aldebasi, 2016; Porter and Donthu, 2006). At the same time, strong usage intentions are likely to drive re-use intentions, which is particularly key in the context of mobile apps given the gradual "buying" experience resulting from app features (Jarvenpaa *et al*., 2003; Miluzzo *et al*., 2010; Mylonopoulos and Doukidis, 2003). That is, consumers often first download the free baseline version of a certain app; then, they are asked if they wish to update and/or upgrade the app, paying a small fee to continue using the app or to improve it (e.g., to remove in-app advertisements). For examples, many branded apps powering games or DIY artwork can be trialed for free and then upgraded to no-ads for a fee (e.g., the Solitaire game app) or require a fee to continue using them (e.g., the Colorfy app for drawing).

In addition to the above, it is not uncommon for consumers to use apps intermittently, i.e. occasionally stopping usage of an app and then eventually resuming its use depending on several contingent factors. For instance, a consumer might download and use an app for public transport

in a specific city that they are visiting for work or leisure, and stop using it upon their departure, only to re-use it again during another trip. In fact, Venkatesh, Thong and Xu (2012) argue that in the context of technology acceptance, embracing the habit/automaticity perspective implies that "repeated performance of a behavior produces habituation and behavior can be activated directly by stimulus cues" (p. 164). This means that, on subsequent occasions, an automatic response without conscious or cognitive mediation (i.e., attitude or intention) might occur.

Intention to use mobile technologies also leads to other marketing outcomes such as satisfaction, loyalty and and/or word of mouth (WOM) (e.g., Ellonen *et al*., 2009; Gruen *et al*., 2006; Kim *et al*., 2013; Samson, 2010; Seitz and Aldebasi, 2016). WOM refers to informal communication of a specific product or service to other consumers (e.g., Christodoulides *et al*., 2012; Sun *et al*., 2006; Westbrook, 1987), and has been extensively researched in online and mobile communication domains (Okazaki, 2008, 2009). Previous research indicates that intention to recommend an app to others has also been confirmed as result of the likelihood to use mobile apps (Xu *et al*., 2015; Newman et al., 2017).

Combining the reflections presented thus far concerning the likely cyclical nature of apps usage (especially in relation to the possibility to pay for a branded app, either to upgrade its features or to continue using it) and the likely impact on outcomes such as word-of-mouth, it is plausible to assume that:

H9: The higher the usage intention of the branded app, the greater the likelihood to recommend it to other consumers, family and friends.

H10: The higher the usage intention of the branded app, the stronger the willingness to pay for the app.

Figure 1 shows the resulting conceptual model comprising all research hypotheses. The model also includes two control variables that this study tests for completeness: i) the type of branded apps, classed as either *hedonic* or *utilitarian* (Childers *et al*., 2002), mimicking the distinction that Bellman *et al*. (2011) use; and ii) consumer demographics (e.g., age and income), in line with Yang (2013). Controlling for the type of branded app is particularly important, since a similar distinction has been made in the analysis of how consumers interact with Internet-based technologies, and given that branded apps offer further opportunity for such a distinction in terms of the possible creative styles that can be executed (c.f. Bellman *et al*., 2011). Moreover, Peng *et al*. (2014) remark that it is widely accepted that apps satisfy the utilitarian and non-utilitarian needs of consumers, and that this facilitates the consumers' decision to use a branded app. The usage itself exposes the consumer to several favourable features, which can bolster the feelings and attachment between the consumer and the brand, exerting positive effects such as sense of belongingness and sameness with the brand. In fact, there are many cases of branded apps linked to an existing brand are launched to establish and/or maintain a connection between the brand and its customers. In doing so, however, it is paramount that branded apps extend the pool of values that the brand delivers and strive for high quality. In fact, Bellman *et al*. (2013) argue that delivering to consumers an informational or utilitarian app that they can continue to find useful is much more challenging than offering an experiential app with the sole aim to entertain and engage consumers. Moreover, making sure that consumers notice a branded app may be extremely difficult, given that there are thousands of apps available to them. Accordingly, the present study posits that controlling for the type of branded app is paramount.

*** Insert Figure 1 about here

The next section presents the methodology used to validate this model and the empirical results obtained, together with a discussion of the key implications of this study.

3. Methods

3.1 Data Collection

Data for this study were collected in 2015, using an online questionnaire. Responses were acquired through a commercial provider (Smart Survey), which administered the survey to a random sample derived from a panel of 1 million UK consumers (screening criteria: 18 years of age and above). The use of panel data is very common in academic literature with a multitude of studies researching branding using panel data. Such research often obtains results from larger response sizes than obtained from student and convenience samples, which ultimately offers greater representativeness of the relevant populations (e.g., Devasagayam *et al*., 2010; Norberg *et al*., 2011; Paredes *et al*., 2013; Peng, Cui and Li, 2012; Simon *et al*., 2016). For the present study, a total of 335 responses were collected. However, to ensure that the profile of respondents fitted the objectives of this research, the analysis excluded responses by people who indicated that they did not own and/or use a technological device powering apps, such as smart phones and/or tablets. This approach is in line with recent research such as Tarute *et al.* (2017), Natarajan *et al.* (2017) and Newman *et al.* (2017). A total of 253 valid and usable responses remained, and the sample consisted of 43.1 per cent males and 56.9 per cent females. The profile

of the sample was well spread between the income and education levels (see Table 2), in line with the profile of the relevant population (UK users of mobile technologies such as apps).

Respondents were presented with a list of the most used apps in the UK taken from AppAdvise.com (accessed in February 2015) to ensure respondents' familiarity with the branded apps. The list included 10 paid-for and 10 free apps. Importantly, the apps presented all prominently displayed a brand identity (see also Bellman *et al*., 2011) and included SNS apps, games and utilities (e.g., maps). Respondents were then asked to choose an app that they knew and to answer a series of questions about the app they chose (see also Tarute *et al.*, 2017). Respondents were given the option to indicate an app of their choice, if they did not know any of the apps in the list. The frequency of selection of the individual apps is presented in Appendix A.

The unit of analysis was individual branded apps, which reflected a deliberate analytical decision underpinned by the desire to generate a conceptual model yielding predictions for the actual app, as opposed to the brand powering the app. Other studies have followed a similar approach (e.g., Peng *at al*., 2014; Stocchi *et al*., 2017; Wu, 2015) and have extended the scope of the implications drawn in light of the existence of many branded apps that are "stand-alone" – i.e., not necessarily linked to an existing brand (e.g., the Spotify app). Nonetheless, when testing the hypothesized relationships, no distinction was made between which branded app respondents chose. Instead, as mentioned earlier, the analysis controlled for the type of the app chosen and whether it fulfilled utilitarian or hedonic needs (Childers *et al*., 2002). This distinction was based on the combination of two factors: i) the insights that emerged from qualitative exploratory research (not reported in this study, but part of a broader project), where 22 participants discussed and evaluated the main purpose for which they use different apps (e.g., utilitarian or hedonic), and ii) the verbatim responses that respondents provided in the questionnaire in

relation to the open-end question: "*In your view, what is this app for? E.g., to complete a task, pass time, connect with others etc.*". Bellman *et al*. (2011) made similar assumptions, and highlighted that this distinction should be determined exogenously (i.e., not within the analytical framework) in order to capture consumer perceptions more accurately. This assumption also allowed capturing more variance, thus producing a more generalizable model.

*** Insert Table 2 about here

3.2 Measures

In order to compare the outcomes of this study against the results of previous research concerning the adoption of mobile technologies and relative post-adoption outcomes, this study derived most measures from existing research or established conventions, as follows (see Appendix A for a detailed list of all measurement items). Measures of perceptions of privacy, security, design characteristics, ubiquity and operational compatibility were all captured using a 1-5 Likert scale (strongly disagree to strongly agree) and were based on the works of Miyazaki and Fernandez (2001), Park and Kim (2003), Wu (2014), Tojib and Tsarenko (2010), and Wu and Wang (2005), respectively. Importantly, the selected measures provided some of the most suitable advancements concerning enablers of technology adoption, which was in line with the aims of the proposed conceptual framework. For the antecedents, this study referred back to the seminal work of Davies *et al*. (1989), adapting the items of perceived usefulness and ease of use to the context of this study (i.e., phrased in terms of branded apps, e.g. "*I find this app useful*" and "*I find this app easy to use*" etc.), which were also measured using a 1-5 Likert scale. Finally, the measure of usage intention was based on Chen *et al*. (2012) and adapted for branded

apps. As far as the post-adoption outcome measures are concerned (i.e., likelihood to recommend and willingness to pay for the app), this study relied upon established conventions and opted for two simple measures. Likelihood to recommend the app (WOM) was measured by asking the following questions: "*How likely are you to recommend mobile apps to friends and family?*" "*How likely are you to provide feedback through online ratings and/or reviews?*" (captured with 5 point scales). Willingness to pay for the app was measured using the questions: "*I am willing to pay to keep using this app*" and "*I am willing to pay a small fee for the app upgrades*". The decision to use these simple measures was based on recent remarks concerning the need to use parsimonious outcome variables to develop theoretically sophisticated models, and to achieve stronger statistical control of potential confounders (see Hayduk and Littvay, 2012). Moreover, in other areas of research on intention, such as on buying behavior, intention scales are often interpreted as simple probability indicators or chances for outcomes of interest to occur (e.g., Wright and MacRae, 2007).

All measures were subject to standard reliability and CFA statistical checks in order to identify the items to be retained for modeling purposes. The process resulted into two single-item measures as outcome variables, which were nonetheless deemed appropriate (see Littvay, 2012).

4. Analysis and Results

4.1 Measurement Model

The first step of the analysis included testing for the validity and reliability of all measures via confirmatory factor analysis using Lisrel 8.71 and the maximum likelihood estimation (MLE) method (Jöreskog and Sörbom, 1993). The results of the CFA test provided in Table 3 indicated a good model fit: χ^2 (227) = 517.227; χ^2/df = 2.52; p = 0.00; RMSEA = 0.078; NNFI = 0.953; CFI = 0.967 and Standardized RMR = 0.05 (e.g., Bentler and Chou, 1987; Bollen, 1989). Moreover, Cronbach's alpha for the multi-item measures indicated good internal consistency as all values exceeded the recommended threshold of 0.7 (Nunnally, 1978). Furthermore, where possible, constructs were submitted to convergent validity and discriminant validity tests. Factor loading estimates, composite reliabilities (CR) and percentages of variance extracted (AVE) indicated construct validity with factor loadings for all measurement items significant at 1 percent level (or better) and values for CRs and AVEs were all above the recommended thresholds of 0.60 and 0.50 (Bagozzi and Yi, 1988) (see Table 3).

Discriminant validity was assessed using Fornell and Larcker's (1981) test, which requires comparison of the shared variance between each pair of constructs to the value of AVE. As Table 4 indicates, discriminant validity was obtained for each of the construct used[1], as all AVE values (where available) are greater than the square of the correlations between each pair of constructs.

[1] Except for the measures that reduced down to a single-item, following reliability and CFA.

*** Insert Table 3 and 4 about here

To exclude concerns of potential common method variance (CMV), the analytical procedure deployed a combination of two approaches: one procedural and one statistical (Podsakoff *et al*., 2003). First, the use of standard survey procedures ensured clarity of questioning and minimized respondent fatigue through the use of different response formats. Second, in terms of statistical remedies, the Harman's single-factor test (Podsakoff *et al*., 2003) ensured the absence of any potential common method bias. No single factor was found, which indicated that CMV was not a threat: the CMV single factor model fit was poor: χ^2 (303) = 10338.85; χ^2/df = 34.12; p = 0.00; RMSEA = 0.363; NNFI = 0.608; CFI = 0.635 and Standardized RMR = 0.252; and the improvement in model fit on moving from the CMV single factor model to the six-factor model was significant ($p < .01$) (see Table 5). Moreover, since the Harman's test is not without criticism, as a precaution, the analysis also considered marker variable testing (Lindell and Whitney, 2001). The assessment of correlations between the constructs and the marker variable *"How often do you see mobile apps adverts in store/retailer/service provider?"* returned non-significant and low correlations (the highest for perceived ease of use: -0.86). Taken collectively, these results lead to the conclusion that CMV does not pose a threat in this study.

*** Insert Table 5 about here

4.2 Hypotheses Testing Procedure

To test the hypotheses presented in the conceptual model, this study used LISREL 8.71 with a covariance matrix as input data and a maximum likelihood estimation method. Table 6 presents the details of the path estimates and *t*-values for the chosen unrestricted model. In line with previous research, the results confirmed the basic TAM model relationships. Specifically, in line with H1, the relationship between app usefulness and the intention to use the branded app was positive and significant (t = 5.87; p< 0.01). Perceptions of ease of use also had a direct positive effect on the intention to use the branded app (H2) (t = 2.42; p< 0.05). In addition, the results highlighted a positive and significant relationship between perceptions of ease of use and usefulness of a branded app (H3) (t = 2.51; p< 0.05).

Furthermore, the results indicated that privacy (H4a), design characteristics (H6a) and compatibility (H8a) increase the perceived usefulness of the branded app (t = 2.11; p< 0.05; t = 2.87; p< 0.01 and t = 4.00; p< 0.01, respectively). Conversely, perceptions of security (H4b) and ubiquity (H7a) do not have an effect on perceptions of usefulness of the branded app. With regard to the effect on perceived ease of use, the results showed that perceived security (H5b) (t = 2.75; p< 0.05), design characteristics (H6b) (t = 1.94; p< 0.05), ubiquity (H7b) (t = 5.17; p< 0.01) and compatibility (H8b) (t = 2.78; p< 0.05) positively impact the perceptions of ease of use of the branded app. Finally, the results showed that the intention to use the branded app positively impacts the willingness to spread word of mouth (H9) (t = 9.11; p< 0.01). On the contrary, results showed that willingness to pay is not affected by intention to use, but that WOM leads to willingness to pay.

*** Insert Table 6 about here

4.3 Mediation Analysis

This study also included an examination of the potential mediation paths between privacy, security, design, ubiquity and compatibility on intention, via perceived usefulness of a branded app and ease of use of branded apps. The model results highlighted the following: Privacy, design, and compatibility all returned significant positive effects on perceived branded app usefulness (β Privacy→Usefulness =.13, p<.05; β Design→Usefulness =.24, p<.001; β Compatibility→Usefulness =.48, p<.001 respectively). Similarly, security, design, ubiquity and compatibility all returned significant positive effects on ease of use of the branded app (β Security→Ease of Use =.19, p<.05; β Design→Ease of Use =.13, p<.05; β Ubiquity→Ease of Use =.39; β Compatibility→Ease of Use =.25, p<.05 respectively). Furthermore, perceived usefulness and ease of use both had positive significant effects on the intention to use the branded app (β Usefulness→Intent =.51, p<.001; β Ease of Use→Intent =.18, p<.05 respectively). This led to significant positive indirect effects of: i) privacy, design and compatibility on usage intention, through perceived usefulness (β Privacy→Usefulness→Intent =.06, p<.05; β Design→Usefulness→Intent = 0.12, p<.001; β Compatibility→Usefulness→ Intent = 0.24, p<.001); and ii) security, design, ubiquity and compatibility on usage intention via ease of use (β Security→Ease of Use→Intent =.003, p<.01; β Design→Ease of Use→Intent = .02, p<.01; β Ubiquity→Ease of Use→Intent = .07, p<.05; β Compatibility→Ease of Use→

Intent = 0.05, p<.05). Hence, these results provided support for all mediation hypotheses, except H8c, H7c, H5c, H5d.

5. Discussion

5.1 Theoretical Implications

This study deals with a topical issue, and fills a research gap in the domain of branded apps by examining a broad spectrum of factors that impact usage intention for branded apps, leading to the intention to recommend the app to others and to pay for the app. It also highlights that the willingness to pay for a branded app is affected by the willingness to spread word of mouth about it. Therefore, the contribution and value of this research is that it extends current knowledge on branded apps, which thus far has only seldom considered drivers of usage, has approached post-adoption through the use of alternative conceptual bases, and has often predicted outcomes in relation to the brand powering the app, as opposed to the branded app itself. More generally, this study contributes to existing research examining adoption and post-adoption of mobile apps. The implications and significance of the findings are explained in greater detail here below.

Considering research that has examined mobile apps as a whole, to a great extent, the outcomes of this study are broadly consistent with some of the key outcomes of Tojib and Tsarenko (2012) who found that ubiquity, enjoyment, ease of use and time convenience drive the experiential value that consumers attach to advanced mobile services, which ultimately impacts technology use (with customer satisfaction as a mediator). The results are also in line with Yang's (2013) findings for young consumers and with the key effects highlighted by Kim, Yoon

and Han (2014) and Bellman *et al*., (2011). Moreover, the findings align with Wang and Li (2012) and Seitz and Aldebasi (2016), who found that in the broadest context of mobile commerce, the features of a supporting technology drive purchase intentions.

Considering the broadest domain of knowledge on technology adoption, this study makes several additional contributions. First, previous research has focused primarily on individual and psychological factors (e.g., innovativeness, attachment) as moderators of the relationships between perceived usefulness, perceived ease of use, attitudes, intention to use or adoption (see Gao *et al*., 2013; Sultan *et al*., 2009; Tojib and Tsarenko, 2012). In contrast, this study offers new insights by modeling context-specific antecedents of perceived usefulness and perceived ease of use which impact usage intention, and by examining both direct and indirect effects. Additionally, this study has considered the willingness to recommend the app and to pay for it as additional outcomes. In this way, the findings of the study complement previous research (Porter and Donthu, 2006; Venkatesh and Davis, 2007; Venkatesh and Bala, 2008), suggesting that consumers who perceive specific technologies as more useful and easier to use will have a higher usage intention than those with lower perceptions.

Second, the results of this study show that the extent to which consumers think that a branded app ensures their privacy will determine the degree to which they will view it as highly useful to achieve a specific goal leading to stronger usage intentions. However, the results also show that consumer perception of the branded apps as secure, ubiquitous and allowing customization can shape the consumer perception of the branded app being effortless and easy to use, leading to stronger usage intentions. This unexpected outcome can be explained by considering the following example. Branded apps linked to social media such as Facebook and Instagram: i) guard consumers' privacy and commit to protecting their information, ii) offer to

consumers several functions anytime, anywhere (e.g., posting photos, sharing information etc.), and iii) provide several options for customization (e.g., through decisions on news feed display mode and content priority, etc.). This study indicates that these characteristics, combined, do not affect the performance or productivity for consumers (e.g., perceived usefulness), but allow them to access and use the app with ease.

Third, this study also extends the understanding of the likely outcomes of usage intention in the context of technology adoption, and sheds light on the link between two key outcomes: willingness to recommend the branded app and willingness to pay for the branded app (e.g., to continue using it). Specifically, this study shows that usage intention of a branded app will lead to increased intention to recommend the specific app to other consumers, but does not affect willingness to pay to continue using the app. This result can be explained as follows. Consumers who intend to use and then actually use a branded app might want to talk about it with other consumers, family and friends to give their opinion and recommendation. Conventional thought clearly indicates that word-of-mouth is a powerful driver of consumer decisions, including in the context of web and digital technologies (e.g., Riegner, 2007). In the specific instance of branded apps, this study reveals that word-of-mouth influences also the willingness to pay for the app.

More generally, to the best of the knowledge of the authors of this article, to date, only two frameworks concerning the adoption of technologies in line with basic TAM-like relationships included mediation analyses: Porter and Donthu (2006) and Tojib and Tsarenko (2012). Importantly, Tojib and Tsarenko (2012) presented a model describing post-adoption of advanced mobile services, in which ease of use, enjoyment and time convenience mediated the effect of ubiquity and experiential value. Tojib and Tsarenko provided extensive theoretical explanations for this outcome and argued that consumers may base their decision to continue

using advanced mobile services on motivational factors, which emerge from the beliefs of the benefits that can be gathered from those services. The results of the present study suggest that perceived usefulness and perceived ease of use should be factors influencing a branded app's usage on an on-going basis, creating the impetus for future intentions and other important outcomes. In more detail, in accordance with Tojib and Tsarenko's (2012) arguments, it appears that specific features of branded apps (i.e., privacy and security safeguarding, design characteristics, ubiquity, and compatibility) have a greater influence when combined with perceived usefulness and perceived ease of use.

Finally, this study confirms the findings of previous research in relation to the role of operational compatibility of a certain technology as predictor of perceived usefulness and ease of use (Karahanna *et al*., 2006). Specifically, the results show that the extent to which a branded app is compatible with what consumers do, will encourage them to see the app as useful and easy to use, thus leading to stronger usage intentions. For example, a branded app which tracks the weather worldwide (e.g., the Weather^{+} app) is perceived useful for people who travel a lot, and a branded app for diet and exercise coaching (e.g., the Weight Watchers' app) is seen as useful by consumers who want to monitor and improve their health.

5.2 Practical Implications

Branded apps have become an invaluable resource for companies, past beyond the "nice to have" point, acquiring a crucial role in the marketing-channel mix and overall customer-company interaction process at the heart of mobile marketing strategies. An increasing number of consumers use branded apps (Aberdeen Group, 2014), driving advantageous business performances, because they enable engagement and interaction with customers (e.g., Wang, Kim and Malthouse, 2016; Yang, 2016;).

Much of the existing research prior to the present study has offered rather general insights of limited practical relevance to business interested in effectively using branded apps within their mobile marketing strategies. A key problem in previous research was the fact that predictions were made primarily in relation to the brand powering the apps, as opposed to the branded app itself. By contrast, this study yields findings that are specifically tailored to the strategic handling of a branded app and obtaining desired outcomes for it, and therefore, increasingly relevant to managers. In particular, the results of this study are insightful for the identification of specific characteristics of branded apps such as privacy and security, which seem to clearly impact consumer perceptions of whether the app will be useful and effortless, and, hence, drive consumer intentions to use in the near future. Additionally, the empirical findings of this work clearly suggest that usage of a branded app leads to WOM recommendations and willingness to pay for the app. This study also shows that different characteristics shape perceptions of usefulness compared to perceptions of ease of use. Lastly, another important finding with practical relevance is that usage intention of branded apps increases the likelihood of recommendation, thus reinforcing the relevance of branded apps in the context of mobile marketing strategies.

Taken together, the practical implications described here can be translated into a series of strategic guidelines for developers and managers of branded apps. Above all, this study suggests that developers and managers should focus on characteristics of branded apps that can shape perceptions of usefulness and ease of use, as they lead to stronger usage intentions and valuable outcomes. In more detail, it is possible to encourage consumers to see a branded app as useful by improving the app's features that: i) protect the privacy of consumers, ii) offer a good design and enhanced navigation opportunities in the form of customization and user-control, and iii) match

their needs and lifestyle. For example, global brands such as British Airways and AirBnB are consistently investing in the improvement of their apps, offering seamless solutions that safeguard sensitive information and provide great customization-potential (e.g., the British Airways app stores travel preferences, additional travel information besides the flight, and much more). These branded apps truly deliver what the consumer wants (e.g., the Air BnB app offers relevant information for an enjoyable experience as "local" tourist anywhere in the world). Importantly, opportunities for customization and compatibility with consumer needs also enhance the perception of ease of use, which can be further encouraged by emphasizing that the app: i) is available anytime and anywhere, and ii) allows safe storing of sensitive information (i.e., protected against unauthorized parties). For instance, branded apps that help the consumers with finding services and shops "on the go", such as the Foursquare app, offer customized functions in line with people's location, and meet consumers' most immediate need regardless of where they are (i.e., around the corner from home or at an overseas holiday destination). While offering consumers with such opportunities is certainly advantageous, the app should also shield sensitive consumer information (e.g., exact geographical location) from any third party. Finally, it seems very important to bolster the features of branded apps that will encourage consumers to see them as useful and easy to use, because it will also entice consumers to talk about the app. Besides being an important outcome of its own, this study clearly indicates that word-of-mouth in relation to branded apps is also pivotal to persuading consumers to pay for the app (i.e., to continue using it). Such an outcome yields important implications to justify mobile marketing investments and to support strategies aimed at the constant improvement of a branded app. Crucially, the practical implications are equally applicable to branded apps attached to an existing brand as well as "standalone" apps, which is a distinction that previous research has

often neglected by focusing excessively on the benefits of apps for the brand powering them. Furthermore, the implications are feasibly relevant in equal manner for utilitarian apps and hedonic apps.

5.3 Limitations and Future Research

In spite of the interesting findings of this study, a number of limitations must be acknowledged. First, while the study examines context-specific characteristics as antecedents of perceived ease of use and perceived usefulness (and is therefore different from research in similar domains), psychological variables that may moderate the relationships studied were not captured. Hence, future research may focus on specific psychological or other moderators of these relationships, such as involvement or attachment with the branded app. Second, this study controlled for the type of branded apps (i.e., utilitarian or hedonic, determined a priori). However, the research design and sample did not allow a more in depth comparison of likely differences between other possible distinctions. Therefore, future research may include formal analyses of the possible moderation effects occurring for different types of branded app. Future studies may also use a multi-group SEM approach to compare different models to shed more light on specific drivers and outcomes of usage intention for different types of branded apps. For example, replications of this work could take into account more practical distinctions such as looking at branded apps linked to social media vs. branded apps linked to retailers and service providers, or the distinction between free and paid apps (see also Stocchi *et al*., 2017). Third, this study examines intention to recommend the app as an outcome of usage intention. Future research may examine how recommendations or reviews by others influence, in return, usage intention. Fourth, another potential limitation of the study is the focus on operational compatibility, as opposed to normative compatibility of apps. Such an assumption may have had impact on perceived

usefulness and ease of use, and could be considered in future replications. More specifically, further research should perhaps model both types of compatibility as separate antecedents. Fifth, the outcome variables included in the measurement model for this study reduced down to a single item. While this is not uncommon in empirical research (see Littvay, 2012), future research could relax the assumptions made on the need to use parsimonious outcome variables and revert to more complex measurement items. Finally, future research should also look into the concepts of consumer engagement, in line with some of the intuition by Yang (2016) (but applied to the branded app itself, not the brand providing the app), testing empirically the propositions by Kim, Ling and Sung (2013) and Wang, Kim and Malthouse (2016).

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Appendix A

Measurement items:

Variables	Items
Privacy (Adapted from Miyazaki and Fernandez, 2001)	• The app shares personal information to other companies (R) • The app tracks my habits (e.g. online purchases and searches) (R) • The apps places cookies on my device(s) (R) • The app causes me to being contacted by companies without providing consent (R) • The app raises some general privacy concerns for me (R)
Security (Adapted from Miyazaki and Fernandez, 2001)	• My private information is managed securely when using this app • I am sure that payment information will be protected when using this app • This app provides detailed information about security • I am afraid that my private information will be utilized in an unwanted manner when using this app (R)
Design characteristics (Adapted from Wu, 2014)	• This app provides more options for me to meet my needs • This app allows me to choose different features • This apps gives me greater control over customization
Ubiquity (Adapted from Tojib and Tsarenko, 2010)	• I can use this app anytime • I can use this app anywhere • I can use this app when needed
Compatibility (In line with Park and Kim, 2003; and Wu and Wang, 2005)	• This app is compatible with the technology of my device(s) • This app adapts to and fits to the size of the screen
Perceived usefulness (Adapted from Davis *et al.*, 1989)	• Using this app improves my performance in my daily life • Using this app increases my productivity in my daily life • Using this app enhances my effectiveness in my daily life • I find this app useful
Perceived ease of use (Adapted from Davis *et al.*, 1989)	• Learning to operate this app is easy for me • I would find it easy to get this app to do what I want it to do • It would be easy for me to become skilful at using this app • I find this app easy to use
Usage intention (Adapted from Chen *et al.*, 2012)	• I intend to use this app in the next two months • It is likely that I will use this app in the next two months • I expect to use this app in the next two months
Likelihood to WOM	• How likely are you to recommend the mobile app to friends and family? • How likely are you to provide feedback through online ratings and/or reviews?
Willingness to pay	• I am willing to pay to keep using this app • I am willing to pay a small fee for the app upgrades

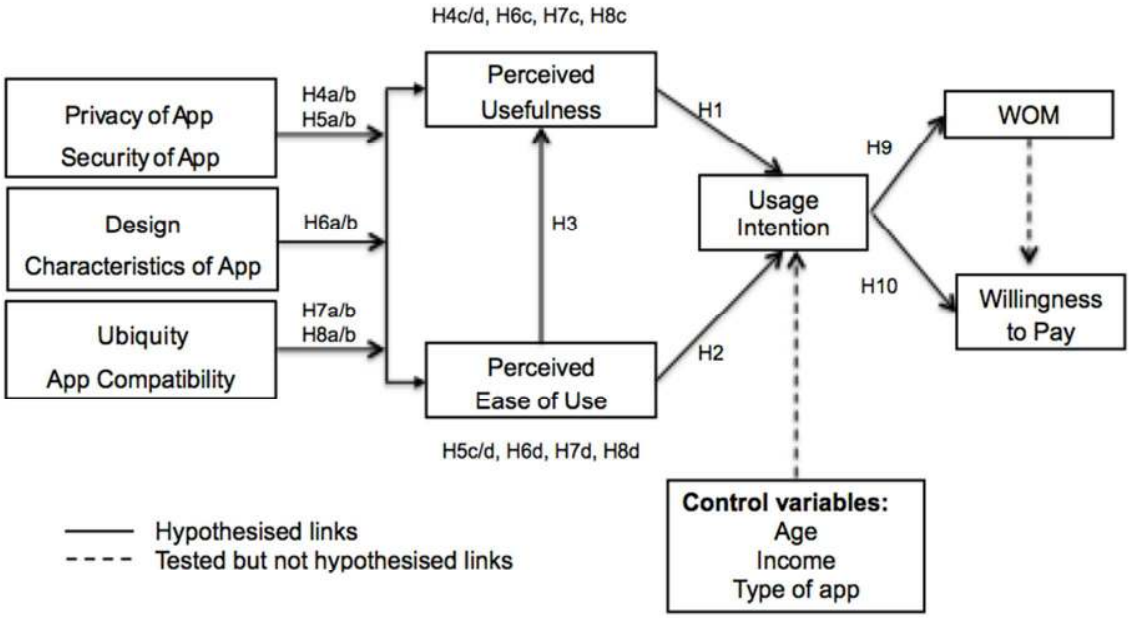
Note:
The notation (R) stands for items whereby the resulting scores were reversed (negative perceptions).

Frequency of selection of branded apps and apps type:

Branded Apps	**% of sample**	**Hedonic or utilitarian**
Facebook	29	Hedonic
WhatsApp	16	Utilitarian
Facebook Messenger	10	Utilitarian
Google Maps	9	Utilitarian
YouTube	8	Hedonic
Other (specify)	5	-
Skype	4	Utilitarian
Instagram	4	Hedonic
Spotify Music	3	Hedonic
Snapchat	2	Hedonic
7 Minute Workout Challenge	2	Utilitarian
Minecraft - Pocket Edition	2	Hedonic
Sleep Cycle Alarm Clock	2	Utilitarian
Fantasy Premier League 14/15	2	Hedonic
Heads Up!	1	Hedonic
Tinder	1	Hedonic
Football Manager Handheld	1	Hedonic
Afterlight	0	Utilitarian
Cut the Rope 2	0	Hedonic
Plague Inc.	0	Hedonic
Facetune	0	Utilitarian

Figures

Figure 1: Conceptual Model



Tables

Table 1: Overview of current research specifically focused on branded apps

Empirical vs. non-empirical	Authors and year	Brief description of the research	Focus on the brand powering the app vs. the branded app	Focus on adoption vs. post-adoption
EMPIRICAL	Bellman et al. (2011)	Drawing upon persuasion and attitudes theory, the authors use an experimental design to **predict patterns in attitudes and purchase intentions for the brand offering the app**. The framework takes into consideration app usage, the type of the app (experiential vs. informational) and consumer involvement with the product category.	Brand powering the app	Adoption
	Peng, Cheng and Wen (2014)	Embracing the theory of consumer-brand relationship and the theory of consumption values, the authors predict the **intention to use the branded app**.	Branded app	Adoption
	Morosan and DeFranco (2015, 2016)	The authors recognise that little is known in relation to **what motivates consumers to share their information in exchange for personalised services**, which may not be entirely clear to them prior to usage. Accordingly, the authors focus on this particular issue in the context of branded apps for hotels.	Brand powering the app	Post-adoption
	Seitz and Aldebassi (2016)	Using a basic Theory of Planned Behaviour framework, the authors examine attitudes towards brands offering a branded app and capture the influence that using a branded app has on **purchase intentions towards the brand (not the app)**.	Brand powering the app	Adoption
	Jin (2016)	The authors link individual consumers' characteristics (e.g., innovativeness) with the **intention to adopt/use a branded app** and **attitudes towards the brand powering the app (not the app itself)**. They used experimental design applied to two cosmetics brands and their apps.	Both	Adoption
	Alnawas and Aburub (2016)	Using a user gratification approach and other conceptual basis (e.g., motivation theory), the authors predict the influence of the apps' interaction-based benefits over **satisfaction and purchase intentions towards the brand powering the app**.	Brand powering the app	Post-adoption
	Kim and Yu (2016)	Drawing upon brand experience theory, the authors predict the effects that the brand app and its characteristics have on **loyalty towards the brand powering the app**, as moderated by media involvement.	Brand powering the app	Post-adoption
	Ahmed, Beard and Yoon (2016)	The authors link i) cognition, attitudes and intentions towards the brand powering the app, and ii) cognition, attitudes and intentions towards the app	Both	Post-adoption

		itself, with **purchase intentions for the brand and the intention to continue using the branded app**.		
	Yang (2016)	The author plugs notions from brand attachment and self-congruence theories into basic TAM relationships to predict the level of attachment to the brand offering a branded app. Specifically, this work reveals entertainment, perceived usefulness, credibility, perceived value and irritation (negative impact) as **drivers of brand attachment**.	Brand powering the app	Post-adoption
	Kim, Wang and Malthouse (2016)	Using data from the loyalty program of one firm, the authors compare spending patterns following the adoption of the branded app. The key findings indicate an **increase in spending**, regardless of differences in the pre-adoption spending.	Brand powering the app	Post-adoption
	Fang (2017)	The authors present a very thorough examination of the factors that drive **the re-purchase intention for the brand powering the app and the intention to continue using a branded app**, combining a utilitarian path (known TAM-like relationships) with an engagement path (beyond valuable utility).	Both	Post-adoption
	Stocchi Guerini and Michaelidou (2017)	Drawing upon known patterns that link brand image and brand usage, the authors **compare different types of apps** (free vs. paid; and linked to existing brands vs. branded independently) **and their market performance**.	Branded app	N/A
	Tarute, Nikou and Gatautis (2017)	Drawing upon consumer engagement theory the authors examine the impact of specific characteristics of apps (e.g., design, functionality and social features) as determinants of consumer engagement itself and also the intention to continue using the app. The research is based on a survey where respondents could choose an app of their liking and most apps chosen (as reported) were, in fact, branded.	Branded app	Post-adoption
	Natarajan, Balasubramanian and Kalisingam (2017)	The authors extend the confines of the basic TAM relationships to include perceived risk (negative weight) and perceived innovativeness (positive weight) as drivers of consumer satisfaction and price sensitivity in relation to retailers powering an app and intention to use the app	Both	Post-adoption
	Newman, Wacheter and White (2017)	This research links the ease of use of apps linked to retailers and the connection that consumers develop with the app, as drivers of the intention to make purchases via the app and recommend the app, whilst considering the moderating effect of app usage frequency.	Both	Post-adoption
	Verissimo (2018)	The author focuses on health-related apps (supposedly branded) and illustrates how ease of use and usefulness of such apps	Branded app (supposedly)	Post-adoption

		can intensify their use ultimately leading to greater effectiveness of the app in relation to better clinical decision-making.		
NON-EMPIRICAL	Wu (2015)	The authors draw upon customer engagement theory and present an empirical model, which depicts **continue to use intention for branded apps** as outcome of: i) performance expectancy (underpinned by the relationship between perceived interactivity and effort expectancy); ii) social influence; and iii) brand identification.	Branded app	Post-adoption
	Kim, Ling and Sung (2013)	The authors do not present any empirical findings; rather, they present a series of assumptions that require testing by drawing upon customer engagement theory. Some of the key aspects highlighted are linked to **customer engagement via branded apps**, and include: vividness, novelty, motivation, control and customization, feedback opportunities, multi-platforming and resonance.	Brand powering the app	N/A
	Zhao and Balague (2015)	The authors do not present any empirical findings; however, they review a series of **key success factors for branded apps**; they also include a classification of different types of branded apps; and a list of key strategic objectives that branded apps should have (e.g., mobile features, social features and brand mentioning features).	N/A	N/A
	Wang, Kim and Malthouse (2016)	The authors present a systematic literature review that highlights the potential of branded apps in the context of **brand engagement and advertising**.	Brand powering the app	N/A

Table 2: Respondents Profile

	n	Percentage %
Gender		
Male	109	43.1
Female	144	56.9
Age		
18-24	17	6.7
25-34	55	21.7
35-54	147	58.1
55+	34	13.4
Income		
Less than £10,000	52	20.6
£10,000 to £19,999	55	21.7
£20,000 to £29,999	46	18.2
£30,000 to £39,999	37	14.6
£40,000 to £49,999	21	8.3
£50,000 and more	16	6.3
Prefer not to say	26	10.3
Education		
GSCE	64	25.3
Further education (e.g., A Levels, GNVQ, BTEC)	88	34.8
Undergraduate degree (e.g., BA, BSc)	64	25.3
Postgraduate degree (e.g., postgraduate certificate, masters or doctoral	30	11.9
Prefer not to say	7	2.8

Table 3: Statistics for the Constructs

	Ease of use	Usefulness	Privacy	Security	Design characteristic	Ubiquity	Compatibility	Usage Intention	Willingness to Pay	Word of Mouth
Mean	4.01	3.87	3.001	3.34	3.35	3.99	3.89	4.16	2.57	3.72
SD	0.81	0.93	0.99	0.78	0.78	0.76	0.74	0.92	1.3	1.1
Cronbach's Alpha	0.934	NA	0.875	0.726	0.794	0.924	0.735	0.96	NA	NA
CR	0.935	NA	0.876	0.74	0.797	0.927	0.742	0.96	NA	NA
AVE	0.783	NA	0.703	0.59	0.567	0.809	0.592	0.889	NA	NA

Table 4: Correlation Matrix (Discriminant Validity on the diagonal and Descriptive Statistics)

	1	2	3	4	5	6	7	8	9	10
EUSE	**0.78**	0.43	0.01	0.31	0.23	0.45	0.47	0.37	0.04	0.31
USEFUL	0.66	**N/A**	0.01	0.33	0.36	0.27	0.51	0.52	0.12	0.45
PRIVACY	-0.07	0.11	**0.70**	0.00	0.02	0.00	0.01	0.00	0.00	0.01
SECURITY	0.56	0.57	-0.07	**0.59**	0.30	0.14	0.31	0.15	0.19	0.26
DCHAR	0.48	0.60	0.15	0.55	**0.57**	0.16	0.18	0.17	0.16	0.27
UBQ	0.67	-0.52	0.03	0.38	0.40	**0.81**	0.47	0.30	0.01	0.17
COPM	0.69	0.72	-0.11	0.56	0.42	0.69	**0.59**	0.45	0.02	0.27
INTENT	0.61	0.72	-0.03	0.39	0.41	0.55	0.67	**0.89**	0.02	0.30
WILL	0.20	0.35	-0.02	0.44	0.40	0.08	0.15	0.15	**N/A**	0.12
WOM	0.56	0.67	-0.10	0.51	0.52	0.41	0.52	0.55	0.35	**N/A**

Note: EUSE – Perceived Ease of Use; USEFUL – Perceived Usefulness; PRIVACY – Privacy concern; DCHAR – Design Characteristics; UBQ – App Ubiquity; COMP – App compatibility; INTENT – Intention to use the App; WILL – Willingness to Pay for the App; WOM – Word of Mouth; APPUSE – Behavioral Usage

Table 5: Modification Indices for the Two Nested Models

Model	**χ^2**	**p-value**	**d.f.**	**χ^2/d.f.**	**RMSEA**	**NNFI**	**CFI**	**St. RMR**
CFA	572.17	0.00	227	2.52	0.078	0.953	0.967	0.052
Harman's test	10338.85	0.00	303	34.12	0.363	0.608	0.635	0.252

Table 6: Parameter Estimates and *t*-Values

Hypotheses			Parameter Estimates and *t*-Values[a]
			Model 2
			SE (*t*-Value)
H1	Usefulness	→ Usage intention	0.51 (5.87**)
H2	Ease of use	→ Usage intention	0.18 (2.42**)
H3	Ease of use	→ Usefulness	0.24 (2.51**)
H4a	Privacy	→ Usefulness	0.13 (2.11*)
H5a	Security	→ Usefulness	0.05 (0.56)
H6a	Design characteristics	→ Usefulness	0.24 (2.87**)
H7a	Ubiquity	→ Usefulness	-0.06 (-0.61)
H8a	App compatibility	→ Usefulness	0.48 (4.00**)
H4b	Privacy	→ Ease of use	-0.05 (-1.03)
H5b	Security	→ Ease of use	0.19 (2.75**)
H6b	Design characteristics	→ Ease of use	0.13 (1.94*)
H7b	Ubiquity	→ Ease of use	0.39 (5.17**)
H8b	App compatibility	→ Ease of use	0.25 (2.78**)
H9	Usage intention	→ Word of mouth	0.56 (9.11**)
H10	Usage intention	→ Willingness to pay	-0.07 (-0.75)
Control paths:			
Age		→ Usage intention	-0.13 (-2.41)
Income		→ Usage intention	0.08 (1.39)
Type of App		→ Usage intention	0.10 (1.80)
Word of mouth		→ Willingness to pay	0.39 (3.89)
R^2 - Usage intention			0.46
R^2 - Word of mouth			0.15
R^2 - Willingness to pay			0.01
R^2 - Usefulness			0.61
R^2 - Ease of use			0.60

** $p < 0.01$, * $p < 0.05$; a = critical t-values are 1.65 and 2.325 for $\alpha = 0.05$ and $\alpha = 0.01$ respectively (one-tailed test)

Drivers and Outcomes of Branded Mobile App Usage Intention

Abstract

Purpose: This study examines the drivers and outcomes of the usage intention of branded mobile applications (apps), revealing findings of theoretical and practical relevance. First, it uncovers the specific technological features that underpin the perceived usefulness and ease of use of branded apps driving (directly and indirectly) usage intention. Second, it outlines two key outcomes that are relevant to the strategic management of branded apps: willingness to recommend the app and willingness to pay to continue using the app.

Approach: This study uses data randomly derived from a panel of one million UK consumers, analyzed via structural equations modeling. The unit of analysis was individual apps prominently displaying a brand identity. The study tested indirect relationships between the key drivers considered and usage intention, via perceived usefulness and ease of use.

Findings: Consumers who view branded apps as protecting their privacy, customizable and compatible with what they do, will have stronger perceptions of usefulness and ease of use, and greater intention to use the app. These effects also occur indirectly. Furthermore, usage intention drives the willingness to recommend the app and to pay to continue using it.

Practical implications: To influence usage intention, managers can improve the perception of usefulness of branded apps by protecting consumer privacy, and improving the app's design and its compatibility with people's needs and lifestyle. Managers can also enhance the perception of ease of use of the branded app by heightening its security and ubiquity. Combined, these factors can enhance (directly and indirectly) the intention to use the app, which will lead to the willingness to recommend the app and pay for it.

Originality/value: This study extends previous research by examining factors driving the intention to use branded apps and the resulting outcomes. It also offers a model that yields predictions for individual branded apps (not the brand powering the app), thus providing practical recommendations on how to manage, in general, apps with a brand identity.

Keywords: *Branded Mobile Applications, Technology Adoption, Post-Adoption Outcomes, Mobile Marketing.*

1. Introduction

Mobile applications (thereafter *apps*) play a vital role in supporting consumer acceptance and use of mobile technologies (Tojib and Tsarenko, 2012). Apps also provide organizations with countless opportunities for establishing relationships with customers, which is in line with Sultan and Rohm's (2005) original definition of apps as "brands in the hand". More recently, Taivalsaari and Mikkonen (2015) describe the "brandification" of apps as the process of substituting the more simplistic functions available on mobile devices, such as messaging, camera and music players with custom-build apps. Such apps often become commercially popular either as standalone offers (see the example of the Spotify app for music streaming), or as extensions of existing offline brands (e.g., the Facebook app). For example, Newman, Wachter and White (2017) highlight that many retailers have the chance to reacquire or reinforce their competitive advantages through apps, especially if they are able to deliver value to consumers across multiple 'touch-points' – i.e., via ensuring that apps complement and extend physical and virtual channels. While there is still quite a long-way before apps will result in the demise of Web as a software platform, the prominence of apps in present day business ecosystems is undeniable.

Unsurprisingly, as Kim and Yu (2016) highlight, the use of branded apps as mobile communication marketing tools is increasingly common among many corporations. This strategic shift seems justified, at least in part, by the documented effect that branded apps have in relation to brand loyalty and purchase intention. In fact, branded apps are an attractive marketing tool for engaging consumers and interacting with them in a manner that has clearly surpassed the opportunities that the traditional web format can offer. However, with 3.8 million apps currently available to consumers via the Google Play Store (Statista, 2018), managers need to know which

factors can be leveraged to encourage consumers to use branded apps, and the potential outcomes of adoption that can yield concrete economic returns. Also, as Ahmed *et al*. (2016) mention, consumers download on average approximately 40 apps, but regularly use a mere 15 or fewer, with only some of them branded. This is because consumers spend half of their time using only about three favorite apps. In fact, Tarute, Nikou and Gautis (2017) remark that although the number of apps available to consumers continue to increase margins remain relatively low, possibly due to not focusing sufficiently on meeting the evolving needs of technology users. Therefore, as Bellman *et al*. (2013) highlight, the most prominent challenge for branded apps is to remain in the short-list of apps that consumers continue to use, because of their particular usefulness. Accordingly, more insights concerning branded apps are needed for businesses to make informed strategic decisions when planning the introduction of an app linked to an existing offer *or* the launch of a new branded app – e.g., to start a new business venture (see also Stocchi et al., 2017). The need for more insights concerning branded apps is also highlighted in other recent works such as Tarute *et al.* (2017) and Newman *et al.* (2017), where it is implied that although research efforts have intensified the understanding of cause and effects relationships is still rather limited.

Existing research in the mobile context can be categorized into works discovering drivers of technology adoption vs. works examining post-adoption outcomes (Nysveen *et al*., 2015). Research on adoption has been significant, although it has primarily concerned the uptake of mobile technology in general and/or specific instances of mobile technologies, such as mobile data services, mobile payments, mobile marketing and, of course, mobile apps. Importantly, as Alnawas and Aburub (2016) remark, many scholars have drawn upon the Technology Acceptance Model (Davies *et al*., 1989) to understand how and why consumers adopt apps. This

strand of research has consistently highlighted that *perceived usefulness* and *ease of use* are the key drivers of attitudes, intention to use, and actual use of mobile apps (see Kim, Yoon and Han, 2016; Tojib and Tsarenko, 2012; Yang, 2013). However, these aspects have not been explored in relation to *branded apps*, i.e. apps clearly showing a brand identity (Bellman *et al*., 2011). Moreover, drivers of adoption are often understood in relation to the brand or organisation powering the app (e.g., Chen *et al*., 2012; Chong, 2013; Cyr, Head and Ivanov, 2006), rather than for the app itself.

At the same time, existing frameworks have failed to consider important outcomes, such as satisfaction and purchase intentions, and have focused too narrowly on predicting the intentions to use the app or to continue using the app. Other outcomes beyond acceptance, such as engagement, are not fully understood. In contrast, research on post-adoption have focused on the factors that motivate consumers to continue to use the technology, and have extended the confines of the TAM model by combining it with other theoretical bases (e.g., motivation theory and expectancy theory). For example, Yang (2016) considers brand attachment and self-congruence theory, while Kim, Ling and Sung (2013), Wu (2015), and Wang, Kim and Malthouse (2016) draw on brand engagement theory. As a result, to date, there is no framework comprehensively explaining the drivers and outcomes of branded app usage intention.

Furthermore, findings of studies that examine the effectiveness of branded apps as advertising medium (c.f. Bellman *et al*., 2011) confirm the need to understand more about the drivers and consequences of branded apps usage. Finally, as Morosan and DeFranco (2016) suggest, the understanding of mechanisms that characterize consumer interactions with branded apps is becoming increasingly difficult, given that consumer–firm interactions occur seamlessly

and simultaneously across multiple channels. This is one of the reasons why scholars have been called to intensify research efforts examining branded apps.

In light of the above, understanding of the full potential of branded apps from a strategic marketing perspective clearly comes across as an underexplored issue of theoretical and practical relevance for a number of reasons. Above all, branded apps can deliver important outcomes that can yield economic returns – e.g., in the form of positive attitudes, purchase intentions, advertising response and consumer engagement (Seitz and Aldebasi, 2016; Yang, 2016). Furthermore, branded apps represent tools that firms can use to establish new connections with customers and to reinforce existing ones, creating unique customer experiences (Kim, Lin and Sung, 2013; Peng, Chen and Wen, 2014). Moreover, branded apps differ to some extent from other mobile technologies, given the considerable potential for consumer engagement and interconnectivity (e.g., Seitz and Aldebasi, 2016; Yu, 2013).

The present study contributes to existing knowledge of consumers' adoption of branded apps, focusing on technology-specific characteristics of mobile apps such as privacy, security, design characteristics, ubiquity, and compatibility as antecedents of perceived usefulness and ease of use. At the same time, it examines outcomes such as word-of-mouth (WOM) recommendation and willingness to pay for extra app features. Lastly, this study also considers indirect connections between these factors (mediation) to further enhance the understanding of the drivers and outcomes of branded app usage intention. These insights emerge from the analysis of a set of consumer panel data gathered in the UK featuring demographic information, consumer perceptions and other relevant information (e.g., intention to use, willingness to pay for the app, and willingness to recommend). The result is a robust framework that generates predictions for individual branded apps, as opposed to the brand powering the app. The

framework offers insights that are applicable to two important scenarios: i) instances of existing brands wanting to launch an app to communicate with their customers and engage them; and ii) instances of branded apps being offered and marketed to consumers as standalone offers. Accordingly, this study delivers a range of practical outcomes that offer some guidance to managerial tactics in the mobile context, especially in relation to determining product and brand management strategies that, when applied to apps, can yield economic returns.

2. Background

2.1 Existing Research on Branded Apps

Bellman *et al*. (2011) define *branded apps* as mobile apps prominently displaying a brand identity. Such apps retain the baseline technological features of mobile apps in general, while functioning also as advertising medium (see Bellman *et al*., 2011), especially in the instance of branded apps linked to an existing brand (e.g., the Facebook app). Branded apps may also compete in the marketplace as standalone offers, if inherently branded via a logo or other branded elements (e.g., color or trademark) and not linked to any existing brand (e.g., the Candy Crush Saga app; see Stocchi *et al*., 2017).

Several researchers have argued that branded apps differ from the more generic domain of mobile services and warrant separate research. Ahmed *et al*. (2016) argue that branded apps differ from other facets of mobile marketing because they are most effective at engaging consumers and facilitating brand-driven communication. Just like traditional advertising, branded apps are often impersonal and sponsored forms of communication aimed at persuasion. However, unlike traditional advertising, branded apps are ideal for interactive, controlled and

highly personalized communication, whereby the consumer becomes much more actively engaged (see also Bellman *et al*., 2011). In fact, as Kim, Lin and Sung (2013) explain, branded apps can facilitate engagement thanks to their vividness and novelty. Branded apps can also motivate consumers, thanks to features that enable control, customization and feedback mechanisms, across multiple platforms. For these reasons, as an advertising medium, apps can be highly influential (see also Calder *et al*., 2009).

According to Seitz and Aldebasi (2016), branded apps enable firms to communicate, interact and deliver messages to consumers. *Interactivity* is particularly important, as it is crucial to brand-related outcomes, such as: i) the establishment of positive attitudes towards the brand and the enhancement of purchase intention (Yu, 2013), ii) the reinforcement of relational dimensions of brand equity (Hoogendoorn, 2013), and iii) bolstering advertising response and persuasion (Bellman *et al*., 2011). Yang (2016) argues that branded apps offer a closer connection with the brand through hand-held devices embedded in consumers' lives, such as smart phones and tablets, increasing the familiarity and accessibility of brands, and offering multiple experiences to consumers. These factors, combined, ultimately result in brand attachment, and reinforce consumer-brand relationships through *engagement* and the establishment of emotional connections. Importantly, Yang (2016) elaborates that these outcomes may be obtained through the fulfillment of affective needs and self-identification. Accordingly, branded apps can create new bonds between brands and consumers, and reinforce existing relationships (Peng, Chen and Wen, 2014); they also provide unique experiences associated with the brand (Kim, Lin and Sung, 2013). In a similar vein, Jin (2016) argues that the role of branded apps has evolved beyond the provision of information and the promotion of goods and services. Namely, branded apps are often entrenched in people's lifestyle to the point

of delivering *unique brand experiences* that strengthen the connection between consumers and brands through instantaneous interactions. In light of such an enhanced role, Jin concludes that it is imperative to determine the drivers of branded apps' effectiveness.

Bellman *et al*. (2013) present some additional reflections on the importance of branded apps as advertising medium. For example, the authors highlight that branded apps favour '*pull*' *advertising strategies* and by-pass the need for opt-in permission marketing, since technically consumers access apps on their own initiative. Furthermore, branded apps provide firms with the advantage of tailored marketing, through localized and personalised information. Bellman and colleagues therefore conclude that branded apps can enhance persuasion by means of facilitating the processing of brand-related information and strengthening consumer-to-brand interactions.

The unique characteristics of branded apps described thus far add to the widely accepted belief that mobile apps, in general, create a realm of opportunities beyond the scope of the traditional mobile marketing strategies (Kim, Yoon and Han, 2014). Specifically, mobile apps have transformed the way firms communicate to consumers (Racherla *et al*., 2012) by offering personalized content that facilitates consumer engagement (Watson *et al*., 2013). As such, apps are a powerful strategic marketing tool that can generate cross-channel synergies alongside other digital advertising media, web advertisement, search-engine optimization and emails (Wang, Kim and Malthouse, 2016). Above all, since they are heavily embedded into consumers' lives, apps can achieve "what other channels cannot", such as: i) actively prompting context-dependent brand recall on a frequent basis, ii) altering the way consumers access a brand's offering by means of integration in existing routines such as repeat purchasing, and iii) triggering new consumption habits and/or reinforcing behavior.

In general, however, literature specifically examining branded apps is seriously limited (see Table 1), especially in comparison to the vast array of studies considering mobile technologies as a whole and even in comparison to research focused on mobile apps as specific instance of mobile digital technology.

Empirical research that has focused on the adoption of branded apps includes Peng *et al.* (2014). Extending the line of thought of Bellman *et al.*'s (2011) work, Peng and colleagues (2014) examine how branded apps might reinforce the pre-existing relationship between consumers and the brand powering the apps via the provision of additional stimuli and touch-points. The authors study the factors that drive the adoption of a branded app (intention to use) from the perspectives of brand relationship and consumption values, using a different theoretical basis to the widely accepted Technology Acceptance Model (TAM) (see Legris *et al.*, 2003; Porter and Donthu, 2006; Venkatesh *et al.*, 2007). Later on, Seitz and Aldebasi (2016) research consumer attitudes towards branded apps, and the relative influence on purchase intentions and usage. However, Seitz and Aldebasi's (2016) work is based on a very small student sample and their outcome variable relates to the brand providing the app, not to the app itself. Jin (2016) considers the brand powering the app as well as the branded app itself, and sheds light on some interesting dynamics. For example, branded apps often offer both cognitive and behavioral experiences. The cognitive side is fulfilled by the provision of information and knowledge about the brand powering the app and its products or services, and the behavioral side is often addressed via rich sensory experiences offered virtually. Yet, Jin's results are based on the analysis of only two branded apps, which limits significantly the scope of the implications drawn.

Empirical research examining post-adoption behavior and focusing on branded apps is relatively more substantial. However, it utilizes more disparate theoretical bases that differ substantially from the core body of research examining technology adoption through the TAM. Yang's (2016) study is a partial exception and seems to be the only work concerned with understanding the post-adoption of branded apps by extending the TAM framework through the inclusion of theoretical relationships concerning brand attachment and self-congruence. However, like Bellman *et al*. (2011) and Seitz and Aldebasi (2016), the dependent variable that Yang (2016) uses related to the brand offering the app, not to the app. Similarly, Natarajan, Balasubramanian and Kasilingam (2017) also draw upon the TAM framework to explore post-adoption matters, but focus exclusively on mobile commerce apps linked to retailers and do not clarify whether they focused on specific branded apps as opposed to apps as a whole. Their findings were also limited to one specific context (India), whereby the uptake of technology has experienced abnormal growth rates.

Morosan and DeFranco (2015, 2016) explore the value of branded apps in the context of the hospitality industry and in relation to the likely marketing functions that apps can satisfy such as advertising, distribution, CRM and so forth. These authors argue that the key rationale for hotel brands to deploy apps is the need to: i) simplify and enhance the interactions with customers and ii) acquire and manage rich information about customers. These two factors, combined, can result in the provision of a broad range of ancillary services that are also uniquely personalised and superior in quality. Yet, Morosan and DeFranco recognise that little is known in relation to what motivates consumers to share their information in exchange for personalised services that may not be entirely clear to them prior to usage. Accordingly, they focus on this particular issue and do not examine other aspects of post-adoption of branded apps. In a similar

vein, Veríssimo (2018) focuses exclusively on health-related apps (supposedly branded) and the likely effectiveness that they can have in relation to leading to better clinical decision-making, via enhancing app usage intensity.

Kim, Wang and Malthouse (2015) test empirically whether using a branded app can actually increase spending in relation to the brand powering the app, in light of rather stable pre-adoption spending patterns. However, their analysis is based on the case of one single app and post-adoption was captured within the customer base of a loyalty program; hence, their results might not be generalizable to different consumer segments and/or other branded apps.

Tarute *et al.* (2017) focus on the likely effects of consumer engagement on continued use intention for branded apps, albeit considering only a limited set of characteristics that apps might have (e.g., design and quality of the information provided) and asking research participants to think of one specific app that they routinely use, without specifying whether it had to be branded or not. In contrast, Wu (2015) presents a formalized model of customer engagement with branded apps and identifies performance expectancy (underpinned by the relationship between perceived interactivity and effort expectancy), social influence and brand identification as key drivers of continue use intention. Similarly, Alnawas and Aburub (2016) evaluate the benefits (learning, social integrative, personal integrative and hedonic) resulting from consumer interactions with branded apps – i.e., in terms of customer satisfaction and purchase intentions. Accordingly, they claim that their findings corroborate the assumption that it is essential to consider the primary motives and benefits likely to drive the use of branded apps and what consumers do with the app. Kim and Yu (2016) examine the effects of the holistic experiences that branded apps offer when it comes to fostering the relationship between consumers and brands. They draw upon a different conceptual background (i.e., brand experience theory) and by

taking into account consumer involvement. They found that affective, cognitive, behavioral and relational experiences have a significant impact on brand loyalty, moderated by involvement. Crucially, however, Wu (2015), Alnawas and Aburub (2016) and Kim and Yu (2016) offer conclusions exclusively in relation to the brand offering the app, not to the branded app itself. As mentioned earlier, this limits the scope of the implications of the results, given that many branded apps available to consumers are not necessarily linked to existing brands.

In contrast, Ahmed *et al*. (2016) and Fang (2017) focus on both the brand powering the app as well as on the branded app itself. In more detail, Ahmed *et al*. (2016) show that attitudes towards the branded app are the strongest driver of app effectiveness (captured in terms of intention to use the branded app and purchase intentions), especially directly. Accordingly, they conclude that marketers should constantly strive to improve the characteristics of the app in order to improve consumer attitudes and purchase intentions. At the same time, brand-related information should not be neglected, because it drives consumer attitudes towards the brand powering the app, which also feed into the intention to use the branded app and purchase intentions. Fang (2017) explores how the potential for consumer engagement of branded apps influences repurchase-intention for the brand powering the app and the intention to continue using the app. Although thoroughly discussed and well justified, Fang's results were effectively based only on two branded apps. In contrast, Stocchi *et al*. (2017) examine a large number of branded apps, including free and paid ones, and including apps linked to existing brands as well as standalone apps. However, they focus on a different theoretical and practical aspect, studying the relationship between app usage and app image.

Research specifically focused on branded apps also includes three conceptual studies. For example, Kim, Ling and Sung (2013) discuss on-going engagement with branded apps and

identify a number of app characteristics likely to drive the desire to "proceed to the next level" from a consumer perspective (i.e., vividness, novelty, motivation, control, customization, feedback, multi-platforming, and resonance). Zhao and Balagué (2015) present a series of assumptions concerning objectives and features that branded apps should have in order to maximize outcomes. Wang, Kim and Malthouse (2016) present a systematic literature review, but do not include any empirical result.

*** Insert Table 1 about here

In light of the above, further research is needed to fully understand and conceptualize the relationships underpinning adoption and post-adoption of branded apps. The decision to consider, simultaneously, adoption and post-adoption in the present study is based on the notion of *app lifecycle* (Böhmer *et al*., 2011; Racherla *et al*., 2012), which includes: i) adoption or discovery of apps, ii) subsequent and ongoing use of apps, and iii) outcomes of usage (e.g., making transactions, word-of-mouth etc.). Moreover, to enhance the theoretical soundness, this study introduces a theoretical framework that is drawn upon the most widely used conceptual basis, i.e. the TAM model and subsequent adaptations. The TAM model comprise of valid, reliable, responsive and easy-to-operationalize constructs (Legris *et al*., 2003; Porter and Donthu, 2006; Venkatesh *et al*., 2007) and, despite its limitations (e.g., Benbasat and Barki, 2007), it is the dominant theory, because it explains more variance in consumer intention to use and actual usage of technologies (Porter and Donthu, 2006; Venkatesh and Bala, 2008). Additionally, recent research has used the TAM model to explain the adoption of mobile services, interactive media and social media technologies in multiple contexts (Childers *et al*., 2002; Koenig-Lewis *et al*.,

2015; Muk and Chung, 2015; Siamagka *et al*., 2016; Tojib and Tsarenko, 2012). However, as Peng *et al*. (2014) state, the majority of existing studies have focused on understanding the drivers of the adoption of apps and mobile commerce in general, as opposed to focusing on understanding the likely impact of branded apps on a broader range of outcomes. Therefore, the present study introduces a comprehensive framework for examination of the drivers and outcomes of branded app usage intention, and the indirect relationships between these. Importantly, to extend the scope of the implications of this line of research, the framework includes outcomes in relation to the branded app, not the brand powering the app. Accordingly, the results may apply to a wider range of branded apps currently available to consumers.

2.2 Drivers and Outcomes of Branded App Usage

Previous research draws on TAM constructs to examine adoption of mobile marketing as a whole (e.g., Gao *et al*., 2013; Rohm *et al*., 2012), mobile commerce (e.g., Cyr *et al*., 2006; Sultan *et al*., 2009; Wu and Wang, 2005; Yang, 2005), specific services offered by mobile apps (e.g., mobile payments) (Koenig-Lewis *et al*., 2015), and mobile apps in general (e.g., Kim, Yoon and Han 2016; Tojib and Tsarenko, 2012; Yang, 2013). Lately, Yang (2016) and Fang (2017) include TAM-like theoretical links in their frameworks investigating outcomes of the adoption of branded apps, albeit focusing more markedly on outcomes for the brand powering the apps (not the app itself). Natarajan *et al.* (2017) do the same, albeit considering outcomes for the app as well. Seitz and Aldebasi (2016) have also examined mobile app usage and impact on attitude and intention to buy the brand powering the app.

In addition, extant studies have also analyzed individual factors as determinants of adoption, such as risk, personal attachment, social influence, innovativeness, product reviews by app users, sharing content, and accessing content (Gao *et al*. 2013; Kim *et al*., 2016; Koenig-

Lewis *et al*., 2015; Sultan *et al*., 2009). For example, Gao *et al*., (2013) focus on individual factors such as innovativeness, attachment and risk avoidance as moderators of the relationships between ease of use and perceived usefulness and attitude towards mobile marketing (see also Bauer *et al*., 2005; Bruner and Kumar, 2005; Pedersen *et al*., 2002; Shankar *et al*., 2010; Sultan *et al*., 2009; Tojib and Tsarenko, 2012). In a similar line, Koenig-Lewis *et al*. (2015) and Kim *et al*. (2016) examine mobile payments and usage of apps (respectively), including TAM constructs in their adoption models. Accordingly, this present study draws on the substantial body of evidence concerning basic TAM-like constructs and inherent conceptual relationships to outline the key elements of a new framework, which encompasses antecedents and outcomes of branded app adoption. The rationale for this conceptual assumption is the following. Regardless of the peculiarities of branded apps, discussed amply in the previous section, it is plausible to assume that like any other technology, perceived usefulness and ease of use of branded apps should provide the impetus to consumer motivations, perceptions, and behavioral reactions.

2.2.1 Perceived Usefulness and Perceived Ease of Use

Perceived usefulness reflects the extent to which the use of a specific technology (e.g., branded app) is advantageous, whereas perceived ease of use relates to the effortlessness and/or convenience of the use of a specific technology (Davis *et al*., 1992; Ha and Stoel, 2009; Tojib and Tsarenko, 2012). Previous research conceptualizes antecedents of *perceived usefulness* and *perceived ease of use* focusing on two streams of thought (Porter and Donthu, 2006). First, research focuses on psychological or personal traits as direct predictors (or as moderators) of perceived usefulness. For example, Gao *et al*. (2013) look at innovativeness and personal attachment as moderators of perceived usefulness and attitude towards mobile marketing. Second, other works focus on technology attributes, such as ubiquity (Lee, 2005; Tojib and

Tsarenko, 2012), as antecedents of usefulness and ease of use. This present study follows the second stream and considers the following antecedents of branded app usage as predictors of perceived usefulness and perceived ease of use: *privacy*, *security*, *design characteristics*, *ubiquity* and *compatibility*.

Perceived usefulness and perceived ease of use predict attitude and intention to use and can lead to the adoption of mobile technologies, including apps (e.g., Kim *et al*., 2016; Koenig-Lewis *et al*., 2015; Tojib and Tsarenko, 2012; Yang, 2013; Natarajan *et al*., 2017). However, some studies have highlighted that perceived usefulness is a stronger predictor relative to perceived ease of use (Koufaris, 2002; Pavlou, 2003; Porter and Donthu, 2006; Shih, 2004). More specifically, research in digital technology contexts suggests that perceived usefulness explains over 50% of variance in intention (Xiao, 2010), implying that individuals use technology products due to their functionality, as opposed to their ease of use (e.g., Venkatesh and Bala, 2008).

In the instance of branded apps, Fang (2017) has recently confirmed that perceived usefulness embodies the value that users seek, which often translates (conceptually) into the outcomes of usage – e.g., improvement of task effectiveness and efficiency (labeled "utilitarian path" in Fang's research). This is why Fang (2017) recommends including perceived usefulness in the formulation of hypotheses aimed at predicting outcomes in relation to branded apps, since it is a vital driver facilitating continuance intention and repurchase intention. Nevertheless, the literature seems to model both perceived usefulness and ease of use as predictors of intention to use certain technologies, including mobile apps (Kim *et al*., 2016; Koenig-Lewis *et al*., 2015; Venkatesh and Davis, 2000). This can be better explicated if one considers the following concrete examples of branded apps. Consumers might wish to use branded apps powering

helpful functions including access to bank accounts (e.g., HSBC app) or online catalogues (e.g., Specsavers' app with which consumers may browse and even 'try on' frames) on the basis of whether the apps are in fact useful to them (e.g., they actually wish to do banking via the app or to find new eyewear) and how easy they are to operate (i.e., depending on whether the tasks/objectives that they want to accomplish are easily manageable, in the form of taking little time or being relatively intuitive). Further, ease of use is likely to enhance the consumer's perception of how useful the branded app is (e.g., if the banking app is easy to operate, it is quite likely that the consumer using it will also consider it useful). Further evidence of the relevance of usefulness and ease of use in relation to the intention to use branded apps can be drawn from recent findings by Natarajan *et al.* (2017), who highlighted that both factors drive consumer intentions in relation to apps linked to retailers (thus branded); and Veríssimo (2018) who found the same for health-related apps (supposedly branded). Also, Tarute *et al.* (2017) have suggested that poor usability is a key factor that encourages consumers to delete or not use an app. These aspects, combined, will underpin the intention to use branded apps in the near future. Put more formally:

H1: The more useful a branded app is perceived to be, the greater the intention to use it.

H2: The easier to use a branded app, the greater the intention to use it.

H3: The easier to use a branded app, the greater its perceived usefulness.

2.2.2 Branded App Characteristics

General as well as context-specific functional characteristics shape perceptions of usefulness and ease of use of a particular technology (Kim and Garrison, 2009; Lu *et al*., 2003; Looney *et al*., 2004; Sarker and Wells, 2003). Within this study, the focus is on privacy, security, design

characteristics, ubiquity and compatibility, considered as antecedents of perceived usefulness and perceived ease of use for branded apps. As mentioned earlier, these characteristics should be inherently prominent and flexible to manage through branded apps, given their potential for interactivity and engagement (Peng *et al*., 2014; Seitz and Aldebasi, 2016). Moreover, according to Ahmed *et al*. (2016), perceptions of a branded app are a strong driver of the app effectiveness. Hence, the authors argued that marketers should constantly strive to improve the characteristics of the app in order to improve consumer attitudes and purchase intentions. The next sections present more details of the rationale supporting the theoretical links between individual characteristics of apps and the perceived usefulness and ease of use.

2.2.2.1 Privacy and Security

Scholars have examined the notions of privacy and security (e.g., Gao *et al*., 2013; Ha and Stoel, 2009; Shankar *et al*., 2010; Vijayasarathy, 2004;) and have concluded that, although related, security and privacy are conceptually distinct (Vijayasarathy, 2004). Privacy denotes the extent to which a technology is perceived to compromise privacy, while security indicates whether a technology is secure from unauthorized third parties (Ha and Stoel, 2009; Miyazaki and Fernandez, 2001; Udo, 2001).

Previous research on online shopping conceptualizes privacy and security as antecedents of usefulness and ease of use (Amin, 2007; Chen, 2008; Ha and Stoel, 2009; Pikkarainen *et al*., 2004; Polasik and Wisniewski, 2009; Wu and Wang, 2005). Similarly, Gao *et al*. (2013) conceptualize loss of privacy and security (i.e., risk avoidance) as moderators of relationships between perceived usefulness and attitudes towards mobile marketing. Shankar *et al*. (2010) argue that heightened perceptions of privacy and security can increase perceived usefulness, leading to usage intention. Furthermore, in a study examining the adoption of Internet banking,

privacy and security have been modeled as antecedents of both perceived usefulness and ease of use, and are highlighted as highly correlated (Lallmahamood, 2007). Additionally, Natarajan *et al.* (2017) confirmed that perceived risk (i.e., consumer uncertainty resulting from the perceptions of likely negative outcomes) has a negative impact on the intention to use apps linked to retailers.

More generally, branded apps that facilitate transactions, such as the Uber app or the Amazon app, have an obligation towards consumers to retain and protect sensitive information, such as credit card and billing details, phone numbers etc. Equally, social media apps, such as the Facebook and Instagram apps, offer features that protect consumers from the possible threat of third unauthorized parties accessing private information, such as photos and videos saved on their devices. To do so, branded apps use security protocols, such as pin codes, to avoid presenting users with a request to enter personal or account information every time they use the app. Such safety measures would make a branded app easy to use, limiting the cognitive effort required. This reduction in effort, in turn, may intuitively influence the perceived usefulness of the app, and most likely influence the intention to use the app. In a similar line, the extent to which a branded app ensures privacy and security of personal information stored within the app should impact the perceptions of usefulness and ease of use, leading to increased usage intentions. Importantly, Morosan and DeFranco (2016) argue that branded apps are characterized by a paradoxical combination of personalization and privacy, whereby one is not possible without bypassing the other (at least to a certain extent). Surprisingly, as they claim, the privacy-personalization dyad is not well understood and the two elements are often treated as separate (at least from a conceptual perspective), failing to mimic a fundamental aspect of any m-commerce ecosystem. Morosan and DeFranco also successfully confirm that perceptions of personalization

and privacy as well as consumer characteristics, such as innovativeness and, more general privacy concerns, predict the intention to use branded apps in the hospitality industry. Hence:

H4a/b: The higher the perceptions of (a) privacy and (b) security of a branded app, the higher the perceived usefulness.

H4c/d: (c) Privacy and (d) security of the branded app indirectly impact usage intention, through perceived usefulness.

H5a/b: The higher the perceptions of (a) privacy and (b) security of the branded app, the higher the perceived ease of use.

H5c/d: (c) Privacy and (d) security of the branded app indirectly impact usage intention through perceived ease of use.

2.2.2.2 Design Characteristics

Venkatesh and Bala (2008) argue that design characteristics or features of a technology impact acceptance (Davis, 1993). Design characteristics involve information or system-related features (DeLone and McLean, 1992) that meet users' needs and enable them to exercise control. Meeting consumer needs and empowering consumers, in turn, typically impact the perceived usefulness and perceived ease of use. For example, design characteristics of websites (e.g., options offered and customization of navigation features and browsing preferences) often allow more control over navigation, and have been found to shape user acceptance and adoption of a certain technology (Pituch and Lee, 2006; Thong *et al.*, 2002; Wu, 2014). In fact, Tarute *et al.* (2017) consider, more broadly, design solutions (e.g., in terms of aesthetics and functionalities)

among the likely characteristics of apps that can drive engagement with apps, ultimately underpinning continued usage intention.

Fang (2017) argues that beyond valuable utility, branded apps can connect consumers with brands in a different way to traditional online and mobile advertising, and branded app interactivity increases the effectiveness of brand related messages and the opportunities for customization. These two factors, in turn, strengthen the relationship between the consumer and brand, and generate greater levels of engagement (see also Kim, Lin and Sung, 2013). Intuitively, this greater potential for engagement originates from the fact that branded apps include a variety of features that allow users to customize the app in order to meet individual needs. For instance, many branded apps powering games such as the Candy Crush Saga app enable consumers to customize the app (e.g., to save their gaming preferences and scores, game avatar name, best performances, statistics on games won etc.). Similarly, branded apps linked to retailers such as Zara and H&M allow saving of browsing preferences (e.g., favorite products and styles, price ranges etc.) and past shopping lists. Thus, branded apps designed in a way that presents consumers with features for customization will result in stronger perceptions of usefulness and ease of use, and subsequently to higher usage intention. Therefore:

H6a/b: Design characteristics of the branded app are positively related to the (a) perceived usefulness of the app, and (b) perceived ease of use of the app.

H6c/d: Design characteristics of the branded app indirectly impact usage intention through the (c) perceived usefulness of the app, and (d) perceived ease of use of the app.

2.2.2.3 Ubiquity and Compatibility

Ubiquity refers to the ability of mobile devices to allow consumers to access services and applications anywhere, everywhere and when needed (Looney *et al*., 2004; Lu *et al*., 2003; Tojib and Tsarenko, 2012). Specifically, Kim and Garrison (2009) define ubiquity as an "individual's perception regarding the extent to which [a wireless technology] provides personalized and uninterrupted connection and communications between the individual and other individuals and/or networks" (p. 326). Recent research concerning advanced mobile services (which therefore include, by definition, apps) shows that ubiquity of mobile technologies positively impacts ease of use as well as perceived usefulness through the provision of convenience, efficiency and experiential value in achieving the task – conditions that ultimately increase the likelihood of app usage (Tojib and Tsarenko, 2012). Importantly, Fang (2017) hypothesizes two utilitarian factors, localization and ubiquity, which can influence apps continuance intention and brand repurchase intention through perceived usefulness. However, Fang's (2017) findings show that the role of ubiquity in increasing perceived usefulness was much more prominent.

Branded apps assisting consumers with their productivity (e.g., the Evernote app, the Outlook app, the Dropbox app, etc.) and fitness apps (e.g., Sweat with Kayla app, 7-Minutes workout app, etc.) exemplify the prominent role of ubiquity in the perception of usefulness and ease of use. The possibility to effortlessly and efficiently accomplish certain tasks will most likely result in stronger perceptions of perceived usefulness and ease of use of the branded app, and subsequently in stronger usage intentions than opportunity for localization. Therefore:

H7a/b: There is a positive relationship between the ubiquity of the branded app and its (a) perceived usefulness, and (b) perceived ease of use.

H7c/d: Ubiquity indirectly impacts usage intention through (c) perceived usefulness, and (d) perceived ease of use.

Compatibility is another characteristic that the information technology literature has examined extensively in relation to its impact on perceived usefulness and perceived ease of use (Chau and Hu, 2001; Wu and Wang, 2005). Compatibility captures notions of *operational compatibility* as well as *normative compatibility* (e.g., compatibility with the needs of the user) (Karahanna *et al*., 2006; Tornatzky and Klein, 1982). Operational or practical compatibility refers to the compatibility with what individuals do (Karahanna *et al*., 2006). Normative compatibility refers to what individuals feel or think about a technology (Moore and Benbasat, 1991; Tornatzky and Klein, 1982) and/or how it fits with their lives (Kleijnen *et al*., 2004). However, normative conceptualizations of compatibility may be confounded with perceived usefulness, since it is unlikely that individuals would perceive a technology as useful if it does not reflect a level of consistency with what they think or perceive (i.e., a relative advantage, see Karahanna *et al*., 2006; Moore and Benbasat, 1991). Previous research in the context of mobile marketing suggests that compatibility may represent either a facilitator or an inhibitor of mobile technology adoption (Shankar and Balasubramanian, 2009). Additionally, Kang *et al*. (2015) argue that compatibility of mobile apps enhances perceptions underpinned by utilitarian motives (e.g., functionality and usefulness). Thus, the extent to which individuals perceive an app to be operationally compatible and "fitting with their needs and preferences" (Kang *et al*., 2015, p. 46) will impact perceptions of usefulness and ease of use, leading to a stronger intention to use the app. Consumers perceive apps more useful and easy to use in instances where apps assist with routine tasks or activities such as accessing social media sites and news (e.g., Twitter app or BBC news app), or even

exchanging instant messages with other individuals (e.g., via messaging apps such as WhatsApp app), ultimately leading to higher usage intention. Therefore:

H8a/b: There is a positive relationship between the compatibility of the branded app and (a) perceived usefulness, and (b) perceived ease of use.

H8c/d: App compatibility indirectly impacts usage intention through (c) perceived usefulness, and (d) perceived ease of use.

2.2.3 Intention to Use Branded Apps

Conventional thought (Davis, 1989; Fishbein and Ajzen, 1981) confirms that usage intention underpins the adoption or uptake of a technology. This has also been tested in relation to branded apps and other mobile technologies (Bellman *et al*., 2011; Kim, Kim and Wachter 2013; Seitz and Aldebasi, 2016; Porter and Donthu, 2006). At the same time, strong usage intentions are likely to drive re-use intentions, which is particularly key in the context of mobile apps given the gradual "buying" experience resulting from app features (Jarvenpaa *et al*., 2003; Miluzzo *et al*., 2010; Mylonopoulos and Doukidis, 2003). That is, consumers often first download the free baseline version of a certain app; then, they are asked if they wish to update and/or upgrade the app, paying a small fee to continue using the app or to improve it (e.g., to remove in-app advertisements). For examples, many branded apps powering games or DIY artwork can be trialed for free and then upgraded to no-ads for a fee (e.g., the Solitaire game app) or require a fee to continue using them (e.g., the Colorfy app for drawing).

In addition to the above, it is not uncommon for consumers to use apps intermittently, i.e. occasionally stopping usage of an app and then eventually resuming its use depending on several contingent factors. For instance, a consumer might download and use an app for public transport

in a specific city that they are visiting for work or leisure, and stop using it upon their departure, only to re-use it again during another trip. In fact, Venkatesh, Thong and Xu (2012) argue that in the context of technology acceptance, embracing the habit/automaticity perspective implies that "repeated performance of a behavior produces habituation and behavior can be activated directly by stimulus cues" (p. 164). This means that, on subsequent occasions, an automatic response without conscious or cognitive mediation (i.e., attitude or intention) might occur.

Intention to use mobile technologies also leads to other marketing outcomes such as satisfaction, loyalty and and/or word of mouth (WOM) (e.g., Ellonen *et al*., 2009; Gruen *et al*., 2006; Kim *et al*., 2013; Samson, 2010; Seitz and Aldebasi, 2016). WOM refers to informal communication of a specific product or service to other consumers (e.g., Christodoulides *et al*., 2012; Sun *et al*., 2006; Westbrook, 1987), and has been extensively researched in online and mobile communication domains (Okazaki, 2008, 2009). Previous research indicates that intention to recommend an app to others has also been confirmed as result of the likelihood to use mobile apps (Xu *et al*., 2015; Newman et al., 2017).

Combining the reflections presented thus far concerning the likely cyclical nature of apps usage (especially in relation to the possibility to pay for a branded app, either to upgrade its features or to continue using it) and the likely impact on outcomes such as word-of-mouth, it is plausible to assume that:

H9: The higher the usage intention of the branded app, the greater the likelihood to recommend it to other consumers, family and friends.

H10: The higher the usage intention of the branded app, the stronger the willingness to pay for the app.

Figure 1 shows the resulting conceptual model comprising all research hypotheses. The model also includes two control variables that this study tests for completeness: i) the type of branded apps, classed as either *hedonic* or *utilitarian* (Childers *et al*., 2002), mimicking the distinction that Bellman *et al*. (2011) use; and ii) consumer demographics (e.g., age and income), in line with Yang (2013). Controlling for the type of branded app is particularly important, since a similar distinction has been made in the analysis of how consumers interact with Internet-based technologies, and given that branded apps offer further opportunity for such a distinction in terms of the possible creative styles that can be executed (c.f. Bellman *et al*., 2011). Moreover, Peng *et al*. (2014) remark that it is widely accepted that apps satisfy the utilitarian and non-utilitarian needs of consumers, and that this facilitates the consumers' decision to use a branded app. The usage itself exposes the consumer to several favourable features, which can bolster the feelings and attachment between the consumer and the brand, exerting positive effects such as sense of belongingness and sameness with the brand. In fact, there are many cases of branded apps linked to an existing brand are launched to establish and/or maintain a connection between the brand and its customers. In doing so, however, it is paramount that branded apps extend the pool of values that the brand delivers and strive for high quality. In fact, Bellman *et al*. (2013) argue that delivering to consumers an informational or utilitarian app that they can continue to find useful is much more challenging than offering an experiential app with the sole aim to entertain and engage consumers. Moreover, making sure that consumers notice a branded app may be extremely difficult, given that there are thousands of apps available to them. Accordingly, the present study posits that controlling for the type of branded app is paramount.

*** Insert Figure 1 about here

The next section presents the methodology used to validate this model and the empirical results obtained, together with a discussion of the key implications of this study.

3. Methods

3.1 Data Collection

Data for this study were collected in 2015, using an online questionnaire. Responses were acquired through a commercial provider (Smart Survey), which administered the survey to a random sample derived from a panel of 1 million UK consumers (screening criteria: 18 years of age and above). The use of panel data is very common in academic literature with a multitude of studies researching branding using panel data. Such research often obtains results from larger response sizes than obtained from student and convenience samples, which ultimately offers greater representativeness of the relevant populations (e.g., Devasagayam *et al*., 2010; Norberg *et al*., 2011; Paredes *et al*., 2013; Peng, Cui and Li, 2012; Simon *et al*., 2016). For the present study, a total of 335 responses were collected. However, to ensure that the profile of respondents fitted the objectives of this research, the analysis excluded responses by people who indicated that they did not own and/or use a technological device powering apps, such as smart phones and/or tablets. This approach is in line with recent research such as Tarute *et al.* (2017), Natarajan *et al.* (2017) and Newman *et al.* (2017). A total of 253 valid and usable responses remained, and the sample consisted of 43.1 per cent males and 56.9 per cent females. The profile

of the sample was well spread between the income and education levels (see Table 2), in line with the profile of the relevant population (UK users of mobile technologies such as apps).

Respondents were presented with a list of the most used apps in the UK taken from AppAdvise.com (accessed in February 2015) to ensure respondents' familiarity with the branded apps. The list included 10 paid-for and 10 free apps. Importantly, the apps presented all prominently displayed a brand identity (see also Bellman *et al*., 2011) and included SNS apps, games and utilities (e.g., maps). Respondents were then asked to choose an app that they knew and to answer a series of questions about the app they chose (see also Tarute *et al.*, 2017). Respondents were given the option to indicate an app of their choice, if they did not know any of the apps in the list. The frequency of selection of the individual apps is presented in Appendix A.

The unit of analysis was individual branded apps, which reflected a deliberate analytical decision underpinned by the desire to generate a conceptual model yielding predictions for the actual app, as opposed to the brand powering the app. Other studies have followed a similar approach (e.g., Peng *at al*., 2014; Stocchi *et al*., 2017; Wu, 2015) and have extended the scope of the implications drawn in light of the existence of many branded apps that are "stand-alone" – i.e., not necessarily linked to an existing brand (e.g., the Spotify app). Nonetheless, when testing the hypothesized relationships, no distinction was made between which branded app respondents chose. Instead, as mentioned earlier, the analysis controlled for the type of the app chosen and whether it fulfilled utilitarian or hedonic needs (Childers *et al*., 2002). This distinction was based on the combination of two factors: i) the insights that emerged from qualitative exploratory research (not reported in this study, but part of a broader project), where 22 participants discussed and evaluated the main purpose for which they use different apps (e.g., utilitarian or hedonic), and ii) the verbatim responses that respondents provided in the questionnaire in

relation to the open-end question: "*In your view, what is this app for? E.g., to complete a task, pass time, connect with others etc.*". Bellman *et al*. (2011) made similar assumptions, and highlighted that this distinction should be determined exogenously (i.e., not within the analytical framework) in order to capture consumer perceptions more accurately. This assumption also allowed capturing more variance, thus producing a more generalizable model.

*** Insert Table 2 about here

3.2 Measures

In order to compare the outcomes of this study against the results of previous research concerning the adoption of mobile technologies and relative post-adoption outcomes, this study derived most measures from existing research or established conventions, as follows (see Appendix A for a detailed list of all measurement items). Measures of perceptions of privacy, security, design characteristics, ubiquity and operational compatibility were all captured using a 1-5 Likert scale (strongly disagree to strongly agree) and were based on the works of Miyazaki and Fernandez (2001), Park and Kim (2003), Wu (2014), Tojib and Tsarenko (2010), and Wu and Wang (2005), respectively. Importantly, the selected measures provided some of the most suitable advancements concerning enablers of technology adoption, which was in line with the aims of the proposed conceptual framework. For the antecedents, this study referred back to the seminal work of Davies *et al*. (1989), adapting the items of perceived usefulness and ease of use to the context of this study (i.e., phrased in terms of branded apps, e.g. "*I find this app useful*" and "*I find this app easy to use*" etc.), which were also measured using a 1-5 Likert scale. Finally, the measure of usage intention was based on Chen *et al*. (2012) and adapted for branded

apps. As far as the post-adoption outcome measures are concerned (i.e., likelihood to recommend and willingness to pay for the app), this study relied upon established conventions and opted for two simple measures. Likelihood to recommend the app (WOM) was measured by asking the following questions: "*How likely are you to recommend mobile apps to friends and family?"* "*How likely are you to provide feedback through online ratings and/or reviews?*" (captured with 5 point scales). Willingness to pay for the app was measured using the questions: "*I am willing to pay to keep using this app*" and "*I am willing to pay a small fee for the app upgrades*". The decision to use these simple measures was based on recent remarks concerning the need to use parsimonious outcome variables to develop theoretically sophisticated models, and to achieve stronger statistical control of potential confounders (see Hayduk and Littvay, 2012). Moreover, in other areas of research on intention, such as on buying behavior, intention scales are often interpreted as simple probability indicators or chances for outcomes of interest to occur (e.g., Wright and MacRae, 2007).

All measures were subject to standard reliability and CFA statistical checks in order to identify the items to be retained for modeling purposes. The process resulted into two single-item measures as outcome variables, which were nonetheless deemed appropriate (see Littvay, 2012).

4. Analysis and Results

4.1 Measurement Model

The first step of the analysis included testing for the validity and reliability of all measures via confirmatory factor analysis using Lisrel 8.71 and the maximum likelihood estimation (MLE) method (Jöreskog and Sörbom, 1993). The results of the CFA test provided in Table 3 indicated a good model fit: χ^2 (227) = 517.227; χ^2/df = 2.52; p = 0.00; RMSEA = 0.078; NNFI = 0.953; CFI = 0.967 and Standardized RMR = 0.05 (e.g., Bentler and Chou, 1987; Bollen, 1989). Moreover, Cronbach's alpha for the multi-item measures indicated good internal consistency as all values exceeded the recommended threshold of 0.7 (Nunnally, 1978). Furthermore, where possible, constructs were submitted to convergent validity and discriminant validity tests. Factor loading estimates, composite reliabilities (CR) and percentages of variance extracted (AVE) indicated construct validity with factor loadings for all measurement items significant at 1 percent level (or better) and values for CRs and AVEs were all above the recommended thresholds of 0.60 and 0.50 (Bagozzi and Yi, 1988) (see Table 3).

Discriminant validity was assessed using Fornell and Larcker's (1981) test, which requires comparison of the shared variance between each pair of constructs to the value of AVE. As Table 4 indicates, discriminant validity was obtained for each of the construct used[1], as all AVE values (where available) are greater than the square of the correlations between each pair of constructs.

[1] Except for the measures that reduced down to a single-item, following reliability and CFA.

*** Insert Table 3 and 4 about here

To exclude concerns of potential common method variance (CMV), the analytical procedure deployed a combination of two approaches: one procedural and one statistical (Podsakoff *et al*., 2003). First, the use of standard survey procedures ensured clarity of questioning and minimized respondent fatigue through the use of different response formats. Second, in terms of statistical remedies, the Harman's single-factor test (Podsakoff *et al*., 2003) ensured the absence of any potential common method bias. No single factor was found, which indicated that CMV was not a threat: the CMV single factor model fit was poor: χ^2 (303) = 10338.85; χ^2/df = 34.12; p = 0.00; RMSEA = 0.363; NNFI = 0.608; CFI = 0.635 and Standardized RMR = 0.252; and the improvement in model fit on moving from the CMV single factor model to the six-factor model was significant ($p < .01$) (see Table 5). Moreover, since the Harman's test is not without criticism, as a precaution, the analysis also considered marker variable testing (Lindell and Whitney, 2001). The assessment of correlations between the constructs and the marker variable *"How often do you see mobile apps adverts in store/retailer/service provider?"* returned non-significant and low correlations (the highest for perceived ease of use: -0.86). Taken collectively, these results lead to the conclusion that CMV does not pose a threat in this study.

*** Insert Table 5 about here

4.2 Hypotheses Testing Procedure

To test the hypotheses presented in the conceptual model, this study used LISREL 8.71 with a covariance matrix as input data and a maximum likelihood estimation method. Table 6 presents the details of the path estimates and *t*-values for the chosen unrestricted model. In line with previous research, the results confirmed the basic TAM model relationships. Specifically, in line with H1, the relationship between app usefulness and the intention to use the branded app was positive and significant ($t = 5.87$; $p < 0.01$). Perceptions of ease of use also had a direct positive effect on the intention to use the branded app (H2) ($t = 2.42$; $p < 0.05$). In addition, the results highlighted a positive and significant relationship between perceptions of ease of use and usefulness of a branded app (H3) ($t = 2.51$; $p < 0.05$).

Furthermore, the results indicated that privacy (H4a), design characteristics (H6a) and compatibility (H8a) increase the perceived usefulness of the branded app ($t = 2.11$; $p < 0.05$; $t = 2.87$; $p < 0.01$ and $t = 4.00$; $p < 0.01$, respectively). Conversely, perceptions of security (H4b) and ubiquity (H7a) do not have an effect on perceptions of usefulness of the branded app. With regard to the effect on perceived ease of use, the results showed that perceived security (H5b) ($t = 2.75$; $p < 0.05$), design characteristics (H6b) ($t = 1.94$; $p < 0.05$), ubiquity (H7b) ($t = 5.17$; $p < 0.01$) and compatibility (H8b) ($t = 2.78$; $p < 0.05$) positively impact the perceptions of ease of use of the branded app. Finally, the results showed that the intention to use the branded app positively impacts the willingness to spread word of mouth (H9) ($t = 9.11$; $p < 0.01$). On the contrary, results showed that willingness to pay is not affected by intention to use, but that WOM leads to willingness to pay.

*** Insert Table 6 about here

4.3 Mediation Analysis

This study also included an examination of the potential mediation paths between privacy, security, design, ubiquity and compatibility on intention, via perceived usefulness of a branded app and ease of use of branded apps. The model results highlighted the following: Privacy, design, and compatibility all returned significant positive effects on perceived branded app usefulness (β Privacy→Usefulness =.13, p<.05; β Design→Usefulness =.24, p<.001; β Compatibility→Usefulness =.48, p<.001 respectively). Similarly, security, design, ubiquity and compatibility all returned significant positive effects on ease of use of the branded app (β Security→Ease of Use =.19, p<.05; β Design→Ease of Use =.13, p<.05; β Ubiquity→Ease of Use =.39; β Compatibility→Ease of Use =.25, p<.05 respectively). Furthermore, perceived usefulness and ease of use both had positive significant effects on the intention to use the branded app (β Usefulness→Intent =.51, p<.001; β Ease of Use→Intent =.18, p<.05 respectively). This led to significant positive indirect effects of: i) privacy, design and compatibility on usage intention, through perceived usefulness (β Privacy→Usefulness→Intent =.06, p<.05; β Design→Usefulness→Intent = 0.12, p<.001; β Compatibility→Usefulness→Intent = 0.24, p<.001); and ii) security, design, ubiquity and compatibility on usage intention via ease of use (β Security→Ease of Use→Intent =.003, p<.01; β Design→Ease of Use→Intent = .02, p<.01; β Ubiquity→Ease of Use→Intent = .07, p<.05; β Compatibility→Ease of Use→

Intent = 0.05, p<.05). Hence, these results provided support for all mediation hypotheses, except H8c, H7c, H5c, H5d.

5. Discussion

5.1 Theoretical Implications

This study deals with a topical issue, and fills a research gap in the domain of branded apps by examining a broad spectrum of factors that impact usage intention for branded apps, leading to the intention to recommend the app to others and to pay for the app. It also highlights that the willingness to pay for a branded app is affected by the willingness to spread word of mouth about it. Therefore, the contribution and value of this research is that it extends current knowledge on branded apps, which thus far has only seldom considered drivers of usage, has approached post-adoption through the use of alternative conceptual bases, and has often predicted outcomes in relation to the brand powering the app, as opposed to the branded app itself. More generally, this study contributes to existing research examining adoption and post-adoption of mobile apps. The implications and significance of the findings are explained in greater detail here below.

Considering research that has examined mobile apps as a whole, to a great extent, the outcomes of this study are broadly consistent with some of the key outcomes of Tojib and Tsarenko (2012) who found that ubiquity, enjoyment, ease of use and time convenience drive the experiential value that consumers attach to advanced mobile services, which ultimately impacts technology use (with customer satisfaction as a mediator). The results are also in line with Yang's (2013) findings for young consumers and with the key effects highlighted by Kim, Yoon

and Han (2014) and Bellman *et al*., (2011). Moreover, the findings align with Wang and Li (2012) and Seitz and Aldebasi (2016), who found that in the broadest context of mobile commerce, the features of a supporting technology drive purchase intentions.

Considering the broadest domain of knowledge on technology adoption, this study makes several additional contributions. First, previous research has focused primarily on individual and psychological factors (e.g., innovativeness, attachment) as moderators of the relationships between perceived usefulness, perceived ease of use, attitudes, intention to use or adoption (see Gao *et al*., 2013; Sultan *et al*., 2009; Tojib and Tsarenko, 2012). In contrast, this study offers new insights by modeling context-specific antecedents of perceived usefulness and perceived ease of use which impact usage intention, and by examining both direct and indirect effects. Additionally, this study has considered the willingness to recommend the app and to pay for it as additional outcomes. In this way, the findings of the study complement previous research (Porter and Donthu, 2006; Venkatesh and Davis, 2007; Venkatesh and Bala, 2008), suggesting that consumers who perceive specific technologies as more useful and easier to use will have a higher usage intention than those with lower perceptions.

Second, the results of this study show that the extent to which consumers think that a branded app ensures their privacy will determine the degree to which they will view it as highly useful to achieve a specific goal leading to stronger usage intentions. However, the results also show that consumer perception of the branded apps as secure, ubiquitous and allowing customization can shape the consumer perception of the branded app being effortless and easy to use, leading to stronger usage intentions. This unexpected outcome can be explained by considering the following example. Branded apps linked to social media such as Facebook and Instagram: i) guard consumers' privacy and commit to protecting their information, ii) offer to

consumers several functions anytime, anywhere (e.g., posting photos, sharing information etc.), and iii) provide several options for customization (e.g., through decisions on news feed display mode and content priority, etc.). This study indicates that these characteristics, combined, do not affect the performance or productivity for consumers (e.g., perceived usefulness), but allow them to access and use the app with ease.

Third, this study also extends the understanding of the likely outcomes of usage intention in the context of technology adoption, and sheds light on the link between two key outcomes: willingness to recommend the branded app and willingness to pay for the branded app (e.g., to continue using it). Specifically, this study shows that usage intention of a branded app will lead to increased intention to recommend the specific app to other consumers, but does not affect willingness to pay to continue using the app. This result can be explained as follows. Consumers who intend to use and then actually use a branded app might want to talk about it with other consumers, family and friends to give their opinion and recommendation. Conventional thought clearly indicates that word-of-mouth is a powerful driver of consumer decisions, including in the context of web and digital technologies (e.g., Riegner, 2007). In the specific instance of branded apps, this study reveals that word-of-mouth influences also the willingness to pay for the app.

More generally, to the best of the knowledge of the authors of this article, to date, only two frameworks concerning the adoption of technologies in line with basic TAM-like relationships included mediation analyses: Porter and Donthu (2006) and Tojib and Tsarenko (2012). Importantly, Tojib and Tsarenko (2012) presented a model describing post-adoption of advanced mobile services, in which ease of use, enjoyment and time convenience mediated the effect of ubiquity and experiential value. Tojib and Tsarenko provided extensive theoretical explanations for this outcome and argued that consumers may base their decision to continue

using advanced mobile services on motivational factors, which emerge from the beliefs of the benefits that can be gathered from those services. The results of the present study suggest that perceived usefulness and perceived ease of use should be factors influencing a branded app's usage on an on-going basis, creating the impetus for future intentions and other important outcomes. In more detail, in accordance with Tojib and Tsarenko's (2012) arguments, it appears that specific features of branded apps (i.e., privacy and security safeguarding, design characteristics, ubiquity, and compatibility) have a greater influence when combined with perceived usefulness and perceived ease of use.

Finally, this study confirms the findings of previous research in relation to the role of operational compatibility of a certain technology as predictor of perceived usefulness and ease of use (Karahanna *et al*., 2006). Specifically, the results show that the extent to which a branded app is compatible with what consumers do, will encourage them to see the app as useful and easy to use, thus leading to stronger usage intentions. For example, a branded app which tracks the weather worldwide (e.g., the Weather^{+} app) is perceived useful for people who travel a lot, and a branded app for diet and exercise coaching (e.g., the Weight Watchers' app) is seen as useful by consumers who want to monitor and improve their health.

5.2 Practical Implications

Branded apps have become an invaluable resource for companies, past beyond the "nice to have" point, acquiring a crucial role in the marketing-channel mix and overall customer-company interaction process at the heart of mobile marketing strategies. An increasing number of consumers use branded apps (Aberdeen Group, 2014), driving advantageous business performances, because they enable engagement and interaction with customers (e.g., Wang, Kim and Malthouse, 2016; Yang, 2016;).

Much of the existing research prior to the present study has offered rather general insights of limited practical relevance to business interested in effectively using branded apps within their mobile marketing strategies. A key problem in previous research was the fact that predictions were made primarily in relation to the brand powering the apps, as opposed to the branded app itself. By contrast, this study yields findings that are specifically tailored to the strategic handling of a branded app and obtaining desired outcomes for it, and therefore, increasingly relevant to managers. In particular, the results of this study are insightful for the identification of specific characteristics of branded apps such as privacy and security, which seem to clearly impact consumer perceptions of whether the app will be useful and effortless, and, hence, drive consumer intentions to use in the near future. Additionally, the empirical findings of this work clearly suggest that usage of a branded app leads to WOM recommendations and willingness to pay for the app. This study also shows that different characteristics shape perceptions of usefulness compared to perceptions of ease of use. Lastly, another important finding with practical relevance is that usage intention of branded apps increases the likelihood of recommendation, thus reinforcing the relevance of branded apps in the context of mobile marketing strategies.

Taken together, the practical implications described here can be translated into a series of strategic guidelines for developers and managers of branded apps. Above all, this study suggests that developers and managers should focus on characteristics of branded apps that can shape perceptions of usefulness and ease of use, as they lead to stronger usage intentions and valuable outcomes. In more detail, it is possible to encourage consumers to see a branded app as useful by improving the app's features that: i) protect the privacy of consumers, ii) offer a good design and enhanced navigation opportunities in the form of customization and user-control, and iii) match

their needs and lifestyle. For example, global brands such as British Airways and AirBnB are consistently investing in the improvement of their apps, offering seamless solutions that safeguard sensitive information and provide great customization-potential (e.g., the British Airways app stores travel preferences, additional travel information besides the flight, and much more). These branded apps truly deliver what the consumer wants (e.g., the Air BnB app offers relevant information for an enjoyable experience as "local" tourist anywhere in the world). Importantly, opportunities for customization and compatibility with consumer needs also enhance the perception of ease of use, which can be further encouraged by emphasizing that the app: i) is available anytime and anywhere, and ii) allows safe storing of sensitive information (i.e., protected against unauthorized parties). For instance, branded apps that help the consumers with finding services and shops "on the go", such as the Foursquare app, offer customized functions in line with people's location, and meet consumers' most immediate need regardless of where they are (i.e., around the corner from home or at an overseas holiday destination). While offering consumers with such opportunities is certainly advantageous, the app should also shield sensitive consumer information (e.g., exact geographical location) from any third party. Finally, it seems very important to bolster the features of branded apps that will encourage consumers to see them as useful and easy to use, because it will also entice consumers to talk about the app. Besides being an important outcome of its own, this study clearly indicates that word-of-mouth in relation to branded apps is also pivotal to persuading consumers to pay for the app (i.e., to continue using it). Such an outcome yields important implications to justify mobile marketing investments and to support strategies aimed at the constant improvement of a branded app. Crucially, the practical implications are equally applicable to branded apps attached to an existing brand as well as "standalone" apps, which is a distinction that previous research has

often neglected by focusing excessively on the benefits of apps for the brand powering them. Furthermore, the implications are feasibly relevant in equal manner for utilitarian apps and hedonic apps.

5.3 Limitations and Future Research

In spite of the interesting findings of this study, a number of limitations must be acknowledged. First, while the study examines context-specific characteristics as antecedents of perceived ease of use and perceived usefulness (and is therefore different from research in similar domains), psychological variables that may moderate the relationships studied were not captured. Hence, future research may focus on specific psychological or other moderators of these relationships, such as involvement or attachment with the branded app. Second, this study controlled for the type of branded apps (i.e., utilitarian or hedonic, determined a priori). However, the research design and sample did not allow a more in depth comparison of likely differences between other possible distinctions. Therefore, future research may include formal analyses of the possible moderation effects occurring for different types of branded app. Future studies may also use a multi-group SEM approach to compare different models to shed more light on specific drivers and outcomes of usage intention for different types of branded apps. For example, replications of this work could take into account more practical distinctions such as looking at branded apps linked to social media vs. branded apps linked to retailers and service providers, or the distinction between free and paid apps (see also Stocchi *et al*., 2017). Third, this study examines intention to recommend the app as an outcome of usage intention. Future research may examine how recommendations or reviews by others influence, in return, usage intention. Fourth, another potential limitation of the study is the focus on operational compatibility, as opposed to normative compatibility of apps. Such an assumption may have had impact on perceived

usefulness and ease of use, and could be considered in future replications. More specifically, further research should perhaps model both types of compatibility as separate antecedents. Fifth, the outcome variables included in the measurement model for this study reduced down to a single item. While this is not uncommon in empirical research (see Littvay, 2012), future research could relax the assumptions made on the need to use parsimonious outcome variables and revert to more complex measurement items. Finally, future research should also look into the concepts of consumer engagement, in line with some of the intuition by Yang (2016) (but applied to the branded app itself, not the brand providing the app), testing empirically the propositions by Kim, Ling and Sung (2013) and Wang, Kim and Malthouse (2016).

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Appendix A

Measurement items:

Variables	Items
Privacy (Adapted from Miyazaki and Fernandez, 2001)	• The app shares personal information to other companies (R) • The app tracks my habits (e.g. online purchases and searches) (R) • The apps places cookies on my device(s) (R) • The app causes me to being contacted by companies without providing consent (R) • The app raises some general privacy concerns for me (R)
Security (Adapted from Miyazaki and Fernandez, 2001)	• My private information is managed securely when using this app • I am sure that payment information will be protected when using this app • This app provides detailed information about security • I am afraid that my private information will be utilized in an unwanted manner when using this app (R)
Design characteristics (Adapted from Wu, 2014)	• This app provides more options for me to meet my needs • This app allows me to choose different features • This apps gives me greater control over customization
Ubiquity (Adapted from Tojib and Tsarenko, 2010)	• I can use this app anytime • I can use this app anywhere • I can use this app when needed
Compatibility (In line with Park and Kim, 2003; and Wu and Wang, 2005)	• This app is compatible with the technology of my device(s) • This app adapts to and fits to the size of the screen
Perceived usefulness (Adapted from Davis *et al.*, 1989)	• Using this app improves my performance in my daily life • Using this app increases my productivity in my daily life • Using this app enhances my effectiveness in my daily life • I find this app useful
Perceived ease of use (Adapted from Davis *et al.*, 1989)	• Learning to operate this app is easy for me • I would find it easy to get this app to do what I want it to do • It would be easy for me to become skilful at using this app • I find this app easy to use
Usage intention (Adapted from Chen *et al.*, 2012)	• I intend to use this app in the next two months • It is likely that I will use this app in the next two months • I expect to use this app in the next two months
Likelihood to WOM	• How likely are you to recommend the mobile app to friends and family? • How likely are you to provide feedback through online ratings and/or reviews?
Willingness to pay	• I am willing to pay to keep using this app • I am willing to pay a small fee for the app upgrades

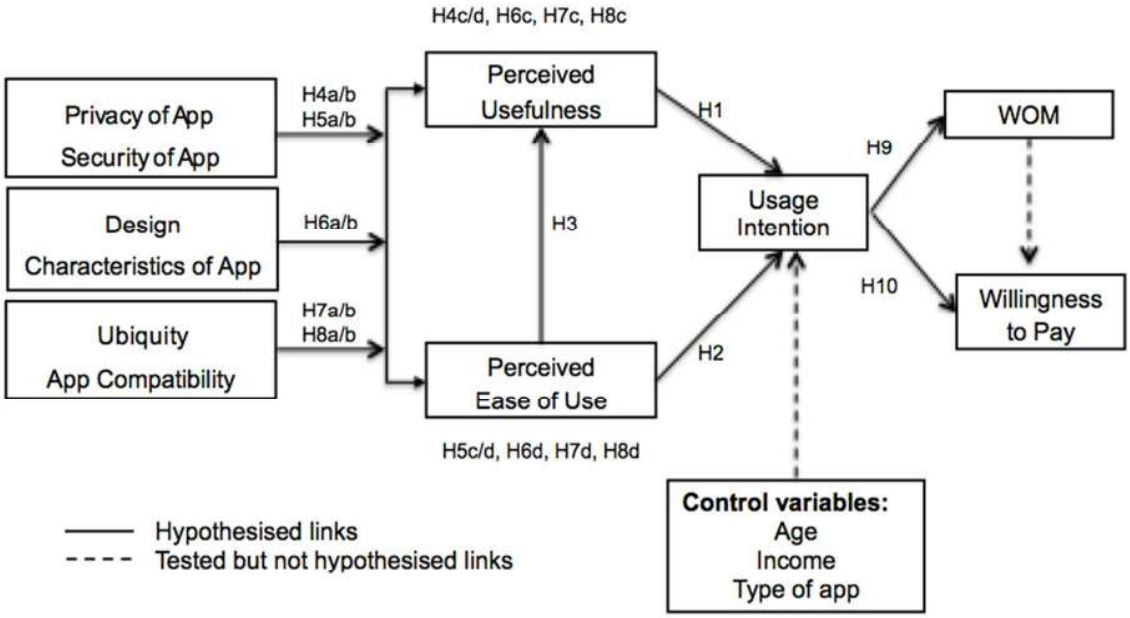
Note:
The notation (R) stands for items whereby the resulting scores were reversed (negative perceptions).

Frequency of selection of branded apps and apps type:

Branded Apps	% of sample	Hedonic or utilitarian
Facebook	29	Hedonic
WhatsApp	16	Utilitarian
Facebook Messenger	10	Utilitarian
Google Maps	9	Utilitarian
YouTube	8	Hedonic
Other (specify)	5	-
Skype	4	Utilitarian
Instagram	4	Hedonic
Spotify Music	3	Hedonic
Snapchat	2	Hedonic
7 Minute Workout Challenge	2	Utilitarian
Minecraft - Pocket Edition	2	Hedonic
Sleep Cycle Alarm Clock	2	Utilitarian
Fantasy Premier League 14/15	2	Hedonic
Heads Up!	1	Hedonic
Tinder	1	Hedonic
Football Manager Handheld	1	Hedonic
Afterlight	0	Utilitarian
Cut the Rope 2	0	Hedonic
Plague Inc.	0	Hedonic
Facetune	0	Utilitarian

Figures

Figure 1: Conceptual Model



Tables

Table 1: Overview of current research specifically focused on branded apps

Empirical vs. non-empirical	Authors and year	Brief description of the research	Focus on the brand powering the app vs. the branded app	Focus on adoption vs. post-adoption
EMPIRICAL	Bellman et al. (2011)	Drawing upon persuasion and attitudes theory, the authors use an experimental design to **predict patterns in attitudes and purchase intentions for the brand offering the app**. The framework takes into consideration app usage, the type of the app (experiential vs. informational) and consumer involvement with the product category.	Brand powering the app	Adoption
	Peng, Cheng and Wen (2014)	Embracing the theory of consumer-brand relationship and the theory of consumption values, the authors predict the **intention to use the branded app**.	Branded app	Adoption
	Morosan and DeFranco (2015, 2016)	The authors recognise that little is known in relation to **what motivates consumers to share their information in exchange for personalised services**, which may not be entirely clear to them prior to usage. Accordingly, the authors focus on this particular issue in the context of branded apps for hotels.	Brand powering the app	Post-adoption
	Seitz and Aldebassi (2016)	Using a basic Theory of Planned Behaviour framework, the authors examine attitudes towards brands offering a branded app and capture the influence that using a branded app has on **purchase intentions towards the brand (not the app)**.	Brand powering the app	Adoption
	Jin (2016)	The authors link individual consumers' characteristics (e.g., innovativeness) with the **intention to adopt/use a branded app** and **attitudes towards the brand powering the app (not the app itself)**. They used experimental design applied to two cosmetics brands and their apps.	Both	Adoption
	Alnawas and Aburub (2016)	Using a user gratification approach and other conceptual basis (e.g., motivation theory), the authors predict the influence of the apps' interaction-based benefits over **satisfaction and purchase intentions towards the brand powering the app**.	Brand powering the app	Post-adoption
	Kim and Yu (2016)	Drawing upon brand experience theory, the authors predict the effects that the brand app and its characteristics have on **loyalty towards the brand powering the app**, as moderated by media involvement.	Brand powering the app	Post-adoption
	Ahmed, Beard and Yoon (2016)	The authors link i) cognition, attitudes and intentions towards the brand powering the app, and ii) cognition, attitudes and intentions towards the app	Both	Post-adoption

		itself, with **purchase intentions for the brand and the intention to continue using the branded app**.		
	Yang (2016)	The author plugs notions from brand attachment and self-congruence theories into basic TAM relationships to predict the level of attachment to the brand offering a branded app. Specifically, this work reveals entertainment, perceived usefulness, credibility, perceived value and irritation (negative impact) as **drivers of brand attachment**.	Brand powering the app	Post-adoption
	Kim, Wang and Malthouse (2016)	Using data from the loyalty program of one firm, the authors compare spending patterns following the adoption of the branded app. The key findings indicate an **increase in spending**, regardless of differences in the pre-adoption spending.	Brand powering the app	Post-adoption
	Fang (2017)	The authors present a very thorough examination of the factors that drive **the re-purchase intention for the brand powering the app and the intention to continue using a branded app**, combining a utilitarian path (known TAM-like relationships) with an engagement path (beyond valuable utility).	Both	Post-adoption
	Stocchi Guerini and Michaelidou (2017)	Drawing upon known patterns that link brand image and brand usage, the authors **compare different types of apps** (free vs. paid; and linked to existing brands vs. branded independently) **and their market performance**.	Branded app	N/A
	Tarute, Nikou and Gatautis (2017)	Drawing upon consumer engagement theory the authors examine the impact of specific characteristics of apps (e.g., design, functionality and social features) as determinants of consumer engagement itself and also the intention to continue using the app. The research is based on a survey where respondents could choose an app of their liking and most apps chosen (as reported) were, in fact, branded.	Branded app	Post-adoption
	Natarajan, Balasubramanian and Kalisingam (2017)	The authors extend the confines of the basic TAM relationships to include perceived risk (negative weight) and perceived innovativeness (positive weight) as drivers of consumer satisfaction and price sensitivity in relation to retailers powering an app and intention to use the app	Both	Post-adoption
	Newman, Wacheter and White (2017)	This research links the ease of use of apps linked to retailers and the connection that consumers develop with the app, as drivers of the intention to make purchases via the app and recommend the app, whilst considering the moderating effect of app usage frequency.	Both	Post-adoption
	Verissimo (2018)	The author focuses on health-related apps (supposedly branded) and illustrates how ease of use and usefulness of such apps	Branded app (supposedly)	Post-adoption

		can intensify their use ultimately leading to greater effectiveness of the app in relation to better clinical decision-making.		
NON-EMPIRICAL	Wu (2015)	The authors draw upon customer engagement theory and present an empirical model, which depicts **continue to use intention for branded apps** as outcome of: i) performance expectancy (underpinned by the relationship between perceived interactivity and effort expectancy); ii) social influence; and iii) brand identification.	Branded app	Post-adoption
	Kim, Ling and Sung (2013)	The authors do not present any empirical findings; rather, they present a series of assumptions that require testing by drawing upon customer engagement theory. Some of the key aspects highlighted are linked to **customer engagement via branded apps**, and include: vividness, novelty, motivation, control and customization, feedback opportunities, multi-platforming and resonance.	Brand powering the app	N/A
	Zhao and Balague (2015)	The authors do not present any empirical findings; however, they review a series of **key success factors for branded apps**; they also include a classification of different types of branded apps; and a list of key strategic objectives that branded apps should have (e.g., mobile features, social features and brand mentioning features).	N/A	N/A
	Wang, Kim and Malthouse (2016)	The authors present a systematic literature review that highlights the potential of branded apps in the context of **brand engagement and advertising**.	Brand powering the app	N/A

Table 2: Respondents Profile

	n	Percentage %
Gender		
Male	109	43.1
Female	144	56.9
Age		
18-24	17	6.7
25-34	55	21.7
35-54	147	58.1
55+	34	13.4
Income		
Less than £10,000	52	20.6
£10,000 to £19,999	55	21.7
£20,000 to £29,999	46	18.2
£30,000 to £39,999	37	14.6
£40,000 to £49,999	21	8.3
£50,000 and more	16	6.3
Prefer not to say	26	10.3
Education		
GSCE	64	25.3
Further education (e.g., A Levels, GNVQ, BTEC)	88	34.8
Undergraduate degree (e.g., BA, BSc)	64	25.3
Postgraduate degree (e.g., postgraduate certificate, masters or doctoral	30	11.9
Prefer not to say	7	2.8

Table 3: Statistics for the Constructs

	Ease of use	Usefulness	Privacy	Security	Design characteristic	Ubiquity	Compatibility	Usage Intention	Willingness to Pay	Word of Mouth
Mean	4.01	3.87	3.001	3.34	3.35	3.99	3.89	4.16	2.57	3.72
SD	0.81	0.93	0.99	0.78	0.78	0.76	0.74	0.92	1.3	1.1
Cronbach's Alpha	0.934	NA	0.875	0.726	0.794	0.924	0.735	0.96	NA	NA
CR	0.935	NA	0.876	0.74	0.797	0.927	0.742	0.96	NA	NA
AVE	0.783	NA	0.703	0.59	0.567	0.809	0.592	0.889	NA	NA

Table 4: Correlation Matrix (Discriminant Validity on the diagonal and Descriptive Statistics)

	1	2	3	4	5	6	7	8	9	10
EUSE	**0.78**	0.43	0.01	0.31	0.23	0.45	0.47	0.37	0.04	0.31
USEFUL	0.66	**N/A**	0.01	0.33	0.36	0.27	0.51	0.52	0.12	0.45
PRIVACY	-0.07	0.11	**0.70**	0.00	0.02	0.00	0.01	0.00	0.00	0.01
SECURITY	0.56	0.57	-0.07	**0.59**	0.30	0.14	0.31	0.15	0.19	0.26
DCHAR	0.48	0.60	0.15	0.55	**0.57**	0.16	0.18	0.17	0.16	0.27
UBQ	0.67	-0.52	0.03	0.38	0.40	**0.81**	0.47	0.30	0.01	0.17
COPM	0.69	0.72	-0.11	0.56	0.42	0.69	**0.59**	0.45	0.02	0.27
INTENT	0.61	0.72	-0.03	0.39	0.41	0.55	0.67	**0.89**	0.02	0.30
WILL	0.20	0.35	-0.02	0.44	0.40	0.08	0.15	0.15	**N/A**	0.12
WOM	0.56	0.67	-0.10	0.51	0.52	0.41	0.52	0.55	0.35	**N/A**

Note: EUSE – Perceived Ease of Use; USEFUL – Perceived Usefulness; PRIVACY – Privacy concern; DCHAR – Design Characteristics; UBQ – App Ubiquity; COMP – App compatibility; INTENT – Intention to use the App; WILL – Willingness to Pay for the App; WOM – Word of Mouth; APPUSE – Behavioral Usage

Table 5: Modification Indices for the Two Nested Models

Model	**χ^2**	**p-value**	**d.f.**	**χ^2/d.f.**	**RMSEA**	**NNFI**	**CFI**	**St. RMR**
CFA	572.17	0.00	227	2.52	0.078	0.953	0.967	0.052
Harman's test	10338.85	0.00	303	34.12	0.363	0.608	0.635	0.252

Table 6: Parameter Estimates and *t*-Values

Hypotheses			Parameter Estimates and *t*-Values[a]
			Model 2
			SE (*t*-Value)
H1	Usefulness	→ Usage intention	0.51 (5.87**)
H2	Ease of use	→ Usage intention	0.18 (2.42**)
H3	Ease of use	→ Usefulness	0.24 (2.51**)
H4a	Privacy	→ Usefulness	0.13 (2.11*)
H5a	Security	→ Usefulness	0.05 (0.56)
H6a	Design characteristics	→ Usefulness	0.24 (2.87**)
H7a	Ubiquity	→ Usefulness	-0.06 (-0.61)
H8a	App compatibility	→ Usefulness	0.48 (4.00**)
H4b	Privacy	→ Ease of use	-0.05 (-1.03)
H5b	Security	→ Ease of use	0.19 (2.75**)
H6b	Design characteristics	→ Ease of use	0.13 (1.94*)
H7b	Ubiquity	→ Ease of use	0.39 (5.17**)
H8b	App compatibility	→ Ease of use	0.25 (2.78**)
H9	Usage intention	→ Word of mouth	0.56 (9.11**)
H10	Usage intention	→ Willingness to pay	-0.07 (-0.75)
Control paths:			
Age		→ Usage intention	-0.13 (-2.41)
Income		→ Usage intention	0.08 (1.39)
Type of App		→ Usage intention	0.10 (1.80)
Word of mouth		→ Willingness to pay	0.39 (3.89)
R^2 - Usage intention			0.46
R^2 - Word of mouth			0.15
R^2 - Willingness to pay			0.01
R^2 - Usefulness			0.61
R^2 - Ease of use			0.60

** $p < 0.01$, * $p < 0.05$; a = critical t-values are 1.65 and 2.325 for $\alpha = 0.05$ and $\alpha = 0.01$ respectively (one-tailed test)