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Mobile Phone Marketing Vis-a-Vis Consumer Perceptions

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Abstract

The purpose of this paper is to present the findings of a recent study which explored consumer perceptions of mobile phone marketing, through the application of constructs adapted from traditional innovation and product involvement research.

This study makes an attempt to examine how a consumer's perception of the relative advantages, compatibility and complexity, associated with mobile phone marketing, and their involvement with their mobile phone, influence their intention to accept marketing communication sent via this channel.

Keywords: Mobile communications, Marketing, Consumer behavior, Product innovation, Vadodara

INTRODUCTION

During the past decade, innovative marketing communication channels that deliver relevant and personalized messages to target audiences, have emerged as major components in the direct marketing programs of many organizations (Harmon et al., 1999; Watson et al., 2002). In particular, the internet, alongside ubiquitous devices such as the mobile phone, is facilitating new channels for reaching and interacting with consumers (Moffett et al., 2002; Trappey and Woodside, 2005; Xu, 2006).

The fast pace of development within the mobile commerce industry has brought about a new field of academic research, in which studies have examined the variety of factors influencing the acceptance of mobile phone marketing from both

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consumers' and organizations' perspectives. However, the current literature remains largely inconsistent and fragmented. One major research stream focuses on consumer acceptance and adoption of mobile services in general, such as multimedia messaging service, online gaming and other wireless services (Foulds and Burton, 2006; Hung et al., 2003; Kleijnen et al., 2004). Another more specific field of research focuses on consumer perceptions and attitudes towards the use of the mobile phone for marketing and commercial application (Barnes and Scornavacca, 2004; Barwise and Strong, 2002; Bauer et al., 2005; Carroll et al., 2007; Leppa¨niemi and Karjaluoto, 2005). Overall, literature within the latter stream has revealed several internal and external factors that influence consumer's acceptance of this direct marketing medium. For example, a number of scholars have argued that a consumer's adoption of mobile phone marketing is likely to be influenced by their acceptance of the mobile phone itself (Barnes and Scornavacca, 2004; Bauer et al., 2005; Dickinger et al., 2004). Additionally, in one of the field's first empirical studies, Barwise and Strong (2002) found that when incentives were offered, almost all respondents were satisfied with receiving advertisements sent to them via short message service (SMS). More recently, Merisavo et al. (2007), examined the drivers of SMS advertising acceptance among consumers. Through large-scale survey research (n= 4,062 respondents) they found that the usefulness and context of the message were significantly associated with consumer acceptance of advertising sent via this medium.

The primary focus of this research is on three innovation attributes, found by Tornatzky and Klein (1982), to exert significant influence over an individual's adoption decision: relative advantage, compatibility and complexity. Relative advantage refers to the degree to which an innovation is perceived as being better than the innovation it replaces; compatibility refers to the degree that an innovation is considered compatible with the existing values, past experiences and needs of the potential adopter; and complexity refers to the level of complexity associated with understanding and using the innovation (Rogers and Shoemaker, 1971). These three innovation attributes form a significant part of Rogers's (1995), innovation attribute framework, which suggests that an individual's combined perception of the innovation's attributes will largely drive their adoption decision. In the past, researchers have used this, and other innovation diffusion theories to explain the adoption of technology driven innovations and for understanding consumer behavior in relation to new product development (Chen et al., 2002; de Ruyter et al., 2001; Hung et al., 2003). While Rogers's (1995). Innovation attribute theory offers a valid context for examining consumer adoption of mobile phone marketing, Thong (1999), advises researchers combine Rogers's (1995) theory with other constructs to provide a richer and potentially more explanatory model. For this reason, the proposed relationship between a consumer's level of involvement with their mobile phone (i.e. product involvement) and their adoption of mobile phone marketing will also be examined by this study.

Consumer's perceptions of the three attributes listed above in the context of mobile phone marketing will form the basis for answering two principal research questions namely:

RQ1. To what extent are consumer perceptions of innovation attributes associated with their adoption of mobile phone marketing?

RQ2. Which, if any, innovation attribute has the greatest effect on consumer adoption of mobile phone marketing?

A further research question regarding the relationship between a consumer's involvement with their mobile phone and their adoption of mobile phone marketing will also be examined:

RQ3. To what extent does a consumer's involvement with their mobile phone affect their adoption of mobile phone marketing?

The next section turns to consider the conceptual framework and associated hypotheses that underpin this research.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

A review of the literature relevant to this study covered four main areas. First, the extant research in the field of mobile phone marketing was reviewed. This was followed by a consideration of the theory for innovation adoption and the core innovation attributes. Finally, the literature relating to the concept of product involvement and how this may influence consumer's perception of an innovation was examined.

Mobile phone marketing

A diverse range of definitions for the broad concept of mobile marketing exist (Mort and Drennan, 2002; Pousttchi and Wiedemann, 2006; Salo and Ta¨htinen, 2005). In view of these, mobile phone marketing is defined here as the use of mobile phones to provide consumers with time and location specific, personalised information, which promotes goods, services and ideas. The novel status of the mobile phone as a one-to-one communication device suggests mobile phone marketing is reminiscent of an innovative form of direct marketing.

Several researchers have studied the factors which influence consumer acceptance of marketing messages sent via this medium (Barnes and Scornavacca, 2004; Barwise and Strong, 2002; Bauer et al., 2005; Carroll et al., 2007; Kavassalis et al., 2003; Leppa¨niemi and Karjaluoto, 2005). Overall, their findings reveal consistent support for three main elements: whether the user has given their permission to receive marketing messages to their mobile phone; the level of control the service provider maintains during the transaction, and extent to which the user trusts the brand being marketed. A similar stream of literature has found the characteristics of the marketing message and its delivery to be key factors driving a consumer's level of acceptability (Merisavo et al., 2007; Trappey and Woodside, 2005). However, until now, there has been little research dedicated to exploring the nature of this medium, and whether this influences a consumer's decision to accept or reject marketing communications sent directly to their mobile phone.

Innovation adoption

Innovation adoption refers to "a decision to make full use of an innovation as the best course of action available" (Rogers, 1995, p. 21). In studies relating to an innovation's diffusion within society, researchers have proposed a number of models that aim to predict the rate of adoption and an individual's adoption decision, according to the innovation attributes and the personal characteristics of the potential adopter. The dominant theoretical framework for analysing the relationship between an innovation's attributes and its rate of adoption is the diffusion of innovation (DOI) model developed by Rogers (1995). Essentially, Rogers' (1995) DOI theory suggests that when a concept is perceived as new, an individual utilises communication tactics within their social systems to arrive at a decision point of either adoption or rejection of the innovation. The innovation's attributes or characteristics serve as an important influence over the individual's adoption decision and the speed of innovation diffusion within society. In broad terms, Rogers' (1995) innovation attribute framework suggests that if a potential adopter holds positive perceptions of the combined innovation attributes, then they will be more likely to adopt, or accept, the innovation. Previous researchers have suggested that Rogers' (1995) DOI model is easy to use, offers mutually exclusive and exhaustive categories allowing results to be compared, and is a suitable framework for replicating and generalizing innovation adoption across studies (Black et al., 2001; Mahajan et al., 1990).

In recent years, the vast majority of innovation diffusion studies have focused on the adoption of technology or tangible products. For example, a number of scholars have used Rogers's (1995) framework for studying consumer adoption of

innovative product technologies (see for example, Foulds and Burton (2006) for multimedia messaging services; Kleijnen et al. (2004) for mobile gaming; Lin and Yu (2006) for the internet as a communication channel; Pedersen (2005) for mobile internet services). In comparison, there are fewer studies that have concentrated on the adoption of intangible, process-like innovations, such as ideas, concepts or services. Here, the researcher has conceptualised mobile phone marketing to be a process-like innovation, which distinguishes it from the mobile phone; a product innovation.

Innovation attributes

Rogers (1995) considers that an individual's combined perception of the five innovation attributes (relative advantage, compatibility, complexity, trialability and observability) will largely drive the individual's adoption decision. As mentioned previously, the innovation attributes applicable to mobile phone marketing in this study are: relative advantage, compatibility and complexity. The remaining two attributes; trialability and observability, refer to the degree to which an innovation can be experimented with prior to its adoption, and the degree to which the results of the innovation are visible to others (Rogers and Shoemaker, 1971). These two attributes were excluded from this study because mobile phone marketing cannot be experimented with by the consumer prior to their adoption, and the results of mobile phone marketing are not directly visible to the rest of society.

By definition, relative advantage refers to the degree to which an innovation is perceived as being better than the idea it supersedes (Rogers and Shoemaker, 1971). In the context of mobile phone marketing, relative advantage is conceptualised as the degree to which consumers perceive this channel to be better than its alternatives, such as direct mail and email.

The current innovation literature has established that relative advantage is one of the best and most consistent predictors of innovation adoption (Onkvisit and Shaw, 1989; Plouffe et al., 2001; Robinson, 1990; Teo and Pok, 2003; Tornatzky and Klein, 1982). For instance, in the context of mobile service innovations, Teo and Pok (2003) found support for a relationship between consumer perceptions of relative advantage and their adoption of wireless application protocol (WAP) enabled mobile phones. Prior to this, Plouffe et al. (2001) found both consumers' and merchants' perceptions of relative advantage were a key driver of their intentions to adopt a new electronic payment system. In view of these findings and the perceived advantages of receiving marketing communications via a mobile phone, it is proposed that a consumer's perception of the relative advantages associated with mobile phone marketing will be positively related to their adoption decision:

H1. Relative advantage is positively and significantly related to consumer adoption of mobile phone marketing.

The second innovation attribute to be examined in this study is compatibility, which describes the degree to which to an innovation is perceived as compatible with the existing values, past experiences and needs of potential adopters (Rogers and Shoemaker, 1971). In terms of mobile phone marketing, this construct may simply denote a consumer's familiarity, or level of comfort with this type of direct marketing. Prior research has established a clear and consistent relationship between compatibility and the adoption of technology driven innovations (Agarwal and Prasad, 1997; Black et al., 2001). Outside of this, user permission and their control of communication have also been found to be key drivers of consumer acceptance of mobile phone advertising (Barnes and Scornavacca, 2004; Barwise and Strong, 2002). Within this study, the personal nature of the mobile phone suggests that the degree of compatibility between a consumer's own values, and that which they perceive to be associated with mobile phone marketing, will be positively related to their adoption decision:

H2. Compatibility is positively and significantly related to consumer adoption of mobile phone marketing.

The final innovation attribute to be incorporated into this study is complexity, which refers to "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers and Shoemaker, 1971, p. 154) and is considered by many to be a close substitute to the "perceived ease of use" factor acknowledged in Davis's (1989) technology acceptance model. Several studies have established a clear association between complexity and innovation adoption (Kleijnen et al., 2004; Pagani, 2004; Teo and Pok, 2003). Given the perceived intricacies associated with mobile phone technology, it is proposed that consumer perceptions of complexity will be negatively associated with their adoption of mobile phone marketing:

H3. Complexity is negatively and significantly related to consumer adoption of mobile phone marketing.

Product involvement

The concept of product involvement has received widespread attention in the marketing realm since the 1980s, particularly in relation to advertising and consumer behavior (Andrews et al., 1990; Neal et al., 2004). Product involvement refers to the way in which consumers view different product categories, with regards to their feelings, thoughts and behavioral responses (Gordon et al., 1998). In the field of consumer behavior, previous researchers have found that a consumer's level of product involvement can influence their behavior through its affect on information search and processing (Andrews et al., 1990; Bloch et al., 1986; Mantel and Kardes, 1999). Of particular relevance is a study by Bauer et al. (2006), who found strong support for the relationship between consumer decision-making styles and product involvement across a number of product categories.

In particular, they described three main factors influencing the consumer's level of product involvement: importance; pleasure and sign value. From a somewhat different perspective, Drossos et al. (2007) stated that a consumer's attitude towards SMS advertising differed according to whether the product being advertised was a high or low involvement product. Within this research setting, it is surmised that mobile phones are an effective and efficient channel for companies to communicate product and promotional information to consumers, thus influencing their adoption decision. Accordingly, consumers who place considerable importance and sign value on their mobile phone (for example, enjoy having the latest model) are more likely to perceive mobile phone marketing to be compatible with their lifestyle and preferences. Thus, it is proposed that a consumer's level of involvement with their mobile phone will influence their decision to adopt or reject marketing communications sent via this channel:

H4. Product involvement is positively and significantly related to consumer adoption of mobile phone marketing.

RESEARCH METHODOLOGY

In addressing the aforementioned research questions and hypotheses, a deductive, quantitative methodological approach was adopted. Data were collected from a non-random sample of undergraduate university students in Vadodara city. Undergraduate students were chosen primarily for their accessibility, but additionally because they represent a key target market for mobile phone marketing due to the majority having grown up in the technological age.

A self-administered questionnaire was developed, and then pretested with a separate group of respondents to enhance its overall design. Results of the pretest revealed minor instances of ambiguous wording (which were subsequently changed) and confirmed the expected completion time for the questionnaire. To ensure a common frame of reference, the opening section of the questionnaire contained a definition and brief explanation of mobile phone marketing.

A total of 271 questionnaires were distributed in April 2013, of which 254 were returned and deemed valid for data analysis, representing a response rate of 93.7 per cent. Bernard (2000) suggests that a valid response rate for face-to-face surveys, as were used here, is approximately 80 per cent. Each of the independent variables and the dependent variable were measured in subsequent sections of the questionnaire. Demographic data were also collected, to allow the researcher to obtain a deeper understanding of the participants' responses.

As shown in Table I, the majority of respondents were aged 20 years and under (44.1 per cent) with an additional 41.3 per cent aged between 21 and 25 years old. More than 75 per cent earned an annual gross income of Rs 20,000 or less, which was expected given the undergraduate student status of the sample.

Table I: Respondents' Profile

Demographics		
	Frequency	Percentage
Gender		
Male	105	41.3
Female	149	58.7
Age		
20 - under	112	44.1
21 - 25	105	41.3
26 - 30	21	8.3
31 - 35	5	2
36 - 40	4	1.6
41 - 45	3	1.1
46 - 50	2	0.8
51 - over	2	0.8
Annual Gross Income		
Less than Rs 10,000	88	34.6
Rs 10,000 - Rs 15,000	64	25.3
Rs 15,001 - Rs 20,000	40	15.7
Rs 20,001 - Rs 25,000	21	8.2
Rs 25,001 - Rs 30,000	20	7.8
Rs 30,001 - Rs 35,000	7	2.8
Rs 35,001 - Rs 40,000	3	1.3
More than Rs 40,000	11	4.3

The innovation attributes of relative advantage and complexity were measured using multi-item index scales, which were modified versions of those used in other empirical studies of technology driven innovations (Davis, 1989; Merisavo et al., 2007; Moore and Benbasat, 1991; Pavlou, 2003). Compatibility, the third innovation attribute, was also measured with a multi-item scale. However, in this instance, the scale was originally developed by the researcher to suit the unique requirements of the current research setting.

Although the researcher examined several measurement scales for this construct, many of the already established items could not be suitably modified to measure an individual's compatibility with an intangible, service-like innovation such is mobile phone marketing. A consumer's level of involvement with their mobile phone (i.e. product involvement) was measured using a modified version of the multi-item index used by Bauer et al. (2006), which reflected the importance, pleasure, and sign value a consumer places on a particular product.

Finally, the dependent variable, consumer adoption of mobile phone marketing, was measured by three items reflecting the consumer's perception of, and commitment to, mobile phone marketing. In all cases, a seven-point Likert scale was used, where 1 = "strongly disagree" and 7 = "strongly agree".

Prior to performing correlation and regression analysis on the data, all five measurement scales were subject to exploratory principal components factor analysis with varimax rotation. Field (2005) suggests that this is an appropriate method for checking the validity of questionnaire items. The results of the factor analysis revealed that all three items used to measure consumer adoption of mobile phone marketing loaded substantially (.0.40) on the

extracted factor. In addition, all but three of the 15 items used to measure the innovation attributes loaded substantially on their respective factors. Thus, nearly all of the dimensions initially proposed by the researcher were represented.

An exploratory principal components factor analysis was also performed on the five items used to measure the participants' involvement with their mobile phone. This analysis generated one principal component with an eigenvalue of 2.25, explaining 44.94 per cent of variance in this factor. All five product involvement items had substantial loadings on the extracted factor, and thus the validity of the initial scale was established following factor analysis, the data were checked for reliability using Cronbach's a coefficient. As shown in Table II, the results of this test revealed that each of the scales used to measure the independent variables and the dependent variable, presented acceptable levels of reliability (that is, above the minimum level of 0.60 as suggested by Nunnally, 1967).

RESEARCH FINDINGS

All four hypotheses were first tested using a series of simple correlation analyses. Upon inspection of the correlation matrix for the innovation attributes and consumer adoption of mobile phone marketing (Table III), it was revealed that relative advantage had a significant and positive correlation with a consumer's decision to adopt mobile phone marketing (r2 0.75, $p<0.01$). Thus, H1 is supported. Compatibility also had a significant and positive correlation with the dependent variable (r2 0.78, $p<0.01$), thus supporting H2. However, despite its significance, the direction of the relationship between complexity and adoption was positive (r2 0.20, $p<0.01$), thus offering no support for H3. Among the independent variables, relative advantage and compatibility also exhibited very strong correlations with each other, and thus the threat of Multicollinearity existed. For this reason, the variance inflation factors associated with each variable were examined, both of which were well below the ten point cut-off recommended by Myers (1990) and hence, the threat was refuted.

The correlation matrix (Table III) was also examined for the purpose of confirming the order in which the innovation attributes would be regressed against the dependent variable. The next stage of data analysis involved multiple hierarchical regressions of the innovation attributes and the dependent variable, consumer adoption of mobile phone marketing. This type of analysis was performed to determine the strength and direction of the relationships between all four variables (when all were accounted for).

Table II: Mean, Standard Deviation and Cronbach's alpha value for key construct

Variable	Mean	S.D.	Cronbach's a
Compatibility	2.65	1.1	0.77
Relative Advantage	2.71	1.3	0.86
Complexity	4.5	1.37	0.71
Product Involvement	3.63	1.04	0.68
Adoption	2.8	1.41	0.89
Note: Seven-Point Likert Scale where 1 Strongly disagree and 7 Strongly agree			

Table III: Correlation matrix for Innovation attributes and Adoption

Variable	1	2	3	4
Adoption	1.00			
Relative Advantage	0.745**	1.00		
Compatibility	0.781**	0.701**	1.00	
Complexity	0.204**	0.154*	0.218**	1.00
Notes: Correlation are based on n = 254, * p Less than 5% , ** p Less than 1%				

In doing so, the researcher was able to further analyse H1, H2 and H3. The results of the multiple regression analysis are reported in Table IV. At the final stage of the regression

model, only relative advantage and compatibility were identified as significant predictors of consumer adoption of mobile phone marketing, thereby offering further support for H1 and H2. Interestingly, the variables relative advantage and compatibility also produced relatively strong and significant coefficients at stages 2 and 3 of the regression model, which suggests that the greatest proportion of variance in a consumer's adoption of mobile phone marketing can be explained when both these variables are accounted for. However, to determine which of these attributes has the greatest affect on a consumer's adoption decision, the standardised regression coefficients for relative advantage and compatibility were examined simultaneously. As shown in stage 3 of the regression model, when compared with relative advantage (b ¼ 0.388), compatibility (b ¼ 0.502) produced a slightly larger standardised regression coefficient. Therefore, the degree of compatibility a consumer perceives to exist between their own values and those associated with mobile phone marketing, has the greatest affect on their decision to adopt or reject marketing communication sent via this medium.

The results of the multiple regression analysis for the innovation attributes and the dependent variable appear to largely confirm previous research findings. Namely, the influence of compatibility on the adoption decision is not overly surprising given that user permission, privacy, service provider control and brand trust are all key factors that have previously been found to drive consumer acceptance of mobile phone marketing (Barnes and Scornavacca, 2004; Barwise and Strong, 2002; Bauer et al., 2005; Carroll et al., 2007).

However, the lack of support for the impact of complexity on the adoption decision contests the findings established by past technology innovation literature (Kleijnen et al., 2004; Teo and Pok, 2003). Possible explanations for this lie in the nature of the innovation examined here and the age structure of the sample used. In general, the actions involved in responding to a mobile phone marketing message do not differ from those required to perform day-to-day functions such as making a phone call or sending a text message. Thus, consumers are not required to develop new skills in order to adopt this innovation, a fact which is likely to reduce the influence of this attribute on the adoption decision (Rogers, 1995). Furthermore, younger consumers are more likely to be proficient users of mobile phone technology (Ling and Yttri, 2002), having been surrounded by such telecommunication devices since a relatively young age. This being the case, any complexities associated with mobile phone marketing are likely to be less of a concern to this age group than the level of compatibility this marketing channel presents.

Table IV: Results of multiple Regression Analysis for consumer adoption of mobile phone marketing

Variable	Stage 1	Stage 2	Stage 3
Compatibility	0.781**	0.509*	0.502*
Relative Advantage		0.388*	0.388*
Complexity			0.035
Change in R Square		0.076*	0.001
R Square	0.611*	0.687*	0.688
F	395.258*	275.867*	184.156*
n	253	253	253
Notes: Standardized coefficients are reported; *p less than 0.001			

To test the hypothesized relationship between a consumer's involvement with their mobile phone and their adoption of mobile phone marketing, a correlation matrix of these two variables was produced and examined. This revealed that although there is only a weak level of association between product involvement and adoption (r2 0.25, $p<0.01$) the relationship is positive, and therefore H4 is supported.

This finding is consistent with the themes outlined in the literature review, in particular the relationship between product involvement and

consumer behavior (Celsi and Olson, 1988; Lee and Miller, 2006; Warrington and Shim, 2000). In addition, the findings here have confirmed that a consumer, who places a high level of importance and sign value on their mobile phone, is more likely to accept this innovation as a direct marketing channel. A likely explanation for this derives from the ability of marketers to provide consumers with, or for consumers to request, up-to-date product information via their mobile phone. In this sense, it was surmised that the mobile phone offers consumers a valuable tool for conducting efficient and effective information search as part of their overall purchase decision. Yet despite this, the low mean score for product involvement (3.63 out of 7) found here implies that predominantly the consumers surveyed had little or no involvement with their mobile phone (a result that was somewhat surprising given the predominantly young age of the sample). As such, the weak relationship between product involvement and consumer adoption of mobile phone marketing, and the low overall score for product involvement, suggests that the extent that product involvement can be used to predict a consumer's intention to adopt mobile phone marketing is somewhat limited. However, the mere presence of a significant finding does provide impetus for further research in this area.

CONCLUSIONS AND FUTURE RESEARCH

The purpose of this study was to examine consumer perceptions of mobile phone marketing. Given the innovative nature of the mobile phone, and its recent application as a direct medium for marketing communication, it was hypothesized that a consumer's perception of three innovation attributes and their level of involvement with their mobile phone would influence their intention to adopt this new form of direct marketing. The research findings confirmed three out of the four hypotheses tested, with strong support found for the effect of relative advantage and compatibility on the consumer adoption decision.

In addition, this research found Rogers' (1995) innovation attribute theory to be a valid and robust framework for analyzing the acceptance, and adoption, of marketing innovations. In particular, a key contribution lies in the newly constructed measurement scales, of which one was developed by the researcher to suit the unique requirements of the research setting. The proven reliability and validity of these scales offers future innovation researchers a strong foundation from which they can adapt their own questionnaire items.

However, because this research was exploratory in nature, the preliminary findings uncovered here do warrant further empirical testing. In particular, future research could examine in further detail consumer perceptions of each of the three innovation attributes, and relate these findings to their adoption behavior. Research of this type would benefit from using a longitudinal research design, thus permitting a thorough examination and determination of the actual adoption rate, and consumer perceptions over the course of the diffusion cycle.

The supported relationship between a consumer's level of product involvement and their intention to adopt mobile phone marketing reveals another avenue for further research. For example, researchers could examine the extent that each component of product involvement studied here (i.e. importance, pleasure and sign value) affects a consumer's intention to accept marketing messages sent via their mobile phone.

Finally, while this research makes several contributions to theoretical and practitioner understanding, this knowledge should be considered in view of the research limitations.

***First**, the age structure of the student sample used here limits the generalizability of this study to consumers of all age groups (85.4 per cent were aged 25 years or under). Prior research has supported differences in the adoption behavior of old and young consumers (Leppa¨niemi et al., 2006) and hence, a similar finding would have been expected here had the sample permitted this type of analysis.*

***Secondly**, it should be noted that the key constructs examined here are not considered exhaustive of all the possible drivers of consumer adoption of mobile phone marketing. Rather, the research findings confirm the presence of a significant relationship between three of Rogers's (1995) innovation attributes and a consumer's overall perception of mobile phone marketing, and in doing so, serves as a catalyst for further research in this area.*

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