Strategy to maximize Mobile Advertising Effect in Smart Environment: Focused on DuCoffe model and TAM

Yong Beom Kim[1], Yongik Yoon[2], Yongwon Kim[3] and Bong Gyou Lee[4*]

[1]Korea Polytechnic University, [2]Sookmyung Women's University, [3,4]Yonsei University
[1]richkim@kpu.ac.kr, [2]yiyoon@sookmyung.ac.kr, {[3]kkjerry, [4]blgee}@yonsei.ac.kr

Abstract

The evolution of mobile devices arising from the explosive dissemination of Smart phones is widely changing life as we know it. In particular, mobile advertising is facing great changes in dealing with Smart devices. However, the basic outline of mobile advertising still mostly resembles advertising strategies centered on feature phones. Despite the fact that Smart device-based mobile advertising has several strategic differences from the existing advertising method, currently there is insufficient research dealing with the appropriate advertising strategy and effectiveness in a Smart environment.

The purpose of this study is to develop an effective mobile advertising strategy framework in a Smart environment by analyzing mobile advertising effects based on Smart devices and by deducing the characteristics of smart device-based adverting. To do so, a new combined advertising model suitable for the Smart generation was developed through the existing representative advertising effect theories, Davis' TAM (1986) and DuCoffe's web advertising effect model (1996).

In conclusion, this study suggests a new advertising effect model by combining the DuCoffe model and TAM model, and on this basis contributes to the establishment of a suitable advertising strategy for a Smart environment.

Keywords*: Smart Environment, Mobile Advertising, DuCoffe's Web Advertising Effect Model, Technical Acceptation Model*

1. Introduction

Recently, the distribution of Smart phones has increased explosively. In the case of South Korea, the number of Smart phone owners takes up 25% of the approximately 44 million mobile phone owners. Importantly, approximately 70% of Smart phone owners have purchased their devices within the last year, and approximately 20 million or more will be purchased by late 2012 [1]. This dramatic increase in the supply of Smart phones is changing the paradigm of this enormous industry together with the spread of social media, such as Facebook and Twitter. The recent IPO of Facebook is a very good example in representing this flow.

Diverse smart devices, such as the Smart phone and Smart pad, induce consumers to have various experiences through new technology. There is a change in the media environment towards new personal media as consumers have new experiences with smart devices. In other words, changes in the advertisement industry are appearing through changes in media consumption behavior. Therefore, this paper aims to investigate changes in mobile advertising, which has close associations with our everyday life, in a smart device environment, with characteristics of open spaces with no limits of time and space, real time interaction, and participation that is open to everyone.

However, there are limits to understanding and analyzing the movements of recent change with the existing research regarding the advertisement industry.

There have been preceding research regarding mobile advertising, but there is insufficient research that suits the recent mobile environment associated to the various technological characteristics based on this new smart environment. The reason for such a state is that there is a lack of awareness regarding the mobile environment and because the new mobile environment has just started.

To deduce the results, this study suggested the research model that was deduced from Davis' TAM and DuCoffe Model, which was based on the preceding studies. Then, based on this, a new combined model was suggested, which is an appropriate evaluation model for the advertising effect in the smart environment.

2. Literature Review

2.1 Concepts of the Mobile Advertising

Blanco, Blasco, & Azorín [2] investigated the influence of independent variables (entertainment, informativeness, advertising attitude) and the parameter (mobile advertising attitude) on the dependent variable (intention to accept advertising) of mobile phone users who use English and Spanish. The results of their research showed that there was a positive relationship between independent variables (entertainment, informativeness, advertising attitude) and the parameter (mobile advertising attitude), while also showing that there was also a significant positive relationship between the parameter (mobile advertising attitude) and the dependent variable (intention to accept advertising).

Park & Kim [3] examined the relationship between independent variables (entertainment, participation, trust), parameters (usefulness, ease of use, advertising attitude), and the dependent variable (intention to accept advertising) in a research study with university students as the subjects. The research results showed that the independent variable (trust) had a significant positive effect on the parameter (usefulness), and the independent variables (entertainment, participation) had a significant negative effect on the parameter (usefulness). The independent variable (entertainment) appeared to have a significant positive effect on another parameter (ease of use), and another independent variable (participation) had a significant negative effect on the parameter (ease of use). Usefulness and ease of use appeared to have a significant positive relationship.

Xu, Oh, & Teo [4] also researched the relationship between independent variables (entertainment, informativeness, annoyance), the parameter (location-based advertising value), and the dependent variable (advertising attitude). Research results showed that entertainment and informativeness had a significant positive effect on location-based advertising, while annoyance had a negative effect. Also, the parameter of location-based advertising value had a positive effect on advertising attitude.

On the other hand, Brackett & Carr Jr. [5] examined the relationship between independent variables (entertainment, informativeness, annoyance, trust, demographic characteristics), the parameter (advertising value), and the dependent variable (advertising attitude) in a research study with university students as the subjects. Analysis results showed that entertainment, informativeness, annoyance, and trust had a significant influence on advertising value and advertising attitude. Especially in their research, the relationship between demographic characteristics and advertising attitude were examined, and it was revealed that sex was an important factor in influencing advertising attitude.

2.2 Web Advertising Effect Model

The web advertising effect model, based on the model of MacKenzie & Lutz [6], explains the attitude of consumers regarding web advertisements with predicting variables of entertainment, informativeness, annoyance, and advertising value, which are the main characteristics of web advertisement. In other words, DuCoffe Model hypothesizes that preceding factors, such as entertainment, informativeness, and annoyance, influence advertising value, which in turn influences mobile advertising attitude [7]. Also, entertainment has a direct effect on advertising attitude, and in most research results, informativeness has more influence on advertising value than entertainment [8, 9].

Based on this model, many of the research conducted added external factors that predict advertising value (belief) or attitude. Bracket & Carr [5] suggested an integrated web advertising attitude model, which combines the DuCoffe Model [7] and other advertising attitude models [6, 10]. They added trust as a preceding factor for advertising value and advertising attitude, and analyzed the demographic variables that influence advertising attitude.

Tsang, Ho, & Liang [11] added variables of user approval, trust, and incentive on the Bracket & Carr [5] model in order to suggest a model that can predict user attitudes and intentions regarding mobile advertising. In the research of Tsang, Ho, & Liang [11], which surveyed SMS advertisement users, it appeared that consumers had an overall negative attitude towards mobile advertising. This was seen especially when advertising was allowed, with factors that had the most influence on advertising attitude being entertainment and trust, but when advertising had not been allowed, only trust had a significant influence on advertising attitude. In other words, there was a different effect on the preceding factors, which influence advertising attitude according to whether consumers had allowed advertising or not.

Okazaki [12] suggested the variable ‘infortainment’ as a singular concept of entertainment and informativeness. ‘Infortainment’ was revealed to be a variable which influences attitude and approach intention regarding mobile advertising together with variables of irritation and trust [13]. This attempt appeared because DuCoffe Model was made to compare the values of the traditional medium and internet advertising, but faced difficult when applied to mobile advertising [14].

Peters & Allouch [15] conducted an empirical study regarding the motivation to use mobile communication technology. The research results showed that work-oriented motivation was the strongest source of motivation to use mobile communication technology, and as time passes, obvious motivation, such as permanent access and social interaction, weakened while latent motivation, such as fashion/status and entertainment, became stronger. Also, as mobile communication technology was used with ease, the boundary between work and personal life gradually disappeared, and mobile communication technology was used simultaneously for both personal purposes and business purposes.

Leung & Wei [16] conducted research regarding the pursued use and gratification when using mobile phones. Their research results showed consistent findings to research results of general phone communication. They suggested mobility and instant access as unique forms of motivation to use mobile phones, and contended that mobility should be regarded as an inherent characteristic of mobile phones.

3. Research Model and Hypothesis Development

3. 1 Affecting Factors of Mobile Advertising Effect Evaluation

Early research regarding mobile advertising had mainly focused on market research or consumer acceptance, but recently, there has been continuous research regarding an effect model that can explain the attitude towards mobile advertising [11, 13]. However, these research studies do little more than suggest a new model, instead by adding a few variables to informativeness, annoyance, and entertainment from the web advertising model, so there is not an independent attitude model that explains the mobile advertising effect yet [13]. In other words, if DuCoffe Model is derived in order to be applied to the mobile effect, it does not reflect the differential characteristics of being mobile, such as omnipresence, location, and personalization, so it has been pointed out that explanation is insufficient [8].

The core of mobile marketing is that context sensitivity is clearly differentiated when compared to the internet environment [17]. With the current technology, the situation of consumers can be obtained through mobile devices, and most necessary information can be provided to the consumer at the most appropriate moment. Therefore, there has been an insufficient theoretical approach regarding the importance and application of this context sensitivity while revealing a mobile attitude model. There has been research that suggests a mobile advertising effect model by adding mobile advertising characteristics of omnipresence and personalization, but this research stopped before suggesting a model where only annoyance works as a parameter for omnipresence and personalization [8]. Therefore, these findings do not explain that context sensitivity is a preceding variable that influences the advertising attitude through informativeness, entertainment, and annoyance. As a result, this study aimed to reveal how user context, which is a differential characteristic of mobile advertisement only, influences perceived informativeness, entertainment, and annoyance, and how these perceived factors influence the attitude towards mobile advertising.

However, most of the research studies that chose DuCoffe Model [7] stop at developing models by adding different external variables that predict the mobile advertising attitude to the existing ideas of informativeness, entertainment, and annoyance. For example, Tsang et al suggested a model that predicts the mobile advertising attitude, intention to use, and behavior, by adding trust, permission, and incentive to informativeness, entertainment, and annoyance [11]. The research results showed that entertainment and trust had an influence on mobile advertising attitude, while attitude had an influence on intention to accept, and intention to accept had an influence on behavior. Therefore, in the research of Tsang et al, it was meaningful that a tool, which measures user behavior regarding mobile advertisements, was developed [11].

Kim [8] argued that a strategy should be developed which allows mobile advertisers or agency employees to add entertainment elements to mobile advertisements. As an alternative, Lee & Park [18] claimed that the desire for information and the entertainment of consumers can be sufficiently satisfied by combining the customer database of mobile communication companies with time and the location information of users.

Therefore, this study sets the following research hypothesis based on the above preceding research.

Hypothesis 1: In the smart environment, entertainment has positive effects on perceived usefulness.

Hypothesis 2: In the smart environment, entertainment has positive effects on perceived ease of use.

Hypothesis 3: In the smart environment, informativeness has positive effects on perceived usefulness.

Hypothesis 4: In the smart environment, informativeness has positive effects on perceived ease of use.

On the other hand, Yang & Kim [19] researched the influence of entertainment, trust, irritation (annoyance), ease of use, usefulness, innovativeness, and subjective norm on the advertising attitude. The research results contended that entertainment and trust had significant positive effects on advertising attitude, irritation (annoyance) had a significant negative effect on advertising attitude, and ease of use along with subjective norm had significant positive effects on usefulness.

Jang, Kim, & Kim [20] further categorized the factors that had influence into usefulness, ease of use, flow, and intention to accept (use, behavior). In their research, flow had a significant positive effect on ease of use and usefulness, usefulness had a significant positive effect on intention to accept (use, behavior), ease of use had a significant positive effect on usefulness, flow had an indirect influence on usefulness and intention to accept (use, behavior), and ease of use had an indirect influence on intention to accept (use, behavior).

Therefore, based on the research of Yang & Kim [19] and Jang, Kim, & Kim [20], it can be seen that the ease of use has an influence on usefulness, so the following research hypothesis was inferred in this study.

Hypothesis 5: In the smart environment, perceived ease of use has positive effects on perceived usefulness.

3. 2 Mediating Factors of Mobile Advertising Effect Evaluation

Park & Kim [3] investigated to what degree the influence of entertainment, participation, trust, usefulness, and ease of use had on advertising attitude (response) and intention to use (use, behavior). Their research revealed that trust has a significant positive effect on usefulness, entertainment and participation had significant negative effects on usefulness, entertainment had a significant positive effect on the ease of use, and participation had a significant negative effect on the ease of use.

Yoo & Kim [9] categorized the factors that had influences into entertainment, informativeness, irritation (annoyance), trust, advertising attitude, and intention to accept (use, behavior). Their research results showed that entertainment, irritation (annoyance), and trust had significant influences on advertising attitude.

Kim [8] researched the effective relationship between informativeness, entertainment, irritation (annoyance), and advertising attitude (response). The results contended that entertainment had significant positive effects on advertising attitude (response) and irritation (annoyance), and significant negative effects on advertising attitude (response).

On the other hand, Yang [13] researched the effective relationship between entertainment, irritation (annoyance), usefulness, ease of use, stability, trust, participation, system satisfaction, advertising attitude, and advertising effect (response). The research results contended that ease of use had a significant positive effect on usefulness, stability had a significant positive effect on system satisfaction, entertainment and trust had significant positive effects on the advertising attitude, and irritation (annoyance) had a significant negative effect on the advertising attitude. On these grounds, this study established the following hypothesis.

Hypothesis 6: In the smart environment, perceived ease of use has positive effects on mobile intention to accept advertising.

Hypothesis 7: In the smart environment, perceived ease of use has positive effects on attitude toward mobile advertising.

Hypothesis 8: In the smart environment, perceived ease of use has positive effects on intention to use mobile advertising.

Hypothesis 9: In the smart environment, perceived usefulness has positive effects on mobile intention to accept advertising.

Hypothesis 10: In the smart environment, perceived usefulness has positive effects on attitude toward mobile advertising.

Hypothesis 11: In the smart environment, perceived usefulness has positive effects on attitude toward mobile advertising.

The following is the new research model suggested in this study.

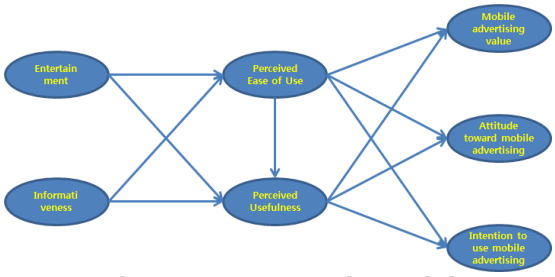

Figure 1. Research Model

4. Results

The purpose of this study is to test how the variables of DuCoffe model affect the mobile advertising variables through TAM's variables. The summary of statistical results is as follow. At first, as the results of path coefficient on our model, entertainment variable is indicated to influence only perceived usefulness. However, informativeness gives a positive effect on perceived usefulness and perceived ease of use. Then, our results reveal that the perceived ease of use has a positive effect on perceived usefulness. Also, this research aims to test that the effect of perceived ease of use and perceived usefulness on mobile advertising value, attitude and intention to use. As results of these relationships, all TAM' variables are indicated to have a positive effect on the dependent variables except the relationship between perceived ease of use and advertising value.

Table 1. Path Coefficient of Research Model

Path	B	β	CR	Hypothesis
Entertainment → Perceived ease of use	.033	.191	.459	reject
Entertainment → Perceived usefulness	.245***	.244	5.068	not reject
Informativeness → Perceived ease of use	.312***	.435	5.067	not reject
Informativeness → Perceived usefulness	.518***	.620	10.295	not reject
Perceived ease of use → Perceived usefulness	.222***	.191	4.437	not reject
Perceived ease of use → Advertising value	.051	.045	.881	reject
Perceived ease of use → Attitude toward ad	.108+	.081	1.657	not reject
Perceived ease of use → Intention to use	.175***	.136	2.777	not reject
Perceived usefulness → Advertising value	.819***	.836	12.868	not reject
Perceived usefulness → Attitude toward ad	.947***	.827	13.367	not reject
Perceived usefulness → Intention to use	.851***	.770	12.394	not reject

+ p<.1, * p<.05, ** p<.01, *** p<.001

5. Conclusion

In the fall of 2009, the release of the iPhone caused a tremendous change in the Korean advertising market. Especially when considering that the release of the Smart phone has not yet been three years, the influence of the Smart phone on our society has gone beyond expression, and the current situation has brought about a circumstance where future changes cannot be put into perspective. If the distribution of Smart phones in Korea exceeds half the

number of mobile phone subscribers in 2013, as many expect, the revolution in the new advertising market, with technically diverse and advanced customer-oriented services, will bring about great changes that we have not experienced before. Therefore, the change in the media environment, from the existing mass media to personal media, suggests that there is a need for a new advertising strategy.

These changes happen because the environments of smart devices have the characteristics of open space with no limitation to time and space, real-time interaction, and participation from anybody.

Therefore, this study aims to suggest an innovative mobile advertisement effect model in a smart environment by suggesting a theoretically combined model that has not been dealt with in the existing studies. Especially when existing research has only perceived the DuCoffe Model and TAM as the preceding variables of the advertising effect, this study casts light on the precedence of the relationship of the two models to suggest that the following model is suitable for maximizing the advertising effect. As a result, this study anticipates a new paradigm in mobile advertising during the advent of the new smart environment.

Acknowledgements

This research was supported by the KCC(Korea Communications Commission), Korea, under the CPRC(Communications Policy Research Center) support program supervised by the KCA(Korea Communications Agency) (KCA-2012-0902-1).

References

[1] Korea Communications Commission, "Comprehensive Measures for Activation of Internet Advertising Market", **(2010)**.

[2] C. F. Blanco, M. G. Blasco and I. I. Azorin, "Entertainment and Informativeness as Precursory Factors of Successful Mobile Advertising Messages", Communications of the IBIMA, **(2010)**.

[3] J. Park and J. Y. Kim, "Study on Receiever Response of Mobile Advertising: Focus on TAM (technology acceptance model)", Outdoor Advertising Research, vol. 7, no. 4, **(2010)**, pp.71-103.

[4] L. -B. Oh and H. Xu, "Effects of Multimedia on Mobile Consumer Behavior: An Empirical Study of Location-Aware Advertising", ICIS 2003 Proceeding, vol. 56, **(2003)** December 14-17; Seattle, Washington, USA.

[5] L. K. Brackett and B. N. Carr Jr., "Cyberspace Advertising vs. Other Media: Consumer vs. Mature Student Attitudes", Journal of Advertising Research, vol. 41, no. 5, **(2001)**, pp.23-32.

[6] S. B. MacKenzie and R. J. Lutz, "An Empirical Examination of the Structural Antecedents of Attitude toward the Ad in an Advertising Pretesting Context", Journal of Marketing, vol. 53, no. 2, **(1989)**.

[7] R. H. DuCoffe, "Advertising Value and Advertising on the Web", Journal of Advertising Research, vol. 36, no. 5, **(1996)**, pp.21-35.

[8] B. C. Kim, "Antecedents Affecting Attitude Toward Mobile Advertising: Expanding and Applying the Web Advertising Effect Model by DuCoffe(1996)", Advertising Research, vol. 75, **(2007)**, pp.35-59.

[9] S. J. Yoo and & H. J. Kim, "Study on Factors Affecting Acceptance Intention of Mobile Advertising", Korea Society of Management Information System, vol. 9, no. 1, **(2007)**, pp.1-21.

[10] S. Shavit, P. Lowrey and J. Haefner, "Public Attitude Toward Advertisign: More Favorable Than You Might Think", Journal of Advertising Research, **(1998)**.

[11] M. M. Tsang, S. -C. Ho and T. -P. Liang, "Consumer Attitudes Toward Mobile Advertising: An Empirical study", International Journal of Electronic Commerce, vol. 8, no. 3, **(2004)**, pp.65-78.

[12] S. Okazaki, "How do Japanese Consumers Perceive Wireless Ads? A Multivariate Analysis", International Journal of Advertising, vol. 23, **(2004),** pp.429-454.

[13] B. H. Yang, "Study on Attitude Effect Model of Mobile Advertising", Journal of Advertising, vol. 69, **(2005)**, pp.139-163.

[14] S. Lee, "Study Trend and Theorization of Mobile Advertising", Korean Society for Journalism and Communication Studies, vol. 6, no. 1, **(2010)**, pp.6-49.

[15] O. Peters and S. B. Allouch, "Always Connected: A Longitudinal Field Study of Mobile Communication", Telecommunications Policy, vol. 22, no. 3, **(2005)**, pp.239-256.

[16] L. Leung and R. Wei, "More Than Just Talk on the Move: Uses and Gratifications of the Cellular Phone", Journalism and Mass Communication Quarterly, vol. 77, no. 2, **(2000)**.

[17] G. Mort and D. Judy, "Mobile Digital Technology: Emerging Issues for Marketing", Journal of Database Marketing, vol. 10, no. 1, **(2002)**, pp.9-23.

[18] H. I. Lee and Cheol Park, "A Typology of Mobile Advertising by Mobile Channel & Methods", Journal of Information Technology Applications & Management, vol. 14, no. 2, **(2007)**, pp.49-70.

[19] B. H. Yang and Y. C. Kim, "Study on Mutual Causality Model for Mobile Advertising Effect: Convergence of Advertising Communication and Mobile Technology", Journal of Advertising, vol. 19, no. 3, **(2008)**, pp.157-171.

[20] J. Jang, J. Kim and T. Kim, "Analysis on Effect Factors of Wireless Internet Service Acceptance: Expansion of Technology Acceptance Model Adding Flow Theory", Journal of MIS Research, vol. 14, no. 3, **(2004)**.

Authors

Dr. Yong Beom Kim who is a professor at Dept. of e-Business in Korea Polytechnic University(KPU) since 2012. Dr. Kim received a Bachelor of Business Administration and MBA from Yonsei Univ. in 1991, 1994 respectively, and Ph.D. in Business Administration from the Graduated School of Yonsei Univ. in 2011. Before joining the KPU, He has been the founder and C.E.O. of his own investment business & incubating company, UTIC Holdings Inc.

Dr. Yongik Yoon completed his doctorate in the distributed transaction processing with the theoretical and practical combination of real-time data processing systems at KAIST (Korea Advanced Institute of Science & Technology) in 1994. He worked in ETRI (Electronics Telecommunication Research and Institute) during 1985~1997. In that time, he was a Director of R&D for developing of the Real-Time Operating Systems and Database Systems for Electronic Switching Systems. From 1997, he has joined dept. of Multimedia Science in the Sookmyung Women's University.

Dr. Yongwon Kim is a senior researcher at Communications Policy Research Center(CPRC) at Yonsei University. He received PhD degree from Yonsei University. He has written many articles in the field of technology of management and human resource.

Dr. Bong Gyou Lee who is a professor at Graduate School of Information has served as a director of Communications Policy Research Center(CPRC) in Yonsei University since 2009. Dr. Lee received a B.A. from the Department of Economics at Yonsei University and M.S, Ph.D. from Cornell University. During 2007 and 2008 he served as Commissioner of the Korea Communications Commission.