

Effects of Message Characteristics, Age, and Gender on Perceptions of Mobile Advertising – An Empirical Investigation among College Students

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Abstract—A tremendous opportunity emerges for marketers to push effective advertisements to target audiences. One forecast suggests mobile advertising will represent one-fifth of the global Internet advertising revenue by 2011, generating \$14.4 billion of revenue. Hence, the need for knowledge advances in this fairly young area is warranted. A study of 344 U.S. college students was conducted to answer two questions in the context of mobile message advertising via SMS: i) How does a mobile advertisement's message length affect the receiving mobile user's attitude toward the advertisement? ii) Are there age and gender differences in the evaluation of SMS-based mobile advertisements? A PLS-based data analysis offers support for the positive effects of mobile ads' message length on the perceived informativeness and entertainment of the mobile ad, which in turn positively influence both attitude toward the mobile ad and the mobile user's intention to click through it and learn more about the advertised brand. Gender effects were found regarding perceptions of a mobile ad's informativeness. Specifically, women reported higher levels for all dependent constructs, i.e. informativeness and entertainment of the mobile ads, attitude toward the ads, and intention to click through and learn more. Also, age was shown to negatively influence the attitude toward the mobile ad, i.e. older users reported lower levels regarding the mobile ad's value, their attitude toward the ads, and their likelihood to click through than younger users. Implications for both theory and practice are also discussed, including an expanded model regarding mobile advertising effectiveness with high explanatory power (i.e. 69% of the variance in the attitude toward mobile ads and 54% of the variance in the behavioral intention to respond to the ad by clicking through was explained).

Keywords: *mobile advertising, message length, age, gender, informativeness, entertainment, attitude, intention*

I. INTRODUCTION

Advances in services and handsets in developed countries and increased use of mobile health and banking services in the developing world have resulted in an explosive growth of mobile phone adoption. According to the latest data from the International Telecommunication Union, there was an estimated 4.6 billion mobile phone users by the end of 2009 [1]. This estimate is significantly

higher than earlier numbers reported in many scholarly papers, which cite anywhere from one to two billion mobile phone users. Beyond the obvious popularity of this medium, and considering the personalization, physical location tracking, and reachability afforded by mobile phones, a tremendous opportunity emerges for marketers to push effective advertisements to target audiences.

Strategy Analytics forecasts mobile advertising to represent one-fifth of the global Internet advertising revenue by 2011, generating \$14.4 billion of revenue [2]. Hence, it can be easily seen why mobile advertising has recently attracted so much attention in the media and consideration by marketing executives. There are several forms of potential advertising engagement via the mobile channel. These include pull-type mobile web sites and mobile video, push and pull mobile applications, and push mobile messaging [3]. Each tactic offers its own advantages, but mobile messaging is ideal for immediate branding, driving users to mobile web sites, and enabling a dialogue between the marketer and the user via mobile message replies, voting, polling and others. Mobile messaging encompasses both Short Messaging Service (SMS) and Multimedia Messaging Service (MMS). The latter is supported on most mobile phones sold recently, and allows for richer content including images, audio, and video content. Although SMS is limited to text, it can reach virtually any mobile user. More importantly, in a recent study by InsightExpress, "SMS campaigns generated increases of 5 percentage points for unaided awareness, 10 percentage points for aided awareness and 18 percentage points for ad awareness" when compared to online advertising norms [4]. To achieve such levels of effectiveness, a key success factor in any campaign is the creative used. In the simple case of a SMS campaign, design considerations pertaining to the text used become critical. Yet, there is extremely limited research in this area and no empirical studies that focus on the design of the mobile advertisement (herein, 'ad'). In addition, past studies have produced conflicting evidence pertaining to gender differences in mobile ad related evaluations. For example, Shavitt, Lowrey, and Haefner [5] concluded that men were more favorable (i.e. more positive attitude) toward mobile

ads than women, whereas Haghirian and Inoue [6] found no gender differences. Consistent with past efforts to identify antecedents of effective advertising campaigns regardless of the channel used (e.g., [7], [8], [9], [10], [11], [12]), and in attempt to offer greater insight on gender differences related to mobile advertising, this study aims to address the following two research questions:

RQ1: How does a mobile advertisement's message length affect the receiving mobile user's attitude toward the advertisement?

RQ2: Are there age and gender differences in the evaluation of SMS-based mobile advertisements?

II. ANTECEDENTS AND CONSEQUENTS OF ATTITUDE TOWARD ADS

A. Characteristics of mobile ad content and length

In a literature review of effective advertisements performed by Park, Shenoy and Salvendy [13], various message design factors were identified as having an impact on the audience's perceptions. These included size, color, length, music/sound, animation, context/clutter, repetition, and involvement. Beyond this effort, there is limited insight on design considerations particularly for mobile advertising.

More specifically, the effects of an advertisement's length have never been studied in the context of mobile ads. However, relevant literature may be found regarding TV ads. Fabian [14] and Patzer [15] argued that length could positively affect the memory of the advertisement by repeating an ad's content. Also, to ensure brand awareness, a short advertisement may be as effective as a long one, but for delivering the claim of an ad, longer ads perform better. Also, the length of advertisement has been shown to have a negative effect on tedium (e.g. [16], [17], [18]). Accordingly, we hypothesize that the length of advertisement could positively influence perceptions associated with the mobile ad's message informativeness and entertainment.

H1a: Message length positively influences perceptions of a mobile ad's message informativeness.

H1b: Message length negatively influences perceptions of a mobile ad's message entertainment

B. Informativeness and entertainment of mobile ads

Ducoffe [19] identified three factors – informativeness, entertainment and irritation - as a starting point for explaining how consumers evaluate the value of advertising. Informativeness refers to the extent to which a web ad satisfies consumers' needs to know of related product or service information, which is fundamentally a utilitarian value [20]. The quality of information included in an ad has

an influence on the consumers' perception of the advertised object, because consumers want the content of mobile ads to be related to them and to be tailored to their interest [21]; [22]. Therefore, we consider perceptions of informativeness regarding a mobile ad to be positively associated with consumers' attitudes toward the mobile ad.

On the other hand, entertainment refers to the extent to which mobile ads please consumers' needs for passing time, aesthetic enjoyment, and/or emotional release, which are fundamentally of hedonic value ([23], [19], [20]). A high degree of pleasure and connection with a medium leads to consumers' positive perceptions of affects and mood [24]. Also, especially in mobile advertising, it is important to be funny and concise, and thus capture consumers' attention immediately [25]. According to Lehmkuhl [26], providing playful or enjoyable games with embedded advertising on a mobile phone can make them more familiar with the ad and even the product. Therefore, perceptions of enjoyment associated with an ad play a salient role in the formation of overall attitudes toward an object [5].

Based on the Theory of Reasoned Action (TRA), the attitude toward an object is determined by one's salient belief regarding or the perceived importance of the object's characteristics. Accordingly, these two factors, informativeness and entertainment, are two salient beliefs related to the evaluation of ads [19]. However, irritation is different from informativeness and entertainment, which are about positively-anchored consumer evaluations. Irritation is about a negative emotional reaction elicited by an ad that was improperly delivered to a consumer, one that does not add to the value of an ad ([19], [27]). Therefore, we focus on the two factors that influence advertising value, i.e., informativeness and entertainment, as antecedents of attitude toward mobile ads.

H2a: Higher levels of a mobile ad's informativeness lead to a more favorable attitude toward the mobile ad.

H2b: Higher levels of a mobile ad's entertainment lead to a more favorable attitude toward the mobile ad.

C. Synergy of informativeness and entertainment of mobile ads

The impacts of informativeness and entertainment have in previous studies been considered as independent and their interaction effect has not been examined. However, there may be a positive interaction effect between two complementary factors and their interaction could affect attitude more favorably. This is known as the 'synergy effect' and it occurs when the combined value of opposite factors is greater than the sum of their individual value ([28], [29], [30], [31]). In other words, an increase in one factor (informativeness) could enhance the effect of another factor (entertainment) and consequently impact attitude more positively. According to various motivational theories,

there are crowding-out and crowding-in effects of extrinsic and intrinsic motivation ([32], [33]). A crowding-out effect indicates that an extrinsic motivation can decrease the effect of an intrinsic motivation. On the other hand, a crowding-in effect shows that an extrinsic motivation can increase the effect of an intrinsic motivation [33]. Informativeness can be referred to as an extrinsic motivation because of its utilitarian value, while entertainment may be viewed as an intrinsic motivation because of its hedonic value [34]. Also, according to the research by Davis, Bagozzi, and Warshaw [35], such a significant positive interaction effect between informativeness and entertainment on attitude was found in the context of using computers in the workplace. Therefore, we predict that there will be a positive interaction effect of a mobile ad's informativeness and entertainment on the attitude toward mobile ads.

H3: The interaction effect of a mobile ad's informativeness and entertainment is positively associated with the attitude toward a mobile ad.

D. Attitude toward and Click Throughs of Mobile Ads

Attitude toward an ad is defined as the predisposition to respond in a favorable or unfavorable manner to a particular advertising stimulus [36]. Also, according to the Theory of Reasoned Action by Fishbein and Ajzen [37], a person's behavioral intention depends on the person's attitude toward the object of that behavior. For example, the findings of a study by Bauer and Greysier [38] were consistent with TRA in that a favorable attitude toward specific ads was strongly correlated with the rating of those ads. Therefore, we hypothesize that the attitude toward a mobile ad is positively related to the mobile user's intention to click through the mobile ad.

H4: Attitude towards mobile ads is positively related to intention to click through mobile ads.

E. Relevant demographic variables

1) *Age*: Mobile services tend to attract a younger audience [39]. Also, according to a study by Shavitt et al. [5] even in the context of traditional advertising, younger customers showed a more favorable attitude toward the ads. Kaasinen [40] offered further support regarding younger consumers showing very positive attitudes toward mobile ads. Based upon these studies, we hypothesize that age will be negatively correlated with the attitude toward a mobile ad.

H5: The recipient's age is negatively correlated with the attitude toward a mobile ad

2) *Gender*: The importance of consumers' individual goals and interests in advertising is receiving scholarly attention and gender differences are often studied ([41], [42],

[43]). Also, Brackett and Carr study [44] unveiled a demographic variable, gender, was as the one that directly influences attitude toward web ads. Likewise, Shavitt et al's study [5] showed that male consumers generally show a more favorable attitude toward ads than female consumers; gender was deemed a direct antecedent of attitude [5]. However, direct effect cannot be the only way in which gender influences attitude. For example, Myers-Levy ([45], [46]) proposed the selectivity hypothesis, which theorizes women try to take in all information before judging the importance of it, while men process only the information they consider having salient importance. Also, men pursue power and performance, while women are driven more by enjoyment and interpersonal harmony [47]. Therefore, there could be differences between men and women in the relationships between informativeness, entertainment and attitude. Hence, we propose the following:

H6a: The perceived informativeness of mobile ads will be different between men and women.

H6b: The perceived entertainment of mobile ads will be different between men and women.

H6c: The attitude toward mobile ads will be different between men and women.

H6d: The intention to click through a mobile ad will be different between men and women.

III. RESEARCH METHODOLOGY

A. Dependent Variables

The antecedents of attitude toward a mobile ad used in this study were informativeness and entertainment, while the consequent measured was the participants' intention to click through or respond to the mobile ad. The importance of attitude toward an ad as a predictor of attitude toward the brand, purchase intention, and in turn purchase has been shown in past studies (e.g., [48], [49]).

Figure 1 shows the research model in which we hypothesize that informativeness and entertainment are affected by the mobile ad's design, specifically with respect to the length of the message used in the SMS.

B. Sample

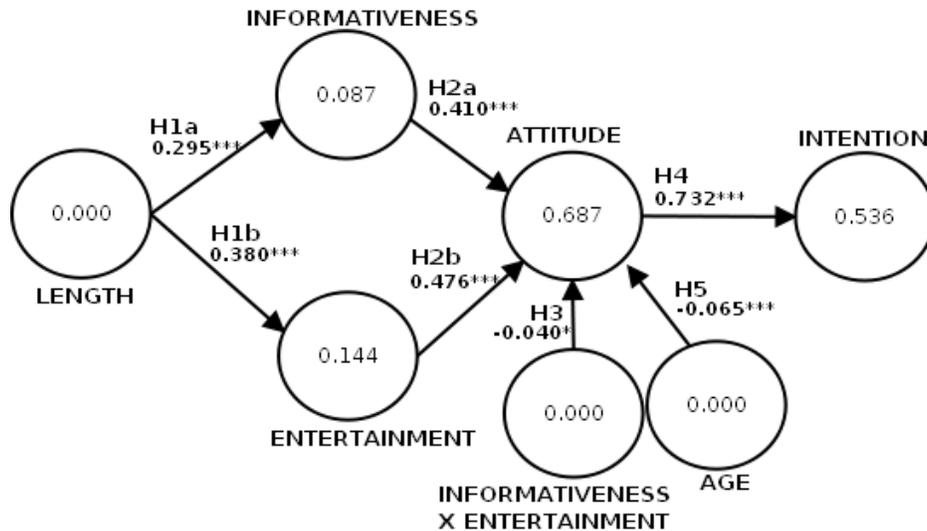
Undergraduate students from a large mid-western U.S. university participated in the experiment. A student sample may be better than a sample taken from the general population in terms of predictive validity [50]. Also, because undergraduates are predominantly in the 18-22 age range that is representative of mobile user characteristics [51] and a target audience in mobile advertising, use of this group in research related to mobile advertising is appropriate. Extra credit was offered to students in return for their participation in the study. A total of 344 subjects participated by making announcements in various random classes across the university reaching 473 students (i.e., a response rate of 73%). The sample consisted of 217 males

and 127 females, aged 18-34 with a mean of 20.5 years, and all owned a mobile phone and used SMS.

C. Procedure and Measures

The study involved a 15-item survey. Participants were instructed to respond to the survey assuming they were a frequent customer of the coffee house, “Rainbow Café”. Apart from the items measuring the age and gender of the participants, and a question on ranking the three SMS messages shown, the other 12 questions (4 questions repeated for each of the three different SMS ads) assessed the informativeness and entertainment of the SMS ad shown, the attitude toward the mobile ad, and their intention to click through to learn more via single-item 7-point Likert-type scales ranging from “not at all” to “very much”. As a matter of reliability and validity to a single item measure, it’s been studied. Generally, single items are not reliable because of measurement errors, and in turn, inconsistent

responses might be obtained ([52], [53]). On the other hand, there was evidence that additional items also could lead to measurement errors and reduce the value of additional items [54]. Also, according to Drolet and Morrión’s study [54], when respondents are exposed to more items, they tend to be less differentiating among items, in turn, they will give mindless response to the survey. Moreover, for the multiple items, participants tend to try to answer consistently in their response to similar questions, which can result in consistency motif bias [55]. In addition, Bergkvist and Rossiter’s study [56] compared the predictive validity of single item and multiple item measures of attitude toward the advertisements and attitude toward the brand. They concluded that a single item measure should be used when the single item has a concrete singular object and a concrete attribute. Thus, under a concrete singular objects and a concrete attribute, the single item measure was validated.



* significant at 0.05 level; ** significant at 0.01 level; *** significant at 0.001 level

Figure 1. The Proposed Structural Model

TABLE I. HYPOTHESES VALIDATION

Hypo's	From	To	Beta	t-Value	p-Value	Sig	Status
H1a	Length	Informativeness	0.295	11.253	.0000	***	Supported
H1b	Length	Entertainment	0.380	17.034	.0000	***	Supported
H2a	Informativeness	Attitude	0.410	11.799	.0000	***	Supported
H2b	Entertainment	Attitude	0.476	14.100	.0000	***	Supported
H3	Informativeness x Entertainment	Attitude	-0.040	2.438	0.0153	*	Supported
H4	Attitude	Intention	0.732	51.441	.0000	***	Supported
H5	Age	Attitude	-0.065	3.950	0.000	***	Supported

IV. RESULTS

The structural model shown in Figure 1 was tested using the variance-based Partial Least Square (PLS) method through the use of the SmartPLS package. PLS enabled us to specify the construct relationships between one another (structural model), as well as with their underlying items (measurement model). Thus, data analysis provided support for both how well the items measured each construct, and how well the hypothesized relationships between constructs supported the theory. PLS features two additional advantages over other methodologies. First, it does not have expectations of normality [57]. This is important for this research due to the varying individual thresholds that participants may display with respect to distraction tolerance. Second, PLS allows for multiple measures for each construct, so paths among constructs would be more accurate estimates than those obtained through multiple regressions. The latter would display downward bias in these estimates due to measurement error ([57], [58]). Another strength of PLS was that it only requires small to medium sample sizes ([59], [60]). The minimum sample size for a PLS analysis should be the larger of (i) 10 times the number of items for the most complex construct; or (ii) 10 times the largest number of independent variables impacting a dependent variable. In our model, the second condition yields a minimum sample size required of 20, which is well exceeded by our sample size of 344.

Overall, the model demonstrated high explanatory power. The R-square of the Behavioral Intention construct was 0.54, or 54% of the variance in user intention to click through to the ad to learn more was explained with our model. The R-square values for the rest of the endogenous variables exceed the 10% benchmark recommended by Falk and Miller [61], with the exception of Informativeness; the R-square for the latter was 0.087 or 8.7%. The variance explained is large enough to accept message length as a significant antecedent, but it becomes evident that there are more design factors influencing a consumer's perceptions of a mobile ad's informativeness beyond the volume of text embedded and received in the ad. Lastly, all of the original hypotheses were supported. Table 1 presents the validation of these hypotheses in more detail.

Reviewing the above results, five sets of conclusions may be drawn. First, on the topic of mobile ad message design, text (SMS message) length was shown to be positively associated with users' perceptions of the informativeness (H1a: $\beta = 0.295$; p -value < 0.001) and entertainment (H1b: $\beta = 0.380$; p -value < 0.001) associated with the mobile ad.

Second, it was theorized that incremental levels of informativeness and entertainment, as well as their interaction effect, would positively impact the mobile user's attitude toward a mobile ad. There was strong statistical support for all three corresponding hypotheses, i.e., H2a (β

= 0.410; p -value < 0.001), H2b ($\beta = 0.476$; p -value < 0.001), and H3 ($\beta = -0.040$; p -value < 0.05).

Third, the often studied relationship between attitude and behavioural intention was adapted in the context of mobile advertising and received strong support, as hypothesized (H3: $\beta = 0.732$; p -value < 0.001).

A second test of the impact of message length on users' overall preference between various mobile ads tested offer additional evidence for the positive impact of message length. As shown in Table 2, all of the pair-wise comparisons of means showed significant differences, suggesting that the increases in the mobile ad's message length from 4 to 12 to 20 words contributed positively to the users' perceptions regarding the mobile ad. Beyond the tests of the hypotheses shown in our research model in Figure 1, a one-way between subjects ANOVA was conducted to compare the effect of gender on Informativeness, Entertainment, Attitude and Behavior Intention. As reported in Table 3, there was a significant effect of gender on Informativeness [$F(1, 1030) = 28.10, p < .001$], Entertainment [$F(1, 1030) = 14.93, p < .001$], Attitude [$F(1, 1030) = 27.57, p < .001$], and Behavior Intention [$F(1, 1030) = 15.88, p < .001$].

Study participants were also asked to provide information regarding their age in addition to gender. Both control variables were analysed by running the model excluding them (uncontrolled), including them one at a time, and lastly including them all at the same time (controlled) in PLS. The results are shown in Table 4. Chin [46] suggests that any changes R-square values may indicate substantial impact of an independent construct on dependents one(s). By inspection, we observe the following: ii) Age had little impact over (R-square change < 0.01) all dependent constructs; iii) Gender had little impact over attitude and intention, but in the case of both informativeness and entertainment a small effect was observed (R-square change between 0.01 and 0.03)

Overall, the fully controlled model improves the R-square values for all dependent constructs.

TABLE II. MULTIPLE COMPARISONS

Dependent Variable: RANK

	(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	0	1	.727*	.055	.000	.60	.86
		2	1.108*	.055	.000	.98	1.24
	1	0	-.727*	.055	.000	-.86	-.60
		2	.381*	.055	.000	.25	.51
	2	0	-1.108*	.055	.000	-1.24	-.98
		1	-.381*	.055	.000	-.51	-.25

*. The mean difference is significant at the 0.05 level.

TABLE III. GENDER DIFFERENCES IN MOBILE AD INFORMATIVENESS, ENTERTAINMENT, ATTITUDE, AND INTENTION

		Sum of Squares	df	Mean Square	F	Sig.
INFO	Between Groups	82.758	1	82.758	28.099	.000
	Within Groups	3033.536	1030	2.945		
	Total	3116.294	1031			
ENTER	Between Groups	46.958	1	46.958	14.934	.000
	Within Groups	3238.692	1030	3.144		
	Total	3285.650	1031			
ATTI	Between Groups	83.418	1	83.418	27.571	.000
	Within Groups	3116.334	1030	3.026		
	Total	3199.752	1031			
INTENT	Between Groups	49.619	1	49.619	15.883	.000
	Within Groups	3217.819	1030	3.124		
	Total	3267.438	1031			

TABLE IV. IMPACT OF AGE & GENDER ON R-SQUARE VALUES OF DEPENDENT CONSTRUCTS

	Informativeness	Entertainment	Attitude	BI
Controlled Model	0.115	0.165	0.688	0.537
Gender	0.114	0.159	0.684	0.536
Age	0.091	0.154	0.687	0.537
Uncontrolled Model	0.087	0.144	0.683	0.536

Next, the path coefficients (Beta) and significance levels (t/p-values) between age and the dependent constructs were reviewed and presented in Table 5. Results suggest that older users had lower perceptions of entertainment associated with the mobile ads than younger users did. Age also had a strong negative path coefficient and corresponding t-value for attitude toward the mobile ad. This would suggest that older participants have less favourable attitudes toward mobile ads than younger users.

TABLE V. PATH SIGNIFICANCE OF AGE AND DEPENDENT CONSTRUCTS

Age		Informativeness	Entertainment	Attitude	BI
	Beta	-0.033	-0.065	-0.048	-0.010
	t-Value	1.269	2.740	4.539	0.538
	p-Value <	n.r.	0.01	0.000	n.r.
	Validation	n.s.	sign.	sign.	n.s.

V. DISCUSSION

This paper proposed a new model to further our understanding of mobile advertising. Specifically, message length in a mobile ad was examined for its potential impact on the mobile ad's perceived value (here, informativeness and entertainment), in turn their respective impact on the attitude toward the ad, and, ultimately, on behavioral intention to click through the ad. From a theoretical point of

view, this work contributes to advertising research by providing a better understanding of the impacts of the message's design on the consumer's perceptions of the ad's value in the mobile channel. We found that longer text messages do have a significant positive impact on the perceived informativeness and entertainment of mobile ads.

With respect to advertising value, we observed a comparable effect by informativeness and entertainment on a consumer's attitude toward a mobile ad. Thus, marketers are charged with the task of designing mobile ads that add both utilitarian value (e.g. they learn something new about the advertised brand or brand item promoted) and hedonic value (e.g. they find the mobile ad humorous or engaging) in the reached mobile user's mind. While an interaction effect between informativeness and entertainment was present, the size of the effect does not at this time yield any directive; both facets of a mobile ad campaign need to be incorporated in the ad creative used.

The frequently studied relationship between attitude toward an object and the intention to use the object was once again confirmed, this time in the context of mobile advertising. A strong predictor of whether the receiving party would in fact click through the received advertisement to learn more indicates that paying attention to what consumers perceive as favorable regarding mobile advertising is critical. A number of studies have recently been reported that attempt to answer questions, such as what the ideal type of a mobile ad is ([7], [13]), or when is it appropriate to push a mobile ad to a mobile user. The related body of literature is still limited and given the rapid advances in mobile telephony, the very nature of the engagement will change over time. Research that is current and relevant is warranted, as marketers will attempt to maximize the perceived value in the two areas studied here, i.e. informativeness and entertainment, whilst managing the risk associated with factors such as increasing levels of engagement and interactivity.

A further implication for practice deals with the validation that longer SMS-based advertising messages produce more favorable reactions. This may be explained by the amount of information that is afforded with more copy embedded in the ad; it could also explain higher levels of entertainment, as more text requires increased time periods of attention and consequently engagement. Increased engagement is likely to elicit a favorable reaction, assuming that there has not been a violation of perceived 'prerequisites' or breach of the protocol in areas such as the time of day or frequency with which a marketer attempts to contact a mobile user.

Additionally, strong beta coefficients and corresponding t-values indicate that women may perceive more informativeness and entertainment in a mobile ad campaign than men; in light of this, the mobile channel seems to be better suited for female-focused marketing campaigns. This is further supported by similarly strong beta coefficients and t-values for attitude toward the mobile ad and a behavioural intention to respond by clicking through and learning more about the advertised brand.

Furthermore, the influence of age on perceptions of a mobile ad is significant. When marketers attempt to reach older users, a more prudent approach is recommended in terms of the design and execution of the mobile ad campaign. A negative relationship between age and attitude toward mobile ads would emphasize the importance of paying attention to the potential negative reactions not studied here (e.g. irritation), as they are likely to reach such levels of annoyance faster or easier than younger mobile users.

As with all studies, there are limitations for this study that can prompt future research in this area. First, the study's tasks were simulated in a scenario described in the questionnaire used in the study. Thus, any sense of urgency or other contextual responses that a user may experience in a real-world setting may not arise here. While this is a limitation in terms of the realism of the study, it is a means of controlling for additional variables that could not be otherwise measured during the experiment. Second, some research would suggest that culture is an important factor in the evaluation of mobile ads. As such, the message length recommendation provided earlier and findings associated with demographics of this sample should not be generalized to other cultures before further validation.

ACKNOWLEDGMENT

We would like to thank the reviewers for their insightful feedback, the track chair and organizers for giving us the opportunity to participate in this premier event on mobile business.

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