

## **Antecedents of Attitude towards In-app Mobile Advertising: Role of Permission in Mitigating Privacy Concerns**

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### **Abstract:**

*Mobile users today are much more aware of third-party tracking activities resulting in highly targeted advertising. Companies need to consider whether there is a notable evolution in consumer behavior towards mobile advertising due to heightened privacy concerns. Subsequently, almost 10 million Pakistani smartphone users have installed ad-blocking browsers on their smartphones. This research study aims to tackle this issue of ad avoidance by looking into the factors that may improve user attitudes towards in-app ads and result in greater ad acceptance. This study explores attitudes towards in-app mobile advertising in terms of perceptions regarding advertising utility, irritation, trust, and privacy concerns and explores the role of permission in mitigating privacy concerns. The structural equation modeling was adopted using AMOS v-22, using cross-sectional data from a sample of 684 individuals. The findings of the study offer guidance to app developers and advertising professionals in designing and directing advertising content more effectively and ensuring excellent ad-click rates. The study also provides some insight into understanding the ad-avoidance behavior prevailing in Pakistan and how marketers can redesign their marketing approach and techniques to control it.*

**Keywords:** In-app Mobile Advertising, Advertising Utility, Irritation, Trust, Privacy Concerns and Attitude

## **I. Introduction**

The many extensive features offered by today's smartphones, including mobile applications, mobile web browsing, Global Positioning Service (GPS), etc., have opened up avenues for a vast range of marketing-related innovations. Mobile marketing is a set of practices that use for consumer engagement positively through mobiles or personal digital assistants' (Gu & Kannan, 2021). Mobile apps have become robust sales and marketing tools as consumers purchase apps, make product purchases and are exposed to multiple advertisements simultaneously (Gu & Kannan, 2021; Kim, Baek, Kim, & Yoo, 2016). Mobile marketing provides the most interactive channel for direct marketing and promotional messages, making it the most valuable medium for advertising. Thousands of advertising messages are delivered and exposed to consumers through online and offline channels (Hsieh, Lo, Chiu, & Lie, 2021) like banner ads, pop-up ads, and interstitial ads on mobile applications (Jebarajakirthy et al., 2021).

Mobile app marketing offers distinct characteristics that differentiate it from other forms of online marketing. One main characteristic refers to the physical aspect of mobile apps, which allows access anytime and anywhere; as a result, marketers can draw direct demographic and geo-location data, allowing for more efficient targeting (Lin & Bautista, 2020). Secondly, mobile apps offer highly personalized information based on individual interests and preferences, enabling marketers to target consumers with highly personalized advertisements (Nam, Lee, & Jun 2019). Mobile apps integrate advertising with entertainment to offer users a fully immersed experience (Sung, 2021).

Conversely, these mobile advertising campaigns raise many other significant challenges for marketers. In today's information age, information privacy is a serious ethical issue; when consumers perceive that their private information is not well protected and is exposed to the threat of unauthorized dissemination and misuse by third parties, they expect higher risks of privacy invasion and hence refrain from releasing personal information (Minjin Kim, Kim, & Kim, 2021). Although over time, regulatory authorities have intervened in an attempt to restrict tracking by third parties to ensure privacy rights, users still encounter highly personalized targeted advertisements when using mobile phones, resulting in heightened privacy concerns (Alwreikat & Rjoub, 2020) and thus affect the attitude towards in-app mobile advertising.

Therefore, this study builds on the suggestions pointed out by Bernitter, Okazaki, and West (2022) and Jebarajakirthy et al. (2021) studies and looks into attitudes toward in-app mobile advertising in terms of perceptions regarding advertising utility, irritation, trust, and privacy concerns. Aligning with the literature, this study proposes that seeking prior permission from the target audience strengthens the relationship between the user and marketer and results in a favorable attitude towards mobile marketing. Hence, this study aims to explore the moderating effect of permission on the relationship between privacy concerns and attitudes toward in-app mobile advertising. The study findings will guide app developers and advertising professionals in designing and directing advertising content more effectively and ensuring excellent ad-click rates.

## **II. Theoretical Underpinning**

The Regulatory Focus Theory postulates that individual motivation is based on gaining pleasure to avoid pain (Higgins, 1997). This theory has two objectives: promotion-focus and prevention-focus (Higgins, 1997). In this, a prevention-focused

person works on getting security and avoiding loss, while a promotion-focused person works in pursuit of achievements (Lee & Aaker, 2004). Underpinning this theory, this study proposed that irritation, privacy concerns, and permission are the influential antecedents of attitude toward in-app mobile advertising for prevention-focused smartphone consumers. On the other hand, trust and advertising utility are the influential antecedents of attitude toward in-app mobile advertising for promotion-focused smartphone consumers. The reflection of these concepts could be obtained from Mikiyoung Kim's (2020) study.

### **III. Hypotheses Development**

#### **A. Advertising Utility and Attitude towards In-app Mobile Advertising**

Advertising utility relates to the effectiveness and the value of advertising concerning the satisfaction of consumer needs. Consumers feel personally attached to their mobile phones and therefore view mobile ads as an intrusion into their personal life (Jebarajakirthy et al., 2021). Companies focus on creating stimuli through several ad traits like information-based, content relevance, and credibility to create a positive perception of the brand (Sharma, Dwivedi, Arya, & Siddiqui, 2021). The marketer needs to send reliable and valid information to benefit consumers (Roth-Cohen, Rosenberg, & Lissitsa, 2022). The ability of an ad to meet consumer needs is referred to as advertising utility, which adds to the advertisement's value and effectiveness (Adikari & Dutta, 2021).

Attitudes are defined as 'mental states used by individuals to structure how they perceive their environment and guide how they respond to it' (Kushwaha & Agrawal, 2016, p. 153). Attitude towards the behavior has been conceptualized as an individual's favorable or unfavorable feelings about performing a behavior. Consumers are most likely to find an advertisement to be helpful when it provides timely and relevant information (Roth-Cohen et al., 2022); through the personalization of the ad content and by delivering updated and easily accessible information (Sharma et al., 2021). Therefore, we propose:

**H<sub>1</sub>:** Advertising utility positively impacts attitudes toward In-app mobile advertising.

#### **B. Irritation and Attitude towards In-app Mobile Advertising**

Irritation is defined as consumers' displeasure, impatience, and negative feelings caused by several advertising stimuli (Lin & Bautista, 2020; Morimoto & Chang, 2006). Consumers avoid ads but are still forced to view ads online (Khan, Rezaei, & Valaei, 2022; Youn & Kim, 2019). Most consumers resist buying certain brands based on the non-appealing content in the ads (Khan et al., 2022). There are two significant forms of ad avoidance: cognitive and affective ad avoidance. Cognitive ad avoidance is defined as consumers deliberately ignoring the advertising in their visual ranges (Hsieh et al., 2021). Affective ad avoidance includes a negative response to the advertisement (Lin & Bautista, 2020).

Studies have shown that consumers tend to have a general bias toward advertising and consider it manipulative, offensive, misleading, and deceptive (Jebarajakirthy et al., 2021). Mobile advertising literature has shown the association between consumer irritation and attitude (Tsang, Ho, & Liang, 2004). Studies show the relationship between ad avoidance, perceived autonomy, and ad intrusiveness in the

context of Facebook advertising (Chetioui, Butt, & Lebdaoui, 2021; Muangmee, 2021). Hence, the general bias that consumers display towards advertising in terms of considering it misleading, offensive, and deceptive may be carried forward by users when developing an attitude towards in-app mobile advertising and, therefore, could negatively impact their attitude. Hence,

**H<sub>2</sub>:** Irritation has a negative impact on attitudes toward In-app mobile advertising.

**C. Trust and Attitude towards In-app Mobile Advertising**

In the advertising context, Soh, Reid, and King (2009) define trust as credible advertising that provides reliable product information and shows a willingness to act on information delivered by advertisers. Credibility positively impacts consumers' attitudes toward advertising (Wang & Genç, 2019). People feel threatened when they perceive that their freedom is in danger (Roth-Cohen et al., 2022). The willingness of a user to respond to an ad is highly dependent on their perception of the trustworthiness of the marketer and the credibility of the marketing message (Roth-Cohen et al., 2022). According to the source credibility theory, when consumers trust the source of information, they are most likely to believe the ad content to be honest, reliable, and sincere (Ball & Mackert, 2013; Guinalú, 2006; Riquelme & Román, 2014) and therefore develop a favorable attitude towards the marketing content. Hence,

**H<sub>3</sub>:** Trust has a positive impact on attitudes toward In-app mobile advertising.

**D. Privacy Concerns and Attitude toward In-app Mobile Advertising**

Privacy is considered a social, psychological, philosophical, and legal concept and has been explored from various perspectives in multiple disciplines of the social sciences (Wang, Genç, & Peng, 2020). Consumers feel insecure regarding protecting their privacy when they encounter excessive personalized advertisements on their phones. Many resist such ads by using privacy control tools such as ad-blockers and opt-out options to protect their information from unauthorized use (Hsieh et al., 2021). Consumers are consciously aware of the presence of sponsored ads merged within the context of mobile applications and find the lack of privacy control disturbing; users are not notified of which personal information is used by third parties or how, nor is prior consent was taken (Park & Tussyadiah, 2017).

Studies (see Alwreikat & Rjoub, 2020; Wang & Genç, 2019) have shown that privacy concerns have risen over time as consumers have become increasingly privacy-protective 9). Privacy concern has been explained as the anxiety related to privacy violations, and three major categories that affect consumers' concerns have been identified as lack of notification, users want to be notified of the use of their information by firms, lack of control; consumers require a sense of control over the use and distribution of their information and finally, lack of security; users want assurance that the information they share is protected and secured by the website (Alwreikat & Rjoub, 2020; Roth-Cohen et al., 2022). Hence,

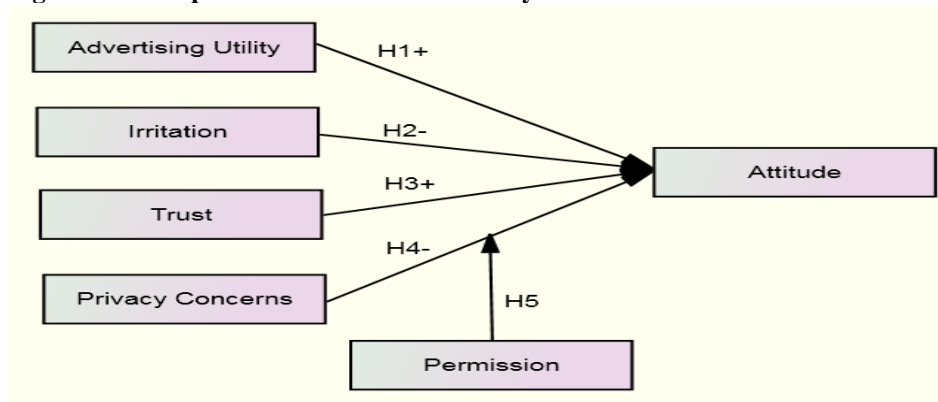
**H<sub>4</sub>:** Privacy concerns positively impact attitudes toward In-app mobile advertising.

### E. Moderation Perspective of Permission-based Advertising between Privacy Concerns and Attitude toward In-app Mobile Advertising

Permission-based advertising is the voluntary, two-way mobile communication between consumers and mobile advertisers (Lindgren, Karegar, Kane, & Pettersson, 2021). With the increasing importance of privacy and informed consent, the phenomenon of permission-based advertising has come into the spotlight (Bhatia, 2020). With the advancement of technology and excessive usage of smartphones, the dynamics of permission-based advertising have evolved (Jebarajakirthy et al., 2021). The process of downloading a mobile application involves a stage where the service provider notifies the users of the need to access certain information on their mobile phones. However, the user needs to be notified of how that information will be used, and no opt-out option is provided at this stage (Hsieh et al., 2021). This study proposes that rather than waiting for consumers to exhibit aversive behaviors towards ads, acquiring informed consent before exposing consumers to marketing posts may alleviate such privacy concerns. By notifying users of how their information may be used by third parties and seeking their permission to target sponsored content, marketers can minimize user concerns regarding lack of control. Seeking prior permission from consumers builds trust in the marketer and helps reduce perceived privacy risks (Lindgren et al., 2021).

**H<sub>5</sub>:** Permission has a moderation effect between privacy concerns and attitude toward In-app mobile advertising.

**Figure 1: Conceptual Framework of the Study**



## IV. Research Methodology

### A. Sampling and Data Collection

The current study used quantitative methodology to investigate the effects of study variables. This research implemented a descriptive research design for targeting the selected participants for the data collection. Furthermore, according to the Pakistan Telecommunication Authority (PTA), there are 193.42 million cellular subscribers in Pakistan (PTA, 2022). This research used a convenience-based snowball sampling approach, considering the nature of the study. This study targeted university students to form the sample for conducting primary research via online surveys. All participants were contacted via Facebook message to participate in the study by filling out a Google Forms survey. Various University Facebook pages and online student forums from different cities were selected, and the members were contacted via a message on Facebook or a

post on the student forum. They were provided a personalized link to the online questionnaire. Respondents were asked whether they owned a smartphone and used mobile applications to ascertain whether they were targets of in-app mobile advertising. Those answering no were screened out. More than 800 respondents filled out the questionnaire successfully.

## B. Measurement

The survey was presented to the respondents with items designed to measure the variables in the conceptual model. All questions were adopted using the Likert scale, measuring responses on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The survey consisted of 27 questions, all of which were close-ended questions adopted from prior studies. A 5-item scale of advertising utility was adopted from Schlosser, Shavitt, and Kanfer's (1999) study. A 5-item scale of irritation was adopted from Tsang's et al. (2004) study. A 5-item scale of trust was adopted from Schlosser's et al. (1999) study. A 4-item scale of privacy concerns was adopted from Roca, García, and De La Vega's (2009) study. A 4-item scale of the permission was adopted from Watson, McCarthy, and Rowley's (2013) study. Finally, a 5-item scale of attitude was adopted from Schlosser's et al. (1999) study.

## V. Results and Discussion

### A. Descriptive Results

Based on the results, the majority of the participants were within the age bracket of 26-35 years (67.8%), and the remaining were 18-25 years (22.5%), less than 18 years (6.3%), and >35years (3.4%). The results also show that a significant portion of participants comprised females (71.1%), and the rest (28.9%) were male. Furthermore, most participants were located in Lahore (54.8%) and other locations, including Islamabad and Karachi, with 31.9% and 13.3%, respectively.

### B. Data Analysis and Results

A Two-stage approach was applied for statistical analysis. First, the assumptions of normality for multivariate analysis were examined to check whether independent constructs explain the dependent constructs in the current research. Second, the measurement model was investigated using Confirmatory Factor Analysis (CFA). Finally, using path analysis through Structural Equation Modeling (SEM), hypothesis testing was conducted. The structural model was determined using the goodness of fit indices like  $\chi^2/df$ , GFI, CFI, NFL, and RMESA. Based on the results in Table 1, the assumptions of normality for multivariate analysis are fulfilled before further analysis.

**Table 1: Descriptive Statistics (N=684)**

Variables	Mean	SD	Min	Max	Skewness	Kurtosis
AU	18.02	4.07	5	25	-0.44	-0.02
IRR	12.76	4.39	5	25	0.49	-0.17
TRU	19.34	3.48	5	25	-0.90	1.45
PC	13.45	2.95	4	20	-0.35	0.28
PER	14.38	2.83	4	20	-0.63	0.69
ATT	14.76	3.07	4	20	-0.79	0.95

**Notes:** AU=Advertising Utility; IRR= Irritation; TRU= Trust; PC= Privacy Concerns; PER= Permission; ATT= Attitude; SD= Standard Deviation

## A. Measurement Model

### Reliability and Validity

The reliability and validity of the items of each latent variable is a mandatory step before analyzing the path model of the study; indicators for uni-dimensionality can be seen in Table 2. CFA confirmed the significant loading of items into their latent variable. As shown in Table 3, Cronbach's Alfa and Composite Reliability (CR) values are  $\geq 0.7$ , which is an acceptable range, and the Normal Fit Index (NFI) also showed acceptable values of  $\geq 0.90$ . The results indicated the overall fitness of the data to proceed for further analysis. The significant estimates of factor loadings of each construct justified the convergent reliability. CR values in Table 3 were required to analyze the third and last method, which requires checking the Average Variance Extracted (AVE) values which are preferred to be above  $> 0.5$ . In Table 3, values are  $> 0.70$ , which means that the results were highly reliable and error-free. All the latent variables passed the possible reliability and validity tests.

**Table 2: Individual CFA (Unidimensionality) Results (N=684)**

Variables	Items	$\chi^2/df$	GFI	CFI	RMR	RMSEA	NFI
AU	5	0.80	0.99	1.00	0.00	0.00	0.99
IRR	5	2.56	0.99	0.99	0.01	0.07	0.99
TRU	5	2.09	0.99	0.99	0.01	0.04	0.99
PC	4	0.63	1.00	1.00	0.00	0.00	0.99
PER	4	1.65	0.99	0.99	0.01	0.03	0.99
ATT	4	0.01	1.00	1.00	0.00	0.00	1.00

Notes: AU=Advertising Utility; IRR= Irritation; TRU= Trust; PC= Privacy Concerns; PER= Permission; ATT= Attitude; GFI= Goodness of fit index;  $\chi^2/df$  = Chi-Square Ratio; CFI= Comparative fit index; GFI- Goodness of Fit Index; RMR= Root mean square residual; RMSEA= Root mean square error approximation; NFI= Normed fit

**Table 3: Convergent Validity and Reliability (N=684)**

Constructs	Items	Convergent Validity			Reliability	
		FL [min-max]	AVE	$\alpha$	CR	
AU	5	[0.61-0.83]	0.56	0.84	0.75	
IRR	5	[0.67-0.77]	0.50	0.86	0.71	
TRU	5	[0.50-0.74]	0.52	0.78	0.70	
PC	4	[0.52-0.86]	0.43	0.76	0.64	
PER	4	[0.53-0.77]	0.51	0.74	0.80	
ATT	4	[0.53-0.77]	0.50	0.80	0.65	

Notes: AU=Advertising Utility; IRR= Irritation; TRU= Trust; PC= Privacy Concerns; PER= Permission; ATT= Attitude; FL= Factor loadings; AVE= Average Variance Extracted; CR = Composite Reliability;  $\alpha$  = Cronbach's alpha

**Table 4: Discriminant Validity (N=684)**

Constructs	AU	IRR	TRU	PC	PER	ATT
AU	<b>0.66†</b>					
IRR	-0.18**	<b>0.70†</b>				
TRU	0.49**	-0.17**	<b>0.72†</b>			
PC	0.35**	-0.02**	0.45**	<b>0.65†</b>		
PER	0.45**	-0.07**	0.49**	0.56**	<b>0.71†</b>	
ATT	0.47**	-0.19**	0.46**	0.42**	0.57**	<b>0.70†</b>

Notes: AU=Advertising Utility; IRR= Irritation; TRU= Trust; PC= Privacy Concerns; PER= Permission; ATT= Attitude; \*\*: Correlation is significant at 0.01 level (2-tailed); †√ (AVE) Values in the Diagonal

Discriminant validity was also calculated using the method recommended by Fornell and Larcker (1981). The method shows that if the square root of the AVE of a variable is more significant than its correlation coefficient with other variables, the variable is treated differently from other variables. Based on the results shown in Table 4, all the variables met the condition of discriminant validity.

As per Ahire, Golhar, and Waller (1996), the Bentler-Bonett NFI was computed to fulfill the method of evaluating the fitness of the six factors nested model. The analysis is shown in Table 5, that the NFI value is 0.92. All other indices justify the appropriateness of the six factors nested model.

**Table 5: Six Factors Nested Confirmatory Factor Analysis (N=684)**

$\chi^2$	df	$\chi^2/df$	GFI	NFI	CFI	RMSEA
8.33	309	2.69	0.91	0.90	0.92	0.05

Notes:  $\chi^2$ = Chi Square; df= Degree of freedom; NFI= Normal Fit Index; CFI= Comparative Fit Index; GFI= Goodness of Fit Index; RMSEA= Root Mean Square Error of Approximation.

## B. Hypotheses Testing

The hypotheses were tested using path analysis. The hypothesis testing began with the validity assessment of the structural model. The previous measurement model fit indices are also for the confirmation of the structural model validity. The maximum likelihood method was analyzed to estimate structural parameters, as shown in Table 6. The results show that model fit indices were in acceptable ranges and show the model's goodness of fit with the data.

**Table 6: Structural Model Fit Indices (N=684)**

$\chi^2$	df	$\chi^2/df$	GFI	NFI	CFI	RMSEA
952.90	330	2.88	0.90	0.90	0.93	0.05

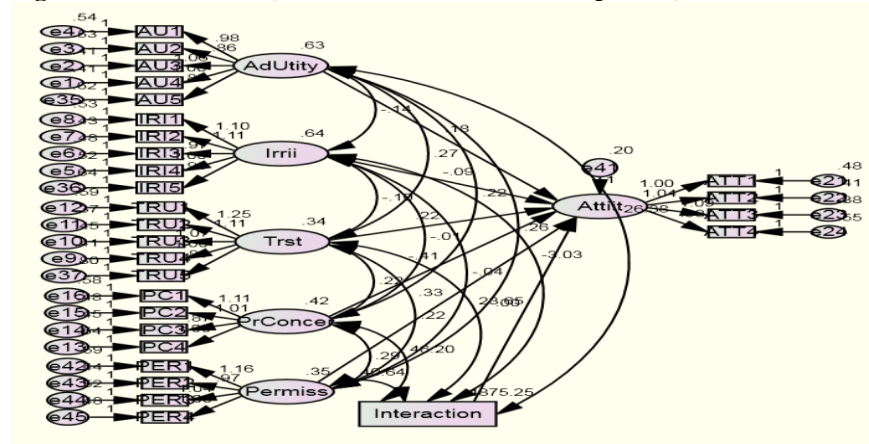
Notes:  $\chi^2$ = Chi Square; df= Degree of freedom; GFI= Goodness of Fit Index; NFI= Normal Fit Index; CFI= Comparative Fit Index; RMSEA= Root Mean Square Error of Approximation.

After validity confirmation, individual paths of the model were examined to evaluate their significance and strengths. The hypothesis testing is shown in Table 7. According to the results, H<sub>1</sub> stated that advertising utility positively impacts attitudes toward in-app mobile advertising ( $\beta= 0.20, p<0.001$ ). H<sub>2</sub> stated that irritation has a negative impact on attitudes towards in-app mobile advertising ( $\beta= -0.11, p<0.005$ ). H<sub>3</sub> showed the positive impact of trust on attitudes toward in-app mobile advertising ( $\beta= 0.18, p<0.002$ ). According to H<sub>4</sub>, privacy concerns have a negative impact on attitudes towards in-app mobile advertising ( $\beta= -0.39, p<0.000$ ). All hypotheses are accepted.

To check the moderation effect, multiplicative term of permission and privacy concerns (i.e., PER\*PC) was created and taken as independent variables and attitude as a dependent variable. We connected all paths from advertising utility, irritation, trust, privacy concerns, and the interaction term (i.e., PER\*PC) to attitude. This approach of testing moderation is based on Marsh, Wen, and Hau's (2004) method in SEM. According to H<sub>5</sub>, permission interacts with privacy concerns to predict an individual's attitude toward In-app mobile advertising; and as shown in Table 7, the hypothesis is also accepted ( $\beta= 0.50, p < 0.000$ ).



**Figure 2: Path Model (Direct and Moderation Perspective)**



**Table 7: Structural Model Results (N=684)**

Effects	Hypothesized Path	$\beta$	S.E	p-value	Conclusion
Direct Effects					
Hypothesis 1 (+)	AU→ Att	0.20	0.04	0.001**	Accepted
Hypothesis 2 (-)	IRR→ Att	-0.11	0.03	0.005**	Accepted
Hypothesis 3 (+)	TRU→ Att	0.18	0.06	0.002**	Accepted
Hypothesis 4 (-)	PC→ Att	-0.39	0.08	0.000***	Accepted
Interaction Effect					
Hypothesis 5	PER*PC→ Att	0.50	0.001	.000***	Accepted

**Notes:** AU=Advertising Utility; IRR= Irritation; TRU= Trust; PC= Privacy Concerns; PER= Permission; ATT= Attitude; SE= Standard Error; \* p < 0.01, \*\* p < 0.05, \*\*\* p < .001

## VI. Discussion on Findings

This research provides compelling results regarding the impact of advertising utility, irritation, trust, privacy concerns, and permission on attitudes toward in-app mobile advertising. The results suggest that users develop a positive attitude towards ads when they find them informative and entertaining. Moreover, the results suggest that when users feel offended or misled by an ad and feel excessive advertising inhibits their search online, they deliberately avoid advertising as it causes annoyance and irritation. Further, it can be inferred that a user's perception regarding the trustworthiness of the marketer and the creditability of the marketing message is a determining force of the resulting attitude formed towards in-app mobile advertising.

Finally, the findings support the notion that due to growing awareness regarding behavioral advertising, privacy concerns regarding tracking online browsing behavior to present targeted ads to consumers have risen, resulting in a negative response toward personalized ads. Regarding the moderating role of permission, the study also found evidence that suggests that rather than exposing users to unsought, highly personalized targeted ads without prior permission and offering opt-out and ad-blocker options as reactive measures, marketers can formulate a more positive attitude towards in-app mobile advertising by seeking prior permission from users before exposing them to excessive online advertising.

## **VII. Practical Implications**

The current study can accommodate advertising marketers to develop and deliver advertisements through mobile applications more effectively. Marketers and ad networks must ensure that advertising content contains information that is useful and will aid in making a purchase decision, e.g., offering pricing and post-sale service comparisons, sharing post-purchase consumer evaluations, etc. Relevant, updated, and timely information must be provided in an appealing manner such that the ad engages the audience; valuable information must be integrated within the element of entertainment, such as a game, music, etc., to satisfy consumer needs for aesthetic enjoyment and pleasure.

The findings suggest that users are highly apprehensive regarding the privacy violations breached by behavioral advertising. Advertising networks and app developers must ensure that the users are well-informed of which information, how, and by whom their information is being used. They must also be made aware of the privacy policy associated with using the app. However, these options are provided after already exposing users to excessive sponsored content without prior permission, which means that any user adopting such techniques has already developed a negative attitude towards the in-app advertising, resulting in ineffective advertising efforts by the ad companies involved.

The findings of this study show that informed consent can help resolve this issue; seeking user permission before directing sponsored ads through mobile applications can help alleviate privacy concerns regarding the use of personal information for advertising purposes and result in more excellent ad acceptance behaviors. This study may allow third parties to understand the need to seek user approval and permission before indulging in behavioral advertising. Finally, for the researcher, this study has helped uncover critical areas of mobile advertising within the smartphone era and aid in understanding how to increase general acceptance and encourage higher ad click rates for in-app mobile advertising.

## **VIII. Directions for Future Research**

Firstly, the general approach adopted in this study to examine user attitudes towards in-app mobile advertising fails to address the differential attitudes towards advertising within different demographic groups, gender-based, and age groups. It would be interesting to explore how perceptions regarding privacy, advertising utility, irritation, and trust may influence attitudes differently among location-based, age brackets, and gender groups.

Moreover, further research must be conducted to assess user attitudes toward different ad formats, timing, and frequency. Users may perceive higher ad utility from click-on ads than auto-play video ads or consider pop-up ads as hindering the flow of their online activities and more intrusive than ads merged within the application's content. Such research can offer valuable insight into how user preferences may differ in these perspectives and whether designing ads according to target user preferences may be rewarding. Furthermore, this study only offers a snapshot of the prevailing situation. A longitudinal study will offer more significant insights and contribute to understanding the phenomenon of in-app advertising.

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