



Determinants of consumers' attitudes toward mobile advertising: The mediating roles of intrinsic and extrinsic motivations



Xifei Feng, Shenglan Fu, Jin Qin*

School of Management, University of Science and Technology of China, #96 Jinzhai Rd, Hefei, Anhui, China

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ABSTRACT

Mobile advertising is booming, due to the popularity of mobile devices. Drawing on motivation theory, this study examines the factors that influence consumers' attitudes toward mobile advertising. The authors identify timeliness, localization, and personalization of the advertisement message as antecedents of extrinsic motivation, as well as consumer innovativeness and perceived enjoyment as antecedents of intrinsic motivation. Using structural equation modeling, the study analyzes the conceptual model with a sample of 218 mobile phone users. Both intrinsic and extrinsic motivations mediate the effects of the advertising message's characteristics on mobile phone users' attitudes toward mobile advertising.

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1. Introduction

Extensive technological developments and the rapid proliferation of mobile devices have created an entirely new advertising channel (Liu, Sinkovics, Pezderkab, & Haghiriian, 2012). Mobile advertising is defined as "the set of actions that enable firms to communicate and relate to their audience in a relevant, interactive way through any mobile device or network" (Mobile Marketing Association, 2010). Marketing practitioners realize that mobile devices will play an important role in advertising because of the device's capacity to target recipients by both location and time (Ghose & Han, 2011; Shankar, Venkatesh, Hofacker, & Naik, 2010). These developments also have made mobile advertising an attractive research venue in recent years.

Although firms in various industries have embraced mobile advertising, many mobile advertisers have reaped only marginal returns or even failed to achieve their promotion goals. Studies reveal that consumers typically hold negative attitudes toward mobile advertising and are not willing to accept mobile advertisements (Chen, Liu, & Huang, 2009; Liu et al. 2012; Wong & Tang, 2008). Marketing and advertising researchers have applied

multiple theories to examine the antecedents of consumers' attitude toward mobile advertising, including the technology adoption model (Pedersen & Nysveen, 2003), uses and gratifications theory (Brackett & Carr, 2001; Ducoffe, 1996; Haghiriian, Madlberger, & Tanuskova, 2005), and the theory of reasoned action (Bauer, Barnes, Reichardt, & Neumann, 2005; Lee, Lee, Lee, Kim, & Lee, 2006; Lee, Tsai, & Jih, 2006; Tsang, Ho, & Liang, 2004; Wong & Tang, 2008). These antecedents include entertainment, credibility, irritation, and informativeness (Haghiriian et al. 2005); personalization (Bauer et al. 2005; Ducoffe, 1996); localization (Ducoffe, 1996; Ho, 2012). However, extant literature has widely ignored a key question: What factors motivate a consumer to accept and use mobile advertising?

Motivation theory has been applied to explain consumers' adoption of information technology (Davis, Bagozzi, & Warshaw, 1992; Igbaria, Parasuraman, & Baroudi, 1996). Kim, Chan, and Gupta (2007) discover that both internal and external motivations influence behavioral intentions. *Intrinsic motivation* refers to behavior driven by internal rewards. In other words, the behavior itself is intrinsically rewarding. In contrast, *extrinsic motivation* implies engaging in a behavior to earn external rewards or avoid punishments. According to motivational theorists, people accept a new information technology because they perceive the possibility of obtaining utility and enjoyment from it (Kim et al., 2007; Teo, Lim, & Lai, 1999; Van der Heijden, 2004). Thus, we employ

* Corresponding author.

E-mail addresses: ffeifei@mail.ustc.edu.cn (X. Feng), fusl@mail.ustc.edu.cn (S. Fu), qjin@ustc.edu.cn (J. Qin).

motivation theory to study consumers' attitudes toward mobile advertising by examining the antecedents of their intrinsic and extrinsic motivations.

Specifically, the key research question of this study is as follows: What factors do increase consumers' motivation to accept mobile advertising? We explore factors related to intrinsic and extrinsic motivations and examine their impacts on consumers' attitudes toward mobile advertising. The rest of this article is organized as follows: The next section outlines the theoretical background of the current work and presents the hypotheses. Section 3 describes the research methodology, followed by the data analysis and results in Section 4. Section 5 summarizes the implications and limitations of this research, as well as possible directions for further research.

2. Theory and hypotheses

Motivational theorists find that both extrinsic (usefulness) and intrinsic (enjoyment) motivations influence people's intentions to use information technologies (Davis et al., 1992; Kim et al., 2007; Lu & Su, 2009; Van der Heijden, 2004). Prior studies on information systems also use motivation theory to study people's intentions to use Internet blogs, mobile Internet, and other mobile services (Ho, 2012). In this study, we examine the effects of intrinsic and extrinsic motivational factors on the mobile users' attitude toward mobile advertising.

We investigate three important characteristics of mobile advertising to determine an individual consumer's extrinsic motivation to accept mobile advertising, including timeliness (consumers' derived value from efficient and timely service delivery), localization (advertisers offer location-based services or products that are relevant to certain places), and personalization (the degree to which the advertising message is customized to reflect a consumer's preferences, needs, mind-set, lifestyle, and specific cultural and geographical characteristics). In previous study, incentives, such as free calls, have a big impact on attitude and intention to receive mobile marketing, and consumers have a negative attitude toward mobile advertising (Tsang et al., 2004). However, with the advancement of technology, mobile devices have had two distinct technical advantages: spatial and temporal maneuverability, which make mobile advertising more acceptable for mobile users. First, global positioning system (GPS)-enabled mobile devices allow marketing professionals to target customers by location. Researchers have demonstrated the importance of location targeting in mobile advertising, suggesting that geographical targeting can improve customer responses (Ho, 2012; Rajala & Westerlund, 2010). Second, mobile technology's capability to target by time allows marketers to communicate with consumers through messages delivered at the optimal moment (Chung, Rust, & Wedel, 2009; Hui, Inman, Huang, & Suher, 2013). Timing is one of the most fundamental dimensions of all economic activities (Balasubramanian, Peterson, & Jarvenpaa, 2002). According to a survey of consumer purchasing patterns conducted by Dentess, the largest media company in Japan, 90% of consumers do not have specific brands in mind when they step into convenience stores. Therefore, time-sensitive advertising through mobile devices can attract consumers to a promoted brand (Lee, Lee et al., 2006; Lee, Tsai et al., 2006). Prior studies on web advertising also emphasize the importance of timing (Ho, Bodoff, & Tam, 2011). In summary, timeliness is a key factor that enables firms to present the right mobile advertisement at the right time to meet a customer's need. However, the effect of timeliness on consumers' attitudes toward mobile advertising has yet to be examined. Moreover, mobile advertising provides potential for personalization, because mobile devices carry consumers' identity information (Lee & Benbasat, 2003). Marketers can collect information about customers'

preferences and use their feedback to customize their messages and offerings to improve the company's future products and services (Stewart & Pavlou, 2002). This process enables companies to reach their target consumers in a personalized way and thus strengthen their consumer relationships.

In addition to these extrinsic factors, we consider two intrinsic motivational factors: consumer innovativeness (the degree to which consumers are receptive to new products, services or practices) and perceived enjoyment (the extent to which the activity of using a product is perceived to be enjoyable in its own right, apart from any performance outcome that may be anticipated). Seeking novelty is part of innovative consumers' nature (Ryan, Deci, Nix, & Manly, 1999). Prior studies show that consumer innovativeness is an intrinsic driver of adoption of new technologies (Reis, 1994). In addition, it is important for advertisements to be short, succinct, and entertaining to create enjoyment among recipients (Xu, 2007). Enjoyment is a sense of pleasure, and it can arouse consumers' interest in the advertised product. Pursuing enjoyment is an innate human desire (Altuna & Konuk, 2009). Thus, perceived enjoyment motivates consumers to accept advisements for fun rather than because of external pressures or rewards (Reeve, 1989). Our model is presented in Fig. 1, and the intrinsic and extrinsic motivations as well as the research hypotheses are explained detail in the following subsections.

2.1. Timeliness

In the context of mobile technology, *timeliness* is defined as consumers' derived value from efficient and timely service delivery, especially for time-critical services, such as last-minute reservations and limited-time travel offers (Hourahine & Howard, 2004). Consumers derive utilitarian value from efficient and timely service delivery in general (Childers, Carr, Peck, & Carson, 2001). Moreover, consumers can carry mobile devices anytime and anywhere; thus, marketers can leverage contextual messages to build relationships with consumers 24 h a day, seven days a week. Mobile technology enables merchandisers to reach consumers whenever and wherever they are ready to buy (Kenny & Marshall, 2000). Marketers can send time-sensitive messages to consumers to elicit timely responses from them. As a result, mobile users can fulfill their consumption goals more economically and save time. Existing studies on Internet advertising show that timing is a key determinant of advertisement effect (Ho et al., 2011). Merisavo et al. (2007) demonstrate that timely information increases consumers' acceptance of mobile advertising. Because targeting mobile users in a timely fashion should effectively improve mobile advertising efficiency, we propose the following:

H1. Mobile advertisement timeliness relates positively to consumers' extrinsic motivation to accept the advertisement.

2.2. Localization

Physical spaces and locations shape consumers' reactions to promotional messages (Dholakia & Dholakia, 2004). *Localization* means that advertisers offer location-based services or products that are relevant to certain places (Kaasinen, 2003). Localization is a main advantage of mobile over traditional advertisements. Wireless communication technology allows phone service providers to use GPS technology to identify users' geographical positions, which allows advertisers to send messages according to where the user is located. Irrelevant advertising information can be reduced by location-sensitive advertising messages. The uniqueness of mobile advertising lies in its potential to target consumers in a specific location (Leppäniemi & Karjaluo, 2008). For example, a consumer

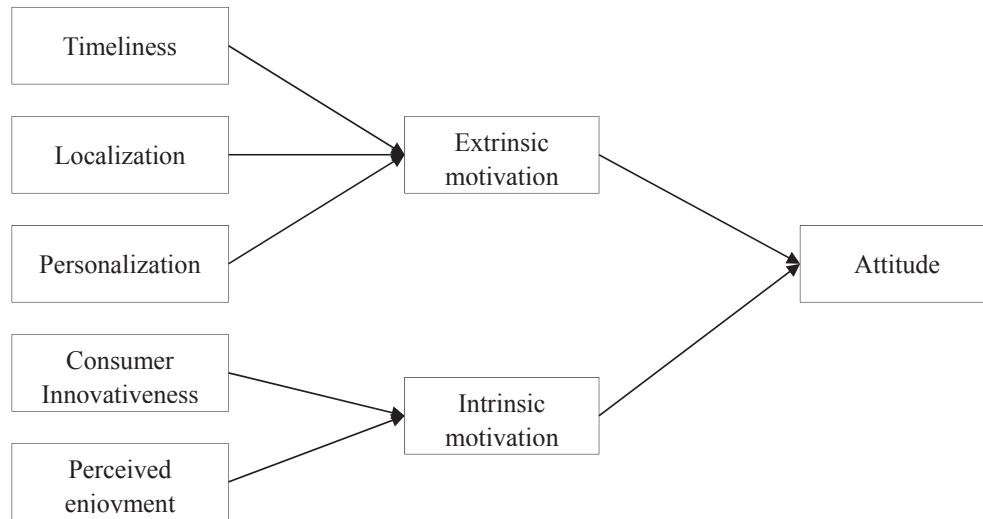


Fig. 1. Research model.

near a retail store might receive a message offering a time-limited promotion from that store. Thus, localization may increase the ad message relevance and reduce irritation to consumers, who would then be more likely to be extrinsically motivated to accept the advertisement.

H2. Mobile advertisement localization relates positively to consumers' extrinsic motivation to accept the advertisement.

2.3. Personalization

Personalization of mobile advertising refers to the degree to which the advertising message is customized to reflect a consumer's preferences, needs, mind-set, lifestyle, and specific cultural and geographical characteristics (Leppäniemi & Karjaluoto, 2008). The degree of personalization plays a critical role in consumers' perceptions of mobile advertising, in that a mobile phone is rarely used by anyone other than its owner. Consumers thus expect highly personalized messages on their mobile phones, which they think of as intimate devices (Bauer et al., 2005). Mobile marketers can use consumer feedback to collect information about their preferences and customize the advertising messages and offerings accordingly. Personalizing the advertising message also enables marketers to reach their potential customers in an individualized way and thus build relationships with them. Consumers are more receptive to advertising messages that are personalized and relevant (Carroll, Barnes, & Scornavacca, 2005; Muk, 2007). Therefore, we propose the following:

H3. Personalization of mobile advertising messages relates positively to consumers' extrinsic motivation to accept the advertisement.

2.4. Consumer innovativeness

Consumer innovativeness refers to the degree to which consumers are receptive to new products, services or practices. It is an important determinant of the speed of the new product adoption process (e.g., Hirschman, 1980; Midgley & Dowling, 1978; Rogers, 1995). The inclination to seek novelty is a significant feature of human nature that affects performance, persistence, and well-being across life epochs (Ryan et al., 1999). When encountering a

new product or service, innovative consumers will be more receptive and responsive to it. Innovative consumers may perceive mobile advertising, a relatively new technological development, as novel and thus may be intrinsically motivated to pursue it (Reeve, 1989; Reis, 1994). Therefore, we anticipate that innovative consumers are more likely to be intrinsically motivated to accept mobile advertising.

H4. A consumer's degree of innovativeness relates positively to his or her intrinsic motivation to accept a mobile advertisement.

2.5. Perceived enjoyment

Perceived enjoyment refers to the extent to which the activity of using a product is perceived to be enjoyable in its own right, apart from any performance outcome that may be anticipated (White, 1959). Researchers suggest that enjoyment also provides an important intrinsic drive for people to perform an activity (Ryan & Deci, 2000). They are more likely to adopt a new technology and use it more extensively if they experience immediate pleasure from using it or perceive any activity involving the technology to be personally enjoyable (Xu, Oh, & Teo, 2009). For example, a person's interest in computer games is largely driven by playfulness and self-achievement in the gaming process. In the context of mobile advertising, consumers should be more willing to accept mobile advertising that is playful and enjoyable. Therefore, we propose:

H5. Consumers' perceived enjoyment from mobile advertisement relates positively to their intrinsic motivation to accept it.

2.6. Extrinsic motivation

Extrinsic motivation refers to committing an action because of its perceived helpfulness in achieving value (Davis et al., 1992). Extrinsic motivation is aroused by factors that exist outside a person. Motivational theorists find that when a person is extrinsically motivated, he or she will engage in an activity for the sake of the benefits derived from the activity (Reis, 1994). Extrinsic motivation is a strong predictor of people's intention to adopt a new technology (Davis et al., 1992). For example, employees who are extrinsically motivated to use a new software application because it can improve their work performance and help them earn higher

salaries are more likely to accept the software application. These findings apply to other fields too, such as mobile Internet usage and mobile advertising (Kim et al., 2007). Thus, we anticipate that if consumers are extrinsically motivated by mobile advertising, they will have a positive attitude toward it.

H6. A consumer's degree of extrinsic motivation to accept mobile advertising relates positively to his or her attitude toward it.

2.7. Intrinsic motivation

Intrinsic motivation refers to committing an action as a result of interest in the action itself, rather than external reinforcement (Davis et al., 1992). An intrinsically motivated person could be driven to act for the fun or challenge involved rather than because of external benefits, pressures, or rewards (Ryan & Deci, 2000). The motivation is derived from the process of performing the activity itself, even in the absence of external reinforcement or rewards. When a person is intrinsically motivated, he or she performs an activity for the inherent interest and enjoyment. Thus, intrinsic motivation leads to a positive attitude toward the activity. Prior research empirically supports the direct effect of intrinsic motivation on people's intention to use a new technology (Hsu & Lin, 2008; Kim et al., 2007; Venkatesh, 2000). Similarly, we anticipate that an intrinsically motivated consumer will have a positive attitude toward mobile advertisement.

H7. A consumer's intrinsic motivation to accept mobile advertising relates positively to his or her attitude toward it.

Both extrinsic and intrinsic motivations influence perceived value and behavioral intentions (Rogers, 1995). Consumers will evaluate mobile advertising, as a new form of information technology, in terms of utility and enjoyment (Kim et al., 2007). Early in the product life cycle, consumers' adoption mainly depends on the level of innovativeness and enjoyment they receive from using the product (Liu et al., 2012). Consumers will judge the usefulness of the product and determine whether to continue to use it. Mobile advertising is in its early product development stages (Liu et al., 2012). When consumers encounter a new technology, they do not have extensive knowledge about it and are not sure about its benefits. However, they can instinctively judge whether the technology is interesting. Davis, Bagozzi, and Warshaw (1989) report that consumers who experience pleasure from using a technology and perceive any activity involving it to be personally enjoyable in its own right are more likely to adopt the technology and use it more extensively than others. Therefore, we propose that when consumers evaluate mobile advertising, intrinsic motivation is more influential than extrinsic motivation on their attitude toward mobile advertising (Ho, 2012).

H8. Intrinsic motivation has a stronger positive effect on consumers' attitude toward mobile advertising than extrinsic motivation.

3. Research method

3.1. Sample and data

We first developed the questionnaire in English by adapting constructs and items from literature. Then the initial English questionnaire was translated into Chinese by a Chinese professor major in marketing. The Chinese version was then translated back into English by another professor in marketing, the translated English version was checked against the original English version for

discrepancies. Then we engaged 15 marketing experts who are also heavy mobile phone users to make extensive discussions and gathered their opinions and suggestions for the structure and content of the questionnaire. According to the comments of those experts, we revised a few items of the questionnaire. To ensure the rationality and effectiveness of the items of the questionnaire, we conducted a pilot test involving 30 respondents from a national university in China. Using the respondents' feedback from the pilot test, we modified several items to finalize the instrument. Finally, the questionnaire (see Appendix) was distributed to 350 participants through online and offline outlets at a national university in China. By the end of December 2013, we received 287 responses. In total, we obtained 218 usable samples, representing a response rate of 62.3%.

All respondents were mobile phone users and owners. Among the 218 respondents, 117 (53.7%) men, the majority were under the age of 24 years, accounting for 53.7% of the total sample, followed by respondents aged 25–35 years (41.3%) and those aged 36 years and older (5.0%). Regarding respondents' highest educational level, 47.7% of the respondents had a postgraduate degree, and 46.8% were undergraduate students. Table 1 details the sample demographics.

3.2. Measures

The goal of the survey is to shed light on consumers' perception of motivation factors and their attitude toward mobile advertising. The survey addressed mobile advertising in general rather than any specific format, such as banner or in-app ads. We developed the items for each construct on the basis of an extensive literature review. We adapted the scales for timeliness, personalization, and localization from Ducoffe (1996), Merisavo et al. (2007) and Pihlström and Brush (2008). We derived the items of consumer innovativeness from Goldsmith and Hofacker (1991) and Citrin, Sprott, Silverman, and Stern (2000). We adapted the perceived enjoyment scale from Ducoffe (1996). We formulated the intrinsic motivation and extrinsic motivation scales with reference to the scales developed by Pelletier, Fortier, Tuson, and Brière (1995) and Vallerand et al. (1992). Respondents assessed all items on five-point Likert-type scales ranging from “strongly disagree” (1) to “strongly agree” (5). The Appendix shows the final items of each construct.

3.3. Construct reliability and validity

We used several methods to validate the measures.

First, we estimated the reliability of the final questionnaire by calculating the Cronbach's alpha for each construct. We concluded that the internal consistency of each dimension is satisfied as all Cronbach's alphas exceeded the benchmark of 0.70 (Nunnally & Bernstein, 1978). Second, a confirmatory factor analysis indicated that the convergent and discriminant validity of the measures were satisfactory. The measurement model fit the data satisfactorily ($\chi^2 = 655.72$, df. = 338, $p < 0.01$; confirmatory fit index (CFI) = 0.903; incremental fit index (IFI) = 0.904; normed fit index = 0.892; root mean square error of approximation (RMSEA) = 0.071), and all factor loadings were highly significant ($p < 0.01$). In addition, all factor loadings exceed 0.70. Each factor's average variance extracted (AVE) was higher than 0.50, ensuring convergent validity. Finally, we estimated discriminant validity by comparing the square roots of each factor's AVE with the correlations between each pair of constructs (Fornell & Larcker, 1981). The square root of each factor's AVE was greater than the construct's correlations with other factors, in support of discriminant validity (see Table 2). Overall, we concluded that the empirical results of the measures used in this research demonstrated adequate reliability

Table 1
Sample profiles.

Characteristics		Frequency	Percentage (%)
Gender	Male	117	53.7
	Female	101	46.3
Age	Under 24 years	117	53.7
	25–35 years	90	41.3
	36–45 years	11	5.0
Education	Associate's degree or lower	12	5.5
	Undergraduate	102	46.8
	Postgraduate	104	47.7
Occupation	Administrative staff	87	39.9
	Self-employed	9	4.1
	Student	114	52.3
	Others	8	3.7

and validity.

4. Results

4.1. Results and discussion

A structural equation model is used to test the hypotheses using AMOS 17.0. Fig. 2 shows the results. The structural model fit the data adequately ($\chi^2 = 523.2$, $df = 326$, $\chi^2/df = 1.605$, CFI = 0.948, IFI = 0.949, Tucker-Lewis index = 0.940, RMSEA = 0.053).

First, we examine the effects of timeliness, localization, and personalization on extrinsic motivation. H_1 proposes that if consumers perceive mobile advertisement to be timely, they will be more likely to be extrinsically motivated. The results show that timeliness has a significant positive effect on extrinsic motivation ($\beta = 0.45$, $t = 4.73$, $p < 0.001$), in support of H_1 . In addition, H_2 is supported ($\beta = 0.14$, $t = 2.57$, $p < 0.05$): Localization has a significant and positive effect on consumers' extrinsic motivation. Personalization exerts a significant and positive effect on consumers' extrinsic motivation ($\beta = 0.44$, $t = 4.11$, $p < 0.001$), in support of H_3 . If the content of mobile advertisement is more related to consumers' interests or preferences, they will be extrinsically motivated toward mobile advertising. We also note that timeliness, localization, and personalization together explain 72% of the total variance of extrinsic motivation.

Second, we examine the effects of consumer innovativeness and perceived enjoyment on intrinsic motivation. Our data support H_4 and H_5 ; consumer innovativeness ($\beta = 0.69$, $t = 3.92$, $p < 0.001$) and perceived enjoyment ($\beta = 0.34$, $t = 2.18$, $p < 0.05$) exert a significant and positive effects on intrinsic motivation. Consumers who perceive mobile advertisements to be enjoyable are intrinsically motivated toward mobile advertising. 96% of the total variance of intrinsic motivation can be explained by the two characteristics of intrinsic motivation.

Third, we test the effects of extrinsic and intrinsic motivation on consumers' attitudes toward mobile advertising. The significant and positive effect of extrinsic motivation on attitudes indicates that extrinsically motivated people are more likely to have a positive attitude toward mobile advertising, in support of H_6 ($\beta = 0.40$, $t = 3.65$, $p < 0.01$). Likewise, intrinsic motivation has a significant and positive effect on consumers' attitudes toward mobile advertising ($\beta = 0.54$, $t = 4.76$, $p < 0.001$), in support of H_7 . The two constructs explain 80% of the variance of attitude toward mobile advertising.

Fourth, we used a pairwise parameter comparison to examine H_8 . Although intrinsic motivation has a greater effect on attitudes toward mobile advertising than extrinsic motivation does ($\beta = 0.54$ vs. 0.40), this difference is not statistically significant ($t = 0.884$, $p < 1.96$). Thus, H_8 is not supported. The test results of the proposed hypotheses are summarized in Table 3.

4.2. Theoretical implications

This study makes several contributions to understanding the factors that influence consumers' attitudes toward mobile advertising, on the basis of motivation theory. We propose and test a theoretical model that includes intrinsic and extrinsic motivations and their antecedents. The results show that extrinsic and intrinsic motivations are significant determinants of consumers' attitudes toward mobile advertising, corroborating previous studies' findings (Hsu & Lin, 2008; Kim et al., 2007; Rogers, 1995). Second, this study demonstrates that features of mobile advertising (i.e., timeliness, personalization, and localization) have significant impacts on consumers' attitudes. Previous studies have rarely accounted for the impact of timeliness. Our results show that timeliness has a significant, positive effect on consumers' extrinsic motivation to accept mobile advertising. That is, consumers want to receive certain mobile advertisements at the right time, such as lunch specials at noon and sales promotions before a holiday. This result is consistent with previous Internet advertisement research findings (Ho et al., 2011). This study also confirms the role of personalization and localization as positive predictors of extrinsic motivation (Yuan & Tsao, 2003). Consumers find mobile advertisements related to their individual characteristics (e.g., gender, lifestyle, shopping preference) more attractive. In conclusion, it is necessary for marketers to make strategy decision to delivery proper content to the right target at the appropriate time and place.

4.3. Managerial implications

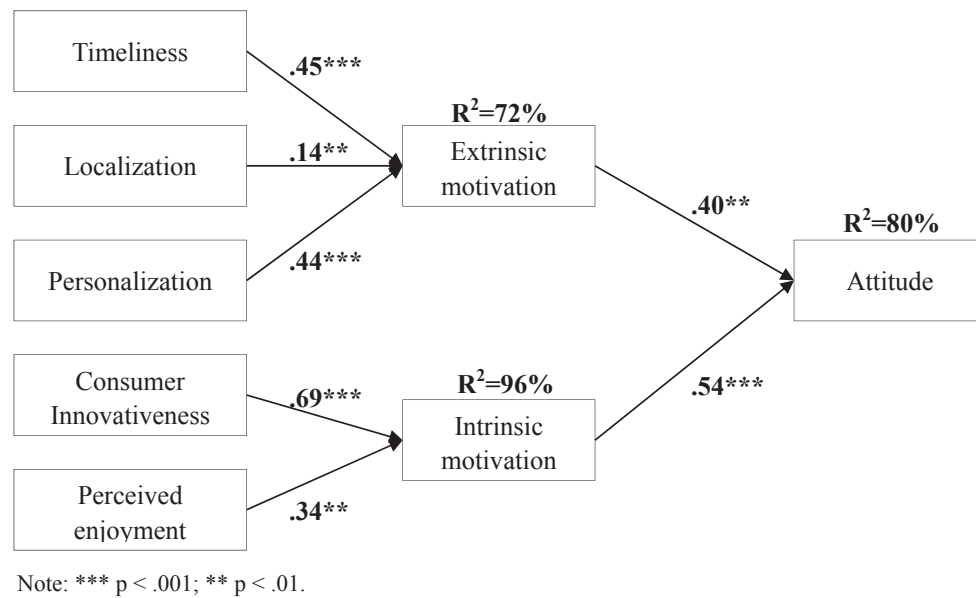
This study offers two important practical implications for marketing professionals. First, it provides insights on which features of mobile advertisements attract consumers most effectively. Our findings empirically confirm that timeliness, localization, and personalization extrinsically motivate a consumer to accept mobile advertising. Thus, firms should consider the value of timing, location, and personalized information of mobile advertisements. In addition, timeliness, personalization, and localization all have positive effects on extrinsic motivation, which implies that consumers consider these aspects to have similar importance. Firms should determine the optimal time and place to send mobile advertisements to target consumers and send personalized mobile messages to develop and enhance consumers' positive attitudes toward mobile advertising.

Second, intrinsic motivational factors, such as consumer innovativeness and perceived enjoyment, are influential. Intrinsic motivation exerts the same effect on consumers' attitude toward mobile advertising that extrinsic motivation does, implying that consumers accept mobile advertising because they enjoy it and think the ads are useful. Thus, mobile advertisements with innovative and playful features have great potential to attract

Table 2
Descriptive statistics and correlations.

Variable	1	2	3	4	5	6	7	8
Timeliness	0.826							
Localization	0.697**	0.809						
Personalization	0.538**	0.464**	0.804					
Consumer Innovativeness	0.447**	0.417**	0.483**	0.806				
Perceived enjoyment	0.547**	0.473**	0.609**	0.468**	0.896			
Intrinsic motivation	0.557**	0.463**	0.534**	0.555**	0.726**	0.844		
Extrinsic motivation	0.582**	0.504**	0.601**	0.501**	0.654**	0.746**	0.835	
Attitude	0.657**	0.562**	0.610**	0.553**	0.683**	0.715**	0.747**	0.890
Mean	3.14	3.39	2.65	3.16	2.77	2.91	2.90	3.06
Standard deviation	0.831	0.783	0.825	0.671	0.813	0.828	0.836	0.869

*p < .05. **p < .01.

**Fig. 2.** Results of the structural equation model estimate.**Table 3**
Results of the hypotheses estimation.

	Hypotheses	T-Score	Result
H ₁	Timeliness → Extrinsic motivation	4.73	Accept
H ₂	Localization → Extrinsic motivation	2.57	Accept
H ₃	Personalization → Extrinsic motivation	4.11	Accept
H ₄	Consumer Innovativeness → Intrinsic motivation	3.92	Accept
H ₅	Perceived enjoyment → Intrinsic motivation	2.18	Accept
H ₆	Extrinsic motivation → Attitude	3.65	Accept
H ₇	Intrinsic motivation → Attitude	4.76	Accept
H ₈	Intrinsic motivation has a greater effect than extrinsic motivation	0.884	Reject

consumers.

4.4. Limitations and future research directions

This study has several limitations that may provide opportunities for further research. First, survey respondents were mainly university students in China. Although they are active mobile phone users, the findings would be more representative if more participants with more varied jobs and backgrounds were included in the sample. Second, this study does not take culture into consideration. Mobile technology is becoming a worldwide phenomenon; thus, a cross-cultural study of consumer responses to mobile advertising could be a promising new research direction. Third, this study does not account for the format of mobile

advertisements, which may moderate the relationship between advertisement features and consumers' attitude. Further research should incorporate the role of advertisement format (e.g., multi-media messaging service, banners, video, in-app ads) to form a more comprehensive understanding of consumers' attitudes toward mobile advertising.

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Appendix. Survey questionnaire items

Constructs and source	Description	Standardized factor loadings
Timeliness (Ducoffe, 1996; Merisavo et al. 2007) $\alpha = 0.803$, AVE = 0.683	<ul style="list-style-type: none"> Mobile advertising provides timely information on products or services. I would view mobile advertising related to a specific time or date (e.g. anniversary, changes in stock prices) as useful. 	0.850 0.746
Localization (Merisavo et al. 2007; Pihlström & Brush, 2008) $\alpha = 0.734$, AVE = 0.655	<ul style="list-style-type: none"> Mobile advertising is a good source of up-to-date product information. I value this real time information and interaction that this service makes possible. Mobile advertising can provide additional information or service based on real-time location more quickly and accurately. I value the information/entertainment this service offers, with the help of which I get what I need in a certain situation. I would view mobile advertising related to me being in a specific location (e.g., stores, parking) as useful. 	0.857 0.848 0.846 0.857 0.717
Personalization (Merisavo et al. 2007; Xu, 2007) $\alpha = 0.725$, AVE = 0.647	<ul style="list-style-type: none"> Contents in mobile advertising are personalized. I would be prepared to spend time providing my personal details (a user profile) to make mobile advertising to better match my needs. I feel that mobile advertising displays personalized messages to me. 	0.707 0.816 0.880
Consumer Innovativeness (Citrin et al. 2000; Goldsmith & Hofacker, 1991) $\alpha = 0.716$, AVE = 0.650	<ul style="list-style-type: none"> I like to pursue new products I'm willing to accept all kinds of surprises and accidents mobile advertisements bring me. In general, I am among the first in my circle of friends to pay attention to mobile advertising. 	0.813 0.822 0.784
Perceived enjoyment (Chen, 1999; Ducoffe, 1996) $\alpha = 0.916$, AVE = 0.802	<ul style="list-style-type: none"> Mobile advertising is entertaining. Mobile advertising is pleasing. Mobile advertising is exciting. Mobile advertising is fun to use. 	0.840 0.936 0.914 0.890
Intrinsic motivation (Pelletier et al. 1995; Robert 1992) $\alpha = 0.797$, AVE = 0.712	<ul style="list-style-type: none"> I accept mobile advertising because it is fun and interesting. I accept mobile advertising because it is a good way to learn lots of new things. I feel satisfaction when I'm the first to accept mobile advertising. 	0.846 0.850 0.835
Extrinsic motivation (Pelletier et al. 1995; Robert, 1992) $\alpha = 0.852$, AVE = 0.697	<ul style="list-style-type: none"> I accept mobile advertising because it can satisfy my personalized needs. I accept mobile advertising because people around me are using it. I accept mobile advertising because it gives me rewards. I accept mobile advertising because it can save my time and money. 	0.849 0.725 0.896 0.860
Attitude toward mobile ads (Xu, 2007) $\alpha = 0.912$, AVE = 0.792	<ul style="list-style-type: none"> Using mobile advertising is a good idea. I like the idea of using mobile advertising. Using mobile advertising would be pleasant. On the whole, my attitude toward mobile advertising is positive. 	0.891 0.897 0.881 0.891

Notes: α = Cronbach's alpha, AVE = average variance extracted.

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