
Original Article

Extending TPB and TAM to mobile viral marketing: An exploratory study on American young consumers' mobile viral marketing attitude, intent and behavior

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ABSTRACT A web survey of 440 American college students was conducted in April, 2010 to apply the theory of planned behavior and the technology acceptance model to examine young American consumers' mobile viral marketing attitude, intention and behavior. Our study shows that subjective norm, behavioral control and perceived cost are significant predictors of young American consumers' attitude toward viral marketing. Young American consumers' attitude toward viral marketing, perceived utility and telephoning predict their intent to pass along entertaining messages while perceived utility, attitude toward viral marketing, subjective norm, and monthly personal income predict their intent to forward useful messages. Young American consumers' behavior of forwarding messages is determined by attitude toward viral marketing, intent to pass along electronic messages, telephoning, texting and race. The implications for industry and academia are discussed.

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INTRODUCTION

Mobile viral marketing is the 'distribution or communication that relies on consumers to

transmit content via mobile communication techniques and mobile devices to other potential consumers in their social sphere and to animate these contacts to also transmit the content' (p. 53).¹ Mobile viral marketing has added more value to Internet viral marketing. First, ubiquity of mobile devices allows consumers to pass along

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mobile viral content anywhere and at any time and so gives immediacy to a viral marketing campaign. Furthermore, as mobile viral content usually comes from relatives or close friends, recipients often feel it more acceptable and credible than promotional messages directly sent by advertisers.² Finally, mobile spamming is prohibited by law and not tolerated by consumers in the United States as American wireless subscribers have to pay for receiving any unsolicited mobile message. As a result, mobile viral marketing is an optimal approach to extend a promotional message's reach and influence at little or no extra costs for advertisers.³ Nevertheless, the success of any mobile viral marketing campaign ultimately depends on message recipients' attitude toward, intent of and actual behavior of forwarding marketing messages to their friends and relatives. So, it is essential for marketing researchers and practitioners to understand the determinants of consumer attitude, intent and behavior in regards to passing along mobile viral content.

At present, limited research has focused specifically on the social-demographic characteristics, attitudes, values, motivations, intents and behaviors of mobile viral agents.^{2,4-7} Almost no similar study can be located in the United States. Consequently, understanding of American consumers' viral marketing attitude, intent and behavior is limited, and effective strategies for American mobile marketers to tap the full potentials of mobile viral marketing are much needed.

Our pioneering study intends to explore to what degree American young consumers' subjective norm, perceived behavioral control, perceived utility of forwarded messages, ease of use (EOU) and perceived cost influence their attitude toward viral marketing. It also examines to what extent their viral marketing attitude and these factors predict their mobile viral marketing intent and actual behavior. In doing so, our study extends the theory of planned behavior (TPB) and technology acceptance model (TAM) to mobile viral marketing research. In turn, we will partially test a comprehensive model of mobile viral marketing in the United States based upon the grounded theory of Palka *et al.*⁶

LITERATURE REVIEW

Previous studies have examined consumers' demographic characteristics, motivations and behaviors of receiving, using and forwarding viral content via the Internet (especially by e-mail). Quite a few scholars have investigated the motivations, attitudes and behaviors of online consumers who pass along e-mail messages.⁸⁻¹² Generally, the literature suggests that consumers are more likely to pass along an e-mail message if they perceive it to be so entertaining or useful that their recipients will appreciate and benefit from the forwarded message and if they believe they will gain some social capital such as affection by doing so.

Only a few studies shed some light on the demographic, psychographic and behavioral characteristics of wireless service subscribers who engage in mobile eWOM communication and viral marketing behavior.^{2,4-7} However, until now, little is known about how cell phone users' attitude toward viral marketing, subjective norms, behavioral control, perceived risks, perceived message quality and EOU affect their intent to engage in mobile viral marketing and their actual behavior of forwarding mobile viral messages. This study is intended to deepen our understanding and contribute to the literature in this aspect.

THEORETICAL FRAMEWORK

Ajzen's TPB^{13,14} (the TPB, based on the theory of reasoned action) has been applied and validated directly or indirectly by previous studies about consumer adoption of e-commerce and mobile advertising.¹⁵⁻²² Therefore, the TPB will be adopted in this study to investigate American young consumers' mobile viral marketing attitude, intention and actual behavior.

The TPB postulates that consumers' intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior (multiplicative products of belief strength and outcome evaluation), subjective norms (multiplicative composites of *n* normative belief-motivation interactions) and perceived behavioral control (a composite sum of perceived control over performing a behavior,

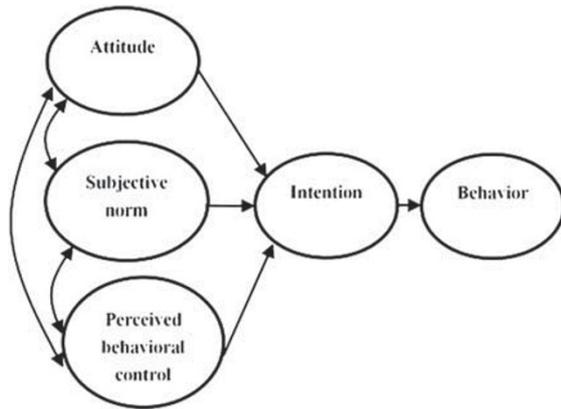


Figure 1: TPB model.

ease or difficulty of performing a behavior and likelihood of performing a behavior if sufficiently motivated). The TPB Model¹⁴ is shown in Figure 1.

In this model, attitude is a person's overall evaluation of performing the behavior and subjective norm concerns the person's perception of the expectations of important others about the specific behavior. Perceived behavioral control denotes a subjective degree of control over the performance of a behavior and should be read as *perceived control over the performance of a behavior* (p. 668).²³ In the case of mobile viral marketing, attitude is defined as a consumer's overall evaluation of the desirability of forwarding viral content via mobile devices while subjective norm refers to the person's perception of the expectations of important others about passing along mobile viral content. For our study, perceived behavioral control comes from a consumer's sense of being in control of forwarding mobile messages to one's friends or relatives. We conceptualize that cell phone users are more likely to approve forwarding mobile messages if the behavior is approved and practiced by the people who are important to them. A consumer will be more inclined to embrace mobile viral behavior if they feel unrestrained. So, we propose the following hypotheses based on the TPB and previous studies:

Hypothesis 1: American young consumers' attitude toward passing along electronic

messages positively predicts their intent to forward electronic messages.

Hypothesis 2: American young consumers' intent to forward electronic messages positively predicts their frequency of passing along mobile messages.

Hypothesis 3a: American young consumers' subjective norm positively predicts their attitude toward passing along electronic messages.

Hypothesis 3b: American young consumers' subjective norm will be positively related to their perceived behavioral control.

Hypothesis 3c: American young consumers' subjective norm positively predicts their intent to forward electronic messages.

Hypothesis 4a: American young consumers' perceived behavioral control positively predicts their attitude toward passing along electronic messages.

Hypothesis 4b: American young consumers' perceived behavioral control positively predicts their intent to forward electronic messages.

The TAM posits that an individual's intention to adopt and use a new information technology is determined by both perceived usefulness (PU) and perceived EOU. According to Davis, PU refers to the individual's subjective assessment of the utilities offered by the technology.²⁴ For the purpose of this research, we define PU as the extent that cell phone users perceive their received mobile messages to be entertaining, useful, credible and self-involved for themselves while relevant and useful to their future recipients. EOU refers to the cognitive effort that the individual puts forward in learning the technology.²⁴ In this study, EOU is defined as the degree to which a consumer believes that forwarding electronic messages would be free of effort. TAM or its revised form has also been adopted and validated by other scholars of e-commerce and mobile marketing.^{22,25–28}

In addition, the current research literature suggests that consumers are more likely to pass along an electronic message such as an e-mail or text message if they perceive it to be entertaining, useful, credible, self-involved and they expect it to be relevant and interesting to their recipients.^{5,8,9,11,12} Following this line of research, this study thus extends the TAM to mobile viral marketing research by testing the following hypotheses:

Hypothesis 5a: The perceived utility (perceived entertainment, usefulness, credibility, involvement, relevancy and interest to others) of electronic messages positively predicts American young consumers' attitude toward passing along electronic messages.

Hypothesis 5b: The perceived utility (perceived entertainment, usefulness, credibility, involvement, relevancy and interest to others) of electronic messages positively predicts American young consumers' intent to forward electronic messages.

Hypothesis 6a: The perceived ease of use positively predicts American young consumers' attitude toward forwarding electronic messages.

Hypothesis 6b: The perceived ease of use positively predicts American young consumers' intent to pass along electronic messages.

Building on previous studies,^{2,7} Palka *et al*⁶ constructed a receipt, usage and forwarding model of mobile viral marketing based on intensive personal interviews and focus group interviews in Germany. Their forwarding model is the most relevant to our study. It suggests that consumers' actual behavior of forwarding mobile viral message is determined by social conditions (adherence of recipient's interests, tie strength, subjective norm and expressiveness), attitudinal conditions (PU of communicator, perceived user friendliness, perceived enjoyment and attitude toward forwarding), personal conditions (market mavenism and altruism), resource-based condition

(perceived cost) and consumption-based conditions (customer satisfaction and involvement of communicator). Perceived cost for mobile viral marketing refers to a consumer's belief that forwarding mobile viral messages will cause the recipients to lose time or money. This study will partially test the model in the United States as we will examine whether American consumers' adherence of recipient's interests, subjective norm, perceived user friendliness (EOU), attitude toward forwarding, and perceived cost influence their mobile viral marketing intent and behavior. It is worthwhile since Palka *et al*'s conceptual model has never been validated by a survey or experimental study. So, we hypothesize

Hypothesis 7a: The perceived cost negatively predicts American young consumers' attitude toward forwarding electronic messages.

Hypothesis 7b: The perceived cost is a negative predictor of American young consumers' intent of forwarding electronic messages.

The proposed research model and hypotheses are summarized in Figure 2.

METHOD

A web survey was administered via SurveyMonkey.com to collect data from college students of a mid-sized public university in southeastern United States. Online survey is an appropriate research method frequently adopted by previous researchers of mobile advertising.^{15,29,30} College student sample is suitable for this study considering that adolescents and young consumers have frequently been targeted by major mobile marketing campaigns in Europe, America and the Asia-Pacific region as younger consumers are heavy users of mobile technology.³¹

An e-mail containing a cover letter and a link to our web survey was sent to 2500 randomly selected college students to ask for their help in April 2010. E-mail solicitation was adopted for our study because e-mail notices have been found more effective for promoting the web survey than paper notices.³² A second e-mail was sent to non-respondents to increase the response rate.

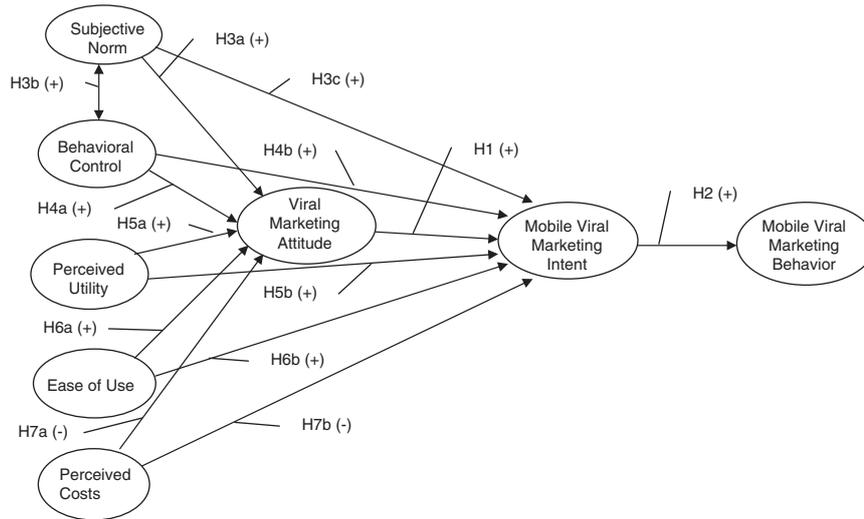


Figure 2: The proposed research model of mobile viral marketing.

The incentives of one US\$100 and three \$50 online gift certificates of Amazon.com were offered to boost the response rate. As previous research indicates, cash and non-cash incentives can significantly increase the response rates of both mail surveys and web-based surveys.^{33–35}

The questionnaire consists of 49 questions and most of them were adopted and adapted from previous studies.^{11,18,30,36} Major scales are shown in the appendix. We also included five demographic questions about their gender, age, race, SES and personal income.

The data are subject to statistical procedures including Pearson's correlation, multiple regression analyses and structural equation modeling with SPSS 18 and Amos 18.

RESULTS

Four hundred and forty college students voluntarily participated in our survey. The response rate is 17.6 per cent. One hundred and thirty-eight respondents (31.4 per cent) are male and 302 female (68.6 per cent). The mean age of the sample is 23.9. An overwhelming majority of them are Whites (90.9 per cent) and minority students make up 9.1 per cent of the sample.

As for the typical daily uses of their cell phones, respondents spent 61.5 min talking on their cell phones on average with the standard

deviation of 72.4 (the median = 30 min and the mode = 30 min). On a typical day, the participants sent 54 text messages on average with the standard deviation of 84.6 (the median = 24 and the mode = 50). Their typical daily uses of cell phones for talking and text messaging varied considerably, ranging from 0 to 540 min of talk time and from 0 to 650 text messages.

Table 1 presents Cronbach's coefficients (α) of all adopted and adapted scales and the results of exploratory factor analyses (principle axis factoring with varimax rotation). A liberal minimum requirement for scale reliability is 0.60,^{37,38} while some scholars recommended a stricter minimum requirement of 0.70.³⁹ So, the performance of three scales is very satisfactory considering their high Cronbach's coefficients and high percentage of variance explained. However, one scale proved to be not reliable.

The weak performance of the perceived risks scale can be explained by the fact that most American cell phone users have recognized the monetary costs associated with passing along mobile messages but not all of them are concerned about the loss of time. Therefore, the question about recipients' monetary costs was dropped from the perceived cost scale.

Pearson's correlation analysis was conducted to test the correlational Hypothesis 3b. As predicted,

Table 1: Scale reliability and EFA results (N=440)

Construct	Cronbach's α	Variance explained (%)
Attitude toward forwarding electronic messages	0.88	72.4
Electronic message quality	0.88	53.4
Subjective norm	0.83	71
Perceived costs or risks	0.44	28.3

American young consumers' subjective norm was positively associated with perceived control ($r=0.37, P<0.01$).

Structural equation modeling method with Amos 18 was used to test our proposed research models and directional hypotheses. The fitness indexes of eight tested models are shown in Table 2. Figures 3–8 present the standardized path estimates of all variables in two proposed TPB models and four re-specified models. Significant results of six χ^2 statistics imply that those six models were not acceptable. However, the χ^2 statistic alone cannot successfully assess the fitness of models estimated with large samples as the likelihood ratio test is very sensitive to sample size and it also assumes that the model fits perfectly in the population. Thus, other fitness indexes were developed to address this problem.⁴⁰ The root mean square error of approximation (RMSEA) of a good model should be equal to or smaller than the recommended cutoff value⁴¹ of 0.06 while its goodness of fit index (GFI) should reach the conventional acceptable level of 0.90 if it cannot meet the stricter standard of 0.95 suggested by recent scholars.⁴² Its Tucker–Lewis index (TLI) or non-normed fit index (NNFI) should be >0.95 , the widely accepted cutoff for a good model fit.^{41,42} By convention, its comparative fit index (CFI) should be ≥ 0.90 to accept the model, indicating that 90 per cent of the covariation in the data can be reproduced by the given model. On the basis of these criteria, the proposed TPB model 1a and 2a have achieved satisfactory fit even though their RMSEA's are >0.06 . A big RMSEA suggests that a mediator should be identified and so the TPB model was re-specified in which mobile

viral marketing intent served as a predictor and mediator. As a result, the re-specified TPB model 1b and 2b have accomplished perfect fit.

The path estimates from viral marketing attitude to mobile viral marketing intent and from intent to behavior in Figures 3–8 all strongly supported Hypothesis 1 and Hypothesis 2. Young American consumers' viral marketing attitude predicted their intent to pass along electronic messages, which led to their actual behavior of forwarding mobile messages. Their viral marketing intent mediated the effect of attitude on behavior.

The proposed model 3 and 4 of mobile viral marketing did not fit the data satisfactorily at first. However, they achieved a pretty good fit, respectively, after re-specifying viral marketing intent as a mediator and correlating those error items as suggested by modification indexes of Amos. Figures 7 and 8 present the standardized path estimates of two revised models of mobile viral marketing.

The significant estimated path coefficients from subjective norm to viral marketing attitude in Figures 7 and 8 supported Hypothesis 3a. Hypothesis 4a and Hypothesis 7a were also substantiated by significant path estimates of behavioral control and perceived cost leading to attitude toward viral marketing in Figures 7 and 8. Hypothesis 5a and Hypothesis 6a were rejected as perceived utility and EOU did not predict viral marketing attitude. Two significant predictors of young American consumers' mobile viral marketing intent consistently emerged in Figures 7 and 8: viral marketing attitude and perceived utility. So, Hypothesis 5b was supported. Subjective norm did not predict American young consumers' intent to pass along entertaining and useful messages in two final models. Therefore, Hypothesis 3c was rejected. Hypothesis 4b, Hypothesis 6b and Hypothesis 7b, were not supported as there were no significant path coefficients connecting behavioral control, EOU and perceived cost with young American consumers' mobile viral marketing intent in Figures 7 and 8. The results of hypothesis testing were summarized more clearly in Table 3.

Table 2: Fitness indices for four proposed and four re-specified models

Model	χ^2 (DF)	Nmd χ^2	RMSEA	GFI	TLI (NNFI)	CFI
TPB model 1a	39.6 (5)*	7.92	0.126	0.966	0.926	0.963
TPB model 1b ^a	4.6 (4) ^{NS}	1.15	0.019	0.996	0.998	0.999
TPB model 2a	48.5 (5)*	9.70	0.141	0.959	0.904	0.952
TPB model 2b ^a	7.7 (4) ^{NS}	1.93	0.046	0.993	0.990	0.996
Viral model 3	746.0 (112)*	6.66	0.114	0.816	0.782	0.820
Viral model 4	689.5 (112)*	6.16	0.108	0.826	0.797	0.833
Final model 3 ^a	179.4 (96)*	1.87	0.044	0.955	0.967	0.976
Final model 4 ^a	175.2 (97)*	1.81	0.043	0.956	0.968	0.977

^aRe-specified models.

* $P < 0.01$.

Note: NS=not significant.



Figure 3: TPB model 1a with standardized path estimates. Note: $N=440$. Significance of the path estimates are shown in parentheses (critical ratio). * $P < 0.05$, ** $P < 0.01$, NS=not significant. Model fit: $\chi^2=175.2$, $DF=97$, $P=0.000$; RMSEA=0.043; GFI=0.956; TLI=0.968; CFI=0.977.



Figure 5: TPB model 2a with standardized path estimates. Note: $N=440$. Significance of the path estimates are shown in parentheses (critical ratio). ** $P < 0.001$. Model fit: $\chi^2=48.5$, $DF=5$, $P=0.000$; RMSEA=0.141; GFI=0.959; TLI=0.904; CFI=0.952.

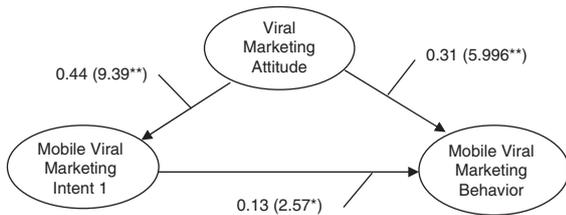


Figure 4: TPB model 1b with standardized path estimates. Note: $N=440$. Significance of the path estimates are shown in parentheses (critical ratio). ** $P < 0.001$, * $P = 0.01$. Model fit: $\chi^2=4.6$, $DF=4$, $P=0.329$; RMSEA=0.019; GFI=0.996; TLI=0.998; CFI=0.999.

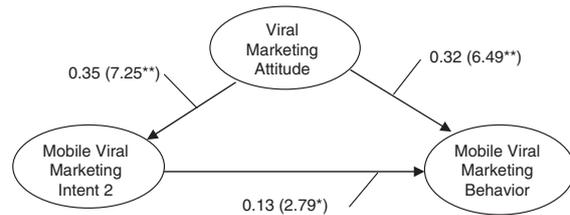


Figure 6: TPB model 2b with standardized path estimates. Note: $N=440$. Significance of the path estimates are shown in parentheses (critical ratio). ** $P < 0.001$, * $P = 0.005$. Model fit: $\chi^2=7.7$, $DF=4$, $P=0.102$; RMSEA=0.046; GFI=0.993; TLI=0.990; CFI=0.996.

Four backward regression procedures were conducted to explore what demographic, psychographic and behavioral factors influence American young consumers' mobile viral marketing attitude, intent and behavior.

The following five variables survived eight iterations to predict American young consumers' attitude toward viral marketing, listed in order of significance: subjective norm ($\beta=0.421$, $t=10.01$, $P < 0.001$), perceived cost ($\beta=-0.220$, $t=-5.79$, $P < 0.001$), behavioral control ($\beta=0.168$, $t=4.04$, $P < 0.001$), perceived utility ($\beta=0.08$, $t=1.89$, $P=0.059$) and text messaging ($\beta=0.062$, $t=1.65$, $P=0.100$). These variables were responsible for 41.4 per cent

of the variance in their attitude toward viral marketing.

To determine what demographic, psychographic and behavioral factors are significant predictors of American young consumers' behavioral intention to engage in viral marketing, two backward multiple regressions were operated on the following 13 independent variables: gender, race, age, family annual income, personal monthly income, cell phone calling, text messaging, attitude toward viral marketing, subjective norm, perceived behavioral control, perceived utility, EOU and perceived costs. Three significant predictors of their intent to pass along entertaining electronic messages were

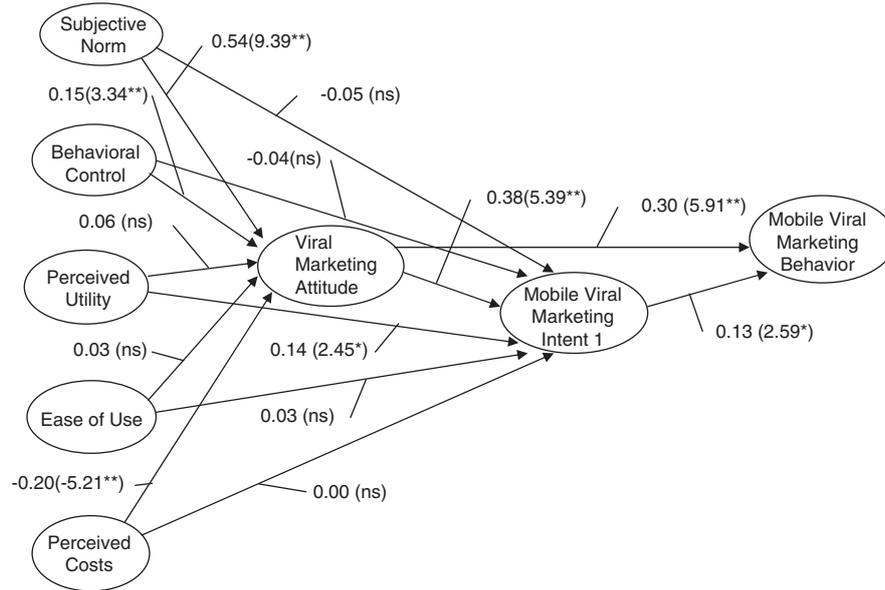


Figure 7: Final model 3 with standardized path estimates.
 Note: $N=440$. Significance of the path estimates are shown in parentheses (critical ratio). * $P<0.05$, ** $P<0.01$, NS=not significant. Model fit: $\chi^2=179.4$, $DF=96$, $P=0.000$; RMSEA=0.044; GFI=0.955; TLI=0.967; CFI=0.976.

retained after 11 iterations in order of their importance: attitude toward viral marketing ($\beta = 0.346$, $t = 7.57$, $P < 0.001$), perceived utility ($\beta = 0.198$, $t = 4.34$, $P < 0.001$) and telephoning ($\beta = -0.086$, $t = -2.00$, $P = 0.046$). Over 20 per cent of the variance in American young consumers' intent to forward entertaining viral messages ($R^2 = 0.204$) can be accounted for by these three factors. Another backward regression was run against American young consumers' intent to pass along useful electronic messages to test these hypotheses. Nine iterations yielded the following five significant predictors: perceived utility ($\beta = 0.203$, $t = 4.171$, $P < 0.001$), attitude toward viral marketing ($\beta = 0.159$, $t = 2.97$, $P = 0.003$), subjective norm ($\beta = 0.120$, $t = 2.176$, $P = 0.030$), income ($\beta = 0.089$, $t = 2.026$, $P = 0.043$) and telephoning ($\beta = 0.084$, $t = 1.905$, $P = 0.057$). They explained 17.2 per cent of the variance in young American consumers' intent to pass along useful messages ($R^2 = 0.172$).

The last backward regression revealed seven significant predictors of American young consumers' actual mobile viral marketing behavior after nine iterations: attitude toward viral marketing ($\beta = 0.239$, $t = 4.922$, $P < 0.001$),

intent to forward entertaining electronic messages ($\beta = 0.122$, $t = 2.446$, $P = 0.015$), telephoning ($\beta = 0.111$, $t = 2.47$, $P = 0.014$), text messaging ($\beta = 0.105$, $t = 2.384$, $P = 0.018$), intent to forward useful electronic messages ($\beta = 0.097$, $t = 2.014$, $P = 0.045$), race ($\beta = -0.095$, $t = -2.189$, $P = 0.029$) and gender ($\beta = 0.079$, $t = 1.821$, $P = 0.069$). These seven factors accounted for 19.5 per cent of the variance in American young consumers' actual behavior of forwarding mobile messages ($R^2 = 0.195$).

Generally, the results of four backward regressions confirmed that of structural equation modeling procedures.

DISCUSSION AND MANAGERIAL IMPLICATIONS

This pioneering study in the United States has explored to what extent some important demographic, psychographic and behavioral factors influence American young consumers' mobile viral marketing attitude, intent and actual behavior. Our findings contribute to the concerted effort of constructing a comprehensive model in that regard.

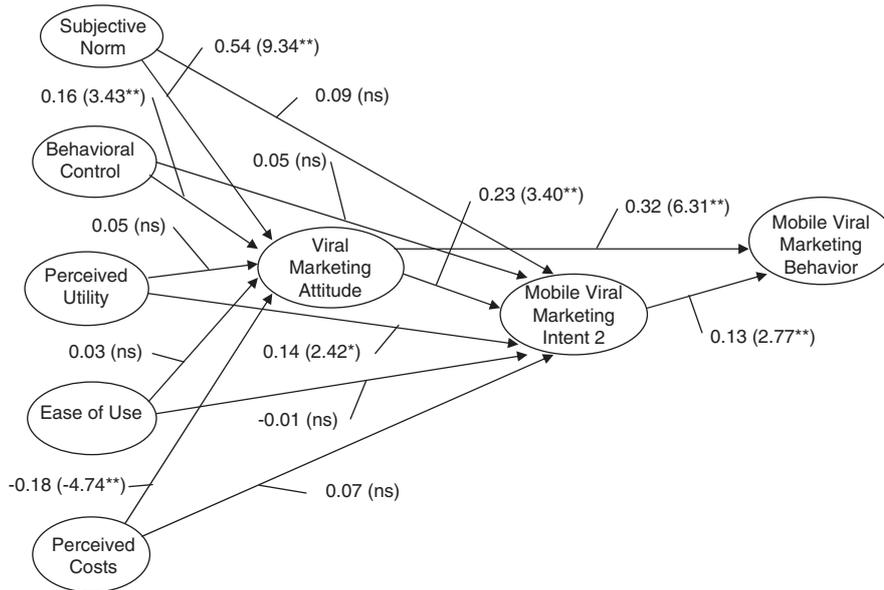


Figure 8: Final model 4 with standardized path estimates.

Note: $N=440$. Significance of the path estimates are shown in parentheses (critical ratio). * $P<0.05$, ** $P<0.01$, NS=not significant. Model fit: $\chi^2=175.2$, $DF=97$, $P=0.000$; RMSEA=0.043; GFI=0.956; TLI=0.968; CFI=0.977.

Our preliminary study is significant in that we have provided considerable empirical evidence to support the applicability of TPB to mobile viral marketing. Our finding strongly suggests that American young consumers are more willing to forward entertaining and useful electronic messages if they hold a more positive attitude toward eWOM or viral marketing. As a matter of fact, their stronger intention to engage in viral marketing did translate into more frequent behavior of passing along entertaining and useful mobile messages. This finding confirmed the chain of attitude-intention-behavior, which is consistent with previous mobile marketing studies.^{15–22} In addition, our study shows that a revised TPB model fits the survey data perfectly when viral marketing intent serves as a predictor and mediator. Our study also supported the influence of subjective norm on American young consumers' attitude toward mobile viral behavior even though it did not predict their intention to pass along entertaining electronic messages. It is good news to mobile marketers that young American consumers will be more likely to embrace mobile viral marketing if their close friends or relatives consider it good to pass along

mobile messages to each other. On the other hand, subjective norm did not have a significant impact on their intent to forward entertaining messages. The mixed result implies that viral marketing has not become a social norm among consumers who are important in our young respondents' lives. Mobile marketers still need to devote a lot of promotional effort to encouraging more mobile phone users to spread their messages in exchange for incentives. Only when a critical mass of cell phone users gets used to passing along mobile messages, will mobile viral marketing really flourish. A mobile viral marketing campaign should remind pass-along recipients that their friends and relatives have forwarded this promotional message especially for them. Cross-media synergistic effect can also be considered. For example, traditional TV and print advertisements should urge viewers and readers to pass on the promotional message to their friends and relatives via mobile phones.

Even though we did not find behavioral control to be a significant predictor of their intent to engage in viral marketing, we should not dismiss it as an unimportant determinant of American young consumers' intent of forwarding

Table 3: Hypothesis testing and results

Hypotheses	Test statistics	Findings
Hypothesis 1: attitude toward viral marketing → forwarding intent	$\beta=0.38, CR=5.39, P<0.001$ $\beta=0.23, CR=3.40, P<0.001$	Supported
Hypothesis 2: forwarding intent → mobile viral marketing behavior	$\beta=0.13, CR=2.59, P=0.010$ $\beta=0.13, CR=2.77, P<0.001$	Supported
Hypothesis 3a: subjective norm → attitude toward viral marketing	$\beta=0.54, CR=9.39, P<0.001$ $\beta=0.54, CR=9.34, P<0.001$	Supported
Hypothesis 3b: subjective norm behavioral control	$r=0.37, P<0.01$	Supported
Hypothesis 3c: subjective norm → forwarding intent	$\beta=-0.05, CR=-0.774, P=0.439$ $\beta=0.09, CR=1.30, P=0.194$	Rejected
Hypothesis 4a: behavioral control → attitude toward viral marketing	$\beta=0.15, CR=3.34, P<0.001$ $\beta=0.16, CR=3.43, P<0.001$	Supported
Hypothesis 4b: behavioral control → forwarding intent	$\beta=-0.04, CR=-0.752, P=0.452$ $\beta=0.05, CR=1.08, P=0.279$	Rejected
Hypothesis 5a: perceived utility → attitude toward viral marketing	$\beta=0.06, CR=1.06, P=0.291$ $\beta=0.05, CR=0.97, P=0.331$	Rejected
Hypothesis 5b: perceived utility → forwarding intent	$\beta=0.14, CR=2.45, P=0.014$ $\beta=0.14, CR=2.42, P=0.016$	Supported
Hypothesis 6a: ease of use → attitude toward viral marketing	$\beta=0.03, CR=0.78, P=0.435$ $\beta=0.03, CR=0.79, P=0.427$	Rejected
Hypothesis 6b: ease of use → forwarding intent	$\beta=0.03, CR=0.69, P=0.492$ $\beta=-0.01, CR=-0.15, P=0.880$	Rejected
Hypothesis 7a: perceived cost → attitude toward viral marketing	$\beta=-0.20, CR=-5.21, P<0.001$ $\beta=-0.18, CR=-4.74, P<0.001$	Supported
Hypothesis 7b: perceived cost → forwarding intent	$\beta=0.00, CR=-0.06, P=0.950$ $\beta=0.07, CR=1.50, P=0.134$	Rejected

viral messages. A healthy sense of being in control empowers consumers and predicts their positive attitude toward viral marketing, not mentioning that it is positively associated with consumers' intent to forward entertaining and useful messages. The effect of behavioral control on consumers' viral marketing intent was likely moderated by perceived cost. In the United States, wireless operators charge consumers for receiving any mobile message despite that it is extremely easy and simple for consumers to pass along mobile viral content. Actually we did find that perceived cost was negatively related to American young consumers' intent of forwarding entertaining messages while EOU was positively associated with their intent of passing along any viral content. Therefore, mobile marketers are suggested to pay for the promotional messages forwarded by recipients to their friends and relatives. In addition, they should remind pass-along recipients that the received promotional messages are free as they are forwarded by friends and relatives.

Our empirical study also proved that TAM is appropriate for mobile viral marketing as the perceived utility of viral messages strongly predicted American young consumers' intent to forward both entertaining and useful electronic messages. We have again confirmed the validity of perceived utility for predicting consumers' eWOM intention as shown in past research.^{5,8,9,11,12} This finding has important implications for mobile marketers. It suggests that entertaining, useful, self-involved and relevant advertising campaigns should be more likely to prompt American young consumers to pass them along to their friends or relatives. If mobile advertising messages are valuable to their friends or relatives in one way or another, they will give young consumers a good reason to forward them. For example, a mobile application or advertising campaign tied in to holidays such as Valentine's Day, Mother's Day or Father's Day will probably be easier to go viral if it offers young consumers free e-greeting cards or e-coupons to their friends or relatives. Similarly, a mobile application or

advertising campaign will have a better chance to be forwarded by young consumers if it connects with their personal interests such as sports and fashion. Moreover, a mobile viral campaign will be more successful if a mobile marketer can assure young consumers that their friends or relatives will be interested and benefited if they pass promotions on to them. In this sense, marketing practitioners are recommended to know prospective consumers and their friends and relatives equally well. It explains partly why mining Facebook.com consumer data is also necessary for mobile marketers. On a side note, our study shows that technology does not facilitate or hinder young consumers' intent to engage in mobile viral marketing. The failure to identify EOU as a significant predictor of consumers' viral marketing intent can be explained by the inherent simplicity of forwarding viral content via cell phones and young people's general techno-savvy.

Even though race emerged as a significant predictor of American young consumer's mobile viral marketing behavior, marketers should be careful to draw a hasty conclusion because an overwhelming majority of our sample (90.9 per cent) consisted of White respondents. It is uncertain that White consumers are more likely than minorities to forward mobile viral content. Future research should investigate whether race is a determinant of mobile viral marketing among a much more diverse group of consumers. On the other hand, our study discovered that monthly personal income predicted young consumers' intent of passing along useful messages. It suggests that consumers with more disposable income may be more likely to spread a promotional message to their friends or relatives as they are probably savvy shoppers with more knowledge of the market place. So, a viral campaign for promotion and referral might be able to expand its audience base more quickly if it purposively targets to consumers with higher income.

Gender was identified as a marginally significant predictor of American young consumers' actual behavior of forwarding mobile messages. It is somewhat consistent with previous

studies that discovered female consumers are more likely to engage in eWOM communication on the Internet.^{43,44} However, caution should be exercised when we generalize that young female Americans are more likely to pass along mobile viral content than young male Americans as a great majority of our respondents (68.6 per cent) was female.

Last not but least, our study found that, to some extent, American young consumers' text messaging usage contributes to their mobile viral marketing attitude, their telephoning significantly predicts their intent to pass along entertaining and useful messages, and their telephoning and text messaging positively predict their actual behavior of forwarding mobile messages. It confirmed that stronger relationship/attachment to the mobile device was positively associated with stronger likelihood of consumers' participation in mobile marketing as indicated by previous studies.^{2,5,45,46} So, mobile marketers are advised to pay more attention to heavy users of telephoning and text messaging in their future marketing activities.

CONCLUSION

As one of the earliest efforts, our study has validated the TPB and the TAM by examining what important demographic, psychographic and behavioral characteristics influence American young consumers' mobile viral marketing attitude, intent and behavior. Consistent with previous studies that apply the TPB and TAM to eWOM and mobile marketing, we found that the TPB and TAM could be integrated and revised to predict young consumers' mobile viral marketing attitude, intent and actual behavior. If young consumers hold favorable attitudes toward viral marketing, they are more inclined to pass on valuable promotional messages to their friends or relatives. Their willingness to engage in viral marketing can indeed translate into action. Our study shows that subjective norm, behavioral control and perceived cost are significant predictors of young American consumers' attitude toward viral marketing. Young American consumers' attitude toward viral marketing, perceived utility, and telephoning predict their intent to pass along entertaining messages while

perceived utility, attitude toward viral marketing, subjective norm and monthly personal income predict their intent to forward useful messages. Young American consumers' behavior of forwarding messages is determined by attitude toward viral marketing, intent to pass along electronic messages, telephoning, texting and race. Further research is strongly encouraged to examine more influence factors. Cross-cultural studies are also necessary to validate the conceptual model.

LIMITATIONS AND FUTURE RESEARCH

The external validity of our findings should be tested by future research as the data of this study was collected from a random sample of college students at a mid-sized Southeastern public university. In addition, our respondents are predominantly White, not representative of US college student population. The rural location of this university also calls for further research in urban or metropolitan areas.

Our study is exploratory in nature. Future studies should endeavor to construct a comprehensive model of consumers' mobile viral behavior by examining more determinants such as customer satisfaction, social tie strength, perceived social benefits, reward, perceived enjoyment, personality strength, opinion leadership, market mavenism and altruism as suggested by Palka *et al.*

Furthermore, it will be interesting to examine these factors in a different cultural context and in the countries where there is no strict government regulation or self-regulation on mobile viral marketing and where it is free to receive mobile messages.

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APPENDIX

Table A1: New media use and marketing web survey (selected measures)

Cell phone usage	<ol style="list-style-type: none"> 1. How much time do you spend talking on your cell phone on a typical day? _____ hours _____ minutes 2. How many text messages do you send with your cell phone on a typical day? _____ messages.
Frequency of forwarding viral messages	<p>How often do you forward a message (for example a text message, a multimedia message, a web link, an application, a ringtone) from your cell phone to your friends or relatives. (1) Never, (2) seldom, (3) sometimes, (4) often, (5) very often, (6) always</p>
Intent of forwarding viral messages ^a	<ol style="list-style-type: none"> 1. I would pass along entertaining messages (for example a viral video, a joke, a funny image, a chain letter, a crazy stunt, a prank) to my friends or relatives. 2. I would pass along useful messages (for example e-coupons, freebies, news for entertainment events, movies, music downloads, new product such as Ipad, product reviews, shopping tips) to my friends or relatives.
Message quality ^b	<ol style="list-style-type: none"> 1. The electronic message I pass along to my friends or relatives is often entertaining. 2. The electronic message I pass along to my friends or relatives is often useful. 3. The electronic message I pass along to my friends or relative is often credible. 4. I think that the electronic message that I pass along to my friends or relatives is often relevant to them. 5. I think that the electronic message that I pass along to my friends or relative is often interesting to them. 6. The electronic message that I pass along to my friends or relatives is often what I care about. 7. The electronic message that I pass along to my friends or relatives are often what connects with myself.
Subjective norm ^c	<ol style="list-style-type: none"> 1. Most people who are important to me think it is good to pass along electronic messages to friends or relatives. 2. Most people who are important to me would pass along electronic messages to friends or relatives.
Perceived control ^d	<ol style="list-style-type: none"> 1. I feel free to pass along electronic messages to my friends or relatives if I like to. 2. Passing along electronic messages to my friends or relatives is entirely within my control.
Ease of use ^e	<ol style="list-style-type: none"> 1. It is easy to pass along electronic messages to friends or relatives.
Perceived costs or risks ^f	<ol style="list-style-type: none"> 1. The problem with passing along messages to friends or relatives is their loss of time. 2. The problem with passing along mobile messages to friends or relatives is their monetary costs. (dropped)
Attitude toward forwarding electronic messages ^g	<ol style="list-style-type: none"> 1. My attitude toward passing along electronic messages is positive. 2. Generally, I think it is good to pass along electronic messages to friends or relatives. 3. I honestly don't like passing along electronic messages to friends or relatives.

^aAll response options ranged from 1, 'strongly disagree' to 5, 'strongly agree.' Adopted or adapted from Huang *et al.*¹¹

^bAdapted from Huang *et al.*¹¹ and Nysveen *et al.*³⁶.

^cAdapted from Pavlou and Fygenon.¹⁸

^dAdapted from Nysveen *et al.*³⁶

^eAdapted from Nysveen *et al.*³⁶

^fAdapted from Merisavo *et al.*³⁰

^gAdapted from Pavlou and Fygenon.¹⁸