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An Extension of Theory of Planned Behavior for in-App Advertisements: The Case of Vietnamese Young Mobile Users

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Abstract

In-app advertisement is a fast-growing trend in mobile advertising, where user acceptance of ads is facilitated by the fact that users have voluntarily downloaded the app through which the ad is served. However, research in this ad category is limited. This study applies an extended version of the theory of planned behavior. Analysis results from 412 young mobile users in Vietnam using structural equation modeling showed that while localization and perceived enjoyment affected user intention to watch in-app ads as expected, perceived behavioral control and trust did not. Such results may be due to embedding the ads to applications, confusing users' behavioral intentions. The results underline the need for more future research in the area. In practical terms, companies should improve localization and entertainment aspects of ads to create more relevant and engaging advertisements.

Keywords : In-App Advertisements, Mobile Advertising, Personalization, Localization, Timeless, Innovation, Perceived Enjoyment and Theory of Planned Behavior

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1. Introduction

Firms use mobile applications for promotion, special discount offers, customer relationship management and new customer attraction [Cheung and To, 2016, 2017; Feng et al., 2016]. The increasing use of these applications has promoted in-app advertisements (in-app ads) as a new marketing channel [Gutierrez et al., 2018; Lu et al., 2019; Shankar et al., 2016]. In-app ads often take the form of banners or location-based ads [Bhave et al., 2013]. The purpose of in-app ads is similar to other mobile marketing tools, which convey messages about products/services and impacts users' perceptions.However, in-app ads are different from other promotion methods such as text message, OR codes or Bluetooth advertising since they can offer more relevant and specific advertisements for consumers [Bhave et al., 2013; Meng et al., 2016]. In addition, in-app ads support users in searching information about products or services since they have become an important source of information for many consumers [Lu et al., 2019; Megdadi and Nusair, 2011; Kaplan and Haenlein, 2010]. In-app ads also plays an important role for the development of m-Commerce [Kim et al., 2016b].

Advertising using mobile devices has grown in frequency and importance in recent years [Kapoor et al., 2018; Muk and Chung, 2015; Shareef et al., 2018]. As with other advertising, however, users of mobile devices do not necessarily welcome promotions on their devices [Chen et al., 2009; Liu et al., 2012; Wong and Tang, 2008]. This holds for in-app advertising as well [Halligrimson, 2016] users have been found to be less interested in using apps when those apps come with advertising [Ghose and Han, 2014]. Understanding aspects of mobile users' acceptance of in-app ads will help firms and application developers reduce negative responses from users and encourage users to watch in-app ads, which then could bring benefits for both firms and potential customers.

Although many previous studies have studied mobile marketing, relatively few studies have examined the antecedents of using in-app ads. They have been conspicuously absent in research constructs since mobile marketing has often been used as a single, monolithic concept [Bauer, 2005], making the specific contribution of in-app ads invisible. Therefore, this study aims to study particularly in-app ads. The research question of this study is "*what factors encourage mobile application users to accept and watch in-app ads?*" To answer this research question, we extend the theory of planned behavior (TPB) of Fishbein and Ajzen [1975] to identify the factors and conditions that drive mobile users to watch in-app ads.

Besides examining whether TPB can be applied to explain the users' motivation to watch in-app advertisements in Vietnamese context, we aim to create a comprehensive model based on the findings from previous studies on trust, user personality and mobile advertisement characteristics. Hence, we propose a chain of relationships among mobile advertising characteristics, users' trust, attitudes, intention, and behavioral responses. We suggest an extension of the TPB for in-app advertisements and provide recommendations for practice regarding how to make in-app advertising more effective by focusing on facets of the TPB. Such recommendations may be helpful since in-app ads are an emerging area of promotional activity.

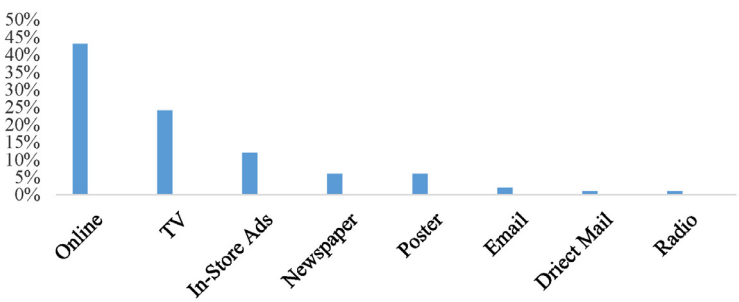
Mobile devices are by now a primary means

of accessing the Internet for many people around the world, and particularly in developing countries such as China, India, and Vietnam [Muralidharan et al., 2015; To and Lai, 2015]. In Vietnam, the approximate number of mobile subscriptions is 136 million, including 37 million using 3G, and around 50 million using the Internet in 2017 [MIC, 2018; Statista, 2019]. These figures are also constantly increasing which is due to the increasing demand for internet access and use of mobile data services. Most people (92% of respondents) use smartphones as the main tool to access the Internet based on the results of the survey of Ministry of Industry and Trade (2019). In terms of device brand, Samsung controlled 38.44 percent of the market share, with Chinese brands OPPO (25.2%) and Xiaomi (10.2%) offering competing devices. A notable new arrival is the domestic company Vsmart that gained a 2.9 percent market share in a short time interval [GFK market research 2019].

In Vietnam, the Internet is the primary means by which people become aware of products and services (see <Figure 1>), and because people conduct more activities on their phones than on PC's, they are more frequently accessing the Internet by their phones. Additionally, one marketing study reports that Vietnamese are especially patient to watching pop-up ads [Vneconomictimes, 2019]. This makes Vietnam a promising market for online advertising, and mobile devices are key to delivering this advertising. Accordingly, mobile advertising is expected to increase by 68% in 2020. Part of this advertising is delivered through in-app ads, and the growth of such type of advertising (mainly in the form of video and display ads) was 50~70% in 2017 [Q&Me, 2019].

The growth of the Vietnamese e-Commerce market is around 26% per year with the transaction value reaching more than 8 billion USD in 2018 [IDEA, 2019]. Indeed, booming online shopping combined with increased online activities such as social networking has created a large mobile advertisement market in Vietnam. Thus, Vietnam is a practically useful case for this research topic. At the same time, it offers a pristine environment to study the antecedents of in-app ads, as the country is a transition economy and marketing in a business context has a short history in the country.

The paper is structured as follows. The theoretical background and the hypotheses of the study are presented in the next section. The research methodology, which includes the survey instrument, data collection and sample characteristics, is then presented in Section 3, followed by data analysis in Section



Source: Vietnam Digital Advertising Report (Adsota, 2018).

<Figure 1> First Touchpoints with Ads

4, the results in Section 5 and the discussion and contributions in Section 6. The paper concludes with theoretical and practical implications and the limitations of the study.

2. Theoretical Background and Hypotheses

2.1 Overview of in-app Advertisements

In-app advertising is based on mobile marketing, where companies are targeting potential customers through mobile channels with marketing information [Gutierrez et al., 2018; Shankar et al., 2016, Varnali and Toker, 2010]. Mobile marketing relies on the traditional direct marketing concept of understanding consumers'needs and filtering information about their products and services to answer those needs for particular consumer groups [Grewal et al., 2016]. Such a targeted approach has been previously used in online advertising, where understanding about consumer needs is generally based on analysis of website user behaviors through cookies and other similar tools. Although mobile devices also use the Internet, making online advertising relevant also for such devices, the difference of mobile advertising to online advertising is that consumer data and marketing information are delivered over mobile devices rather than stationary access devices [Lin et al., 2016].

As mobile devices are typically more personal than stationary digital devices such as desktop PCs, they are more amenable to be used in pull-type marketing where, instead of being randomly selected for mass marketing messages, individuals receive targeted marketing messages [Dhar and Varshney, 2011; Nasco and Bruner, 2008, Yang et al., 2013]. While desktop PC's can have multiple different users, mobile devices normally have just one defined user. This makes it more realistic to assume that a given website visitor is the same visitor who used that device last time when visiting the site, improving marketing personalization. In turn, personalized marketing can save marketing costs and improve customer retention because consumers receive more relevant information for their individual situations.

Alongside personalization, the other main feature of mobile advertising is the possibility for localization [Li and Du, 2012; Yun et al., 2013]. Mobile devices are taken with the user potentially everywhere, and as marketing opportunities often surface based on consumers' geographical position, knowledge about location can be exploited to make advertisement messages more relevant for consumers. Data from cellular base stations and GPS systems give the technical means to locate consumers to target them for advertising, often related to the proximity of products and services ready for consumption. Taken together, personalization and localization, along with timeliness of the ad in relation to the existence of user need [Ho et al., 2011], are the primary means by which marketers can address relevance in mobile advertising. However, despite the available tools, creating this relevance remains a challenge for marketers [Marketing Zeitgeist, 2012].

In-app advertising is a form of mobile advertising relying on an application to deliver the advertising message on a mobile platform. It can be argued that this type of advertising is like the "adware" concept, where the provider of software will offer it for free in exchange for embedding advertisements on it that will be served to users of the software. Therefore, users accept to watch the em-

bedded advertisements in exchange for enjoyment or utility from the application. The additional value of the method in comparison with mobile advertising is potentially greater user acceptance [Altuna, 2009; Bart et al., 2014], although this tends to depend on individuals' trust in this kind of ads [Cheung and To, 2017], but it may also be possible to create more relevant ads due to the link with the application. For example, customer targeting may be based on interest toward the app and engagement with the app using touchscreen and camera [Meng et al., 2016]. If the app uses location information, then this information can also be applied in advertising [Li and Du, 2012; Yun et al., 2013]. Additionally, some apps facilitate in-app purchasing, making it natural to advertise on such a platform [Ghose and Han, 2014].

Although in-app ads have special features, ultimately, their worth can be considered in similar ways as other advertising, that is, whether app users are interested in the ad,and take steps for further engagement with the company (e.g. touch the ad to be redirected to a website or be provided with more ad content). An individual's motivation to deepen engagement may differ; for instance, the ad may be highly relevant to the individual's current need (due to personalization, localization, and timeliness of the ad), leading them to seek more information to purchase; but it may also be a pleasure-seeking motivation to enjoy more ad content, or curiosity toward the ad itself [Feng et al., 2016]. From the perspective of the company, it is most desirable to foster engagement that stems from purchase intentions, but engagement not linked with purchase intention may also be valuable in order to nurture brand awareness and positive attitudes toward the brand.

2.2 Characteristics of in-App Advertisements, User Personality and User Attitude

In-app advertisements utilize applications as the channel through which marketing information is delivered to customers. As applications can be run on any mobile device such as a smart phone, pad, or tablet, in-app ads are a very versatile marketing method. As mobile devices are highly personal and are often carried along by consumers, in-app ads can precisely target consumers and are very suitable for personalized marketing [Leppaniemi and Karjaluoto, 2005; Feng et al., 2016]. In-app ads often have certain characteristics in order to create significant influence on user attitudes [Lu et al., 2019]. In this study, three important characteristics of in-app advertisements are investigated, which are timeliness, localization and personalization.

Timeliness (TMS) is the ability of advertisements to provide information that is timely for potential customers of products or services [Hourahine and Howard, 2004]. Timeliness is a major determinant of advertising effectiveness [Ho et al., 2011]. As consumers often carry their mobile devices, advertising messages can be sent in a more selective and timely manner through the app and can therefore create more positive attitudes.

Localization (LOC) is the provision of information based on user location [Kaasinen, 2003]. The Global Positioning System (GPS) connections in devices make it easy for marketers to determine users' location and suggest appropriate services. Therefore, localization can increase the relevance of advertising messages to user needs through location determination, positively affecting their attitudes [Li and Du, 2012; Yun et al., 2013].

Personalization (PRS) refers to the degree

that advertisements are customized to reflect users'personal characteristics such as preferences, needs, lifestyles and cultural characteristics [Leppaniemi and Karjaluoto, 2008]. For example, collection of user information from use of the app can foster personalization [Meng et al., 2016]. Personalized marketing is beneficial in in-app ads [Yang et al., 2013] as it increases the likelihood that users will accept the advertising [Altuna, 2009; Bart et al., 2014]. Personalization is achieved through creating specific personal benefits to users (or user segments) so that positive attitudes, and in turn, positive purchase behavior, can be promoted [Feng et al., 2016].

Therefore, we hypothesize the following:

H1a: Timeliness is positively related to attitudes toward in-app advertisement.
H1b: Localization is positively related to attitudes toward in-app advertisement.
H1c: Personalization is positively related to attitudes toward in-app advertisement.

In addition to these mobile advertisement characteristics, we consider two other factors of consumer personality, which are consumer innovativeness and perceived enjoyment [Bauer et al., 2005]. People who have a curious nature have a tendency to search for novelty [Ryan et al., 1999]. Prior studies found that consumer innovativeness (INV), which is defined as the degree to which consumers are receptive to new products, services or practices, is a driver of adoption of new technologies [Reis, 1994]. Innovativeness in advertisements can offer unprecedented service experiences for customers, which fosters their positive attitudes. Thus, advertisement innovativeness can be an important factor to motivate mobile users to accept in-app ads.

Perceived enjoyment (ENJ) refers to the extent that the use of services/products is perceived to be enjoyable. Enjoyment is a sense of pleasure, and it can arouse consumers' interest in the advertisement and advertised products. For in-app advertisements, enjoyment can come from the entertainment value of the ad [Xu et al., 2016]. Entertaining advertisements bring pleasure and create more positive attitudes. As a result, perceived enjoyment can motivate consumers to accept advertisements.

Therefore, we hypothesize the following:

H1d: Consumer innovativeness is positively related to attitudes toward in-app advertisement.
H1e: Perceived enjoyment is positively related to attitudes toward in-app advertisement.

2.3 Trust (TRU)

Trust refers to users' beliefs that a service can meet their needs. As beliefs about a service are underpinned by broader perceptions regarding the firm, it is also the degree of certainty that a customer has in a company's sincerity and its willingness to honor its promises to that customer [Flavian and Guinaliu, 2006]. Previous studies [Becerra and Korgaonkar, 2011; Elliott and Speck, 2005; Gvaili and Levy, 2016] found that when users believed in the vendor's honesty, they were easily convinced by the benefits of products/services through advertisements. A recent study in Hong Kong showed that trust affected the attitude and the intention to watch in-app advertisements of young mobile users [Cheung and To, 2017]. As a result, users may come to know more about advertised products.

Thus, we hypothesize the following:

H2a: Trust is positively related to attitudes toward in-app advertisements.
H2b: Trust is positively related to intention to watch in-app advertisements.
H2c: Trust is positively related to users' behavioral responses in watching in-app advertisements.

2.4 Theory of Planned Behavior (TPB)

The theory of planned behavior (TPB) has been used to predict and explain peoples' behavior in several fields [Cheung and To, 2016; 2017; Jiang et al., 2016; Kim et al., 2016a Pavlou and Fygenson, 2006]. Essentially, TPB links an individual's attitude, subjective norm, and perceived behavioral control to intention toward a behavior as well as the actual behavior [Ajzen, 1991].Intention is the degree of readiness and willingness to act or promote actual action [Ajzen, 1991]. Attitude is defined as a positive or negative evaluation of the behavior, and strongly predicts the intention as well as the behavior [Ajzen, 1991; Fishbein and Ajzen, 1975]. Previous studies in several research fields expand TPB to add new factors such as trust [Pavlou et al., 2006] and personalization [Xu, 2016].

2.4.1 Attitude (ATT), Subject Norms (SUB), and Perceived Behavioral Control (PBC)

When consumers develop a favorable attitude toward in-app ads, they are happier about and more attracted to watch in-app ads as one information channel before making their purchasing decisions. Kim et al. [2013] found that positive attitudes toward online ads reduced advertisement avoidance. In addition, a person ho having higher positive attitudes toward in-app ads may be more willing to spend time on assimilating information from the ads [Cheung and To, 2017; Raines, 2013].

Subjective norms reflect the influence of relatives, family members and friends to users' intention on performing actions [Wei et al., 2009]. Consumers who perceive themselves to be heavily influenced by their peers (including their spouse, friends, and relatives) are more prone to follow the behavior of these peers. For example, if a person' friends, colleagues or family members watch in-app ads, it is likely that the person will copy their action [Li et al., 2012].

Perceived behavioral control shows the perceived ease or difficulty in performing actions and depends on users' experience as well as future expectations [Ajzen, 1991; Cheung and To, 2017]. In this study, perceived behavioral control was defined as the lack of resources (e.g. time, money, availability of access device and Internet connection) to watch in-app ads. In another words, high perceived behavioral control regarding in-app ads is associated with lower intention to watch in-app ads [Cheung and To, 2017].

Thus, we hypothesize the following:

H3a: Attitudes toward in-app ads is positively related to intention to watch in-app ads.
H3b: Subjective norms is positively related to intention to watch in-app ads.
H3c: Perceived behavioral control is negatively related to intention to watch in-app ads.

2.4.2 Intention to Watch in-App Ads (INT) and Behavioral Responses (RES)

According to Ajzen [1991], behavior is a

function of compatible intentions. Therefore, the stronger an individual's behavioral intention, the more likely it is for that person to take the actual behavior. Intention is the degree of readiness and willingness to act or promote actual action [Ajzen, 1991]. Previous studies in e-Commerce show that consumers who often watch advertisements more likely perform actions advocated by advertisements [Lee and Turban, 2001]. For in-app advertisement particularly, Cheung and To [2017] also found evidence of strong intention influencing users' behavioral responses. A user's intention to watch in-app advertisements may lead to desirable actions such as making a purchase or forwarding an in-app advertisement to friends. Thus, we hypothesize the following:

H4: Intention to watch in-app advertisements is positively related to behavioral responses

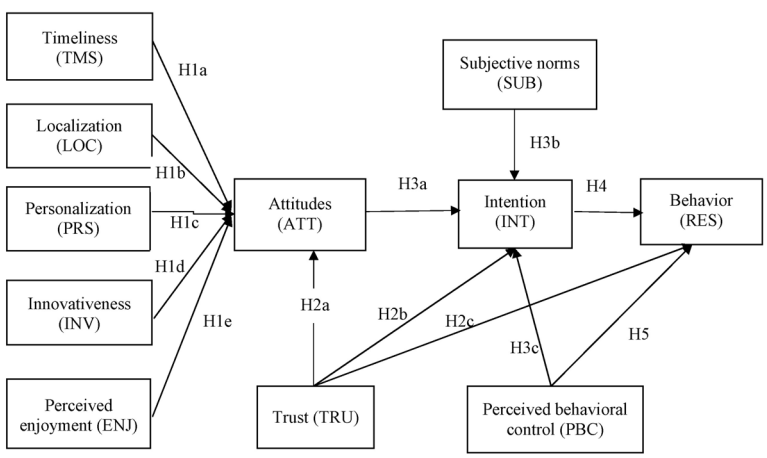
2.4.3 Perceived Behavioral Control and Behavioral Responses

Perceived behavioral control is the perception of favorable or unfavorable conditions in purchasing process such as: the ease or readiness to access the system and facilitators or barriers to use the system. Generally, if users have more information available to them about a company's offerings, for example through in-app ads, they might be more likely to buy the company's products [Vorderer et al., 2016]. Thus, we hypothesize the following:

H5: Perceived behavioral control is negatively related to behavioral responses.

2.5 Research Model

Based on the preceding literature review, the conceptual framework of this study integrates timeliness (TMS), localization (LOC), personalization (PRS), innovativeness (INV), perceived enjoyment (ENJ), attitudes (ATT), subjective norms (SUB), trust (TRU), perceived behavioral control (PBC) and intention (INT) as antecedents of the behavioral responses of people to watch in-app ads (RES) in a comprehensive framework, which is depicted in 〈Figure 2〉. The hypothesized relationships were tested and validated by the data collected from Vietnam.



〈Figure 2〉 Research Framework

3. Methodology

3.1 Development of the Survey Instrument

The survey method was used to collect data and test the hypotheses. The constructs were adapted from previous literature, explained as follows. Timeliness was measured by four items based on Ducoffe [1996], Merisavo et al., [2007] and Feng et al. [2016], localization and personalization were both measured by four items based on Merisavo et al. [2007] and Feng et al. [2016], innovativeness was measured by five items based on Goldsmith and Hofacker [1991] and Feng et al. [2016], perceived enjoyment was measured by four items based on Ducoffe [1996] and Feng et al. [2016]. The trust construct was adapted from Lee and Turban [2001] and Cheung and To [2017], and was evaluated using four items.

In the TPB model, the "attitude" construct was evaluated using six items from Lai and Huang [2011] and Cheung and To [2017], the "subjective norm" construct was evaluated by four items from Ajzen [1991] and Izquierdo-Yusta et al. [2015], the "intention" construct was measured using four items from Ajzen [1991] and Cheung and To [2017], and the "behavioral response" construct was measured by five items from Cheung and To [2017]. All items were measured using a five-point Likert scale, anchored by 1: strongly disagree and 5: strongly agree.

The items in the questionnaire were translated from English to Vietnamese using the back-translation technique to ensure the reliability of the translation process. The content validity of questionnaire was also considered through a discussion with five customer behavior experts. In addition, a pilot test was conducted with twenty students in Hanoi before conducting the official survey to evaluate the questions. The final questionnaire is described in appendix A.

3.2 Data Collection and Sample Characteristics

The survey was conducted from March to May in 2018 in the three largest cities of Vietnam, which were Hanoi (the Capital in the North), Da Nang (in the Central region), and Ho Chi Minh City (in the South). The targeted respondent group was young mobile users from 18 to 30 years old, because this group has been a fast adopter of ICT services compared to other age groups [Harris et al., 2005; Cheung and To, 2017]. In Hanoi, we asked the lecturers of the Foreign Trade University and the National Economics University to help us to distribute 300 questionnaire sheets. We received 176 valid answers in return. In Da Nang and Ho Chi Minh City, we used the online survey method by emailing the questionnaire link to lecturers

〈Table 1〉 Demographic Profile of Respondents (N = 412)

Criteria	Components	Number	Percentage
Age Group	〈 20	9	2%
	20~25	274	67%
	25~30	129	31%
Gender	Males	144	35%
	Females	268	65%
Education	High school	9	2.20%
	Undergraduate	277	67.20%
	Bachelor's degree	61	14.80%
	Masters' degree or above	65	15.80%
Career	Students	271	84.40%
	Employees	102	24.80%
	Others	35	8.50%
Average time using Internet daily	〈 2h	41	10%
	2~<4h	106	25.70%
	4~6h	154	37.40%
	〉 6h	111	26.90%

of Economics in the University of Da Nang and lecturers of Marketing in the University of Finance (Ho Chi Minh city). These lecturers were asked to forward the survey link to their undergraduate and/or graduate students. After the preliminary screening of responses, we obtained 412 valid responses for the analysis process (see 〈Table 1〉). The sample size surpassed the number of 400 to ensure the reliability of the research [Comrey and Lee, 1992; Hair et al., 2006].

4. Data Analysis

4.1 Common Method and Non-Response Bias

When the research uses only a survey to collect data, it can cause common method bias or parameter bias estimation which can influence the validity of research conclusions or the true relationship between constructs [Podsakoff et al., 2003]. Thus, we applied different solutions to reduce effect of common method bias. Following the suggestion of Podsakoff et al. [2003, 2012], we first used anonymous respondents to collect data, and then designed the items carefully to avoid ambiguous items. The items were asked alternately in positive or negative ways (e.g. do you like it? or don't you like it) to control for acquiescence and disacquiescence biases [Podsakoff et al., 2012].

After data collection, we used Harman's test to evaluate common method bias in the data collected. The result of the test indicated that the total variance explained was smaller than 50% (it was 39.8%) which proves that common method bias did not affect the results of the study.

Non-response is a problem for surveys that affects the research results. In this study, in order to examine non-response bias, we used t-test to compare early respondents and late respondents at the rate of 70:30 [Armstrong and Overton, 1977]. There was no difference between the two groups (p-value 〉 0.05). These test results suggested that response bias was not a concern in our research.

4.2 Data Analysis Methods

We used exploratory factor analysis (EFA) to assess discriminant validity among constructs in the model. The criteria for EFA was KMO greater than 0.5, p-value (Bartlett's test) lesser than 0.05,and the factor loadings of each item. We also used Confirmatory Factor Analysis (CFA) in order to test the research validity. The model does fit well with data if Chi-square/df is smaller than 3, CFI, TLI and IFI are greater than 0.9, and RMSEA is smaller than 0.08 [Hair et al., 2010; Kline, 2015, Hooper et al., 2008]. The factor loading in every factor should be higher than 0.5 to achieve convergent validity [Hair et al., 2010]. In testing reliability, Composite Reliability (CR) and Cronbach's Alpha should be greater than 0.7 and Average Variance Extracted should be greater than 50% [Hair et al., 2010]. Finally, to test the hypotheses, we used Structural Equation Model (SEM) with statistical significance at 5%.

5. Results

5.1 Discriminant Validity

5.1.1 For Independent Variables

We used EFA to test discriminant validity of constructs in the model. The findings indicated that the items of independent variables in the model converged into eight components as in the proposed model (〈Table 2〉).

The results also showed that the EFA analysis is consistent with the actual data: KMO = 0.936 (〉 0.5), Bartlett's test has p-value = 0.000 (〈 0.05), the factor loadings of each construct were larger than 0.5, and the total variance explained (TVE) was 73.066% (larger than 50%). This leads to the conclusion that the items which wereused to measure independent variables reached convergent and discriminant validity.

5.1.2 For Dependent Variables

Regarding dependent variables (i.e. ATT, INT and RES), the result analysis showed that all KMOs were larger than 0.5, Bartlett's test had p-value 〈 0.05, factor loadings were larger than 0.5, and variance was larger than 50% (〈Table 2〉). This indicated that the items used to measure dependent variables were uni-dimensional scales and reached discriminant validity.

5.2 Reliability and Validity of Constructs

The results from CFA indicated that the model fit indexes were accepted (Chi-square/df = 2.025 〈 3; CFI = 0.936; TLI = 0.927; IFI = 0.936 all were larger than 0.9 and RMSEA = 0.050 was less than 0.08), showing that the model achieved the overall fit index to actual data [Hair et al., 2006; Hooper et al., 2008; Kline, 2011]. The factor loading of each item was larger than 0.6, which showed that the constructs in the proposed model reached convergent validity [Hair et al., 2006]. Cronbach's Alpha and Composite Reliability foreach construct were greater than 0.7 and the Average Variance Extracted was greater than 50% (except INV), which indicated that the constructs were reliable [Kline, 2011], as shown in 〈Table 3〉.

〈Table 2〉 The Analysis Result

Constructs	Items	Factor loadings
Independent variables (KMO = 0.936, p-value 〈 0.001 , TVE = 73.066%		
Subjective norms (SUB)	SUB3	0.833
	SUB1	0.826
	SUB2	0.816
	SUB4	0.684
Trust (TRU)	TRU2	0.739
	TRU1	0.732
	TRU3	0.700
	TRU4	0.693
Localization(LOC)	LOC2	0.772
	LOC3	0.734
	LOC4	0.704
	LOC1	0.641
Timeliness(TMS)	TMS3	0.683
	TMS1	0.681
	TMS4	0.666
	TMS2	0.601
Perceived Enjoyment (ENJ)	ENJ2	0.709
	ENJ3	0.639
	ENJ1	0.602
	ENJ4	0.592
Personalization (PRS)	PRS3	0.771
	PRS2	0.741
	PRS4	0.733
Innovativeness (INV)	INV1	0.864
	INV4	0.691
	INV2	0.582
Perceived behavioral control(BEH)	PBC2	0.856
	PBC1	0.844
Dependent variables		
Attitude (KMO = 0.696, p-value 〈 0.001, TVE = 74.633%)		
Attitude (ATT)	ATT4	0.903
	ATT2	0.847
	ATT3	0.841
Intention (KMO = 0.839, p-value 〈 0.001, TVE = 75.621%)		
Intention (INT)	INT2	0.893
	INT4	0.869
	INT3	0.860
	INT1	0.856
Behavioral Responses (KMO = 0.822, p-value 〈 0.001, TVE = 69.119%)		
Responses (RES)	RES3	0.844
	RES1	0.829
	RES4	0.828
	RES2	0.824

〈Table 3〉 Result of Reliability and Validity

Constructs	Code	N of item	Range of loadings (CFA)	Cronbach's Alpha	Composite reliability	Average variance extracted
Timeliness	TMS	4	0.714~0.757	0.838	0.828	0.547
Personalization	PRS	4	0.608~0.814	0.817	0.831	0.554
Innovativeness	INV	5	0.675~0.726	0.779	0.735	0.481
Perceived Enjoyment	ENJ	4	0.663~0.881	0.889	0.894	0.681
Localization	LOC	4	0.684~0.753	0.812	0.815	0.525
Trust	TRU	4	0.711~0.841	0.870	0.871	0.629
Subjective norms	SUB	4	0.663~0.911	0.892	0.901	0.697
Perceived Behavioral Control	PBC	4	0.811~0.845	0.742	0.814	0.686
Attitudes	ATT	4	0.741~0.844	0.829	0.833	0.626
Intention	INT	4	0.769~0.859	0.892	0.890	0.670
Behavioral Responses	RES	4	0.760~0.782	0.851	0.851	0.588

5.3 Structural Model and Hypotheses Test

We conducted structural equation modelling analysis to test hypotheses in the proposed research model. The analysis results showed that the fit between the research model and the data was acceptable (Chi-square/df = 2.072 〈 3; CFI = 0.932; TLI = 0.924; IFI = 0.932 all were larger than 0.9 and RMSEA = 0.051 〈 0.08). However, three hypotheses, which were the relationship between timeliness, personalization, trust and attitude, were not statistically significant (p-value 〉 0.05) and were rejected. In addition, the relationship between perceived behavioral control and intention to watch in-app ads were not supported because we expected their relationship to be negative. In other words, we ac-

〈Table 4〉 Test of Structural Model and Hypotheses

Hypotheses Code	Relationships	Std. Beta	Critical ratio	p-value	Supported
H1a	TMS → ATT	-0.034	-0.286	0.775	**No**
H1b	LOC → ATT	0.273	6.035	〈0.001	Yes
H1c	PRS → ATT	0.004	0.051	0.959	**No**
H1d	INV → ATT	0.169	2.309	0.021	Yes
H1e	ENJ → ATT	0.622	8.740	〈0.001	Yes
H2a	TRU → ATT	0.074	0.775	0.438	**No**
H2b	TRU → INT	0.163	2.321	0.020	Yes
H3b	SUB → INT	0.103	2.016	0.044	Yes
H3a	ATT → INT	0.544	7.141	〈0.001	Yes
H3c	PBC → INT	0.189	3.996	〈0.001	**No**
H2c	TRU → RES	0.309	4.223	〈0.001	Yes
H4	INT → RES	0.585	6.804	〈0.001	Yes
H5	PBC → RES	-0.161	-2.782	0.005	Yes
	Gender → RES	-0.034	-0.853	0.393	No
	Edu → RES	-0.030	-0.774	0.439	No

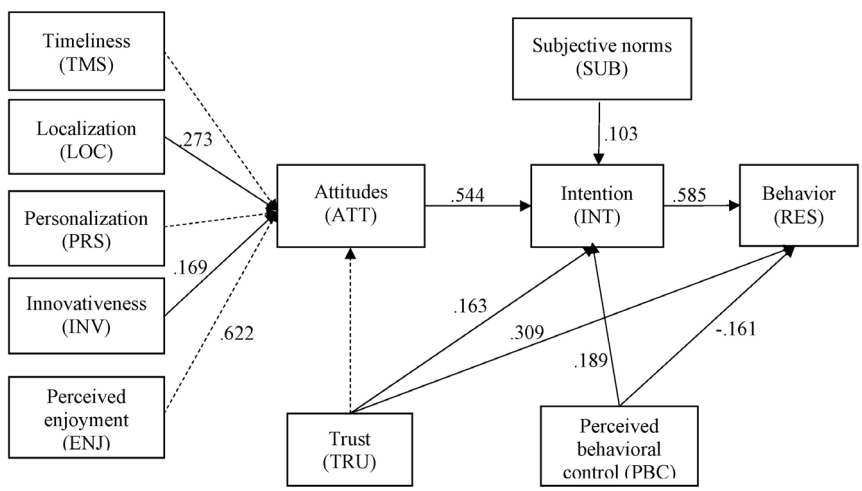
Note: Gender 1 = male, 0 = female; Edu 1 = student, 0 =other

cepted hypotheses H1b, H1d, H1e, H2b, H2c, H3a, H3b, H4, H5, and rejected H1a, H1c, H2a and H3c as shown in the 〈Table 4〉 and 〈Figure 2〉 below. We also analyzed the effect of control variables which were gender (male and female) and educational background (between students and others). These control variables had no effect as shown in 〈Table 4〉.

6. Discussion

Mobile marketing is a new, increasingly popular [Leppäniemi and Karjaluoto, 2005] method of advertising that enables personalization, interactivity and localization in contacting consumers [Bauer, 2005]. Such characteristics have been seen to save on advertising costs and make it more likely that consumers will consider ads relevant for their needs. However, the category of mobile marketing itself includes a number of channels,of which one is in-app ads [Bauer, 2005]. In-app ads are special in that the consumer has already shown interest in the company by downloading the application. Hence, the application can become a means of communication between the company and the consumer, making advertising more amenable to such consumers.

In this study, we examined whether TPB can be used to explain the factors which motivate mobile users to watch in-app ads. We integrated TPB with trust theory and also extended TPB by adding three important characteristics of mobile advertising and two aspects of mobile user personality. The results show that TPB can be used to explain the user's behavioral responses regarding in-app ads in Vietnamese context. Previous studies [Bauer, 2005] have proved the validity of the Theory of Reasoned Action (which is underpinning TPB) for research in the area of mobile marketing. Our study enhanced this finding by focusing on in-app ads, a specific form of mobile adverting. To elucidate, our results support TPB in terms of finding a link between subjective norm and behavioral intention. In addition, we found that users' intention to watch in-app advertisements was positively predicted by their attitudes toward in-app ad-



〈Figure 2〉 Results of Structural Model and Hypotheses Tests

vertisements and trust. The favorable high intention in watching in-app ads results in the desirable behavior.

Perceived behavioral control has a negative influence on behavioral response to in-app advertisements, but a positive influence on intention to watch in-app advertisements. This is against our expectations. In other words, the fewer barriers there are for users to watch in-app ads, the more they are interested to watch these ads; however, what they actually do is different. The positive link between perceived behavioral control and intention is unexpected, and it might be due to embedding the advertisements in applications, confusing users'intentions regarding using the app and watching ads. Another study [Cheung and To, 2017] found a similar anomalous linkage between perceived behavioral control and intention, and explained it by the content of the ads, conjecturing that users share ad-related content with friends and thereby develop positive intentions to watch the ads themselves.

We combine trust with TPB in our research model, and after testing the model, find significant linkages among trust and intention, and trust and behavior. It is reasonable that those who have high trust toward in-app ads are likely to have high intention to watch in-app ads. When a consumer has a high intention to watch in-app ads, they will also behave accordingly. However, this study did not find the relationship between trust and attitude toward in-app ads, which is different from previous studies. Credibility was found to be the most important attribute to influence consumer attitudes toward general mobile advertising in the studies of Tsang et al. [2004] and Xu [2007]. Our findings were also opposite to the result of Cheung and To [2017], in which trust affected attitude but not intention to watch in-app ads. This may be due to the difference between the characteristics of mobile users in different markets. It also means that attitude does not have a mediating role between trust and intention to watch, and trust and behavioral responses. In other words, according to our results, trust and attitudes work independently to influence intention and behavior. If a person has trust toward in-app ads, this alone is sufficient to make them continue watching those ads; it does not improve one's attitude toward the in-app ads. For example, one may consider in-app ads from a given company as relatively harmless because of one's perception of that company; yet, it does not make one positively inclined toward the ads themselves. However, this trust toward the ads can make one continue to use the app and hence be subjected to more advertising. As other studies show a variety of findings in this respect, researchers are recommended to be cognizant of these prior findings when conducting their own studies.

Finally, regarding mobile characteristics and user personality, in our study, the hypotheses about the relationships between localization, customer innovativeness, enjoyment and attitude were supported. This shows the important role of localization, innovativeness and enjoyment which have been also noted in many previous studies. Localization helps users find products/services related to their access points to meet their needs more easily, and users may have an expectation to be provided location-specific suggestions, perceiving less intrusion from these advertisements [Huhn et al., 2011]. Indeed, such services have been often well received by customers [Leppaniemi and Karjaluoto, 2005]. Mobile users, as people everywhere, are motivated by enjoyment [Altuna and Konuk, 2009]. Mobile devices are

one channel through which people seek enjoyment through entertainment [Chen et al., 2013], and the presence of entertainment value can foster the acceptance of mobile advertising [Bauer, 2005] this was found for teenagers' acceptance of mobile ads [Parreno et al., 2012]. Hence, an enjoyable application will stimulate user goodwill toward in-app ads appearing in the application. Regarding innovativeness, according to Rogers' theory of the diffusion of innovations [Rogers, 2003], new technologies such as in-app ads appeal first to "innovators" and "early adopters". In this study, we found a link between users' innovativeness and positive attitudes toward in-app ads. What is "new", is judged through one's prior knowledge of a technology and similar technologies [Sheth, 1968], implying that information available to users about mobile technologies, and in-app ads, is critical when it comes to their attitude formation [Moreau et al., 2001].

On the other hand, our study found that two characteristics of in-app ads, which are (1) timeliness and (2) personalization, did not have positive influence on attitude toward in-app advertisements. There was no significant relation between these constructs and attitude toward in-app ads. These results are different from various previous studies, which have found that time-sensitiveness and personalization are the key drivers of the development of successful mobile services, especially m-advertising [Leppaniemi and Karjaluoto, 2005]. These results could be explained by the relevance of ads. Even if an ad is timely and personalized to a user segment, it is virtually impossible to make ads relevant for a given individual in a given situation all the time. Hence, even personalized ads will, most of the time, be irrelevant for individual users, although they will have a comparatively greater chance of being relevant than mass marketing. Additionally, when users are concerned about their privacy, they will reduce their exposure to advertising [Aguirre, 2015]. Such concerns may be raised when user data is being trans·mitted to third-party companies [Turow et al., 2009]. Marketing efforts will have to balance personalization with ethical use of data to avoid alienating consumers.

7. Conclusion and Recommendations

We contribute to in-app ads literature in two distinct ways: first, applying TPB to in-app ads, a relatively new area of mobile advertising and second, examining the behavior of watching in-app ads. The antecedents of this behavior we examined are the characteristics of in-app ads, user personality (innovativeness), and trust. We found a link between social norms and intention to watch in-app ads. In addition, the positive role of innovativeness, perceived enjoyment and localization to behavioral responses via attitudes and intention to watch in-app ads were confirmed. Finally, the effects of trust and perceived behavioral control on the intention to in-app ads and on response behavior to in-app ads were partly supported.

In terms of practical contributions, our study can inform companies using in-app ads. Firstly, companies should create their in-app ads with entertainment value in mind. Secondly, these ads should utilize localization features. Thirdly, companies need to build credibility (trust) for advertising messages. In realization that this trust related to in-app ads may originate from the overall trust to the company, steps should be taken to build firm reputation to increase user acceptance

of advertisements. Fourthly, companies can improve users' accessibility to applications by making the apps more available on various operating systems and various app stores. Price may also be a factor in accessibility, in particular, for emerging markets such as Vietnam.

Our study has some limitations. First, this is a cross-sectional study with the data was collected in Vietnam; thus, future study can extend the scope to various markets. Second, we used only two personality measures in this study. Thus, future studies can add more personality traits into the models, for example the big five model, to assess the different influence of personality traits on ad adoption and users' responses.

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〈APPENDIX A〉

Items	Description
Timeliness 〔Ducoffe, 1996; Merisavo et al., 2007; Feng et al., 2016〕	
TMS1	In-app advertisements provide timely information on products or services
TMS2	I would view in-app advertisements related to a specific time or date (e.g. anniversary, changes in stock prices) as useful.
TMS3	In-app advertisements are a good source of up-to-date product information
TMS4	I appreciate the timely information which in-add ads provide
Localization 〔Merisavo et al., 2007; Feng et al., 2016〕	
LOC1	In-app advertisements can provide additional information or service based on real-time location quickly and accurately
LOC2	With the help of in-app advertisements, I get the information/services I need in a certain situation.
LOC3	I appreciate the information and/or entertainment values which in-app ads offer
LOC4	I would view mobile advertisements related to me being in a specifi location (e.g., stores, parking) as useful.
Personalization 〔Merisavo et al., 2007; Feng et al., 2016〕	
PRS1	I would be prepared to spend time providing my personal details (a user profile) to make in-app ads to better match my needs.
PRS2	Contents in mobile advertisements are personalized.
PRS3	In-app advertisements I receive are relevant to my job and activities
PRS4	Overall, I think that in-app advertisements are well personalized
Consumer Innovativeness 〔Goldsmith and Hofacker, 1991; Feng et al., 2016〕	
INV1	I like to pursue new products
INV2	I am willing to accept all kinds of surprises in-app advertisement bring me
INV3	I am willing to accept all kinds of surprises in-app advertisements bring me
INV4	If I heard about a new information technology, I would look for ways to experiment with it
INV5	In general, I am among the first in my circle of friends to pay attention to in-app advertisements
Perceived enjoyment 〔Ducoffe, 1996; Feng et al., 2016〕	
ENJ1	In-app advertisements are entertaining.
ENJ2	In-app advertisements are pleasing.
ENJ3	In-app advertisements are exciting.
ENJ4	In-app advertisements are fun to use.
Trust 〔Lee and Turban, 2001; Cheung and To, 2017〕	
TRU1	In-app advertisements is believable.
TRU2	The content of in-app advertisements is accurate.
TRU3	In-app advertisements is reliable.
TRU4	I trust in-app advertisements.
Attitude toward in-app advertisements 〔Lai and Huang, 2011; Cheung and To, 2017〕	
ATT1	Using in-app advertisements is a good idea.
ATT2	I like the idea of using in-app advertisement
ATT3	Using in-app advertisement would be pleasant
ATT4	On the whole, my attitude toward in-app advertisements is positive

Items	Description
Subjective norms 〔Ajzen, 1991; Izquierdo-Yusta et al., 2015〕	
SUB1	I watch in-app advertisements because my close friends do that.
SUB2	I watch in-app advertisements because my friends of friends do that.
SUB3	I watch in-app advertisements because my family members do that.
SUB4	I watch in-app advertisements because people who important to me think that I should watch.
Perceived behavioral control 〔Ajzen, 1991; Cheung and To, 2017〕	
PBC1	I don't have a device that allows me to access in-app advertisements.
PBC2	I don't get access to the internet easily
PBC3	I don't watch in-app advertisements because of the lack of time.
PBC4	I don't watch in-app advertisements because it will cost me money.
Intent to watch in-app advertisements 〔Ajzen, 1991; Cheung and To, 2017〕	
INT1	I often think about watching in-app advertisements.
INT2	It is very likely that I will spend more time watching in-app advertisements.
INT3	It is very likely that I will seek more chances to watch in-app advertisements
INT4	I will try to watch in-app advertisements in the future
Responses 〔Cheung and To, 2017〕	
RES1	After watching in-app advertising, I plan to learn more about the products/services.
RES2	After watching in-app advertising, I discuss with my friends more frequently about the products/services.
RES3	After watching in-app advertising, I have a greater intention to purchase the products/services.
RES4	Overall, after watching in-app advertising, I have greater attention on products/services advertised

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