SMS Advertising in India: Is TAM
a Robust Model for Explaining Intention?

Hemant Bamoriya[1]

Abstract: This study examined mobile users' intentions to receive SMS advertising in India using Technology Acceptance Model (TAM) as research framework. 242 respondents completed a structured questionnaire; measuring their responses for the TAM's five constructs viz. perceived utility, perceived ease of use, perceived trust, attitude and intention. Using Structural Equation Modeling (SEM) both measurement model and structural model testing was done to analyze the data. Findings indicated that specified TAM model contributed to 81.8% of variance in the intention to receive SMS advertising and was a valid model in explaining the intention to receive SMS advertising. Study further indicated that perceived utility was much better predictor of attitude towards SMS advertising than perceived ease of use and perceived trust. Study suggested marketers that to increase acceptance of SMS advertising they should focus more on increasing utility of SMS ads, so that users would develop positive attitudes towards SMS advertising.

Key Words: Intention; Mobile; Structural Equation Modeling.

JEL Classification: M30; M31

1. Introduction

Marketers are gradually shifting away from traditional marketing medium to more innovative, interactive and personalized mediums (Roozen et al. 2008; Mirbagheri 2010). One such concept is SMS advertising (Dickinger et al. 2005) which could be defined as marketing activities delivering advertisements to mobile phones using Short Message Service (SMS) to promote sales or build brand awareness (Gao 2008). In India, SMS usages are already substantial as average Indian mobile user spends 1/3 of total mobile usage time (14 minutes/day) on SMSing and handles 8.4 SMSes daily (Informate 2009). This trend is further expected to grow rapidly with increasing mobile phone penetration and declining tariffs. SMS advertising is catching eyeballs and is expected to touch $84.5 million by 2012 in India (eMarketer 2010).

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[1] Assistant Professor, PhD in progress, Acropolis Institute of Technology & Research, India, Address: 301, Starlit Tower, Y. N. Road, Indore (M. P.), India, Tel.: 0731-4215338 Fax: 0731-2533338, Correesponding author: hemantbamoriya@acropolis.in.

1.1 SMS Ad-vantage

Literatures suggest that SMS advertising has advantages over conventional channels and e-mail. Some advantages are due to inherit technology of SMS and some are due to habits of mobile users. Mobile users have tendency to carry their mobile with them everywhere (Bamba et al. 2006) thus SMS advertising ensures anytime, anywhere reach to consumers (Luxton 2009; Dickinger et al. 2005). Mobile users have a habit of reading SMS and further, mobile phones have no Spam filters as in e-mails, due to this SMS ads claim definite edge over e-mail ads (Bauer et al. 2005; Leppaniemi 2005; Mirbagheri 2010). SMS is highly interactive (Bauer et al. 2005; Barnes 2003) and is suitable for both pull as well as push promotions (Katzstone 2001). Further SMS ads enlarge campaign's reach through viral effects (Yaniv 2008; Bauer et al. 2005). At last, complemented with traditional media SMS advertising could allow marketers to maximize campaign effectiveness and reduce promotional cost (Frolick 2004).

1.2 Technology Acceptance Model & SMS Advertising

Technology Acceptance Model (TAM) explains the determinants of user acceptance of an end-user technology (Davis 1989). TAM points out that perceived ease of use and perceived usefulness affects attitude towards technologies and in turn affect the intention to use. Davis (1989) defined perceived ease of use as *"degree to which a person believes that using and dealing with a particular system would be free from effort"* and perceived usefulness as *"degree to which a person believes that using a particular system would enhance his performance"*. MacKenzie and Lutz (1989) defined perceived trust as "*perception of truthfulness and reliability of advertising and advertisers in general*". TAM has gained wide spread attention because of its robustness across geographical boundaries and times (Cheung et al. 2005; Teo 2009a; Teo 2009b; Drennan et al. 2005). It has been used to study user acceptance of consumer services and applications such as internet services, e-commerce etc (Kaasinen 2005).
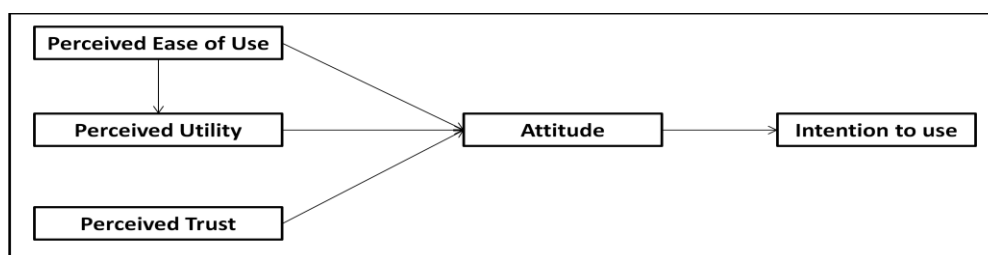

Figure 1. Technology Acceptance Model

Source: (Kaasinen, 2005)

SMS advertising could get competitive advantage over traditional channels very soon (eMarketer 2010). Yet detailed nature of this channel and attitude of

consumers towards it are little known especially in Indian context. Various authors have studied attitude towards SMS advertising (Table 1). Marketers are not only interested in identifying the core factors that influence intention to receive SMS ads, but also in complex interactions among such factors. Answer could be TAM potentially explaining acceptance of SMS advertising.

Table 1. Related Literature

Authors	Studied_at	Factors
Bauer et al. (2005)	UK	Perceived risk, Perceived utility, Customer knowledge
Blano et al. (2005)	Spain	Entertainment, Informativeness
Tsang et al. (2004)	Taiwan	Credibility, Entertainment, Informativeness
Radder et al. (2010)	S.Africa	Perceived risk, Perceived information utility, Information seeking behavior
Ratihayu et al. (2008)	Indonesia	Trust in privacy and law, Perceived utility, Perceived control
Al-alak et al. (2010)	Jordon	Trust, Privacy concern
Jayasingh et al. (2009)	Malaysia	Perceived ease of use, Perceived utility, Perceived trust
Parissa et al. (2006)	Austria	Entertainment, Informativeness, Credibility, Irritation

2. Objectives

1. To study the extent to which the TAM is a robust model to explain the intention to receive SMS advertising.

2. To study the influence of each construct in the TAM on the intention to receive SMS advertising.

3. Research Approach

A Structural Equation Modeling (SEM) approach was executed step by step.

Step 1: Model Specification

Figure 2 is the specified model under study depicting that intention to receive SMS advertising is a function of four variables viz. attitude, perceived ease of use, perceived utility and perceived trust.
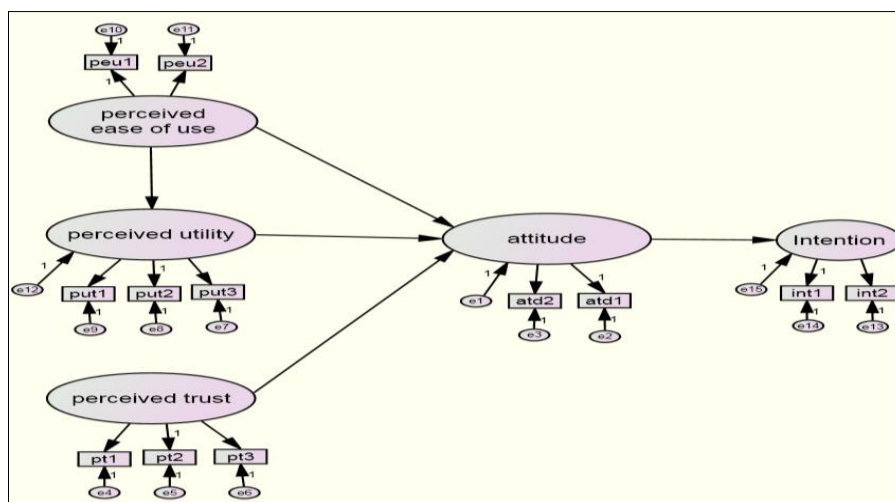
Figure 2. Specified Model

Step 2: Model Identifiability

Specified model had 12 observed variables (n) thus 78 distinct sample moments (n*{n+1}/2). Further in specified model 29 free parameters were to be estimated. As no. of distinct sample moments was greater than no. of free parameters so the specified model was overidentified, an acceptable condition.

Step 3: Measure Selection

To measure latent variables in the specified model pre-validated measures were adopted from previous studies (Table 2). It is recommended that there should be minimum two observed variables per latent variable (Joreskog 1993).

Table 2. List of Latent & Observed Variables

Latent_Variables	Observed_Variables	Adopted_from
Perceived_Utility	PUt1, PUt2, PUt3	*Bauer et al. 2005*
Perceived_Trust	PTs1, PTs2, PTs3	*Tusang et al. 2004*
Perceived_Ease_of_Use	PEU1, PEU2	*Tanakinjal et al. 2010*
Attitude	ATD1, ATD2	*Tusang et al. 2004*
Intention	INT1, INT2	*Shimp et al. 1984*

Step 4: Data Collection, Cleaning & Checking statistical assumptions

SEM is a large sample size technique and a ratio of 20 cases per observed variable is desirable (Kline 2005; Hoyle 1995). Thus for the study data from 242 mobile users was collected.

Data was first subject to cleaning i.e. missing value analysis & outlier detection. In 5 cases missing values were found, casewise deletion led to 237 usable cases (available-case method). For finding outliers standard scores (z scores) of observed variables were calculated using SPSS15. All scores were between +3 and -3 suggesting no outliers ($|z| > 3$ indicating outliers; Kline 2005).

Data was next tested for univariate normality, multivariate normality, reliability and validity. Univariate normality was ensured using skewness and kurtosis indices. Skew and kurtosis indices should not exceed $|3|$ and $|10|$ respectively (Kline 2005). Here data was regarded as univariate normal as skew index ranged from -.62 to .75 and kurtosis index ranged from -.76 to.51.

Mardia coefficient is a measure of multivariate normality where critical ratio of coefficient 1.96 or less indicates multivariate normality (Gao et al. 2007). Critical ratio of Mardia coefficient calculated using AMOS18 was 1.53, suggesting multivariate normality.

Cronbach's α of scale was found to be 0.814, suggesting data reliability (α >or=0.7 acceptable; de Vaus 2002). In multivariate analysis ensuring convergent validity is very important (Abramson et al. 2005) and it exists when measures that purport to measure the same construct have moderate to high correlations (Kline 2005). Scanning of correlation matrix of observed variables confirmed convergent validity as significant correlation was present between observed variables measuring same construct.

Step 5: Model Estimation & Analysis

Model evaluation in SEM has 2 sub-steps: a.Measurement model testing b.Structural model testing. Generalized Least Squares method was used to test specified SEM model's fits with the data. AMOS18 took 7 iterations to produce initial results.

Table 3. Model Fit Indices

Index	Estimated value	Recommended value	Remark
Chi_squared df P	60.275 49 .201	 > or =0.05*[#]	 Model fit
Normed_Chi_squared (x^2/df)	1.23	< or =3[#]	Model fit
Goodness_of_Fit (GIF)	.921	> or =0.9*	Model fit
Root Mean Square Error of Approximation (RMSEA) P	 .048 .598	 0< RMSEA <0.08[#] > or =0.05[#]	Model fit
Incremental_Fit_Index (IFI)	.913	> or =0.9*	Sig. model fit compared to null model
Tucker_Lewis_Index (TLI)	.869	> or =0.9*	No significant fit compared to null model

*Ref:***Klem (2000) [#]Kline (2005)

Step 5a: Measurement Model testing

For measurement model test no single index is perfect, instead multiple indices from various categories should be used (Hair et al. 2006). Table 3 summarizes various indices' used in study.

In SEM, Kline (2005) suggested reporting a number of fit indices, with greater the number of indices supporting the model fit, greater the confidence with the model. So the specified model was accepted as all indices except one index, TFI supported that specified model fits the observed data well. Further residual covariance matrix confirmed that model respecification is not required as all values in matrix were less than 2.58 (Abramson et al. 2005) so structural model was tested next.

Step 5b: Structural Model testing

Figure 3 shows unstandardized estimates i.e. unstandardized regression coefficients for direct effects on endogenous variables, variances for exogenous variables and error terms. The total effect i.e. combined direct and indirect effect on intention to receive SMS advertising was largest for attitude (2.111; when **attitude** goes up by 1, **intention** goes up by 2.111) followed by perceived utility (.974), perceived ease of use (.513) and perceived trust (.173).
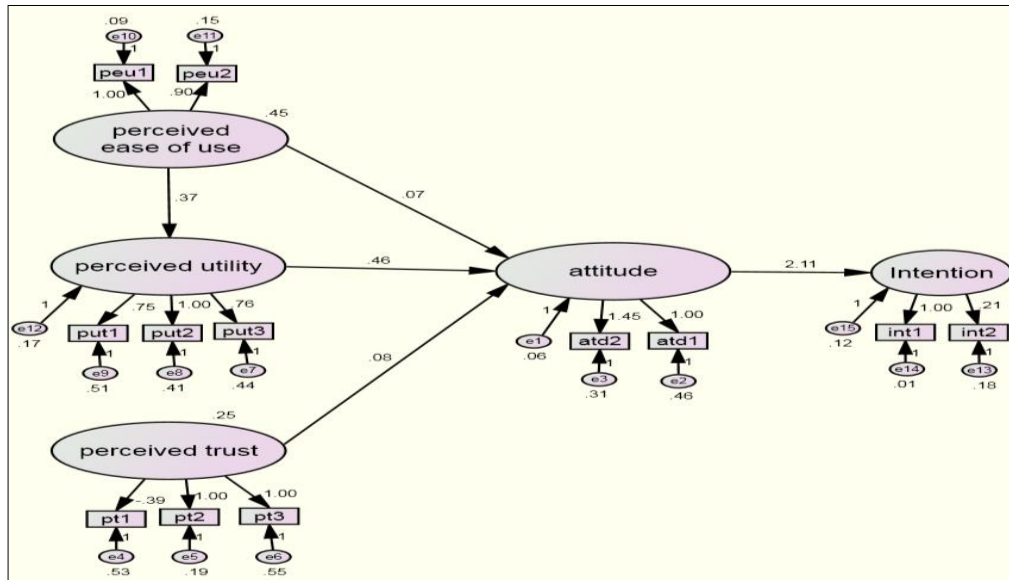
Figure 3. Unstandardized estimates

Table 4 shows standardized regression beta weights. These implied that in SMS advertising, effect of perceived ease of use on perceived utility, of perceived utility on attitude and of attitude on intention was found to be large (effect size>0.5; Kline 2005) whereas effect of perceived ease of use on attitude and of perceived trust on attitude was found to be moderate (0.5>effect size>0.1; Kline 2005). Further, standardized regression beta weights were used to evaluate relative effect of perceived ease of use, perceived utility and perceived trust on attitude towards SMS advertising. Perceived utility was found to 4.6 times better predictor of attitude towards SMS advertising than perceived ease of use and 5.5 times better than perceived trust.

Table 4. Standardized Estimates

Path			Standardized_Weights	Effect_size
Perceived_utility	<---	Perceived_ease_of_use	.511	Large
Attitude	<---	Perceived_utility	.638	Large
Attitude	<---	Perceived_ease_of_use	.137	Moderate
Attitude	<---	Perceived_trust	.116	Moderate
Intention	<---	Attitude	.905	Large

Table 5 shows squared multiple correlations (SMC) of variables. Specified model explained 26.1 % of variance in perceived utility and 52.8% of variance in attitude towards SMS advertising (Table 5). Further model was able to explain 81.8% of variance in intention thus leaving only 18.2% variance unexplained, suggesting robustness of TAM in explaining intention to receive SMS advertising.

Table 5. Squared Multiple Correlations

Latent variables	Predictors	SMC
perceived utility	Perceived ease of use	.261
Attitude	Perceived ease of use, Perceived utility, Perceived trust	.528
Intention	Attitude	.818

4. Conclusions

Study examined the extent to which the TAM is a robust model in explaining the intention to receive SMS advertising and the influence of each construct in the TAM on the above intention. Both measurement and structural model testing suggested that constructs in the TAM i.e. perceived utility, perceived ease of use and attitude towards SMS advertising were instrumental in determining the intention to receive SMS advertising as model contributed to 81.8% of the variance in the intention. Thus TAM was a robust model in explaining the intention to receive SMS advertising.

Teo (2009a), Teo (2009b) suggested that attitude is a significant predictor of the intention to use technology when users have complete freedom to make choice regarding use. Obviously mobile users in this study were free to decide whether to receive or not SMS ads, as 'Do-Not-Disturb' and 'Do-Not-Call' norms are strict in India. Thus findings of the study are consistent with past findings, as standardized estimate of the path from attitude to intention (.093) was substantially greater than other paths.

Among the constructs affecting the attitude towards SMS advertising, perceive utility was found to be strongest predictor than perceived ease of use and perceived trust. Davis (1989); Taylor (1995) stated that perceived usefulness evolves as stronger predictor of attitude than perceived ease of use, as users become more experienced familiar with technology. In India mobile phones are with common men more than a decade and average mobile user in India handles 8.4 SMSes daily (Informate 2009). So Indian mobile users seems to be very familiar with mobile technology, SMS in particular. Hence, It could be implied that respondents would have not perceived issues pertaining to opt-in/opt-out, interacting with SMS ads,

specifying time slots for receiving SMS ads etc. important; reflecting perceived ease of use a weaker predictor of attitude towards SMS advertising.

Perceived trust was another weaker predictor of attitude towards SMS advertising in comparison to perceived utility. One explanation of this could be that in India, 'Do-Not-Disturb' & 'Do-Not-Call' norms and third party privacy policies are clearly stated and strict. Because of these Indian mobile users seems to take it for granted that marketers would not send unsolicited SMS ads and would not misuse their personal information.

5. Implications

Findings have important implications for marketers. To increase acceptance of SMS advertising marketers should provide pleasant experiences, so that users would develop positive attitudes towards SMS advertising. This in turn would reinforce users' intention to receive SMS advertising. Perceived utility of SMS advertising is better predictor of attitude towards SMS advertising so marketers should focus on increasing perceived utility. This could be done by providing incentives (Tsang 2004; Bamoriya et al. 2011), informative content (Blano et al. 2005; Parissa et al. 2006), personalized messages (Scharl et al. 2005; Robins 2003).

6. Limitations & Future Research

Study has certain limitations. Firstly, it is recommended that the final model to be tested on a second sample (model replication, Kline 2005), but due to sample size consideration in the study model replication was not exercised. Secondly, study only dealt with prediction of behavior i.e. intention rather than actual behavior which may have led to loss of explanatory power of model. Third, there could be other factors possibly contributing in intention to receive SMS ads, like social norms (Karjaluoto et al. 2008), attitude towards advertising in general (Bauer et al. 2005). Study lacks accounting of such additional constructs' interaction. Here last 2 limitations indentified provide some good future research implications in area of SMS advertising.

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