The effect of smartphone usage motivation on application display advertising attitude and avoidance: Mediating effect of ad intrusion

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Abstract The effect of smartphone usage motivation on application display advertising attitude and advertising avoidance was investigated. In addition, the mediating effect of advertising intrusion was confirmed. The total number of participants in the study was 309, and the data collection method used a survey method. Covariate structural analysis was conducted to investigate the causal relationship between smartphone usage motivation and advertising attitude and the mediating effect of perceived intrusion on advertising avoidance. There are five results. First, the motivation for using smartphones had a significant effect on the display advertising attitude of smartphone applications. Second, the display advertising attitude of the smartphone application had a significant effect on the advertising avoidance behavior. Third, the display advertising attitude of smart phone application had a significant effect on perceived advertising intrusion. Fourth, the perception of intrusiveness of display advertising in smartphone applications had a significant effect on advertising avoidance behavior. Finally, it was confirmed that the perceived ad intrusion has a partial mediating effect in the causal relationship of the smartphone application display advertising attitude to the ad avoidance behavior. The results of this study will contribute to suggesting strategies to reduce advertising avoidance behavior.

Key Words: Smartphone application, Display advertisement, Avoidance of advertisements, Advertisement intrusion, Motivation for using smartphones, Perception of intrusiveness

요약 본 연구에서는 스마트폰 이용동기가 어플리케이션 디스플레이 광고태도와 광고회피에 미치는 영향을 확인하였다. 또한, 광고침입성의 매개효과를 확인하였다. 연구참여자는 309명이며 설문조사방법을 이용하여 자료를 수집하였으며, 공변량구조분석을 이용하여 스마트폰 이용동기와 어플리케이션 디스플레이 광고태도간의 인과관계를 분석하였으며, 광고침입성의 매개효과를 검증하였다. 연구결과, 첫째 스마트폰 이용동기는 스마트폰 어플리케이션 디스플레이 광고태도에 유의미한 영향을 미쳤다. 둘째, 스마트폰 어플리케이션 디스플레이 광고태도가 광고회피하는 데 유의미한 영향을 미쳤다. 셋째, 스마트폰 어플리케이션 디스플레이 광고태도는 지각된 광고침입성에 유의미한 영향을 미쳤다. 넷째, 스마트폰 어플리케이션 디스플레이 광고태도는 자각된 광고침입성에 유의미한 영향을 미쳤다. 다섯째, 스마트폰 어플리케이션 디스플레이 광고의 침입성 지각은 광고회피행동에 유의미한 영향을 미쳤다. 마지막으로, 스마트폰 어플리케이션 디스플레이 광고의 침입성 지각은 광고회피행동에 유의미한 영향을 미쳤다. 본 연구결과는 광고회피 협력을 감소시키는 전략을 제안하는데 기여할 것이다.

주제어: 스마트폰 어플리케이션, 디스플레이광고, 광고회피, 광고침입성, 스마트폰 이용동기, 광고침입성 지각
1. Introduction

With the spread of smartphone, the content of smartphone, applications that become the gateway to the web, and advertisements using these applications are emerging as new issues. Smartphone application advertisements are forcibly exposed to advertisements by placing advertisements instead of distributing applications for free, and so far, unlike existing internet banner advertisements, advertisement audiences can not arbitrarily avoid avoiding them. However, for application creators, profitability is guaranteed, which helps in the development and development of new applications, and users can use applications for free[1]. However, the diversification of media and the increase in advertisements accordingly can induce indifference to advertisements or negative emotions such as irritation. In particular, since application display advertisements are forcibly exposed each time the application is used, the possibility of avoiding advertisements may be high.

Therefore, this study intends to propose a strategy for producing effective display advertisements for smartphone applications. To this end, we tried to find out the factors affecting the avoidance of advertisements on display of smartphone applications from the perspective of advertisement audiences. The advertisement avoidance phenomenon is a phenomenon that occurs in all media, and therefore, consideration of advertisement avoidance must be made in application display advertisements. By finding out what factors affect consumers’ avoidance of advertisements when they are forcibly exposed to display advertisements during application execution, it will be possible to provide useful guidelines for establishing effective strategies for smartphone application display advertisement. It started with the purpose of providing basic data to achieve this purpose. To this end, research was conducted with three directions. First, it was confirmed how the motivation of using smartphone users affects the display advertisement attitude. That is, among the five factors that motivate use of smartphone, we tried to find out the factors that influence the attitude of display advertising. These results are expected to provide an answer to what kind of desire and motivations to satisfy smartphone users can positively increase display advertisement attitude. The second direction confirmed the relationship between the motivation for using smartphone and the behavior to avoid display advertisements. It is expected that it will provide guidelines on factors that should be considered positively when producing display advertisements by identifying factors that reduce such advertisement avoidance behavior.

The third direction was to investigate the causal relationship that advertising attitude has on advertising avoidance behavior. In addition, it was attempted to confirm how the perception of advertisement intrusion has a mediating effect between advertisement attitude and advertisement avoidance behavior. By confirming the mediating effect of these ad intrusion factors, we expect a suggested guideline on what factors ad producers should try to reduce display ad avoidance behavior. In order to achieve this research purpose, the following research model was presented and a hypothesis was established to confirm the relationship between each variable.

2. Smartphone App Advertisement

In order to understand the mobile advertising market, it is essential to study various perspectives on the current status and prospects
of advertisements following the introduction of a new media platform called smartphone apps. This study emphasizes the necessity of not only establishing the theory on the types of advertisements and their effects of smartphone apps, but also expecting significant application effects in practical and educational dimensions.

The smartphone app provides a mobile environment that reflects the possibility of always-on access, immediacy and mobility, and makes it possible to use location-based services and augmented reality[3]. In other words, compared to the online environment, user convergence is more excellent, so it provides a distinctly differentiated user experience from existing online media. With the advent of smartphone apps, communication between consumers and seller at any time regardless of time and place has become possible, and as a result, the concept of separation of time and place that existed between buyers and seller is becoming thinner. In addition, it is possible to provide personalized targeted advertisements tailored to individual needs and various information based on the consumer’s location at specific times when services are needed according to the context of the consumer’s time, place, and interest. As such, it provides an opportunity to experience various media in terms of interoperability between online and offline according to timeliness and mobility, and customer adhesion through smartphone apps.

Likewise, smartphone app ad are interactive compared to traditional ad, and messages can be repeatedly exposed anytime, anywhere, regardless of time and place. In addition, it is combined with location-based services to have a new characteristic that can deliver personalized messages in detail.

With the recent increase in the spread of smartphone, mobile advertisements in a new expression format have appeared, and domestic and foreign organizations and associations are suggesting new mobile advertisement types. The American Mobile Marketing Association has proposed mobile web, mobile application, mobile message, mobile video & television as international mobile advertising standards guidelines. That is, mobile advertisements are classified into four categories and presented. Among them, mobile applications were classified into in-app display advertising unit, integrated advertising, branded mobile applications, and sponsored mobile applications[4].

Message advertisements, web advertisements, video and television advertisements are expression formats developed from existing mobile advertisements, and application advertisements are new types of mobile advertisements using smartphone applications. Similar to internet banner advertisements, application advertisements are mainly in the form of displaying advertisement banners in the application, but are gradually diversifying into brand applications that advertise a specific brand itself[5].

Smartphone app advertisements are defined as delivering personalized information-type advertisements through interaction for the purpose of selling goods and services[6], and the method of measuring advertisement effectiveness is a method based on market data and a communication index. It can be divided by the method by[7]. In general, communication indicators use preference, interest, awareness, emotion, purchase intention, and reliability. In this study, the advertisement effect is measured by advertisement attitude and advertisement avoidance behavior.

2.1 Hypothesis and research model

A hypothesis was established based on previous studies on the effect of smartphone application on advertisement attitude and advertisement avoidance. In addition, a mediating effect hypothesis was established based on previous studies on ad intrusion. In this
study, a research model was constructed based on the relationship between hypotheses.

Hypothesis 1: Among the motivations for using smartphone, factor of conspicuous expression will have a positive effect on display advertising attitude.

Hypothesis 2: Among the motivations for using smartphone, factor of entertainment will have a positive effect on display advertising attitudes.

Hypothesis 3: Among the motivations for using smartphone, the factor of utilize work learning will have a positive effect on the display advertising attitude.

Hypothesis 4: Among the motivations for using smartphone, the factor of convenience information will have a negative effect on the display advertising attitude.

Hypothesis 5: Among the motivations for using smartphone, the factor of multimedia use will have a positive effect on the display advertising attitude.

Hypothesis 6: Display advertising attitude will have a negative effect on advertising intrusion.

Hypothesis 7: Display advertising attitude will have a negative effect on advertising avoidance behavior.

Hypothesis 8: Perceptual factors of ad intrusion will have a positive effect on ad avoidance.

Hypothesis 9: In the relationship between display advertising attitude and advertising avoidance behavior, Perceptual factors of ad intrusion will have a mediating effect on ad avoidance behavior.

In this study, a research model as shown in Figure 1 was set up to clarify the proposed research hypothesis.

3. Methods

3.1 Subjects

This study was conducted with university students attending N University in Cheonan. The total number of participants in the study was 309, and the data collection method used a survey method in which a questionnaire was distributed to the survey subjects, explained and then collected, and was conducted for 10 days from November 1 to 10, 2020.

3.2 Measurement scales

3.2.1 Smartphone usage motivation

In order to measure the motivation for using smartphone, five factors influencing advertisement avoidance behavior were selected and constructed based on the research results composed of seven dimensions in the study of Seung-yeob Yu and Jin-hee Kim [8–9]. This scale consists of a total of 21 questions including conspicuous expression, entertainment, convenience information for life, work learning utilization and multimedia utilization.

It was measured using a 7-point Likert scale. As a result of the reliability analysis of the scale, the value of Cronbach α coefficient was .863, which is interpreted as good. In detail, it was found to be conspicuous expression (.855), entertainment (.799), convenience information (.692), use of work learning (.748), and use of multimedia (.719).

3.2.2 Advertising attitude
In order to measure the display advertising attitude of a smartphone application, it was measured using a total of 6 items consisting of a Likert type 7-point scale based on the research results of Lee[10]. As a result of the reliability analysis of the scale, the value of the Cronbach α coefficient was .895.

3.2.3 Perceived intrusion

Based on the research of Edward, Li, and Lee[11-12] who developed the perceived intrusion scale of advertisements to measure the perceived intrusiveness of advertisements, a total of 7 items were measured using a 7-point semantic differentiation scale. As a result of the reliability analysis of the scale, the value of the Cronbach α coefficient was .905, which is interpreted as good.

3.2.4 Advertisement avoidance

In order to measure cognitive avoidance of advertisement avoidance, a total of 3 items were measured using a 7-point Likert scale based on the research results of Jeongah Lee and Jiyeon Ryu[13]. The scale of Speck PS, Elliott MT was referenced[14]. As a result of the reliability analysis of the scale, the value of the Cronbach α coefficient was .883, which was interpreted as good.

3.3 Data Analyses

Factor analysis was conducted to find out the sub-factors for the motivation to use smartphone. Confirmatory factor analysis was used for validation. The AVE was .5 or more and the CR was .7 or more, securing concentrated validity. The AVE values among all variables were larger than the square value \( r^2 \) of the correlation coefficient, and 1 was not included in the confidence interval of the correlation coefficient, so discriminant validity was secured. The results of confirmatory factor analysis on smartphone usage motives are as follows: \( \chi^2 = 313.208, df = 153, p < .001; RMR = .148, RMSEA = .058, GFI = .909, AGFI = .875, NFI = .864, CFI = .924, TLI = .906 \). In addition, a covariate structural analysis was conducted to investigate the causal relationship between smartphone usage motivation and advertising attitude and the mediating effect of perceived intrusion on advertising avoidance. Finally, Cronbach α was used to verify the reliability of the scale.

4. Results

4.1 Hypothesis test result

4.1.1 Confirmatory factor analysis of motivation for smartphone use

This study conducted a confirmatory factor analysis to find out whether the factor structure of the motivation for using smartphone is valid. As a result of confirmatory factor analysis, two items were deleted to increase model fit. In other words, one question from the factor of entertainment and one question from the factor of convenience information was deleted. A total of 20 items showed an appropriate factor structure, and the model fit was also confirmed to be generally satisfactory. In addition, both mean variance extraction (AVE) and concept reliability were secured to satisfy the critical value for the evaluation index that confirms model fit. Therefore, the fit of the model was recognized, and this study judged that there was no problem in analyzing the structural model. The results of the model fit analysis are shown in Table 1.

Table 1. Comparison of research models and the final model fit indices

<table>
<thead>
<tr>
<th>Fit Indices</th>
<th>RMR</th>
<th>RMSEA</th>
<th>GFI</th>
<th>AGFI</th>
<th>NFI</th>
<th>CFI</th>
<th>TLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research model</td>
<td>.060</td>
<td>.067</td>
<td>.826</td>
<td>.782</td>
<td>.888</td>
<td>.925</td>
<td>.912</td>
</tr>
<tr>
<td>Finalized model</td>
<td>.139</td>
<td>.058</td>
<td>.838</td>
<td>.807</td>
<td>.826</td>
<td>.902</td>
<td>.890</td>
</tr>
</tbody>
</table>

Research model: \( \chi^2 = 1305.578, df = 599, p < .001 \)
Finalized model: \( \chi^2 = 1067.215, df = 528, p < .001 \)
4.1.2 Results of research model and hypothesis testing

This study started with the purpose of providing basic data for producing effective smartphone application display advertisement. To this end, among the factors that motivate the use of smartphone, a factor that influences the display advertisement attitude of a smartphone application was selected to investigate the relevance. These results are expected to provide guidelines for smartphone users on what needs to be satisfied can improve display advertisement attitude. In addition, it was attempted to confirm the relationship between the motivation for using the smartphone and the behavior of avoiding advertisements on the smartphone display. It was expected to provide guidance on factors to be avoided when producing display advertisements by confirming what factors increase such advertisement avoidance behavior. Finally, we tried to confirm how the perceptual factors of ad intrusion show a mediating effect between ad attitude and ad avoidance behavior.

In order to achieve these research objectives, a research model was presented and a hypothesis was established to confirm the relevance between each variable. As a result of confirming the suitability of this research model, as a result of verifying the initial model, the goodness-of-fit indices of the research model did not meet the acceptance criteria for goodness-of-fit. The model extracted through this modification process was adopted as the final model of this study, and model suitability and hypothesis were verified. These research model goodness-of-fit index values are generally interpreted to be of acceptable size (See Table 1).

Table 2 shows the analysis results and hypothesis verification results of the revised final research model. Also, the result of the modified final study model according to the result of covariate structure analysis is shown in Figure 2. In the final research model analysis, as a result of the analysis of Hypothesis 1, the influence of the conspicuous expression factor on the advertising attitude among smartphone usage motivations is as follows. The path coefficient between the two variables was .748 (t=1.630, p>.05), showing no significant effect. Therefore, hypothesis 1 was rejected.

As a result of the analysis of Hypothesis 2, when examining the influence of entertainment factors on the advertising attitude among smartphone usage motivations, the path coefficient between the two variables was 1.697 (t=2.054, p<.05), which had a significant effect. Therefore, hypothesis 2 was accepted. As a result of the analysis of Hypothesis 3, the influence of

<table>
<thead>
<tr>
<th>Channel</th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>p</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising attitude toward Display ← conspicuous expression</td>
<td>.748</td>
<td>.459</td>
<td>1.630</td>
<td>.103</td>
<td>H1, Reject</td>
</tr>
<tr>
<td>Advertising attitude toward Display ← Entertainment</td>
<td>1.697</td>
<td>.826</td>
<td>2.054</td>
<td>.040</td>
<td>H2, Accept</td>
</tr>
<tr>
<td>Advertising attitude toward Display ← Business learning utilization</td>
<td>1.802</td>
<td>.759</td>
<td>2.376</td>
<td>.018</td>
<td>H3, Accept</td>
</tr>
<tr>
<td>Advertising attitude toward Display ← Multimedia utilization</td>
<td>2.043</td>
<td>.826</td>
<td>2.474</td>
<td>.013</td>
<td>H5, Accept</td>
</tr>
<tr>
<td>Perception of ad intrusion ← Advertising attitude toward Display</td>
<td>-.593</td>
<td>.070</td>
<td>-8.435 ***</td>
<td>H6, Accept</td>
<td></td>
</tr>
<tr>
<td>Ad avoidance behavior ← Advertising attitude toward Display</td>
<td>-.602</td>
<td>.080</td>
<td>-7.531 ***</td>
<td>H7, Accept</td>
<td></td>
</tr>
<tr>
<td>Ad avoidance behavior ← Perception of ad intrusion</td>
<td>.244</td>
<td>.066</td>
<td>3.675 ***</td>
<td>H8, Accept</td>
<td></td>
</tr>
<tr>
<td>Ad avoidance behavior ← Perception of ad intrusion ← Advertising attitude toward Display</td>
<td>-.335 ***</td>
<td>H9, Accept</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Research Hypothesis Testing Results
business learning utilization factors on advertising attitude among the factors that motivate use of smartphone is as follows. In other words, the path coefficient between the two variables was 1.802 (t=2.376, p<.01), which had a positive and significant effect. Therefore, hypothesis 3 was accepted.

In the case of hypothesis 4, the influence of the factors of use of convenience in use on the attitude of advertising among the motivations for using smartphone is as follows. That is, the path coefficient between the two variables was -9.063 (t=-2.493, p<.01), which had a negative effect. Therefore, hypothesis 4 was accepted. When smartphone users mainly use it for convenience in life, it is interpreted that there is a negative relationship with the advertising attitude of the smartphone display. In order to confirm the analysis result of Hypothesis 5, as a result of confirming the influence of the multimedia utilization factor on the advertising attitude during the motivation for using smartphone, the path coefficient between the two variables had a significant effect as 2.043 (t=2.474, p<.01). Therefore, hypothesis 5 was accepted.

To confirm the analysis result of hypothesis 6, as a result of confirming the influence of the smartphone display advertisement attitude on the perception of advertisement intrusion, the path coefficient between the two variables was -.593 (t=-8.435, p<.001). These results had a negative and significant effect. Therefore, hypothesis 6 was accepted. Therefore, it was found that the more smartphone users with high perception of ad intrusion, the more negative their attitude toward advertising.

To confirm hypothesis 7, the influence of the smartphone display advertisement attitude on the advertisement avoidance behavior was confirmed. As a result, the path coefficient between the two variables was -.602 (t=-7.531, p<.001). Therefore, the result had a negative and meaningful effect. Therefore, it was found that advertisement attitude and perception of advertisement intrusion had opposite relationship. In other words, when the perception of ad intrusion is high, the attitude of advertising is negative, whereas when the perception of ad invasion is low, the attitude hypothesis 7 was accepted.

In order to confirm hypothesis 8, the influence of the factor of perception of ad intrusion of smartphone users on ad avoidance behavior was found, and the path coefficient between the two variables was found to be .244 (t=3.675, p<.001). The results had a significant effect. Therefore, hypothesis 8 was accepted.

As a result of analyzing the mediating effect of perception of advertisement intrusion in the causal relationship that the advertisement attitude of Hypothesis 9 has on advertisement avoidance behavior, the coefficient of the

![Fig. 2. Verification result for the finalized model](image-url)
indirect route was found to be .335 (p<.001). The result had a positive effect. Therefore, it was confirmed that hypothesis 9 has a partial mediating effect (See Figure 2).

5. Discussion

This study was conducted to propose a strategy for effectively producing display advertisements for smartphone applications. The most important key point is to make consumers perceive the smartphone application display advertisement as a likable creative stimulus. By doing so, the perceived intrusiveness of advertisements can be perceived to be low, and when the perceived intrusiveness is reduced, the causal relationship that the advertisement avoidance behavior decrease was confirmed.

The results obtained through the influence of the smartphone application advertisement attitude on the advertisement avoidance behavior have the following implications. The more positive the smartphone application display advertising attitude is, the less advertising avoidance behavior is. This result is due to the negative attitude that users who use smartphone applications have toward advertisements. Therefore, in order to reduce advertisement avoidance behavior, it is necessary to present advertisements as a stimulus for users to enjoy advertisements like entertainment. This means that it is necessary to use creative strategies that emphasize entertainment functions such as games in smartphone application advertisements.

Also, it is also necessary to produce advertisements with stimulating characteristics that can bring novelties to smartphone application users. By presenting a stimulus that is inconsistent with the existing consumer's schema, it is expected that the attention of advertisements can be raised by using a strategy that is mysterious about the stimulus.

The result that the perception of intrusiveness in smartphone application advertisements shows advertisement avoidance behavior and causality has the following implications. Advertisements exposed to consumers in the process of operating a smartphone application should not act as a stimulus that interferes with the recognition of existing information. When an application advertisement interferes with the interpretation of existing information, the consumer evaluates the advertisement negatively.

In addition, since it has been shown that the usage motivation of smartphone users has a significant effect on the display advertisement attitude of the smartphone application, reflecting this motivation when producing advertisements is expected to play an important role in producing effective application display advertisements. In the future, it is necessary to propose a targeting advertisement production strategy by dividing each type of smartphone usage motive by group. Also, the results of this study will contribute to suggesting strategies to reduce advertising avoidance behavior.

REFERENCES


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