“Investigating innovations in information systems: how to evaluate the m-advertising effectiveness?”

AUTHORS	Stéphanie Hérault
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Stéphanie Hérault (France)

Investigating innovations in information systems: how to evaluate the m-advertising effectiveness?

Abstract

Nowadays, over 9 out of 10 French own a mobile phone. The studies concerning the understanding and the measurement of mobile advertising effectiveness are, however, still at their beginning. The aim of the study is to synthesize previous work lead in persuasive advertising in general and on mobile, in particular. The author proposes a test of a causal model of mobile advertising effectiveness derived from the TAM model (Davis, 1986) and integrating mobile advertising intrusiveness. Results from a quantitative study based on 252 surveys answered confirm, on the one hand, the importance of perceived usefulness of mobile advertising in attitude toward mobile advertising shaping, on the other hand, they validate the strong negative influence of intrusiveness on intention to use.

Keywords: mobile advertising, technology acceptance model, intrusiveness, information systems.
JEL Classification: M15, M31, M37.

Introduction

According to the French College of Electronic Communications and Posts regulation (ARCEP), mobile media is becoming more omnipresent in consumers' day-to-day lives. Nowadays, over 9 out of 10 French own a mobile phone (94.6%). Amongst them, 41.6% can access to the Internet with their mobile phone. This ratio has been increasing these last few years due to the development of the supply of smart phone-type terminals and mobile phone packages with unlimited Internet access offered by mobile phone operators.

If the studies related to the understanding and to the measurement of advertising effectiveness in general or for numeric medias like Internet have considerably developed in the last few years (Chandon et al., 2003; Chtourou et al., 2002; Rettie et al., 2005), the studies and research dedicated to mobile advertising effectiveness are still very fragmented. Whether it is in France or on the North American continent, a large part of the studies is more focused on the measuring of advertising effectiveness in a specific format, very often the text message (Barwise and Strong, 2002; Gauzente, 2008; Li and Stoller, 2007; Muk, 2007) or on models aimed at validating determinants of acceptance of mobile advertising.

This article suggests a synthesis of the literature of the studies concerning advertising effectiveness measurement in general and for mobile advertising in particular. In the light of theoretical frameworks resulting from previous studies, we will then test a simplified model adapted from the Davis et al.'s (1989) TAM model (Technology Acceptance Model) itself derived from the theory of reasoned action by Fishbein and Ajzen (1975) to which we integrate mobile advertising intrusiveness (Gauzente, 2006; Gauzente et al., 2008). We will then respectively discuss the limits, the managerial implications and the future research areas of our contribution.

1. The measurement of advertising effectiveness

An approach exclusively cognitive of the decision processes was suggested by researchers for a long time whether in the consumer's attitude or in persuasive communication research area. Research did, in the first place, postulate that action was initiated by a process of active information processing, followed by the evaluation of the information, the shaping of an attitude, then those of intention and action. The unique sequential order cognitive/emotional/conative thus set and constitutive of the cognitive paradigm being the starting point of studies in persuasive advertising in three major directions:

- A set of models suggested a simplified description of factors and steps causing the action under advertising influence, such as the traditional models of hierarchy of effects of communication (Lavidge and Steiner, 1961; McGuire, 1978).
- The theories of learning constituted here a privileged explanation for the shaping of an action in an advertising context.
- Cognitive reactions and beliefs are considered as mediating variables of the persuasive advertising process (Greenwald, 1968; Fishbein, 1963; Lutz and Swazy, 1977).

However, a lack of consensus concerning the validation of this mediation (Olson et al., 1982; Hastak and Olson, 1989), as well as the review relative to theoretical hypothesis underlying these models lead researchers like Krugman (1965) or Ray et al. (1973) to postulate the existence of alternative hierarchical sequences and suggest other theoretical frameworks. According to these researchers, the

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"cognitive approach" (Bourgeon and Filser, 1995) only gives a partial explanation to persuasive mechanisms. From this observation 3 major developments are followed (they structure our scientific knowledge of this field of research today):

- Following Petty and Cacioppo's (1981) or Chaiken's (1980) studies, some processes that do not result from an intensive information processing concerning the characteristics of the product are unveiled: the evaluation of the advertisement can contribute itself to explain the effectiveness of an advertisement. The theoretical "roads" of persuasion including a process of emotional order reveals three mediating constructs: A_{ad} (attitude toward the ad usually called "advertising liking"), A_b (attitude toward the brand) and I_b (purchase intention) (Brown and Stayman, 1992).
- The Lutz's dual mediation hypothesis (1985) is validated in a context of advertisement pre-testing; made richer through the contribution of MacKenzie, Lutz and Belch (1986), emotions and affective reactions caused by the advertisement (RADA) are set as variables of advertising effectiveness (Holbrook and Batra, 1987; Derbaix, 1995).
- Variables set generally upstream from the persuasion process and described as "mode-rating" may reinforce *versus* inhibite the roles of mediating variables (for example, variables concerning the exposition context or implication toward the product or advertising it self; more stable variables like the need of knowledge or self-confidence may also moderate the causal relationships).

Today, practitioners and researchers are therefore unanimous to admit that advertising effectiveness relies on ad ability to shape a positive attitude toward the brand and a positive purchase intent and that under certain conditions, the predictive character of attitude and the intention will be reinforced (*versus* inhibited).

2. The measurement of mobile advertising effectiveness

For the past fifteen years, a number of researchers have taken interest in the mobile channel as a channel destined to mobile marketing operations. A first review of the literature shows strong diversions concerning the definition itself of mobile marketing. According to Leppäniemi et al. (2006), some consider mobile marketing as "*the distribution of any type of message or promotion that brings value to the consumer while improving benefits for the company*" (Kalakota and Robinson, 2002); or "*the use of the mobile phone as a way to deliver a commercial message to consumers*" (Bauer et al., 2005). Others dedicate this channel to the rollout of mobile advertising messages (Petty, 2003; Tsang et al., 2004). Therefore, we can recognize what comes under mobile advertising and what comes under other forms of "promoting" and/or actions *via* mobile phone. Thereby, according to the French AFMM[1], the mobile marketing "*consists in using the mobile phone to reach the consumer and to make him react in a targeted way, at any moment, wherever he is located*", including at the same time Li's (2004)[2] definition of mobile advertising. Thus, mobile advertising does not include m-couponing or m-commerce.

2.1. Contribution of information systems research area to the field of mobile advertising acceptance. Studies have started to be more structured these past ten years in the USA and in Asia (Barnes, 2002; Barnes and Scornavacca, 2004; Barwise and Strong, 2002; Leppärniemi and Karjaluoto, 2005; Li, 2004 *in* Li and Stoller, 2007; Okasazki, 2004; Tsang, Ho and Liang, 2004) but we can notice that there are almost no studies in France in that field (except for Gauzente, 2006, 2008). The theoretical framework that federates the research in this field results mainly from studies about the acceptance and adoption of information technologies and more precisely Davis' (1986) TAM model. Derived from the theory of reasoned action (Fishbein and Ajzen, 1975), this model is widely used to predict purchasing intentions in contexts outside of physical shops, like Internet or mobiles (Yang, 2005). From a more general point of view, the TAM brings a theoretical framework for determinants of the acceptance of attitude toward the use of technologies.

According to the TAM, the intention to use depends on the attitude toward the use that stems from two characteristics of the use: its perceived usefulness (PU) and its perceived ease of use (PEOU). Initially developed to predict adoption of technologies in the work environment (Davis, 1986; Davis, Bagozzi and Warshaw, 1989), the TAM model postulates that the acceptance of the user of a new system is determined by the intention to use the system, which is itself determined by the perceived usefulness of the system and the user's perceived ease of use. The perceived usefulness refers to the belief that a person thinks that a system can improve his individual performance and the perceived ease of use refers to the belief that the system would be accessible without a strong cognitive effort. This

[1] French Association of Mobile Multimedia.

[2] "Mobile advertising refers to any communication about products, services and ideas that involves the use of mobile devices for promotional purposes".

TAM model is empirically validated in a number of situations of adoption of technologies (Gefen and Straub, 1997; Gefen et al., 2003; Pavlou, 2003; Ventakesh and Davis, 2000; Hoffman et al., 2006).

Some consider, therefore, mobile advertising as an innovation of use. As Bauer et al. (2005) underlines, to understand correctly the mobile marketing acceptance, it is important to examine decisions that concern adoption or use as combined processes. The reason we turn to the TAM for mobile advertising comes from the explanation given by Bauer (2005) who considers that mobile advertising represents a particular case of the application of the TAM, that is, an innovation of use: "*the communication of a content via a mobile media can only be efficient if the consumers allow the regular reception of advertising messages on their mobile phones*".

On the basis of the TAM model, many studies have tried to identify and measure the contribution of each determinant to the use and acceptance of an inovation. Thus, have progressively been updated:

- Determinants based on the characteristics of the innovation itself. For example, some studies show that the significant role of perceived usefulness in the acceptance of mobile advertisement, claiming that the consumers will accept mobile advertisement only if they perceive a benefit (Gefen and Straub, 2000; Kavassalis et al., 2003). The perceived risk (Bauer, 1976, in Bauer et al., 2005), the perceived control and the ease of use (Venkatesh, 2000) have also been validated as antecedents.
- Individual determinants like the perceived sacrifice of receiving mobile advertisement (Merisavo et al., 2007), the trust in the legislation concerning privacy and other variables like the inclination for innovation (Roehrich, 2004).

2.2. Attitude toward mobile marketing and perceived intrusiveness. Few studies clearly identify the determinants, components and consequences of ad intrusiveness. While consumers, in general (Roux, 2006), and people exposed to advertising develop important resistance attitudes and behaviors, studying the precise conditions of occurrence of these attitudes in the context of advertising persuasion becomes a major imperative. Indeed, it may lead, on the one hand, to a shaping of negative attitudes (evaluative aspects) and/or created with little strength (non evaluative dimensions) (Hérault, 1999, 2006) and, on the other hand, to stronger avoidance attitudes (Elliott and Speck, 1988). As for ad intrusiveness, researchers question the role of the perceived control of the individual and, likewise, of the degree of interaction of the audience with the media as a potential antecedent of the advertising perceived intrusiveness (Stewart and Pavlou, 2002). Thus, the less the individual is brought to interact with the ad received on his mobile, the more the perceived intrusiveness can be strong resulting in avoidance attitudes toward advertising. That is how Mac Innis and Jaworki (1989) considered overcoming the hindering linked to intrusiveness to approach an individual's assumed role, a role that suggests a more experiential than analytical processing of the ad.

3. Conceptual framework and research hypothesis

The aim of the study is to test a derived model of the TAM model by integrating an important construct for mobile advertising: perceived intrusiveness (see Figure 1). We suggest, therefore, that the perceived intrusiveness may constitute an antecedent of the attitude toward mobile advertising by having a direct and negative influence on this emotional evaluation. In addition, in the manner of the results obtained in advertising persuasion research within the traditional medias, we will also postulate a possible negative influence of the perceived intrusiveness on the intention to use. This idea relies on the hypothesis according to which the perceived intrusiveness may be a mobile advertising belief and at the same time a determinant of intention, by following the conceptions of Fishbein and Ajzen (1975).

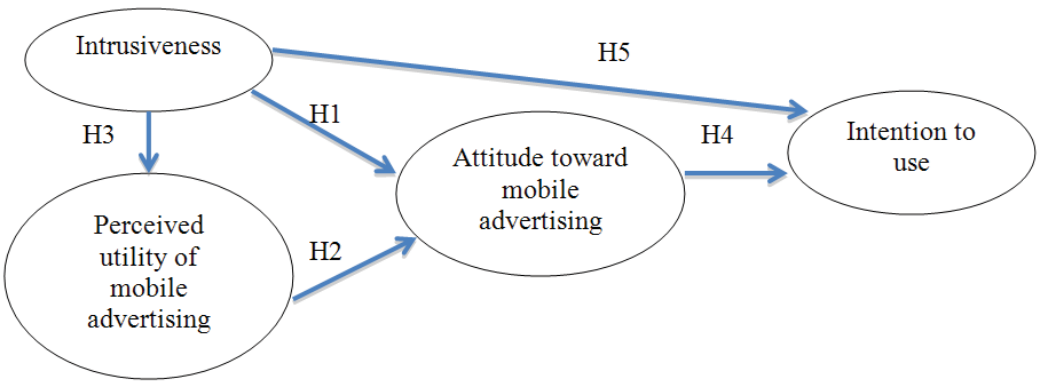

Fig. 1. Tested conceptual model

The research hypotheses H1 to H5 resume the different causal relationships in our theoretical model (see Figure 1). As a cognitive element of mobile advertising and following Fishbein and Ajzen (1963) shaping conception of attitude, a first hypothesis consists in stipulating that the more an individual perceives mobile advertisement as intrusive, the more his global evaluation towards the mobile advertisement will be unfavorable.

H1: *Perceived intrusiveness of mobile advertising exerts a negative effect on attitude toward mobile advertising.*

In a congruent manner with the TAM model and under the scope of antecedents of acceptance of mobile advertising, we postulate in the same way as Gefen and Straub (2000) or Kavassalis et al. (2003) that consumers will accept mobile advertising only if they perceive a benefit from it, and thus, there exists a positive correlation between perceived usefulness of mobile advertising and its evaluation.

H2: *Perceived usefulness of mobile advertising influences positively attitude toward mobile advertising.*

We can postulate that an individual perceiving a mobile advertising as intrusive will be sceptical concerning the perceived usefulness of this ad, hence the addition of the hypothesis H3, a totally intuitive hypothesis.

H3: *Perceived intrusiveness of mobile advertising exerts a negative effect on the perceived usefulness of mobile advertising.*

Fishbein and Ajzen's (1975) theory of reasoned action but also some results challenging the mediating role of attitude towards the use (Hoffman et al., 2006) makes us set the hypotheses H4 and H5. We postulate a direct and negative path from the perceived intrusiveness of mobile advertising to the intention to use (H5). In a congruent manner with a strongly cognitive conception of the shaping of intentions, for a start, it is then suggested that the more an individual perceives an ad as intrusive, the less he will be intending to use it later, in a conative way (click on it, save it to view it later, transfer it to friends, recommend it, etc.).

H4: *Attitude toward mobile advertising exerts a positive effect on the intention to use.*

H5: *Perceived intrusiveness of mobile advertising exerts a negative effect on the intention to use.*

4. Methodology

This hypothetico-deductive research relies on an operationalization of constructs in conformity with the literature and an experimental protocol including a gathering of quantitative data "on line".

4.1. Operationalization of constructs. The different concepts of this research come from an existing scale (see Appendix). Intrusiveness was operationalized in this way in conformity with Gauzente's (2006, 2008) and Li et al.'s studies (2002) (8 items at the start). We chose to use these scales because they mix items of perceived intrusiveness and items of perceived advertising clutter. The constructions items of perceived usefulness of mobile advertising result from Bauer's (2005) and Merisavo et al. (2007) (8 items). Those concerning the attitude towards mobile advertising and intention to use are infered from those of Shimp and Kavas (1984) (respectively 4 and 2 items).

4.2. Experimental protocol. The survey was conducted on line with the help of Sphinx Online on a convenience sample (see Table 1). *In fine*, 252 surveys were studied (we chose to remove from our final sample the surveys of people who had declared they worked in the fields of marketing, communication and/or market studies as well as those of students specialised in marketing and/or communication fields). The structure of our final sample in terms of gender and age is set as follows (see Table 1).

Table 1. Characteristics of the survey respondents

Age*	Bracket, size, proportion of the sample
<15 years old	82 (32.5%)
[15;24]	86 (34.1%)
[25;34]	66 (26.2%)
[35;49]	16 (6.3%)
[50;64]	1 (.4%)
>65 years old	1 (.4%)

Notes: * 92.9% < 35 years old; men: 96 (38.1%), women: 156 (61.9%).

5. Results

The results of this research concern both the confirmation of the psychometric properties of our measuring scales (analysis of principal components under SPSS) and the testing of our research hypotheses within our model of structural equations (AMOS). Only the items with an eigenvalue superior to .5 were kept. It should be noted that for the endogenous variable (intention), we only kept the item "I wish to receive commercial messages on my mobile".

Table 2. Reliability and converging validity of data

Constructions	Item labels	Factorial weight (commonality)
Intrusiveness	It is intrusive It is invading It bothers me	.872 (.76) .892 (.796) .867 (.752)
Reliability (Joreskög's ρ)		.85
Converging validity (Fornell's and Larcker's ρ_{vc})		.65
Perceived usefulness of mobile advertising	I think that mobile advertising can make me save time I think that mobile advertising can help me save up money I think that mobile advertising brings useful information I think that mobile advertising brings me an entertaining experience	.697 (.486) .718 (.515) .65 (.422) .684 (.467)
Reliability (Joreskög's ρ)		.7
Converging validity (Fornell's and Larcker's ρ_{vc})		.3
Attitude toward a mobile ad	I like to receive mobile ads on my mobile phone I am favorable to mobile ads Mobile advertising is a good thing	.741 (.55) .817 (.657) .803 (.646)
Reliability (Joreskög's ρ)		.72
Converging validity (Fornell's and Larcker's ρ_{vc})		.47

Reliability and converging validity of our scales reveal to be satisfying (Table 2). Confirmatory analysis shows satisfying goodness of fit for scales (see Appendix). As shown in Appendix, our model shows also satisfying global fit with our data as the GFI and AGFI are superior to .9 (except for the perceived usefulness of mobile advertising with GFI and AGFI of respectively .85 and .89). We notice good results regarding the values of GFI and AGFI indicators of our model, which is in conformity with Didellon and Valette-Florence's (1996) recommendations.

6. Discussion and managerial implications

Our model testing validates our research hypothesis H1, H2 and H5 (Figure 3). H4 is invalidated. In the manner of the results of previous studies, the predictive role of attitude on intention is questioned again (Hoffman et al., 2006). Individuals seem to shape an intention of use, independently from an evaluation of this use. This would set the supremacy of cognitive and conative processes on a more emotional process. Expected beliefs and benefits of technological innovation directly determine the behavioral intention of an individual.

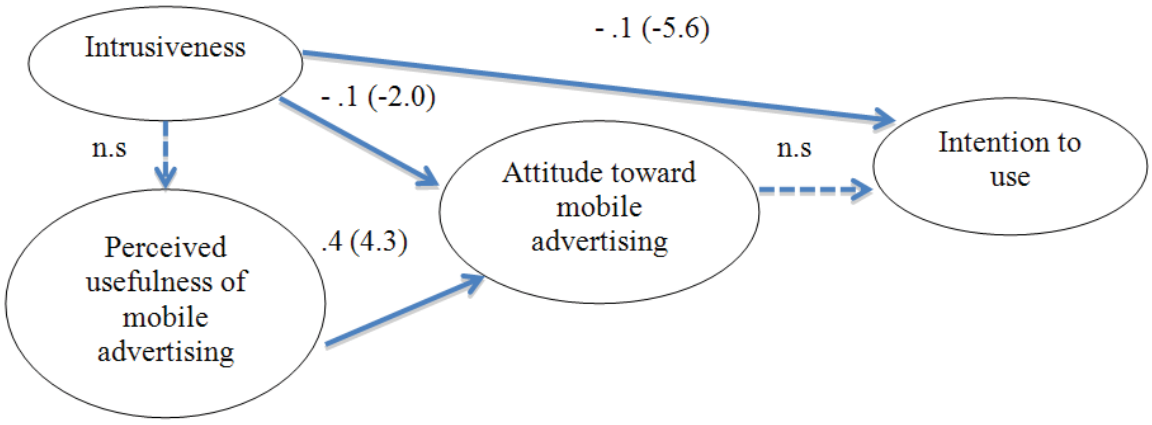

Fig. 3. Research model (results)

The validation of hypothesis H2 confirms the results of previous studies. Following the TAM model, the perceived usefulness is an antecedent of attitude toward mobile advertising. According to our operationalization of perceived usefulness, some cognitive or experiential items determine the attitude toward mobile advertising. Indeed, mobile advertising is expected to give the benefit of saving money and time but mobile advertising is also supposed to bring an entertaining experience to individuals. Thus, these results compass other studies in the field of technological innovations, that have enriched the TAM model by introducing more emotional and/or experiential determinants.

The validation of the hypothesis H5 suggests the supremacy of the perceived intrusiveness as this construct influences negatively and directly the intention to use and statistically in a very significant manner (t-value = -5.6). This suggests that the more the individual perceives mobile advertising as intrusive, the less his intention to use it later is important. Not only that, an unfavorable first

impression might have a bad effect for the advertising *ad hoc* but also have a repercussion on other mobile advertisements received later; thus, this corroborates possible occurence of resistance and/or of rejection of mobile advertising in its whole.

This research underlines a number of managerial implications that can be of interest for brands and/or advertising agencies. These recommendations concern for example mobile advertising formats (mobile advertising display) and the level of perceived intrusiveness, referring to privacy concerns in general.

If mobile advertising in its whole can be perceived by individuals as being intrusive, we can suppose that there exists different level of intrusiveness depending on the type of mobile advertising: indeed, we expect that individuals do not perceive in the same manner the fact of receiving a commercial text message on their mobile containing a clickable link, a commercial video of "rich media" or the sending of a commercial coupon based on their location. Mobile advertising location raises the question of the prior permission and of the likelihood of control of the information by the individual. Thus, scenarios combining mobile advertising format, interest in the category of products and context of reception of the mobile ad could give different levels of intrusion and associated attitude and/or behavior (avoiding ads, resistance, deleting, viewing the ad, archiving for ulterior viewing, etc.).

Considering the importance of perceived intrusiveness underlined by this research, practitioners must create mobile advertising formats by checking on the measurement of perceived intrusiveness of mobile advertising display. Thus, by refining with other characteristics of the target such as the gender, age or other individualistic characteristics, the rejection and/or avoidance of the communicating brand could be minimized. The mobile media being considered as very personal by individuals, the designers of mobile advertising layouts or mobile applications in general must take into account the perceived intrusiveness. The need for pre-testing of mobile advertising copies, in the manner of what exists in traditional media, is therefore highly needed.

Our results suggest that besides developing advertising formats capable of encouraging a strong perceived usefulness from individuals, whether monetary or experiential benefits (like our data suggests and considering the measuring scale used). Regarding this subject, it appears necessary to investigate more deeply in two presupposed dimensions of mobile advertising: their informational and emotional/experiential dimention.

The acceptance of innovation such as mobile advertising is only a step within the adoption process. After a first acceptance, individuals must still show the intention to continue to use this technology. In the field of mobile advertising in particular, by ignoring this fundamental sequence, marketing and communication agencies take the risk of turning individuals away from the communicating brand and also from mobile advertising in its whole.

One can notice that the average scores and medians are respectively 1.27 and 1 (measured on the Likert 5-point scale), the opinion towards mobile advertising is not very favorable at the moment. Researchers and practitioners should work on the minimization of beliefs and strong negative attitudes associated to this new media with mailing and targeting potentiality at the risk of seeing resisting behaviors develop an avoidance strategy, or even a rejection of this kind of digital communication.

Conclusion

Thanks to the arrival of the first Internet audience measurement system developed by the Mediametrie Company, it is possible to measure the real audience of mobile Internet by providing indicators comparable to those of fixed Internet (i.e. the number of visitors, the number of unique visitors and number of page viewed). In the manner of traditional media large-scale studies that have enabled the establishing of the predictive status of pre-testing variables such as the advertising agreement (the "liking") (i.e. A_{ad}) ("The Copy Research Validity Project" of the ARF, 1991), there are numerous possibilities of research in the area of understanding, measurement and construction of a mobile advertising effectiveness model.

Henceforth, complementary studies could help order the importance of mediating variables of mobile advertising effectiveness process according to correlation with the triggering of a precise behavior (viewing of an ad, saving the ad for ulterior viewing, sharing the ad with their circle, deleting an ad, etc.).

The mobile ad is one of the possible advertising formats of digital communication. One of the characteristics of this new form of communication is its degree of interactiveness (in the manner of Internet advertising, media known to be interactive). Understanding and measuring the conditions of mobile advertising effectiveness becomes today a necessity for brands and/or communication agencies. Nowadays, the digital strategies of firms and the expectations of consumers lead brands to adopt a "cross-media" or "360" strategy for their advertising campaigns.

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Appendix

Table 1a. Goodness-of-fit statistics for scales

Construct	GFI	AGFI	RMSEA (*p*)
Intrusiveness	.95	.97	.12 (.1)
Perceived usefulness of mobile advertising	.85	.89	.09 (.05)
Attitude toward mobile advertising	.98	.99	.06 (.45)

Table 2a. Global fit of structural model

χ^2	ddl	$\chi^{2/ddl}$	GFI	AGFI	RMSEA
78.4	40	1.96	.9	.9	.1

Table 3a. List of items

Construct	Scale	Items statement
Intrusiveness	Gauzente (2008), Li, Edwards and Lee (2002)	It distracts from what we were doing Receiving mobile ads on my phone interferes with my life. It is disturbing Receiving mobile ads on my mobile phone prevents me from doing something else **It is intrusive** **It is invading** I feel an obligation **It bothers me**
Perceived usefullness of mobile advertising	Bauer (2005), Merisavo et al. (2007)	**I think that mobile advertising can make me save time** **I think that mobile advertising can help me save up money** **I think that mobile advertising brings useful information** **I think that mobile advertising brings me an entertaining experience** I can take advantage of mobile ads I think mobile advertising does not help me to improve my productivity Mobile advertising improves product information search Mobile advertising brings me exclusive information
Attitude toward mobile advertising	Shimp and Kavas (1984)	**I like to receive mobile ads on my mobile phone** **I am favorable to mobile ads** **Mobile advertising is a good thing** In general, I like mobile advertising
Intention to use	Derived from Shimp and Kavas (1984)	**I wish to receive commercial messages on my mobile** I will use mobile marketing services in the future

Note: Bold items are those kept for scales and model validation with SPSS and Amos for confirmatory analysis.