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Perception of Mobile Users towards Mobile Advertising: An Application of Confirmatory Factor Analysis

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Abstract

Literature pertaining to perception or attitude towards mobile advertising implies numerous factors which influence the perception of mobile user's toward mobile advertising. Among these factors informativeness, permission, disruptive nature, credibility and familiarity of advertisers were found with perceptible influence. In the present study a measurement model is developed. The present paper makes an attempt to ensure the validity concerns and fitness of measurement model of factors affecting perception of mobile user's toward mobile advertising. All these constructs were found statistically reliable. The studied measurement model had adequate construct validity, convergent validity and discriminant validity. Hence, it may be concluded that perceived measurement model is reliable and valid.

Introduction

It is perhaps not an exaggeration to assert that the mobile phone is the most ubiquitous personal item in the world (Jayawardhena, Chanaka et al., 2009). In the era of smart phones where internet and much more facilities are available within mobile phone, organisations are increasingly appreciating the importance of mobile phones in marketing applications. From a marketer's perspective, the benefits of mobile marketing include a high rate of personalisation, interactivity, and a low cost of reaching larger target audiences at the right time and in the right place (Facchetti, A., et al., 2005). Hence, mobile advertising is a very important tool for all marketers, for the simple reason that the combined benefits of mobile marketing are simply not yet available through any other medium (Jayawardhena, Chanaka et al., 2009). Mobile advertising offers an alternative approach to reach targeted customers more effectively. With second highest mobile subscriber's base, mobile is looking a very effective medium for marketing goods and services to the end users in India. Several studies have been conducted to measure mobile subscriber's perception or attitude and factor affecting them. Previous studied reported numerous factors which influence perception or attitude of mobile users toward mobile advertising. Informativeness, permission, trust, irritation, credibility, familiarity, entertainment, and disruptive nature were found some common factors in the mobile marketing literature. Informativeness, prior-permission, disruptive nature, credibility and familiarity were used in most of previous researches and found most influential factors. So, in the present study an attempt has been made to confirm the validity issues pertaining to these factors which highly influence the perception or attitude of mobile user's toward mobile advertising.

Review of Literature

The consumer attitudes toward mobile advertisement construct in marketing literature generally is based on four dimensions: entertainment, informativeness, irritation and credibility (Ducoffe, R. H., 1996; Tsang, M. M. et al., 2004). In some research studies examining consumer attitudes toward mobile advertisements, another dimension has been added to those basic four constructs (Ducoffe, R. H., 1996). Study conducted by Mohd Nazri Mohd Noor, et al., 2013) gives a clear picture on importance of prior permission. In the context of

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mobile advertising entertainment construct was found less influencing factors. (Barnes, S. J. et al., 2004) stated that user permission is one of the variables affecting mobile advertising effectiveness. In this study constructs adopted from previous studies with their respective indicators are given below:

Informativeness

Past researches show that informativeness of the advertising message turns out to be the strong influential factor on consumer's perception (Bauer, H., et al., 2005; Ducoffe, R. H., 1996; Haghirian, P. et al., 2005; Merisavo M. et al., 2007; Tsang, M. M., et al., 2004; Khasawneh, A. M. et al. 2013). If mobile advertising can provide consumers with relevant information that helps them to fulfil their needs, they will accept it too. Informativeness indicates the completeness of the product information imply its timeless, relevance and being a reliable resources. In the context of this study, informativeness can be viewed as the ability of advertising to deliver information to customers in order to satisfy their needs (Khasawneh, A. M. et al. 2013).

Indicators of Perceived Informativeness:

(Info1) Mobile advertisement enhances capabilities of gathering information.

(Info2) Mobile advertisement improves quality of information.

(Info3) Information through mobile advertisement is reliable and trustworthy.

(Info4) Information through mobile advertisement is relevant.

(Info5) Information can be gathered more easily and quickly though mobile advertising.

Prior-Permission

There were a number of studies discussed the role of permission in mobile advertising (Bamba, F. et al., 2007; Maneesoonthorn, C. et al., 2006; Krishnamurthy, S., 2001). According to the previous studies, consumers in general have shown negative attitudes towards receiving mobile advertisements that are unexpected (M. Keshtgary, S. Khajehpour, 2011). Some researches show that consumer attitudes toward mobile advertising are generally negative, but are positive if permission is obtained. Majority of consumers treat mobile as their valuable private belongings (Bamba et al., 2007; Barnes et al., 2004). Hence, prior permission plays an important role to inculcate their positive view toward mobile advertising (Bauer, et al., 2005). In reality, the key success factor of mobile advertising depends on the consumer's permission (Carroll, A. et al. 2007) Sending an advertisement without prior permission can tarnish the mobile advertising industry. This factor was found to be most influential factor rated by consumers (Corroll, et al., 2007).

Indicators of Prior-Permission:

(Per1) Prior permission of user should be seeked before sending them mobile ads

(Per2) I would give permission if mobile ads are relevant and informative.

(Per3) I would give permission if mobile ads are interesting.

(Per4) I would give permission if mobile ads are reliable.

Credibility and Familiarity

Credibility is the degree to which consumers trust commercial messages about products or brands (Mackenzie, Scott B. et al., 1986) and rely upon advertiser's claim (Chowdhury, H. K. et al., 2006). Advertising credibility refers to consumer's perception of the truthfulness and believability of advertising (McKenzie, S. B. et al. 1989). Various researchers identified that there is a positive correlation between perceptions of the credibility of an advertisement and consumer attitudes towards the advertising (Brackett, L. K. et al. 2001). Study conducted by Okazaki in 2005, clears that the one of strongest determinant of mobile advertisings adoption is brand familiarity. Consumers are likely to respond ads if they are sent from the company that they know or are familiar.

Indicators of Credibility and Familiarity:

(Cf1) Mobile ads from famous and credible companies are preferred.

(Cf2) Mobile ads through familiar advertisers are liked.

Disruptive Nature

It refers to any offending effects that may go against what a user values. It is a phenomenon whereby consumers tend to refuse advertisements if they have the feeling that the advertisement is too intrusive.

Indicators of Disruptive Nature:

(Dn1) Reading mobile advertisements is not time consuming.

(Dn2) Mobile advertisement does not cause loss of privacy

Various studies have been conducted to find out the factors which affect the perception or attitude of mobile user's toward mobile advertising. But mobile advertising concept is relatively new. There is a need to confirm those factors which are identified in previous researches, so that, advertisers can devise and design strategies of mobile advertising more prudently, effectively and efficiently.

Objective

To ensure the validity concerns and fitness of measurement model of factors affecting perception of mobile user's toward mobile advertising.

Research Design and Distribution of Respondents:

The study was conducted in Haryana in 2012. Data for the research were collected from 200 respondents (Mobile users) through a online questionnaire survey and convenience non-random sampling was followed. The questionnaire was developed from existing literature. The survey questionnaire consisted of 13 questions. Data was analysed by using SPSS and AMOS version 20 for windows through the study. Sample constitutes from 54% male and 46% female. 10.5% respondents belong to the age group of 'Below 18 years' while highest (49.5%) were in the age group of '18-30' and 31% were in the age group of '31-45' and rest 9% of age '46 and above'. Majority of respondents (62%) were married. 17.5% respondents were 'under graduate', 13% were 'graduate', 40% were 'post graduate' and 29.5% were 'other higher. Respondents were almost equal in different income groups ranging 28% to 22.5%.

Analysis and Results

According to Ahire, S. L. et al., (1996), confirmatory factor analysis (CFA) provides enhanced control for assessing unidimensionality (i.e., the extent to which items on a factor measure one single construct) than exploratory factor analysis (EFA) and is more in line with the overall process of construct validation. In this study, confirmatory factor analysis model is run through Amos version 20. In the present study total four constructs were developed and validated to confirm the factors affecting mobile user's perception towards mobile advertising using CFA. CFA is used to determine the construct validity of survey items. It means how well the construct is explained by the variables under the construct. Also, the factor loading or the standardised regression weight of the items must be significantly correlated to the specified construct thereby contributing to the construct validity comprehension. **Figure I**

Assessment of Construct validity and reliability:

It is proposed that each item should, for acceptable construct validity, have a minimum factor loading of .60 for its hypothesized construct (Nunnally, J. C., 1978). **Table I** shows the exploratory factor loadings and confirmatory factor loadings for indicator each and crabach's alpha value for each construct.. All items met this norm for the four construct in case of exploratory factor analysis but ten out of thirteen items met this norm for the four constructs in case of confirmatory factor analysis. All confirmatory factor loadings are significant. Indicators 'Info5' and 'Per1' were dropped from further analysis due to very low confirmatory factor loading as compare to acceptable value. The Confirmatory factor loading for indicator 'Info4' is slightly less than acceptable value and it is also significant, so it was retained for further analysis. All this ensures construct validity.

For the informativeness construct, indicator 'Info1' had a relatively higher confirmatory factor loading (.83) than indicator 'Info2' (.82), indicator 'Info3' (.54) and indicator 'Info4' (.65). This indicates that indicator 'Info1' is most highly correlated with the informativeness construct. In case of permissibility construct, 'Per4' had a relatively higher confirmatory factor loading (.86) than 'Per2' (.71) and 'Per3' (.73). This indicates that 'Per4' is most highly correlated with the permissibility construct. For credibility and familiarity construct, the most highly correlated indicator is 'Cf2' with (.85) loading and for disruptive nature construct, it is 'Dn2' indicator with .72 loading, who is highly correlated with disruptive nature construct than indicator 'Dn1'.

Scale reliabilities were estimated using Cronbach's alpha also called co-efficient alpha. It measures the internal consistency of the items. It is the degree to which responses are consistence across the items within a measure (Kline, 2004). In all the four constructs, Cronbach's alpha exceeded the standard acceptance norm of .70 except the construct disruptive nature. Some times more than .65 is also considered good for reliability purposes. So it can be concluded that all constructs are statistically reliable or that is good consistency among the items within each dimension. **Table II**

Assessment of Convergent validity: (CR > 0.7; CR > AVE; AVE > 0.5)

A set of variables presumed to measure the same construct shows convergent validity if their inter-correlations are at least moderate in magnitude (Kline, 2004). Convergent validity ensures that all indicators are measuring the same construct. It is the degree to which multiple methods of measuring a variable provide the same. This validity ensures when Composite reliability (CR) is more than 0.7, Average variance extracted (AVE) is more than 0.5 and CR is more than AVE. **Table II** shows that the CR for all constructs are more than 0.7, but for construct disruptive nature, it is (0.66) slightly less than the criteria. AVE for all constructs are also more than 0.5, except for disruptive nature which is 0.493. The AVE value for construct disruptive nature is almost approx 0.5. Since the values of this construct is not much less than acceptable criteria, so this construct was retained in the tested model. CR is more than AVE for all constructs. . In general, the factors in the measurement model had adequate convergent validity.

Discriminant Validity: (MSV < AVE; ASV < AVE)

A set of variables presumed to measure different constructs shows discriminant validity if their inter-correlations are not too high (Kline, 2004). It is the degree to which the measures of different latent variables are unique. Discriminant validity is ensured if a measure does not correlate very highly with other measures from which it is supposed to differ. To examine discriminant validity, the shared variance between factors was compared with the AVE. This validity ensures when square of maximum shared variance (MSV) is less than Average variance extracted (AVE) and Square of Average shared variance (ASV) is less than Average variance extracted (AVE). **Table II** shows that MSV is lower than AVE and ASV is less than AVE for all constructs, and thus confirming discriminant validity of the measurement model.

Fit Indices:

A confirmatory factor analysis was conducted to examine the goodness-of-fit of the measurement model for these factors. Over the past decades, there has been a large body of research and debate on the cut-off criteria of fit indices, the following were those often reported in published research: chi square, Comparative fit Indices (CFI), the standardized root mean square residual (SRMR), the root mean square error of approximation (RMSEA), the goodness of fit index (GFI). Researchers tend to agree that it is not advisable to rely on one fit index to assess the model fit. Instead, using a combination of different fit indices may be more reliable. "Among the SEM fit indices, the ÷2 is the only inferential statistic; all the others are descriptive. That is, only for the ÷2 may we make statements regarding significance or hypothesis testing, and for the others, there exist only "rules-of-thumb" to assess goodness-of-fit. This quality may make it seem like ÷2 should be the only statistic to report." However ÷2 is hailed to be quite responsive to the sample size. In order to overcome this problem, it has been recommended, that a model exhibits a reasonable fit if the ÷2 / dof (i.e. chi-

sqaure divided by degrees of freedom) does not exceed 3.0 (Kline, (2004). In our case ÷2/ df = 1.440, which suggests a good model fit. **Table III**

Based on typical cut-off criteria of model fit, results indicate that the measurement model fits the sample data satisfactory **(Table II)**. Hence, the measurement model of factors affecting perception of mobile users toward mobile advertising shows excellent fit to the obtained data in terms of all the selected goodness-of-fit statistics.

Finally, it may be concluded that perceived measurement model is reliable and valid. This should enable researchers to use past work with greater confidence, resulting in stronger theory development in the future. With perceptible influence marketers should promulgate their ad strategies by taking into account above analysed four constructs which qualify all most all statistical requirements of validity and reliability to attain desirable results in era of cut-through competition.

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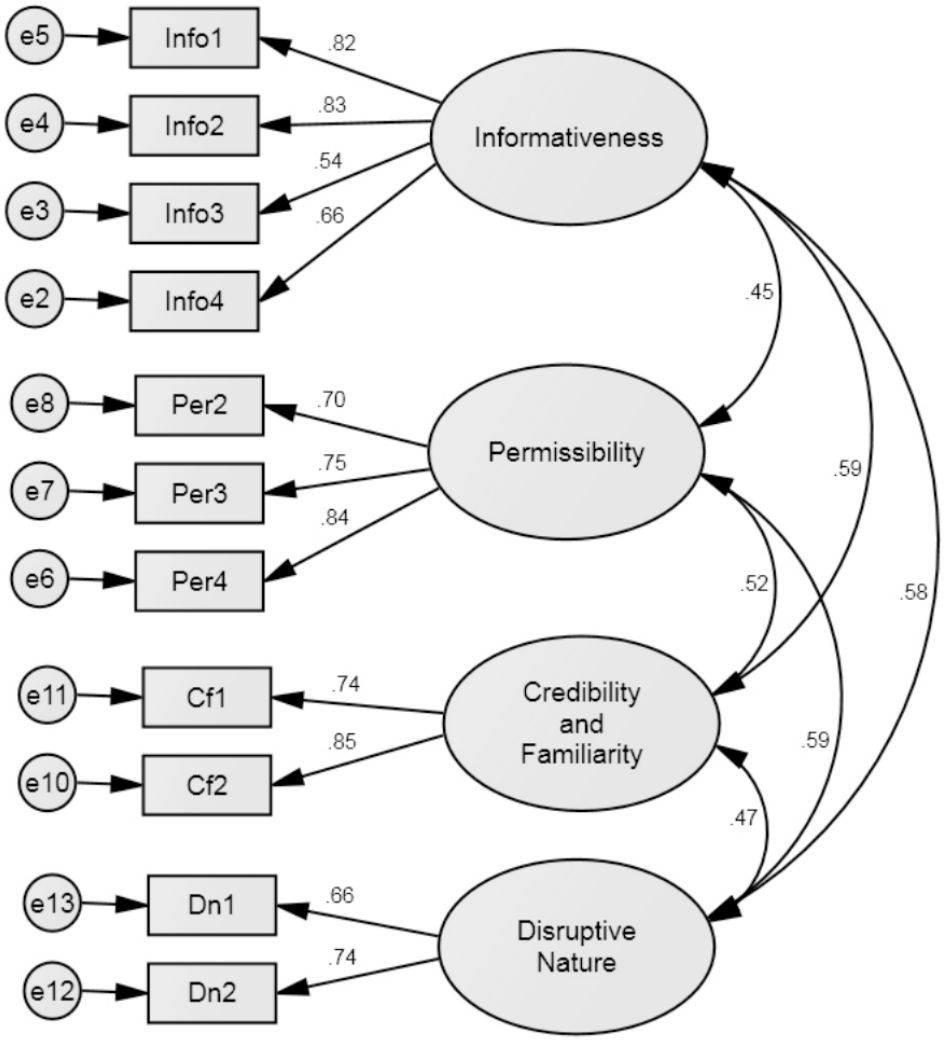

Figure 1: Measurement Model

Table I: Factor Loadings and Cronbach's alpha for all Constructs

Constructs	Indicators	Exploratory factor Loadings	Confirmatory factor loadings	Cronbach's alpha
Informativeness	Info1 Info2 Info3 Info4 ~~Info5~~	.781 .766 .643 .695 .639	.83*** .82*** .54*** .65*** .49***	.793
Permissibility	~~Per1~~ Per2 Per3 Per4	.724 .776 .614 .804	.35*** .71*** .73*** .86***	.754
Credibility and Familiarity	Cf1 Cf2	.819 .804	.74*** .85***	.77
Disruptive Nature	Dn1 Dn2	.696 .821	.68*** .72***	.657

Table II : CR, AVE, MSV and ASV Values for all Constructs to Assess the Convergent and Discriminant Validity

	CR	AVE	MSV	ASV	Credibility and Familiarity	Informativeness	Permissibility	Disruptive Nature
Credibility and Familiarity	0.774	0.633	0.35	0.283	0.796			
Informativeness	0.809	0.522	0.35	0.295	0.592	0.722		
Permissibility	0.808	0.585	0.349	0.275	0.523	0.448	0.765	
Disruptive Nature	0.66	0.493	0.349	0.302	0.474	0.577	0.591	0.702

Table III : Model fit Summary (Default Model)

	CMIN/DF	GFI	AGFI	CFI	RMSEA	PCLOSE	P
Model value	54.726/38 =1.440	.952	.917	.979	.047	.544	.039
Cut-off Criteria	< 3 good; <5 sometimes permissible	>.95	>.80	>.95 great; >.90 traditional; >.80 sometimes permissible	<.05 good; .05-.10 moderate; >.80 sometimes permissible	>.05	>.05