A comparative study on attitudes towards SMS advertising and mobile application advertising

Gökhan Aydin*

School of Business and Management Sciences,
Istanbul Medipol University,
Kavacık Mah. Ekinciler Cad. No.19 Kavacık Beykoz 34810,
Istanbul, Turkey
Email: aydin.gokhan@gmail.com
*Corresponding author

Bilge Karamehmet

Communications Department,
Istanbul Medipol University,
Kavacik Mah. Ekinciler Cad. 19, Beykoz,
34810 Istanbul, Turkey
Email: bkaramehmet@medipol.edu.tr

Abstract: The objective of the present study is to determine the major factors influencing consumers' attitudes towards two major types of mobile marketing activities**:** SMS advertising and mobile application advertising. It also discusses the potential differences in antecedents of attitude between the two types of advertisements. The study was carried out in Turkey among university students, who are commonly targeted in mobile marketing studies due to their high mobile phone ownership rates and familiarity with new technologies. A total of 489 valid questionnaires were obtained and analysed using partial least squares structural equation modelling. The findings indicate that overall attitudes towards both mobile advertisement types are negative, SMS marketing being the inferior type. Differences in perceptions of the antecedents of attitudes towards SMS and mobile app ads were detected. On the other hand, the way variables affect attitudes (paths) among the two wireless advertisements types were quite similar.

Biographical notes: Gökhan Aydin is currently employed as a full-time Assistant Professor at Business Administration Department of Istanbul Arel University. He is lecturing on various marketing topics in graduate and undergraduate classes. He has 12 years of hands-on private sector work experience in addition to his academic experience. His areas of interest include brand equity, digital marketing, technology acceptance and mobile marketing.

Bilge Karamehmet is currently employed as a full-time Assistant Professor at Communications Department of Istanbul Medipol University. Her interest areas include destination marketing, healthcare tourism, healthcare marketing and mobile marketing.

1 Introduction

Mobile devices are getting more popular everyday throughout the world and ownership of traditional mobile phones, smartphones and other mobile devices are on the rise. Currently, there are more mobile devices on the planet than humans (International Telecommunication Union, 2014). These personal devices are becoming the primary means of access to the internet in developed countries as mobile subscription ownership rates have nearly saturated in both developed countries and developing countries. According to a recent report by ComScore (2014), consumers in the USA spent nearly 60% of the time online on mobile devices. Another study by Movable Ink on US consumers indicate that 65% of marketing emails are opened on a mobile device (Burdge, 2014). Among the lower-income countries and in rural areas with weak infrastructure, traditional mobile phones are the most popular communication devices owned by the majority of the population. In Africa, 66% of the population owns a mobile subscription (International Telecommunication Union, 2014). Mobile phones offer affordable, instant communication and portability to all users regardless of income or previous access to fixed phone lines. Undoubtedly, mobile devices present unique opportunities and have become an important channel for marketers worldwide. According to a study by eMarketer, mobile advertising is the fastest-growing sector in media worldwide, with annual growth rates exceeding 100% in both 2013 and 2014 (EMarketer, 2015). Attitudes towards this relatively new medium in developing countries are of special interest to marketing professionals as well as researchers.

The Mobile Marketing Association (2009) updated the definition of mobile marketing as "a set of practices that enables organizations to communicate and engage with their audience in an interactive and relevant manner through and with any mobile device or network." Engagement can be in any form and may be initiated by the company/marketer (push) or by the user/consumer (pull) (Mobile Marketing Association, 2009). Push-type mobile marketing activities include Short message system (SMS)/MMS, ad-supported and ad-integrated applications. Pull-type messages include coupons, mobile promotions and attached advertisements (Park, Shenoy and Salvendy, 2008).

The first and the most widely known among mobile marketing practices is the use of SMS advertising operating under GSM systems provided by telecommunication firms. The first wave of mobile devices had limited processing and multimedia capabilities. This limitation led to the dominance of text-based mobile marketing activities, which can be received by any mobile handset. Consequently, text-based SMS advertisements rapidly gained wide acceptance as a cost-effective way of delivering messages to consumers. Even in underdeveloped regions, mobile markets are booming. According to GSM Association, mobile market in Sub-Saharan Africa region has grown by 18% in the past 5 years and are expected to be the fastest-growing mobile market in the coming years (*The China Post*, 2013). Accordingly, SMS marketing offers probably the best promise in reaching individuals all around the world, including those in lower-income

countries. Moreover, SMS messages have higher open rates than similar marketing tools such as email marketing. Barwise and Strong (2002) found that virtually all users in developed countries read the complete text of an SMS advertisement shortly after receiving it. In addition to this finding, various reports published online show that SMS messages have extremely high open rates of 98–99% (Essany, 2014).

With improving technology and emergence of new devices, mobile marketing now incorporates a wide range of activities not limited to SMS. These include ad-supported mobile applications (social networking apps, utility apps, mobile games etc.), mobile coupons, push notifications, location-based messaging and notification services as well as proximity systems (Gao et al., 2013; Park, Shenoy and Salvendy, 2008). Mobile applications are among the most promising services and industry founded upon mobile devices, on which users spend the majority of their time. Nielsen's 2013 data indicated that people spend 65% more time using mobile apps compared to 2011 (Nielsen, 2014) and Yahoo!'s Flurry Analytics found a 76% overall app usage increase in 2014 (Khalaf, 2015). Again Flurry's finding of mobile apps accounting for 86% of the time spent on mobile devices is a good indicator of the popularity and significance of these apps. Despite the popularity, users are not willing to pay to access mobile apps, mostly preferring ad-supported "free" apps. According to eMarketer, only 36% of smartphone users in the USA are expected to pay for apps in 2015, and the share of mobile users who pay for apps is expected to decrease slowly over the next 4 years (Emarketer, 2015). These findings imply that there are abundant opportunities in mobile applications marketing and advertising owing to the dominance of ad-supported business model.

As discussed in the previous paragraphs, two major types of mobile advertisements are of utmost importance to marketers worldwide. The first one is SMS advertising that offers access to virtually all mobile devices on the planet. The latter is mobile application-related advertising, which is the most rapidly growing platform in digital marketing (Barutçu, 2007; Park, Shenoy and Salvendy, 2008; Quah and Lim, 2002). The present study aims to reveal the major factors influencing consumers' attitudes towards these two vital and popular types of mobile advertising. SMS advertising is the major focus of the extant literature on mobile marketing and relevant studies are abundant; however, studies on mobile application advertising are quite scarce. Moreover, studies comparing various forms of mobile advertising, which can provide insights to marketing practitioners are also limited. These phenomena indicate a significant research gap that is aimed to be addressed with the present study.

2   Literature review

Attitudes towards advertisements have been investigated extensively in the past 50 years. The positive overall attitude that was evident until the 1970s turned negative among general populace in the following years (Mittal, 1994). Consistent with this overall attitude change, attitudes towards mobile advertising are also found to be negative in most of the recent studies (Luna Cortés and Royo Vela, 2013; Tsang, Ho and Liang, 2004; Usta, 2009; Wong, 2010). However, there seems to be regional differences; US consumers are more negative and Asian consumers are more positive in general (Ferle and Lee, 2003; Zhou, Zhang and Vertinsky, 2002). Consequently, attitudes towards mobile advertising are subject to change in diverse cultures and the literature will benefit from the studies that are not limited to Western cultures.

Most of the available literature on mobile advertising is solely focused on SMS advertisements (Barwise and Strong, 2002; Tsang, Ho and Liang, 2004). Research on the relatively new mobile marketing activities outside of SMS are available but scarce (Okazaki, 2004; Watson, McCarthy and Rowley, 2013). Moreover, there are virtually no motivational studies in existing literature dealing with rapidly expanding mobile application advertising carried out in developing nations.

Current research on consumer motivation in mobile advertising benefits from traditional advertising literature. One of the important lines of research in this context utilises the uses and gratifications theory (UGT) or develops an approach analogous to it (Liu et al., 2012; Tsang, Ho and Liang, 2004). UGT is a consumer-centric approach, which was mainly developed to understand consumer motivations in various mass media. In traditional UGT, cognitive needs, affective needs, personal integrative needs, social integrative needs and relaxation needs are considered as basic 'needs and gratification' categories for individuals in media use. Recently, a noteworthy amount of research on motivation in modern media and technologies has also been founded on UGT such as mobile phone use (Leung and Wei, 2000). In our study, we also draw from UGT and use the dimensions that emerge as essential in relevant literature in cognitive and affective need categories. The related dimensions utilised are entertainment and informativeness which are employed in mobile and internet advertising contexts widely (Luo, 2002; Okazaki, 2004).

Other than these factors, overall perceived value of advertising, trust towards advertisement as well as the advertisement source and the extent to which ads are perceived irritating are considered as significant criteria affecting attitudes towards advertising in the existing literature (Altuna and Konuk, 2009; Bauer et al., 2005; Ducoffe, 1996; Shavitt, Lowrey and Haefner, 1998; Tsang, Ho and Liang, 2004). Trust towards the advertisement itself and the credibility of the organisation supplying the advertisement is critical in individuals' perception of advertisements (Choi, Hwang and McMillan, 2008). In digital media where the control mechanisms are not as strict as printed media or TV ads, credibility of the advertisement is probably a more significant factor affecting attitudes towards ads. Irritation dimension appears as an important factor as well and is incorporated into the studies on advertisements both in general and mobile contexts. Consumers are irritated by the intrusive ads that are even sometimes perceived as insulting their intelligence. Consequently, irritation construct in relevant studies was found to affect attitudes towards ads negatively (Okazaki, 2004; Schlosser, Shavitt and Kanfer, 1999).

All the aforementioned factors, which are considered antecedents of attitude, are incorporated into this study in accordance with the relevant literature and are discussed further in the following sections.

2.1 Credibility

Among the primary factors affecting attitude towards advertisements in the literature is found to be credibility. MacKenzie and Lutz (1989) defined advertisement credibility as "the extent to which the consumers perceive the claims about the brand/product advertised in the advertisement to be truthful and believable" and accepted it as one of the antecedents that affect attitude towards advertisements in general. The credibility of an advertisement incorporates the credibility of the advertisement source (the company/institution providing the advertisement) and also the credibility of the

advertisement itself (MacKenzie and Lutz, 1989). Consumers' perceptions about how correct, reliable and trustworthy the advertisement and the advertisement source are affect their attitudes towards the advertisement (Altuna and Konuk, 2009; Chowdhury et al., 2006; Okazaki, 2004; Özçam, Kuşçu and Yozgat, 2015; Xu, Liao and Li, 2008). The credibility factor is incorporated into the model in this study following the findings of previous researchers and the hypotheses below are proposed:

H1: Credibility has a positive effect on mobile advertising value

H2: Credibility has a positive effect on attitude towards mobile advertising

2.2   Entertainment

The entertainment dimension of advertisements is considered as one of the major factors affecting attitudes towards and acceptance of advertisements. This dimension is related to the enjoyment that is associated with the advertisement itself. Consumers usually develop a positive attitude towards messages that they find entertaining (Shavitt, Lowrey and Haefner, 1998; Xu, 2006). Consumers' interest, participation and loyalty can all be increased using entertaining messages in advertisements (Haghirian, Madlberger and Tanuskova, 2005). Consequently, this effect/relationship found in traditional advertising is expected to be present in the mobile advertising context. Various researchers have included entertainment dimension in their studies and detected positive effects of entertainment on attitude towards mobile marketing activities (Choi, Hwang and McMillan, 2008; Haghirian, Madlberger and Tanuskova, 2005; Liu et al., 2012; Tsang, Ho and Liang, 2004). Following the steps of previous researchers and their findings, the entertainment factor is incorporated into the proposed model in this study.

H3: Entertainment is positively related to mobile advertising value

H4: Entertainment is positively related to attitude towards mobile advertising

2.3   Informativeness

In UGT, information delivery is considered as a need-satisfying function. In our context, information dimension related to an advertisement, which is usually referred to as 'informativeness', is accepted as one of the noteworthy factors creating value for the consumers and affecting their attitudes towards advertisements (Ducoffe, 1995, 1996). The information provided in advertisements should be timely and relevant for the target to be of value. Informativeness can be considered delivering the content value and enjoyment of the style/form of value (Tsang, Ho and Liang, 2004). Informativeness factor is used in the models that try to understand consumer attitude and adoption of online advertisements and mobile advertisements by various researchers such as Tsang, Ho and Liang (2004), Bauer et al. (2005) and Choi, Hwang and McMillan (2008), whose findings provide proof of the positive effect of informativeness on attitude towards (mobile) advertisements.

Consequently, informativeness dimension is included in our model and the following hypotheses are formed:

H5: In formativeness has a positive effect on mobile advertising value

H6: Informativeness has a positive effect on attitude towards mobile advertising

2.4 Irritation

Consumers find certain advertisements irritating as they can be perceived as manipulative, offensive or insulting consumers' intelligence (Ducoffe, 1996). In addition, the message may be confusing, intrusive and distracting to consumers, which can also cause irritation. Consequently, irritation is considered an important reason for individuals in developing a negative attitude towards advertisements (Schlosser, Shavitt and Kanfer, 1999). Irritation is also believed to diminish the value obtained from the advertisements by the users (Ducoffe, 1996; Liu et al., 2012). Irritation factor may especially be important for messages received on mobile phones, which are indisputably very personal devices (Bauer et al., 2005). In practice, various researchers (Altuna and Konuk, 2009; Luna Cortés and Royo Vela, 2013; Okazaki, 2004; Rau, Liao and Chen, 2013; Tsang, Ho and Liang, 2004; Ünal, Ercis and Keser, 2011; Wong, 2010) found intrusiveness of the message and irritation as a significant element that negatively affects attitudes towards mobile advertisements. Therefore, irritation is expected to adversely affect attitudes towards advertisements and is incorporated into the model by the following hypotheses:

H7: Irritation is negatively associated with mobile advertising value

H8: Irritation is negatively associated with attitude towards mobile advertising

2.5 Advertising value

In this study advertising value (ad value) concept as developed by Ducoffe (1995, 1996) is also accepted as one of the antecedents of consumer attitude towards mobile advertising. Advertising value is defined by Ducoffe (1995) as the "subjective evaluation of the relative worth or utility of advertising to consumers." Satisfaction for the consumer (recipient of the advertisement) can only be provided if perceived value of the advertisement itself is high enough to satisfy consumer's expectations. Based on Ducoffe's (1996) findings, researchers such as Haghirian, Madlberger and Tanuskova (2005) and Liu et al. (2012) incorporated this factor into their studies analysing mobile advertisement attitude formation and found a positive effect on attitude. Therefore, we hypothesise that

H9: Perceived mobile advertising value is positively related to attitude towards mobile advertising.

In addition to a hypothesised direct effect on attitudes, the mediating role of ad value on the effect of independent variables on attitudes was also tested in the study using the following statement:

H10i: The direct relationship between the independent variables and the attitudes towards mobile ads is mediated by the advertising value construct.

Table 1 summarises previous research that focuses on attitudes towards mobile advertisements and highlights relevant findings.

Table 1   Research on attitude towards mobile advertisements

Researchers and title	Region/sample	Findings
"Permission-based mobile advertising" (Barwise and Strong, 2002)	UK, 500 respondents	Consumers respond well to entertaining and informative ads. The messages should be relevant to the user, and permission is essential
"Consumer attitudes towards mobile advertising: an empirical study" (Tsang, Ho and Liang, 2004)	Taiwan, 380 respondents	The respondents held negative attitudes about receiving mobile ads. Entertainment, informativeness and credibility affect attitude positively whereas irritation affects it negatively. Entertainment is the most significant of the factors affecting attitudes
"How do Japanese consumers perceive wireless ads? A multivariate analysis" (Okazaki, 2004)	Japan, 590 respondents	Infotainment (a composite factor including information and entertainment values) and perceived irritation affects attitudes towards wireless advertisements. In addition, content credibility affected the willingness to access
"Driving consumer acceptance of mobile marketing: a theoretical framework and empirical study" (Bauer et al., 2005)	General (internet), 1103 respondents	Perceived utility of information and perceived utility of entertainment affect the attitude towards mobile marketing
"Consumer attitude towards mobile advertısıng in an emerging market: an empirical study" (Chowdhury et al., 2006)	Bangladesh, 318 respondents	Only credibility has a significant positive effect on consumer attitude towards mobile ads. Information, entertainment and irritation factors are found to be insignificant
"Attitudes towards mobile marketing tools: a study of Turkish consumers" (Barutçu, 2007)	Turkey, 418 respondents	Attitudes of consumers towards different mobile activities and marketing tools were analysed and found to be positive
Combining empirical experimentation and modelling techniques: a design research approach for personalised mobile advertising applications (Xu, Liao and Li, 2008)	China, 135 respondents	Credibility, entertainment value and personalisation dimensions affect the attitude towards mobile advertising. The effects of irritation and informativeness are insignificant on the attitude towards mobile advertising
"How mobile advertising works: the role of trust in improving attitudes and recall" (Okazaki, Katsukura and Nishiyama, 2007)	Japan, 53 respondents	A positive relationship exists between mobile advertisement trust and attitude towards mobile advertising
"Mobile advertising in different stages of development: a cross-country comparison of consumer attitudes" (Haghirian, Madlberger and Inoue, 2008)	367 students from Japan and 408 students from Australia	Informativeness and entertainment were found to be important factors affecting consumer attitudes towards mobile advertising in both markets
"Gearing up for mobile advertising: a cross-cultural examination of key factors that drive mobile messages home to consumers" (Choi, Hwang and McMillan, 2008)	629 students from Korea and USA	Entertainment and informativeness were found as significant factors affecting the attitude towards mobile advertising messages in both of the markets. The irritation and credibility factors' effects on attitude were found to be insignificant

Table 1   Research on attitude towards mobile advertisements (continued)

Researchers and title	Region/sample	Findings
"Understanding the acceptance of mobile SMS advertising among young Chinese consumers" (Zhang and Mao, 2008)	China, 262 respondents	Perceived information usefulness has a positive effect on intention to use SMS advertising
"Consumers' attitudes towards mobile advertising" (Wong, 2010)	China, 781 respondents	Informativeness, entertainment, credibility and personalisation have positive effects on attitude. Overall attitude towards SMS ads are negative
"Understanding consumer attitudes toward mobile advertising and its impact on consumers' behavioural intentions: a cross-market comparison of USA and Turkish consumers" (Altuna and Konuk 2009)	Turkey, 98 respondents and USA, 94 respondents	Consumers in Turkey show more positive attitudes than US respondents regarding mobile advertisements. Enjoyment, credibility, informativeness and irritation dimensions affect the attitudes toward mobile advertisements
Understanding attitudes towards mobile advertising (in Turkish; (Usta, 2009)	Turkey, 400 University students	Overall attitudes towards SMS ads are negative. Informativeness, enjoyment, credibility and irritation affect attitude
"Attitudes towards mobile advertising - a research to determine the differences between the attitudes of youth and adults" (Ünal, Ercis and Keser, 2011)	Turkey, 377 respondents	Entertainment, informativeness and credibility have positive effects on attitude whereas irritation has a negative effect
"Determinants of consumer perceptions toward mobile advertising - a comparison between Japan and Austria" (Liu et al., 2012)	170 respondents from Japan and 164 from Austria	Infotainment (information and entertainment value of advertising) and credibility positively affects the advertising value whereas irritation negatively affects it. Advertising value in turn affects the attitude towards mobile advertising
"The antecedents of consumers' negative attitudes toward SMS advertising: a theoretical framework and empirical study" (Luna Cortés and Royo Vela, 2013)	Spain, 188 university students	Irritation and privacy concerns adversely affects attitude towards mobile advertisements
Understanding mobile advertising acceptance: an integrative approach (Özçam, Kuşçu and Yozgat, 2015)	Turkey, 353 users	Attitudes towards mobile advertising are positively affected by consumers' trust on the usefulness of the ads, by their resistance to change, customisation of the ads and ability of the consumers to use mobile technologies

3   Methodology: data, variables and the model

The present study was carried out to understand attitudes towards SMS ads and mobile application ads. In this context, SMS ads were defined as "messages that various organizations send to consumers to promote their products or services." Mobile application ads on the other hand were defined as "display advertisements shown to the

users either at launch or closing of a free ad-supported mobile application or presented within the application itself." Examples for mobile application ads (ad-supported weather apps and gaming aps), which are in its infancy stage compared to well-established SMS ads, were provided to the respondents to establish a common understanding.

3.1   Measures

The scales used for measuring informativeness, entertainment, irritation and perceived advertising value are fundamentally based on the works of Ducoffe (1995, 1996) in this study. The credibility of advertisements is measured using items from Liu et al. (2012) and McKenzie and Lutz's (1989) advertising credibility scales. Finally, attitudes towards mobile advertising are measured using items from study of Tsang, Ho and Liang (2004). The measures used in this study are presented in detail in the Appendix. All of the constructs are measured using a 5-point Likert-type scale ranging between 1 = *strongly disagree* and 5 = *strongly agree*.

3.2   Model

The proposed model incorporating the hypothesised relations is illustrated in Figure 1.

Figure 1   Proposed model
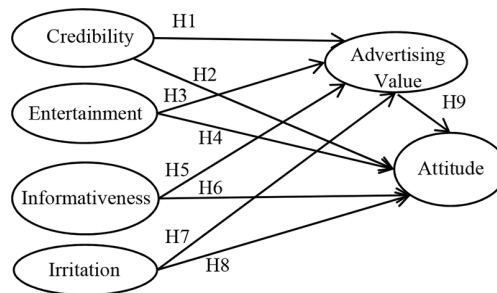
3.3   Sampling and data collection

University students and young adults with high mobile device ownership and rapid adoption of new technologies are among the primary target groups of mobile advertising activities (Peters, Amato and Hollenbeck, 2008). Consequently, university students have been utilised in several mobile marketing studies (i.e. Hanley, Becker and Martinsen, 2006; Okazaki, 2004). Similarly, university students were selected as the target group in this study, and the sample size was chosen as 500 considering the resources available. Convenience sampling was used in choosing the respondents.

Survey method was used to carry out data collection for the study and a questionnaire was formed to incorporate the scales used. The questionnaire was tested and refined using a pilot study on 25 faculty members and students. Following the pilot stage, wording and ordering of several questions were altered and the questionnaire was finalised. In addition to self-administration of the printed version in the authors' university, the survey was carried out using a web-based service (www.kwiksurveys.com). Each respondent was asked to answer questions both for SMS ads and mobile application ads in the survey

study. Half of the respondents received the questions for SMS ads first, the latter half receiving them after completing the section on mobile app ads. The questionnaire was kept online for 3 weeks in June 2014, and the printed version was administered during the same period. Only university students in Turkey were invited to answer the survey, and the information provided was controlled after the implementation stage for confirmation. The resulting data from 610 questionnaires were carefully screened and partially completed or low-quality surveys (all responses including reverse questions are coded in the same way etc.) were eliminated. In addition, respondents with no smartphones, no experience with ad-supported mobile applications or have not seen any mobile application ads were excluded from the study using filtering questions. After the screening process, there were 489 valid questionnaires available for analysis, and no imputation methods were used, as there were no missing data left in the dataset. Size of the sample was deemed adequate for structural equation modelling analysis in agreement with Barclay, Higgins and Thompson (1995)'s suggestion of 10 subjects per variable while also satisfying Cohen's (1992) power suggestions.

Basic demographic information on the sample is provided in Table 2.

Table 2 Sample demographic information

Gender	Frequency	Percentage	Mobile phone owner for	Frequency	Percentage
Male	202	41.3%	1–5 years	21	4.3%
Female	287	58.7%	6–10 years	339	69.3%
Age			11+ years	129	26.4%
19 or below	43	8.8%	Smartphone owner for		
20–24	389	79.6%	1–2 years	149	30.5%
25–29	37	7.6%	2–4 years	198	40.5%
30+	20	4.1%	5+ years	142	29.0%
Total	489	100%	Total	489	100%

4 Analysis and findings

Prior to carrying out the structural analysis, variables were assessed for normality. As an outcome of this analysis 89% of the variables showed significant Kurtosis or skewness at 0.05 significance level, and all of the statistics for Shapiro-Wilks tests were significant. These results indicate severe deviations from normality. Therefore, an approach that can work well with non-normally distributed data, namely component based partial least squares (PLS) structural equation modelling (SEM) approach, was chosen. These variance-based methods such as PLS-SEM are gaining popularity within SEM approaches (Kaplan and Haenlein, 2010; Schumacker and Lomax, 2010, p.7) due to their applicability to smaller sample sizes, non-parametric data and non-normally distributed data (Hair et al., 2013).

Following the normality tests, a principal component exploratory factor analysis (EFA) was carried out in SPSS application to test the scales utilised in this study. According to the initial EFA, one item from the irritation scale was left out of further analysis. The final EFA resulted in 6 factors as expected with their eigenvalues exceeding

0.90. Kaiser-Meyer-Olkin measure was calculated as 0.947 and Bartlett's test of sphericity was significant at <0.001 level. The factors accounted for 75.2% of the total variance. Following the EFA, PLS-SEM analysis was executed in Smart-PLS application. In this approach, a confirmatory factor analysis (CFA) is performed together with the path analysis. The results of the CFA and descriptive statistics for each variable related to the constructs are provided in Table 3.

Table 3   Factor analysis descriptive statistics ($N = 489$) SMS and mobile app ads

SMS ads (scale 1–5)			Mobile app ads (scale 1–5)		
Loading	Mean	Standard deviation	Loading	Mean	Standard deviation
Entertainment (ENT)					
ENT item 1	0.848	1.93	1.02	0.858	2.54	1.23
ENT item 2	0.843	1.94	1.03	0.804	2.51	1.20
ENT item 3	0.868	2.15	1.01	0.857	2.46	1.09
Information (INF)					
INF item 1	0.815	2.90	1.11	0.820	2.99	1.12
INF item 2	0.832	3.29	1.01	0.821	3.26	1.03
INF item 3	0.824	2.91	1.00	0.849	3.02	1.03
Irritation (IRT)					
IRT item 1	0.892	3.76	1.11	0.926	3.52	1.14
IRT item 3	0.857	3.75	1.08	0.905	3.47	1.15
Credibility (CRE)					
CRE item 1	0.705	2.42	0.98	0.813	2.64	1.04
CRE item 2	0.814	2.44	1.01	0.825	2.60	0.95
CRE item 3	0.816	2.63	1.01	0.861	2.71	1.00
CRE item 4	0.785	2.76	0.92	0.722	2.77	0.94
Advertising value (ADV)					
ADV item 1	0.747	2.03	1.15	0.796	2.45	1.17
ADV item 2	0.846	2.50	0.99	0.859	2.73	1.12
ADV item 3	0.872	2.04	0.95	0.872	2.35	1.13
Attitude (ATT)					
ATT item 1	0.897	2.46	0.99	0.864	2.49	1.02
ATT item 2	0.914	2.02	1.02	0.913	2.38	1.18

ENT, entertainment; INF, informativeness; IRT, irritation; CRE, credibility;
ADV, advertising value; ATT, attitude.

4.1   Instrument validity

The construct reliability, discriminant and convergent validity of the model were assessed using various generally accepted internal consistency measures. The results of the analysis are summarised in Tables 4 and 5 for SMS ads and mobile app ads, respectively.

One indicator, namely irritation construct item 2 (IRT2), was omitted in the analysis due to low loading on IRT construct.

Table 4 Correlation matrices and validity analysis: SMS ads

Latent variable	AVE [1]	Composite reliability (CR) [2]	Cronbach's alpha (CA) [3]	Average inter-item correlations	ENT	INF	IRT	CRE	ADV	ATT
ENT	0.728	0.890	0.814	0.523	**0.853***					
INF	0.678	0.863	0.765	0.480	0.496	**0.823***				
IRT	0.765	0.867	0.694	−0.451	−0.675	0.387	**0.875***			
CRE	0.611	0.862	0.786	0.507	0.555	0.688	−0.434	**0.781***		
ADV	0.678	0.863	0.762	0.557	0.743	0.616	-0.608	0.628	**0.823***	
ATT	0.820	0.901	0.781	0.563	0.775	0.594	−0.637	0.653	0.770	**0.906***

*The square root of average variance extracted is on the diagonal. [1]AVE > 0.5; [2]CR > 0.7; [3]CA > 0.7; ADV, advertising value; ATT, attitude; CRE, credibility; ENT, entertainment; INF, informativeness; IRT, irritation.

Table 5 Correlation matrices and validity analysis: mobile application ads

Latent variable	AVE [1]	Composite reliability (CR) [2]	Cronbach's alpha (CA) [3]	Average inter-item correlations	ENT	INF	IRT	CRE	ADV	ATT
ENT	0.706	0.878	0.792	0.601	**0.840***					
INF	0.689	0.869	0.776	0.574	0.635	**0.830***				
IRT	0.839	0.912	0.809	−0.548	−0.763	−0.605	**0.916***			
CRE	0.651	0.881	0.821	0.553	0.667	0.732	−0.548	**0.807***		
ADV	0.710	0.880	0.795	0.619	0.836	0.688	−0.715	0.670	**0.843***	
ATT	0.790	0.883	0.737	0.609	0.805	0.677	−0.696	0.667	0.807	**0.889***

*The square root of average variance extracted is on the diagonal. [1]AVE > 0.5 ; [2]CR > 0.7; [3]CA > 0.7; ADV, advertising value; ATT, attitude; CRE, credibility; ENT, entertainment; INF, informativeness; IRT, irritation

Cronbach's alpha (CA) and composite reliability (CR) were used to assess the internal consistency reliability of the model. As indicated by the high factor loadings provided in Table 3, which are all greater than 0.70, the internal consistency reliability measures were within recommended levels. Cronbach's alpha (Carmines and Zeller, 1979; Nunnally, 1978) and composite reliability were both greater than 0.70 (Fornell and Larcker, 1981).

Convergent reliability of the model is assessed using average variance extracted (AVE) and outer loadings of constructs. All the outer loadings were greater than 0.70, and AVE was also within recommended values in the literature. These findings lead us to the conclusion that the items can explain required variation levels in each latent variable and that convergent reliability conditions are met.

The discriminant validity was evaluated by using two widely used methodologies. First, cross-loadings of the indicators were evaluated and whether the indicators loaded more highly on their own construct than on other constructs was assessed. Then the methodology proposed by Fornell and Larcker (1981) of comparing the inter-item

correlations (the correlation between items) with the square roots of AVE for each construct was used. The inter-item correlations were all below the 0.90 threshold (Hair et al., 2013) and lower than the square root of the AVE as seen in Tables 4 and 5. These results demonstrate that all constructs shared more variance with their indicators than with other constructs; consequently, the discriminant validity conditions were satisfied. According to the assessments carried out, it can be concluded that all validity and reliability requirements were met.

4.2   Structural analysis findings

Following the validity and reliability analysis, PLS-SEM analysis was carried out for SMS and mobile app ads separately. The results of these analyses are illustrated in Figures 2 and 3.

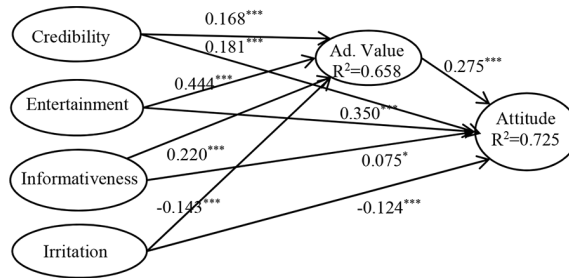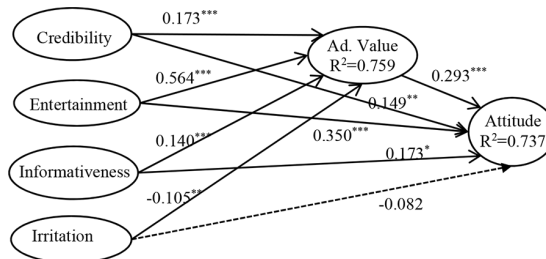**Figure 2**   SEM analysis resulting model for SMS ads

Figure 3   SEM analysis resulting model for mobile application ads

In assessment of the predictive power of the model, we observed that the model accounted for substantial amounts of variance in attitudes towards SMS and mobile app ads (72.5 and 73.7%, respectively). In addition to the coefficient of determination (R^2) representing the amount of variance explained by the exogenous constructs, Stone-Geisser's Q^2 value (Stone, 1974) was used to assess the predictive power of the model. Q^2 values were obtained by using blindfolding procedure, a sample reuse technique that omits every n^{th} data point of the indicators in Smart-PLS program. By using an omission distance of 7, Q^2 values obtained were 0.439 for advertising value (ADV) and 0.590 for attitude (ATT) constructs in SMS ads and 0.530 for ADV and 0.561 for ATT constructs in mobile app ads. As noted in the related literature Q^2 values above 0.35 suggest large predictive relevance for the model (Hair et al., 2013; Henseler Ringle and Sinkovics, 2009), as is the case in our study.

All of the hypotheses except H8 (IRT→ATT) for mobile app ads were supported in our study, and a summary of the findings is provided in Table 6. Irritation's direct effect on attitude was insignificant; however, we can see an indirect effect through advertising value construct.

Table 6 SEM analysis results and hypotheses testing

Hypotheses	Path	SMS ads			Mobile app ads			SMS vs mobile app ads		
		Path coefficients	Standard deviation	t-Statistics	Path coefficients	Standard deviation	t-Statistics	Path coefficient difference	t-Value	p-Value
H1	CRE→ADV	0.168	0.0436	3.850***	0.173	0.044	3.918***	0.005	0.081	0.936
H2	CRE→ATT	0.181	0.0362	4.999***	0.149	0.062	2.399***	0.032	0.446	0.656
H3	ENT→ADV	0.444	0.0500	8.880***	0.564	0.044	12.711***	0.120	1.804*	0.072
H4	ENT→ATT	0.350	0.0442	7.910***	0.350	0.060	5.809***	0.000	–	–
H5	INF→ADV	0.220	0.0447	4.925***	0.140	0.041	3.442***	0.080	1.302	0.187
H6	INF→ATT	0.075	0.0383	1.960**	0.173	0.075	2.315**	0.098	1.165	0.244
H7	IRT→ADV	−0.143	0.0394	3.633***	−0.105	0.041	2.575***	0.038	0.669	0.504
H8	IRT→ATT	−0.124	0.0343	3.611***	−0.082	0.051	1.608	0.042	0.684	0.494
H9	ADV→ATT	0.275	0.0446	6.165***	0.293	0.059	4.994***	0.018	0.244	0.808

*<0.10 significance level; **<0.05 significance level; ***<0.01 significance level.

The differences in paths in the structural models were assessed by the approach offered by Keil et al. (2000). Only one path (effect of entertainment on ad value) was significantly different at 90% level, which leads us to the conclusion that the structural models were not significantly different between SMS ads and mobile application ads.

In addition to assessing differences in paths, a factor-by-factor paired *t*-test was performed on the collected data to gain insights into potential dissimilarities in each dimension between SMS ads and mobile app ads. The results of this analysis are provided in Table 7.

Table 7   Paired *t*-Test results between SMS ads and mobile app ads factor scores

SMS vs. mobile app ads	Mean difference	Standard deviation	Standard error mean	t
Credibility***	−1.170	2.328	0.107	−10.969
Entertainment**	−0.192	2.051	0.094	−2.044
Informativeness*	0.158	1.928	0.088	1.787
Irritation***	−0.628	2.174	0.100	−6.298
Ad Value***	−0.904	2.321	0.106	−8.496
Attitude***	−0.268	1.425	0.065	−4.106

*<0.10 significance level; **<0.05 significance level; ***<0.001 significance level.

As can be seen from Table 7 all SMS factor scores are different from their mobile app counterparts at varying significance levels. Credibility, irritation, advertisement value and attitude are significant at <0.001 level, whereas entertainment is significant at <0.05 level and informativeness at <0.10 level. It is evident that the respondents' views towards the two mobile advertising methods are different from each other.

4.3   *Mediation analysis*

The mediation analysis was carried out using the methodology proposed by Preacher and Hayes (2004). The indirect effects and direct effects were calculated using individual bootstrapping results and significance tests were conducted. Fundamentally, the following conditions should be met for existence of a mediation effect (Hair et al., 2013, p.222):

- Presence of a significant direct effect of independent variable on dependent variable (independent variable's variations account significantly for the mediator's variations).

- Presence of a significant direct effect of the mediator on dependent variable (mediator's variations account significantly for the dependent variable's variations).

- Presence of a significant indirect effect of independent variable on dependent variable through the mediator (when direct paths are controlled, a previously significant relationship between the independent and dependent variable changes its value significantly).

All the direct effects and indirect effects were significant at varying levels. This infers the presence of a mediation effect of ad value between dependent variables and attitudes. The

degree of the mediation, on the other hand, is calculated using 'variance accounted for' (VAF) that reflects the size of the indirect effect with regards to the total effect. When VAF is less than 20% it is assumed that almost no mediation takes place. Values exceeding 80% correspond to full mediation, whereas values between 20 and 80% indicate partial mediation (Hair et al., 2013, p.225). The VAF values provided in Table 8 indicate that there is a weak partial mediating effect of ad value on the relationships between entertainment, informativeness constructs and attitudes towards SMS ads. There is almost no mediating role of ad value on the relationships between credibility, irritation and attitudes towards SMS ads. The findings are similar but not exactly the same for mobile application ads. There is a weak, partially mediating role of ad value on the relationships between credibility, entertainment, irritation constructs and attitudes towards mobile application ads. The mediation for the relationship between informativeness and attitudes towards mobile ads is on the other hand practically non-existent.

Table 8 Mediation analysis

For SMS ads	Direct effect	Indirect effect	Total effect	Variance accounted for (%)	Conclusion
Credibility → attitude	0.228	0.046	0.274	17	Almost no mediation
Entertainment → attitude	0.471	0.122	0.593	21	Weak mediation
Informativeness → attitude	0.136	0.061	0.196	31	Partial mediation
Irritation → attitude	−0.163	−0.039	−0.202	19	Almost no mediation
For mobile app ads					
Credibility → attitude	0.149	0.051	0.200	26	Weak mediation
Entertainment → attitude	0.350	0.171	0.521	33	Partial mediation
Informativeness → attitude	0.173	0.041	0.214	19	Almost no mediation
Irritation → attitude	−0.082	−0.031	−0.113	27	Weak mediation

Overall, the indirect effects were able to explain a limited level of variance in the attitudes. Thus, H_{10} hypothesis on the role of ad value as a mediator is partially accepted.

Implications of all the aforementioned findings are deliberated together with SEM results in the Discussions section.

5   Discussion

The structure of attitude formation towards two forms of mobile advertisements and the types of relationships are quite similar with no significant differences in paths. However, there are significant differences in the factor scores between SMS and mobile app ads attitudes and their antecedents that should be noted and elaborated.

The structural model explained similar amounts of variance in attitudes towards mobile app ads (73.7%) and SMS ads (72.5%). When we analyse the paths, we see that all the factors (credibility, entertainment, irritation and informativeness) have significant effects on attitudes as noted by several researchers around the world (Altuna and Konuk, 2009; Bauer et al., 2005; Liu et al., 2012; Tsang, Ho and Liang, 2004; Ünal, Ercis and Keser, 2011; Wong, 2010).

The overall attitudes towards mobile app ads is negative with 60% of the sample responding negatively (1 or 2 on a 1–5 scale) to items measuring attitudes towards SMS and mobile app ads. Compared to the other studies in Turkey, this finding is consistent with the studies by Usta (2009) and Ünal et al. (2011) study but contradicting the study by Barutçu (2007). As for the contradiction, this study is carried out on a younger group of participants than Barutçu's, which may account for the difference in attitudes. Negative attitudes towards mobile advertisements was also witnessed by researchers in different countries (Lee, Tsai and Jih, 2006; Luna Cortés and Royo Vela, 2013; Mir, 2011; Tsang, Ho and Liang, 2004; Wong, 2010). According to the findings, attitudes towards SMS ads is more negative compared to mobile app ads. This is indicated by 64.5% of the respondents' negative attitudes towards SMS ads compared to 56.5% towards mobile app ads and also by paired *t*-test results.

In terms of credibility neither of the mobile advertising methods rank positively, SMS being the inferior type compared to mobile app ads. Credibility is the second most important factor that affects the advertisement value and also attitudes towards mobile app ads and third most important in SMS ads.

Within the antecedents, entertainment has the strongest effect both on advertisement value and attitudes as observed in the works by Tsang, Ho and Liang (2004) in Taiwan, Petrovici and Marinov (2010) in Romania, and Xu, Liao and Li (2008) in China. When we consider the potential differences between SMS and mobile app ads, we see that respondents find SMS ads less entertaining. Nevertheless, entertainment is the most important factor in ad value and attitude formation and should be handled with careful attention paid to practice of both SMS and mobile app ads.

Irritation has a negative effect on ad value for SMS ads in our study, which is consistent with the previous studies that have confirmed the negative effect of irritation on mobile advertising value and attitudes towards mobile advertising (Altuna and Konuk, 2009; Liu et al., 2012; Okazaki, 2004; Tsang, Ho and Liang, 2004). The direct effect of this factor on attitudes towards mobile application ads is insignificant; however, an indirect effect is observed through ad value.

Moreover, users are more irritated by SMS ads compared to mobile app ads. This can be explained by the difficulty and, occasionally, the inability to block unwanted SMS (advertisement) messages. On the other hand, there is usually a choice involved in mobile application ads. For instance, by using ad-supported mobile applications instead of paid versions consumers make a choice to receive ads instead of paying for the application.

The effects of advertisement value on attitudes towards both mobile advertisement types are significant. Moreover, the antecedents of advertising value are all in agreement

with the existing literature and findings of researchers such as Haghirian, Madlberger and Tanuskova (2005), Liu et al. (2012), and all the related hypotheses are confirmed. In terms of the differences between two types of mobile advertising, the negative scores of advertising value's antecedents lead to less perceived overall value for SMS ads compared to mobile app ads.

Informativeness is the second most important criteria in attitude formation ads and third most important for advertisement value for SMS. In mobile app ads, this factor ranks as the third most important factor in attitude formation and advertisement value formation. In general and internet advertising contexts, informativeness is considered one of the two dominant factors affecting attitudes (Ducoffe, 1996; Petrovici and Marinov, 2010); however, in mobile advertising it has also appeared as one of the less important factors (Choi, Hwang and McMillan, 2008; Tsang, Ho and Liang, 2004). This finding is also in line with the extant literature.

6 Limitations and future research avenues

As can be observed from the findings, attitudes towards mobile app ads and the antecedents may vary for different mobile ad applications. Two of the major (push-type) mobile advertisement methods were analysed in this study; however, there are other tools available to mobile marketers. The scarcity of motivational studies focusing on different mobile marketing and advertisement types presents further research avenues to researchers.

In order to compare users' views on SMS and mobile app advertisements only the users with smart phones were included in the study. By focusing on university students (considered one of the major groups of mobile devices) and choosing respondents, who have smartphones we were able to reflect the point of view of this important group very effectively. However, this choice limits the generalisability of this study. Future studies that represent different consumer segments may shed more light on attitude formation towards different mobile advertisement types and will be helpful for practitioners of marketing as well as for researchers.

In this study, an attitudinal approach was adopted and survey methodology was used to understand attitude towards mobile advertisements. As another prospective research avenue, behavioural studies may be carried out on different mobile advertisement tools. These studies may help in proving possible relationships between attitudes and actual behaviours for various mobile marketing tools.

7 Conclusion

Findings of our study contribute to theoretical and practical understanding of individuals' attitudes towards two major types of mobile ads in Turkey, a large developing country in the crossroads of Asia and Europe. From a theoretical perspective, this study has confirmed and provided an understanding of the major factors forming attitude towards mobile advertisements, supporting the theoretical framework on which it is founded. The findings on attitudes and advertisement value formation are consistent with the previous literature. Distinguishing from the available literature, this study offers a comparison of different mobile advertisement types and incorporates mobile application ads, which have

been mostly overlooked so far. In this sense, this study will help in facilitating future studies.

On practical implications, we can denote that users find SMS advertising less valuable and they develop a more negative attitude towards it compared to mobile app advertisements. In addition, SMS advertisements are considered more irritating by the users. We can safely say that users find SMS advertising inferior compared to mobile app advertisements. These findings lead to the conclusion that if other factors such as costs, target audience and so on are similar, marketing professionals should prefer mobile app ads over SMS ads.

As previously noted, the most important factor in the development of perceived ad value and attitude was the entertainment factor. Designing mobile advertisements to be as fun and pleasurable as possible may help to overcome general negative attitudes observed towards this medium. Informativeness is the second most important factor in the creation of SMS ad value. If providing entertaining messages is not possible in SMS medium, advertisers should focus on content by offering relevant, up-to-date and valuable information to target recipients. It is easier to create mobile ad value using entertainment dimension of advertisements in mobile app ads than in SMS ads due to the availability of multimedia content in mobile app ads lacking in SMS. Finally, providing trust and establishing credibility in advertisements will lead to improvements in attitude towards mobile ads. In practice, this can be achieved by ensuring believability and truthfulness in the ads and promising only what can truly be achieved.

References

Altuna, O.K. and Konuk, F.A. (2009) 'Understanding consumer attitudes toward mobile advertising and its impact on consumers' behavioral intention: a cross-market comparison of U.S. and Turkish consumers', *International Journal of Mobile Marketing*, Vol. 4, No. 2, pp.43–51.

Barclay, D., Higgins, C. and Thompson, R. (1995) 'The partial least squares (PLS) approach to causal modeling: personal computer adoption and use as an illustration', *Technology Studies*, Vol. 2, pp.285–309.

Barutçu, S. (2007) 'Attitudes towards mobile marketing tools: a study of Turkish consumers', *Journal of Targeting, Measurement and Analysis for Marketing*, Vol. 16, No. 1, pp.26–38.

Barwise, P. and Strong, C. (2002) 'Permission-based mobile advertising', *Journal of Interactive Marketing*, Vol. 16, No. 1, pp.14–24.

Bauer, H., Barnes, S. Reichardt, T. and Neumann, M. (2005) 'Driving consumer acceptance of mobile marketing: a theoretical framework and empirical study', *Journal of Electronic Commerce Research*, Vol. 6, No. 3, pp.181–192.

Burdge, B. (2014) *New research shows mobile dominates desktops, MovableInk*, available at: http://blog.movableink.com/new-research-shows-mobile-dominates-desktops-with-65-of-total-email-opens-in-q4-2013/.

Carmines, E.G. and Zeller, R.A. (1979) *Reliability and Validity Assessment*, Sage Publications, Beverly Hills, CA.

Choi, Y.K., Hwang, J. and McMillan, S.J. (2008) 'Gearing up for mobile advertising: a cross-cultural examination of key factors that drive mobile messages home to consumers', *Psychology and Marketing*, Vol. 25, No. 8, pp.756–768.

Chowdhury, H.K., Parvin, N. Weitenberner, C. and Becker, M. (2006) 'Consumer attitude towards mobile advertising in an emerging market: an empirical study', *International Journal of Mobile Marketing*, Vol. 1, No. 2, pp.33–41.

Cohen, J. (1992) 'A power primer', *Psychological Bulletin*, Vol. 112, No. 1, pp.155–159.

ComScore. (2014) *The US Mobile App Report*, available at: http://www.slideshare.net/ LudovicP/comscore-us-mobile-app-report-june-2014-datatheusmobileappreport (accessed 1 October 2015).

Ducoffe, R. (1995) 'How consumers assess the value of advertising', *Journal of Current Issues & Research in Advertising*, Vol. 17, No. 1, pp.1–18.

Ducoffe, R. (1996) 'Advertising value and advertising on the web', *Journal of Advertising Research*, Vol. 36, No. 5, pp.21–35.

EMarketer. (2015) *Mobile Ad Spend to Top $100 Billion Worldwide in 2016, 51% of Digital Market, Media Buying*, available at: http://www.emarketer.com/Article/Mobile-Ad-Spend-Top-100-Billion-Worldwide-2016-51-of-Digital-Market/1012299 (accessed 31 May 2016).

Emarketer. (2015) *Only 33% of US Mobile Users Will Pay for Apps This Year*, available at: http://www.emarketer.com/Article/Only-33-of-US-Mobile-Users-Will-Pay-Apps-This-Year/1011965 (accessed 5 February 2015).

Essany, M. (2014) *SMS Marketing Wallops Email with 98% Open Rate and Only 1% Spam*, *MobileMarketingWatch*, available at: http://www.mobilemarketingwatch.com/sms-marketing-wallops-email-with-98-open-rate-and-only-1-spam-43866/.

Ferle, C. and Lee, W. (2003) 'Attitudes toward advertising: a comparative study of consumers in China, Taiwan, South Korea and the United States', *Journal of International Consumer Marketing*, Vol. 15, No. 2, pp.5–24.

Fornell, C. and Larcker, D.F. (1981) 'Evaluating structural equation models with unobservable variables and measurement error', *Journal of Marketing Research*, Vol. 18, No. 1, pp.39–50.

Gao, T., Rohm, A.J., Sultan, F. and Pagani, M. (2013) 'Consumers un-tethered: a three-market empirical study of consumers' mobile marketing acceptance', *Journal of Business Research*, Vol. 66, No. 12, pp.2536–2544.

Haghirian, P., Madlberger, M. and Inoue, A. (2008) 'Mobile advertising in different stages of development: a cross-country comparison of consumer attitudes', *Proceedings of the Annual Hawaii International Conference on System Sciences*, Sophia University, Vienna University of Economics and Business Administration, Keio University.

Haghirian, P., Madlberger, M. and Tanuskova, A. (2005) 'Increasing advertising value of mobile marketing-an empirical study of antecedents', *38th Hawaii International Conference on System Sciences*, Vol. 1, pp.1–10.

Hair, J.F., Hult, G.T.M. Ringle, C.M. and Sarstedt, M. (2013) *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 1st ed., Sage Publications, Inc., Thousand Oaks.

Hanley, M., Becker, M. and Martinsen, J. (2006) 'Factors influencing mobile advertising acceptance: will incentives motivate college to accept mobile advertisements?' *International Journal of Mobile Marketing*, Vol. 1, pp.50–59.

Henseler, J., Ringle, C.M. and Sinkovics, R.R. (2009) 'The use of partial least squares path modeling in international marketing', *Advances in International Marketing*, Vol. 20, pp.277–320.

International Telecommunication Union. (2014) *ICT Facts and Figures 2014*, available at: http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.

Kaplan, A.M. and Haenlein, M. (2010) 'Users of the world, unite! The challenges and opportunities of social media', *Business Horizons*, Vol. 53, No. 1, pp.59–68.

Keil, M., Tan, B.C.Y. Wei, K-K. Saarinen, T. Tuunainen, V. and Wassenaar, A. (2000) 'A cross-cultural study on escalation of commitment behaviour in software projects', *MIS Quarterly*, Vol. 24, pp.299–325.

Khalaf, S. (2015) *Shopping, Productivity and Messaging Give Mobile another Stunning Growth Year*, *Flurry from Yahoo*, available at: http://www.flurry.com/blog/flurry-insights/shopping-productivity-and-messaging-give-mobile-another-stunning-growth-year#.VOiwyvmUcg8 (accessed 20 February 2015).

Lee, S., Tsai, Y. and Jih, W. (2006) 'An empirical examination of customer perceptions of mobile advertising', *Information Resources Management Journal*, Vol. 19, No. 4, pp.39–55.

Leung, L. and Wei, R. (2000) 'More than just talk on the move: uses and gratifications of the cellular phone', *Journalism & Mass Communication Quarterly*, Vol. 77, No. 2, pp.308–320.

Liu, C-L. 'Eunice', Sinkovics, R.R. Pezderka, N. and Haghirian, P. (2012) 'Determinants of consumer perceptions toward mobile advertising— a comparison between Japan and Austria', *Journal of Interactive Marketing*, Vol. 26, No. 1, pp.21–32.

Luna Cortés, G. and Royo Vela, M. (2013) 'The antecedents of consumers' negative attitudes toward SMS advertising: a theoretical framework and empirical study', *Journal of Interactive Advertising*, Vol. 13, No. 2, pp.109–117.

Luo, X. (2002) 'Uses and gratifications theory and e-consumer behaviors: a structural equation modeling study', *Journal of Interactive Advertising*, Vol. 2, No. 2, pp.34–41.

MacKenzie, S.B. and Lutz, R.J. (1989) 'An empirical examination of the structural antecedents of attitude toward the ad in an advertising pretesting context', *Journal of Marketing*, Vol. 53, No. 2, pp.48–65.

Mir, I. (2011) 'Consumer attitude towards M-advertising acceptance: a cross-sectional study', *Journal of Internet Banking and Commerce*, Vol. 16, No. 1, pp.1–23.

Mittal, B. (1994) 'Public assessment of TV advertising: faint praise and harsh criticism', *Journal of Advertising Research*, Vol. 34, No. 1, pp.35–53.

Mobile Marketing Association. (2009) *MMA Updates Definition of Mobile Marketing*, available at: http://www.mmaglobal.com/node/11102.

Nielsen. (2014) *Smartphones: So Many Apps So Much Time*, available at: http://www.nielsen.com/us/en/insights/news/2014/smartphones-so-many-apps--so-much-time.html   (accessed   1 February 2015).

Nunnally, J.C. (1978) *Psychometric Theory*, 2nd ed., McGraw-Hill, New York.

Okazaki, S. (2004) 'How do Japanese consumers perceive wireless ads? A multivariate analysis', *International Journal of Advertising*, Vol. 23, No. 4, pp.429–454.

Okazaki, S., Katsukura, A. and Nishiyama, M. (2007) 'How mobile advertising works: the role of trust in improving attitudes and recall', *Journal of Advertising Research*, Vol. 47, No. 2, p.165.

Özçam, D.S., Kuşçu, A. and Yozgat, U. (2015) 'Understanding mobile advertising acceptance: an integrative approach', *International Journal of Mobile Communications*, Vol. 13, No. 4, p.376.

Park, T., Shenoy, R. and Salvendy, G. (2008) 'Effective advertising on mobile phones: a literature review and presentation of results from 53 case studies', *Behaviour & Information Technology*, Vol. 27, No. 5, pp.355–373.

Peters, C., Amato, C.H. and Hollenbeck, C.R. (2008) 'An exploratory investigation of consumers' perceptions of wireless advertising', *Journal of Advertising*, Vol. 36, pp.129–145.

Petrovici, D. and Marinov, M. (2010) 'Determinants and antecedents of general attitudes towards advertising – a study of two EU accession countries', *European Journal of Marketing*, Vol. 41, No. 3–4, pp.307–326.

Preacher, K.J. and Hayes, A.F. (2004) 'SPSS and SAS procedures for estimating indirect effects in simple mediation models', *Behavior Research Methods, Instruments, & Computers*, Vol. 36, No. 4, pp.717–731.

Quah, J.T. and Lim, G.L. (2002) 'Push selling – multicast messages to wireless devices based on the publish/subscribe model', *Electronic Commerce Research and Applications*, Vol. 1, pp.235–246.

Rau, P.L.P., Liao, Q. and Chen, C. (2013) 'Factors influencing mobile advertising avoidance', *International Journal of Mobile Communications*, Vol. 11, No. 2, p.123.

Schlosser, A., Shavitt, S. and Kanfer, A. (1999) 'Survey of internet users' attitudes toward internet advertising', *Journal of Interactive Marketing*, Vol. 13, No. 3, pp.34–54.

Schumacker, R. and Lomax, R. (2010) *A Beginner's Guide to Structural Equation Modeling*, 3rd ed., Routledge, New York.

Shavitt, S., Lowrey, P. and Haefner, J. (1998) 'Public attitudes toward advertising: more favorable than you might think', *Journal of Advertising Research*, Vol. 38, No. 4, pp.7–22.

Stone, M. (1974) 'Cross-validatory choice and assessment of statistical predictions', *Journal of the Royal Statistical Society*, Vol. 36, pp.111–147.

The China Post. (2013) *Fastest Growing Mobile Market is Still in Africa*, *The China Post*, available at: http://www.chinapost.com.tw/business/africa/2013/11/13/393512/Fastest-growing.htm.

Tsang, M., Ho, S. and Liang, T. (2004) 'Consumer attitudes toward mobile advertising: an empirical study', *International Journal of Electronic Commerce*, Vol. 8, No. 3, pp.65–78.

Ünal, S., Ercis, A. and Keser, E. (2011) 'Attitudes toward mobile advertising – a research to determine the differences between the attitudes of youth and adults', *Procedia – Social and Behavioral Sciences*, Vol. 24, pp.361–377.

Usta, R. (2009) 'Understanding attitudes towards mobile advertising (in Turkish)', *Doğuş Üniversitesi Dergisi*, Vol. 10, No. 2, pp.294–309.

Watson, C., McCarthy, J. and Rowley, J. (2013) 'Consumer attitudes towards mobile marketing in the smart phone era', *International Journal of Information Management*, Vol. 33, No. 5, pp.840–849.

Wong, M.T.M. (2010) *Consumers' Attitude towards Mobile Marketing*, Hong Kong Polytechnic University, Hong Kong.

Xu, D.J. (2006) 'The influence of personalization in affecting consumer attitudes toward mobile advertising in China', *Journal of Computer Information Systems*, Vol. 47, No. 2, pp.9–19.

Xu, D.J., Liao, S.S. and Li, Q. (2008) 'Combining empirical experimentation and modeling techniques: a design research approach for personalized mobile advertising applications', *Decision Support Systems*, Vol. 44, No. 3, pp.710–724.

Zhang, J. and Mao, E. (2008) 'Understanding the acceptance of mobile SMS advertising among young Chinese consumers', *Psychology and Marketing*, Vol. 25, No. 8, pp.787–805.

Zhou, D., Zhang, W. and Vertinsky, I. (2002) 'Advertising trends in urban China', *Journal of Advertising Research*, Vol. 42, No. 3, pp.73–81.

APPENDIX

No	Item	Dimension	Source
1	SMS/mobile app advertising is entertaining	Entertainment, ENT1	Ducoffe (1996, 1995)
2	SMS/mobile app advertising is enjoyable	Entertainment, ENT2	
3	SMS/mobile app advertising is pleasant	Entertainment, ENT3	
4	SMS/mobile app advertising is a good source of product information	Information, INF1	Ducoffe (1996, 1995)
5	SMS/mobile app advertising is a good source of timely product information	Information, INF2	
6	SMS/mobile app advertising supplies relevant product information	Information, INF3	
7	SMS/mobile app advertising is irritating	Irritation, IRT1	Ducoffe (1996, 1995)
8	SMS/mobile app advertising is annoying	Irritation, IRT2	
9	SMS/mobile app advertising insult's people's intelligence	Irritation, IRT3	

APPENDIX (continued)

No	Item	Dimension	Source
10	SMS/mobile app advertising is convincing	Credibility, CRE1	Liu et al. (2012), McKenzie and Lutz, (1989)
11	SMS/mobile app advertising is credible	Credibility, CRE2	
12	SMS/mobile app advertising is believable	Credibility, CRE3	
13	SMS/mobile app advertising is truthful	Credibility, CRE4	
14	SMS/Mobile app. advertising is useful	Ad value, ADV1	Ducoffe (1996)
15	SMS/mobile app advertising is valuable	Ad value, ADV2	
16	SMS/mobile app advertising is important	Ad value, ADV3	
17	Overall, I like SMS/mobile app advertising	Attitude, ATT1	Tsang et al. (2004), Bauer et al. (2005)
18	Generally I find SMS/mobile app advertising a good thing.	Attitude, ATT2	