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Sustainable Social Media Advertising as an Informatics-Enabled Service System: Evidence from Facebook Users in Vietnam

Nguyen Hoang Sinh
School of Business Administration, Ho Chi Minh City Open University
sinh.nh@ou.edu.vn

Abstract. This study conceptualizes sustainable social media advertising as an information-intensive, informatics-enabled service system that facilitates value co-creation between firms and consumers. Drawing on service science and social media marketing literature, the research examines how informatics-driven service mechanisms embedded in Facebook advertising, namely perceived interaction, advertising avoidance, credibility, privacy management, informativeness, and entertainment, shape users' attitudes toward advertising and, subsequently, toward brands. These dimensions are interpreted not merely as promotional tactics, but as service system attributes that reflect data-driven targeting, information transparency, user control, and interactive service exchange within digital platforms. Survey data were collected from 368 Facebook users in Vietnam and analyzed using Structural Equation Modeling. The results show that perceived interaction, advertising avoidance, credibility, privacy, and informativeness significantly influence attitudes toward Facebook advertising, whereas entertainment has a negligible effect. Positive attitudes toward advertising, in turn, strongly enhance brand attitudes. The findings highlight the central role of informatics infrastructures, particularly privacy governance, information quality, and interactive data flows, in sustaining effective and trusted service exchanges in social media environments. By framing social media advertising as an informatics-enabled service system rather than a standalone communication activity, this study contributes to the literature by advancing understanding of how digital service design and information management support sustainable value creation. Practically, the results suggest that firms should prioritize transparent data use, privacy-respecting targeting, and interactive service features to improve long-term service performance and consumer trust in social media platforms.

Keywords: social media advertising, brand perception, consumer attitudes, advertising effectiveness, sustainable marketing.

1. Introduction

In the era of digital transformation, social media platforms have evolved beyond communication, and promotion channels to become information-intensive service systems that mediate interactions, data exchange, and value co-creation between firms and consumers. From a service science perspective, platforms such as Facebook operate as socio-technical service infrastructures, integrating data collection, algorithmic processing, and interactive interfaces to deliver personalized content and support ongoing service relationships. This transformation has profound implications not only for marketing outcomes, but also for how digital services are designed, governed, and sustained over time.

Social media platforms remove traditional spatial and temporal constraints, enable multimodal information exchange, and provide scalable, user-friendly interfaces that support continuous interaction between service providers and users. Over the past few years, platforms like Facebook have become pivotal marketing tools, offering businesses new ways to engage with consumers. As of October 2019, Facebook ranked as the third most-visited website globally, with over 2.4 billion monthly active users, including nearly 947 million in the Asia-Pacific region (Datareportal, 2019). Such scale underscores the importance of understanding Facebook advertising not merely as a promotional activity, but as a core component of digital service operations.

In the context of Industry 4.0, where algorithmic decision-making and analytics-driven personalization are embedded in everyday service encounters, firms face increasing pressure to manage not only marketing effectiveness but also service quality, data governance, and sustainability. Social media advertising systems rely heavily on consumer data architectures, targeting algorithms, and content delivery mechanisms that shape how information is processed and experienced by users. Consequently, consumer attitudes toward advertising can be interpreted as responses to information system design choices, including personalization logic, privacy management, interactivity, and information quality.

Sustainability has further intensified the service-oriented role of social media advertising. Beyond driving short-term demand, digital advertising systems are increasingly expected to support transparent information exchange, ethical data use, and long-term trust – key principles aligned with service science and informatics research. Interactive features, real-time engagement, and user-generated feedback enable firms to co-create value with consumers while simultaneously managing service performance and reputational risk. As Sashi (2012) notes, the interactive nature of social media fosters continuous dialogue among firms, users, and communities, transforming advertising into an ongoing service relationship rather than a one-way message transmission.

Despite the extensive literature on social media marketing and consumer behavior, existing research has largely treated social media advertising attributes, such as informativeness, credibility, interactivity, and privacy, as isolated marketing tactics, rather than as interconnected service system mechanisms enabled by informatics infrastructures (Bernoff & Li, 2011; Mangold & Faulds, 2009). As a result, there remains limited conceptual understanding of how sustainability-oriented advertising attributes function as long-term service quality signals within information-intensive digital platforms. This represents a theoretical gap that extends beyond geographic context and calls for integration between social media marketing, informatics, and service science perspectives (Berthon et al., 2007; Keller, 2008).

The Vietnamese market offers a relevant empirical setting to test and refine this conceptual framing, given the rapid adoption of social media platforms and increasing consumer sensitivity to privacy, transparency, and responsible data use. Rather than serving solely as justification for data collection, the Vietnamese context allows examination of how informatics-enabled advertising mechanisms operate in an emerging digital service ecosystem (Coon, 2010; Gordhamer, 2009; Sinh & Kiet, 2025).

Accordingly, this study conceptualizes Facebook advertising as an informatics-enabled service system and examines how key service mechanisms, perceived interaction, advertising avoidance, credibility, privacy management, informativeness, and entertainment, influence consumer attitudes toward advertising and brands. By doing so, the study contributes to the Journal of Logistics, Informatics and Service Science by advancing understanding of how digital advertising systems function as sustainable service operations that integrate information management, service design, and value co-creation.

2. Literature Review and Hypothesis Development

2.1.Related Concepts

Advertising as a Service Interface

Traditionally, advertising has been defined as paid, non-personal communication intended to inform or persuade consumers (Kotler, 2008). From a service science perspective, however, advertising, particularly in digital environments, can be understood as a service interface that connects firms and consumers through information exchange. In social media contexts, advertising is embedded within broader service systems that integrate data analytics, algorithmic targeting, and interactive feedback loops, thereby influencing both user experience and service outcomes (Zarella, 2010; Kaplan & Haenlein, 2010).

Social Media as an Informatics-Enabled Service System

Social media platforms originated as networked communication structures facilitating interaction within virtual communities (Peters et al., 2013). Kaplan and Haenlein (2010) emphasize their participatory and egalitarian nature, where firms and users engage as peers. From an informatics standpoint, social media platforms function as data-driven service infrastructures, relying on large-scale data collection, information processing, and content delivery systems to support personalization, engagement, and decision support. These characteristics position social media squarely within the domain of informatics and service science rather than solely marketing (Erdogmus & Cicek, 2012; Stileman, 2009).

Social Media Advertising as an Information-Intensive Service Mechanism

Social media represents a specialized service mechanism within digital platforms, enabling firms to deploy targeted content based on user data, behavioral analytics, and algorithmic personalization. Prior studies have shown that credibility, informativeness, and interactivity significantly influence consumer attitudes toward social media advertising (Chu, 2013; Kaplan & Haenlein, 2010). However, these attributes also reflect underlying informatics processes, such as information quality management, transparency mechanisms, and privacy governance. Thus, consumer responses to social media advertising can be interpreted as evaluations of how effectively these service mechanisms are designed and managed (Kim & Ko, 2012; Leung, Bai & Stahura, 2015; Yu et al., 2013).

Consumer Attitudes toward Advertising as Responses to Service System Design

Consumer attitudes toward advertising, defined as learned predispositions to respond favorably or unfavorably to ads (Lutz, 1985), play a critical role in determining advertising effectiveness. In digital environments, such attitudes are shaped not only by message content but also by system-level features, including perceived control, personalization accuracy, and data usage practices. Research indicates that online advertising often generates more favorable attitudes due to its informational value and interactivity (Mehta, 2000; Speck & Elliott, 1997; Schlosser et al., 1999; Gordon & De Lima-Turner, 1997), reinforcing the view that advertising outcomes are closely linked to information system performance.

Toward a Service Science Perspective on Social Media Advertising

While prior research has documented the effects of social media advertising on brand attitudes and behavioral intentions, there remains limited integration of service science and informatics perspectives. This study addresses this gap by examining how sustainability-related advertising attributes function as service quality indicators within informatics-enabled advertising systems, thereby extending existing theories beyond a purely marketing-oriented framework (Heinrichs et al., 2011; Chu & Kim, 2011; Kelly et al., 2010).

2.2.Previous Studies

As social media platforms have grown, advertising on these channels has become a key area of interest for researchers, with numerous studies investigating how consumers perceive and react to such ads. Blanco et al. (2010) explored the effectiveness of mobile advertising, highlighting that entertainment and informational value are significant factors shaping consumer attitudes. While this research underscores the importance of engaging consumers through content, it primarily focuses on mobile advertising, leaving a gap in understanding how these factors operate within social media contexts, such as Facebook. This study builds on such findings by addressing how these factors, especially entertainment and informativeness, affect brand perception in Facebook advertising.

Azizul et al. (2012) examined Facebook advertising in Malaysia, identifying interactivity, advertising avoidance, and privacy concerns as the main factors influencing consumer attitudes. However, they found that credibility did not significantly predict attitudes toward social media ads. This suggests that privacy-sensitive and interactive advertising approaches are more influential than credibility in shaping consumer perceptions. This study extends their findings by evaluating how credibility, alongside privacy and interaction, impacts brand perception in Facebook ads, focusing on how these factors contribute to sustainable advertising practices.

Similarly, Jaemin et al. (2016) investigated social media advertising in South Korea, focusing on community influence and social network advertising characteristics. They found that non-intrusive, organically embedded ads generated more positive consumer responses than disruptive ones. This insight is crucial for the current study, as it underscores the need for Facebook ads to balance engagement with minimal disruption to foster positive brand perception, aligning with the growing demand for sustainable, user-friendly advertising.

Kaustav and Neelotpaul (2017) explored how social media advertising shapes consumer attitudes, particularly in terms of entertainment, informativeness, and credibility. Their findings suggest that these factors significantly influence behaviors like purchase intentions and word-of-mouth (WOM). This study leverages their insights to investigate how these same dimensions, especially entertainment and credibility, affect brand perception in the Facebook advertising space, contributing to a better understanding of how consumer attitudes influence brand outcomes on social media platforms.

Akkaya et al. (2017) emphasized that consumer attitudes toward social media ads mediate the relationship between entertainment and behavioral outcomes, such as purchase decisions. They also noted that negative perceptions, such as perceived ad clutter, can diminish favorable attitudes. This research expands on their work by examining both positive and negative influences, such as informativeness versus advertising overload, on consumer attitudes toward Facebook ads, offering deeper insights into optimizing ad strategies that enhance brand perception.

Gaber et al. (2019) conducted a study on Instagram ads, focusing on credibility, informativeness, and entertainment as key drivers of consumer attitudes. Interestingly, they found that demographic variables did not significantly predict consumer attitudes toward Instagram ads. This challenges the traditional approach of demographic segmentation and aligns with this study's focus on psychographic and behavioral factors in shaping brand perception through Facebook ads, offering fresh perspectives on audience segmentation.

In Vietnam, Ngo and Mai (2017) investigated the impact of social media advertising on purchase intentions. They found that interactivity, credibility, and entertainment positively influenced consumer attitudes, while annoyance had a negative effect. These findings highlight the need to balance engagement with the minimization of negative factors, such as ad intrusiveness, a crucial insight for this research, which explores how these dimensions affect brand perception in Facebook ads, particularly in the Vietnamese context.

Overall, these studies lay the groundwork for understanding how social media advertising, including Facebook ads, impacts consumer attitudes and behaviors. By examining factors such as entertainment, credibility, privacy, and interactivity, this study contributes to the ongoing discourse on social media marketing, offering practical insights for advertisers aiming to enhance brand perception while maintaining sustainable and consumer-friendly advertising practices.

2.3.Hypotheses Development

The increasing prominence of Facebook as a social media advertising platform has spurred significant interest in how consumers form attitudes toward advertisements on the platform and how these attitudes influence brand perception. Key factors such as perceived interactivity, ad avoidance, credibility, privacy, informativeness, and entertainment play pivotal roles in shaping consumer responses to Facebook ads. This section develops hypotheses around these factors, aiming to provide insights into how they contribute to the effectiveness of Facebook advertising strategies in shaping brand perception.

Perceived Interactivity

Perceived interactivity refers to the degree of interaction that an ad allows between users and brands, creating opportunities for greater engagement and participation. Chu and Kim (2011) found that interactive features foster stronger consumer-brand connections, enhancing engagement and shaping favorable attitudes toward the ad. Within the Facebook advertising context, interactivity can lead to more immersive consumer experiences, strengthening the consumer's relationship with the brand. Therefore, it is hypothesized that:

H1: Perceived interactivity positively influences consumers' attitudes toward Facebook advertisements.

Advertising Avoidance

Advertising avoidance occurs when consumers intentionally evade ads they perceive as intrusive or irrelevant (Speck & Elliott, 1997). With the proliferation of social media ads, consumers may become overwhelmed, leading to heightened ad avoidance (Gritten, 2007). Negative experiences with ad clutter or irrelevant content can harm attitudes toward Facebook ads. This research examines how such avoidance behaviors influence consumer attitudes and brand perception. Hence, it is hypothesized that:

H2: Advertising avoidance negatively influences consumers' attitudes toward Facebook advertisements.

Credibility

Advertising credibility reflects the extent to which consumers perceive an ad as trustworthy and reliable (MacKenzie & Lutz, 1989). Credibility has long been recognized as a critical determinant of advertising effectiveness, as consumers are more likely to engage with ads they trust (Choi & Rifon, 2002). In social media advertising, perceived credibility is often lower due to the perceived unregulated nature of the platform (Prendergast et al., 2009). This study investigates how credibility influences consumer attitudes toward Facebook ads and how trust in these ads affects brand perception. Therefore, it is hypothesized that:

H3: Credibility positively influences consumers' attitudes toward Facebook advertisements.

Privacy

Privacy concerns have become increasingly prominent as users grow wary of how their personal information is collected and used in targeted advertising on platforms like Facebook (Barnes, 2006). Consumers with heightened privacy concerns may develop negative attitudes toward ads if they feel their personal data is being exploited. Conversely, brands that respect user privacy through transparent policies can foster more positive attitudes (Cranor et al., 2000). Therefore, it is hypothesized that:

H4: Privacy positively influences consumers' attitudes toward Facebook advertisements.

Informativeness

Informativeness refers to the extent to which an advertisement provides valuable, timely, and relevant information (Oh & Xu, 2003). Ads that deliver useful content help consumers make more informed decisions, thereby enhancing their attitude toward the ad (Waldt et al., 2009). Within the context of Facebook advertising, providing personalized and relevant information is crucial for shaping consumer perceptions. Therefore, it is hypothesized that:

H5: Informativeness positively influences consumers' attitudes toward Facebook advertisements.

Entertainment

Entertainment is another important factor, referring to the ad's ability to engage consumers through enjoyable and emotionally stimulating content (Oh & Xu, 2003). Ads that entertain are more likely to capture attention and generate positive attitudes (Ducoffe, 1996). In the context of Facebook ads, entertainment can create memorable experiences that enhance consumer engagement and brand connection. Thus, it is hypothesized that:

H6: Entertainment positively influences consumers' attitudes toward Facebook advertisements.

Advertising Impact on Brand Perception. Positive attitudes toward Facebook advertisements can significantly influence consumers' overall perceptions of the advertised brand. According to the transfer of effect hypothesis (Lutz et al., 1983), favorable attitudes toward ads translate into positive brand perceptions. Gaber et al. (2019) confirmed that consumers' positive attitudes toward social media ads can strengthen brand relationships and foster loyalty. This research extends this understanding by exploring how consumer attitudes toward Facebook ads directly affect brand perception. Therefore, it is hypothesized that:

H7: Consumers' positive attitudes toward Facebook advertisements positively influence brand perception.

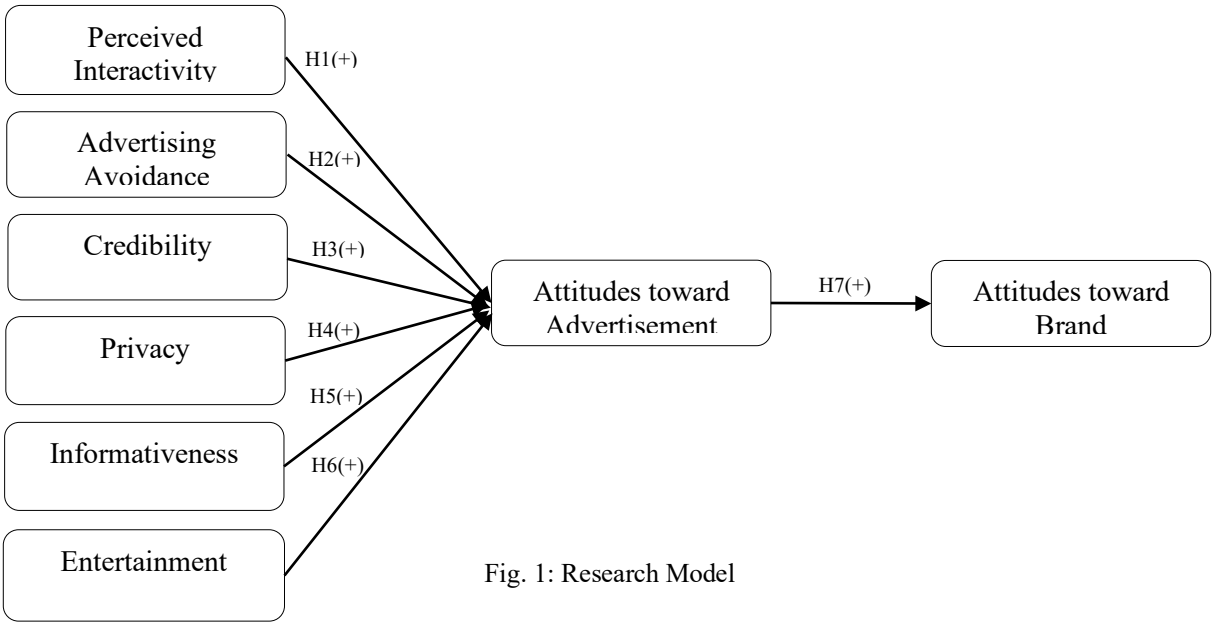

Fig. 1: Research Model

These hypotheses collectively address how various factors shape consumer attitudes toward Facebook advertising and their subsequent impact on brand perception. By investigating the roles of interactivity, ad avoidance, credibility, privacy, informativeness, and entertainment, this research contributes to a broader understanding of how Facebook advertising can be optimized to build stronger brand perceptions. The research model is depicted in Figure 1.

3. Research Methodology

3.1.Research Design

This study employed a two-phase approach, beginning with a qualitative phase followed by a quantitative phase. The qualitative phase aimed to refine and finalize the questionnaire, while the quantitative phase focused on collecting, processing, and analyzing survey data to test the research model and hypotheses.

The research utilized a mixed-methods approach to explore the factors influencing consumer attitudes toward brand advertisements on social media platforms. A 5-point Likert scale was used to measure the variables. The study's methodological process is outlined below.

3.2.Qualitative Research

Measurements

The constructs were measured using validated scales refined from prior research (Akkaya et al., 2017; Azizul et al., 2012; Gaber et al., 2019; Kaustav & Neelotpaul, 2017).

Sampling

The study employed a convenience sampling approach, targeting an initial sample size of 400 respondents to mitigate potential attrition and ensure a minimum of 350 valid observations for analysis. This sample size satisfies the requirements for exploratory factor analysis and Structural Equation Modeling, following Hair's (2010) recommendation of 5 to 10 respondents per observed variable. Data were collected using a structured questionnaire administered both online (via Google Forms) and offline. Participants were recruited through social media userplatforms, including Facebook and Zalo, as well as via email invitations.

While this approach was appropriate for examining the proposed structural relationships, it limits the representativeness and external validity of the findings. The sample comprises a relatively high proportion of younger respondents and students, reflecting the accessibility of social media platforms and the nature of convenience sampling. Accordingly, the results should be interpreted as representative of active and digitally engaged Facebook users, rather than the broader population of Facebook users in Vietnam.

Data Analysis

Data collected were analyzed using SPSS and AMOS software following a two-stage approach that integrates psychometric validation with interpretive assessment of informatics-enabled service attributes. First, scale reliability and dimensionality were evaluated using Cronbach's alpha and exploratory factor analysis (EFA). All constructs demonstrated acceptable internal consistency, indicating that the measurement items coherently capture users' perceptions of key information service mechanisms embedded in Facebook advertising.

Confirmatory factor analysis (CFA) and structural equation modeling (SEM) were subsequently employed to test the theoretical model and hypotheses. Descriptive statistics were utilized to summarize demographic characteristics, including gender, age, and education level, as well as the distributions of the study variables.

To assess the potential impact of common method bias, Harman's single-factor test was conducted by loading all measurement items into an unrotated exploratory factor analysis. The results

indicated that no single factor accounted for the majority of the total variance, suggesting that common method variance is unlikely to be a serious concern in this study. In addition, full collinearity variance inflation factors (VIFs) were examined and found to be below recommended thresholds, further reducing concerns regarding common method bias.

The study adhered to established criteria for model validation, including eigenvalue thresholds, explained variance, and factor loadings (Garson, 2002; Hair, 2010). Convergent validity was established by ensuring factor loadings exceeded 0.5 (Gerbing & Anderson, 1988). The reliability and stability of the measurement model were further supported through bootstrap estimation (Rex, 2005).

4. Research Results and Discussion

4.1.Descriptive Statistics

Sample Characteristics

The descriptive statistics indicate a well-balanced gender distribution among the 368 respondents, with males comprising 48% and females accounting for 52%. This gender balance enhances the study's representativeness. Regarding educational attainment, 49% of respondents have education levels below undergraduate, 31% hold postgraduate degrees, and 20% have completed undergraduate studies, reflecting a diverse range of educational backgrounds.

In terms of occupational distribution, students represent the largest group at 36%, followed by office employees at 24%, homemakers at 19%, teachers at 11%, and other occupations at 10%. Age distribution reveals that 40% of respondents fall within the 21 to 30 age range, 25% are aged 16 to 20 years, 18% are between 31 and 35 years old, and 17% are aged 36 and above.

Variable Means

The analysis of the variables reveals a relatively uniform distribution, as evidenced by consistent standard deviation values across the dataset. Most of the scales exhibited mean values exceeding the midpoint on the 5-point Likert scale, suggesting positive overall responses from participants. However, the Advertising Avoidance scale scored lower than expected, indicating that a majority of respondents expressed disagreement with statements related to ad avoidance behaviors. This finding suggests that, contrary to traditional concerns about advertising overload, respondents in this study demonstrated a general openness to advertisements on social media platforms, particularly within the context of Facebook. This openness provides a promising landscape for marketers aiming to engage users without significant resistance to advertising content.

Table 1: Descriptive Statistics

Constructs	Code	Mean	Standard Deviation	Item-total Correlation	Cronbach's Alpha if Item Deleted
Perceived Interactivity (Cronbach's α = 0.897)	INT1	3.897	1.167	0.724	0.879
	INT2	3.837	1.156	0.722	0.879
	INT3	3.883	1.153	0.742	0.876
	INT4	3.745	1.213	0.717	0.880
	INT5	3.772	1.166	0.699	0.883
	INT6	3.810	1.156	0.729	0.878
Advertising Avoidance (Cronbach's α = 0.838)	AD.AV1	2.035	1.037	0.645	0.804
	AD.AV2	2.038	1.077	0.651	0.803
	AD.AV3	1.981	0.981	0.602	0.816
	AD.AV4	2.035	1.101	0.645	0.805
	AD.AV5	2.076	1.028	0.661	0.800
Credibility (Cronbach's α = 0.882)	CRE1	3.826	1.161	0.750	0.848
	CRE2	3.715	1.138	0.717	0.856
	CRE3	3.793	1.188	0.742	0.850
	CRE4	3.766	1.199	0.712	0.857
	CRE5	3.891	1.104	0.661	0.869

Constructs	Code	Mean	Standard Deviation	Item-total Correlation	Cronbach's Alpha if Item Deleted
Privacy (Cronbach's α = 0.875)	PRI1	3.747	1.176	0.701	0.852
	PRI2	3.758	1.206	0.732	0.840
	PRI3	3.701	1.269	0.747	0.834
	PRI4	3.701	1.234	0.748	0.834
Informativeness (Cronbach's α = 0.892)	INF1	3.707	1.225	0.746	0.866
	INF2	3.723	1.228	0.760	0.862
	INF3	3.717	1.309	0.758	0.863
	INF4	3.788	1.210	0.745	0.866
	INF5	3.823	1.138	0.669	0.882
Entertainment (Cronbac''s α = 0.808)	ENT1	3.845	1.122	0.621	0.772
	ENT2	3.813	1.146	0.685	0.707
	ENT3	3.832	1.174	0.663	0.730
Attitudes toward Advertisement (Cronbach's α = 0.864)	ATT1	3.821	1.134	0.693	0.834
	ATT2	3.783	1.266	0.737	0.816
	ATT3	3.742	1.238	0.740	0.814
	ATT4	3.761	1.145	0.682	0.838
Attitudes toward Brand (Cronbach's α = 0.798)	AT.BR1	3.886	1.081	0.666	0.701
	AT.BR2	3.902	1.123	0.644	0.723
	AT.BR3	3.842	1.130	0.618	0.751

4.2.Measurement Testing

Reliability

The reliability of the measurement scales was assessed using Cronbach's alpha prior to conducting EFA and CFA. According to Nguyen (2024), a reliable scale should have a Cronbach's alpha coefficient of 0.7 or higher. Additionally, items with a total correlation of less than 0.3 should be removed to enhance the overall reliability of the scale. The results, summarized in Table 1, show that all scales achieved a Cronbach's alpha greater than 0.7, with item-total correlations exceeding 0.3. Consequently, the scales are considered reliable for further analysis.

Exploratory Factor Analysis

Following the reliability assessment, EFA was performed to reduce a large set of interrelated variables into smaller, meaningful factors (Hair, 2010). The analysis adhered to guidelines set by Nguyen (2024), including Bartlett's test of sphericity, which produced a KMO value between 0.5 and 1.0, alongside significant results ($p < 0.05$). The analysis utilized Principal Axis Factoring with Promax rotation. As indicated in Table 2, the data clustered into eight distinct factors, each exhibiting factor loadings greater than 0.5, thereby confirming both convergent and discriminant validity. Thus, the measurement scales are deemed suitable for theoretical model testing.

Table 2: Exploratory Factor Analysis

Constructs	Code	Factors							
		1	2	3	4	5	6	7	8
Perceived Interactivity (INT)	INT6	0.813							
	INT3	0.794							
	INT2	0.771							
	INT5	0.760							
	INT4	0.716							
	INT1	0.708							
Advertising Avoidance (AD_AV)	AD.AV2		-0773						
	AD.AV4		-0.710						
	AD.AV3		-0.705						
	AD.AV5		-0.686						
	AD.AV1		-0.655						
Credibility	CRE1			0.869					

Constructs	Code	Factors							
		1	2	3	4	5	6	7	8
(CRE)	CRE4			0.823					
	CRE2			0.773					
	CRE3			0.768					
	CRE5			0.602					
Privacy (PRI)	PRI3				0.851				
	PRI2				0.793				
	PRI4				0.779				
	PRI1				0.764				
Informativeness (INF)	INF3					0.850			
	INF4					0.818			
	INF1					0.817			
	INF2					0.779			
	INF5					0.610			
Entertainment (ENT)	ENT2						0.836		
	ENT3						0782		
	ENT1						0.706		
Attitudes toward Advertisement (ATT)	ATT3							0.835	
	ATT2							0.831	
	ATT1							0.769	
	ATT4							0.719	
Attitudes toward Brand (AT_BR)	AT.BR1								0.783
	AT.BR2								0.771
	AT.BR3								0.711

0.5 ≤ KMO = 0.920 ≤ 1.0; p = 0.00 ≤ 0.05; Eigenvalue = 1.516 ≥ 1.0; AVE = 60.295% ≥ 50%.

Confirmatory Factor Analysis

Although the EFA results indicated that the measurement scales were reliable, CFA was performed to evaluate the model's fit prior to structural equation modeling. The CFA results demonstrated satisfactory model fit indices: Chi-square/df = 1.114 (< 5), p = 0.035 (< 0.05), RMSEA = 0.018 (< 0.08), and GFI = 0,917, CFI = 0.991, and TLI = 0.989 all exceeding 0.9. The scales exhibited unidimensionality, with all factor loadings greater than 0.5 and significant at the 5% level. Additionally, both composite reliability and average variance extracted met the required thresholds, confirming the presence of convergent and discriminant validity.

Table 3: Composite Reliability and Average Variance Extracted

Parameter			Estimate	Composite Reliability (CR)	Average Variance Extracted (AVE)
INT	--->	INT3	INT	0.898	0.594
INT	--->	INT6	INT		
INT	--->	INT1	INT		
INT	--->	INT5	INT		
INT	--->	INT2	INT		
INT	--->	INT4	INT		
CRE	--->	CRE1	CRE	0.882	0.600
CRE	--->	CRE4	CRE		
CRE	--->	CRE2	CRE		
CRE	--->	CRE5	CRE		
CRE	--->	CRE3	CRE		
PRI	--->	PRI3	PRI	0.875	0.638
PRI	--->	PRI4	PRI		
PRI	--->	PRI2	PRI		
PRI	--->	PRI1	PRI		
ATT	--->	ATT2	ATT	0.864	0.615
ATT	--->	ATT3	ATT		

ATT	--->	ATT1	ATT		
ATT	--->	ATT4	ATT		
INF	--->	INF3	INF	0.893	0.625
INF	--->	INF1	INF		
INF	--->	INF4	INF		
INF	--->	INF5	INF		
INF	--->	INF2	INF		
AT_BR	--->	AT.BR1	AT_BR	0.799	0.571
AT_BR	--->	AT.BR2	AT_BR		
AT_BR	--->	AT.BR3	AT_BR		
ENT	--->	ENT2	ENT	0.809	0.586
ENT	--->	ENT3	ENT		
ENT	--->	ENT1	ENT		
AD_AV	--->	AD.AV1	AD_AV	0.838	0.509
AD_AV	--->	AD.AV5	AD_AV		
AD_AV	--->	AD.AV4	AD_AV		
AD_AV	--->	AD.AV3	AD_AV		
AD_AV	--->	AD.AV2	AD_AV		

The factor loadings in the CFA model are all greater than 0.5 and statistically significant at the 5% level, confirming the convergent validity of the measurement scales. As summarized in Table 3, both CR and AVE meet the required thresholds, indicating that the measurement model is reliable. Additionally, the correlation coefficients between the constructs are all significantly different from 1, demonstrating discriminant validity.

Therefore, the CFA tests have been satisfied. The measurement scales show high reliability, and the model fits well with the data, making it suitable for further analysis using structural equation modeling.

4.3.Model Testing

SEM analysis was conducted to explore the complex relationships within the research model. The SEM results indicated a good fit with the data. The fit indices, following guidelines from Bagozzi and Yi (1988), Hair (2010), and Chin and Todd (1995), were as follows: Chi-square/df = 2.039, p = 0.00, RMSEA = 0.053, CFI = 0.911, TLI = 0.904, and GFI = 0.818. These results affirm that the theoretical model aligns well with the data.

Table 4: Theoretical Model Testing

Parameter			Standardized Estimates	S.E.	C.R.	p	Results
INT	--->	ATT	0.170	0.058	2.972	**	H1: accepted
AD_AV	--->	ATT	-0.233	0.071	-3.853	***	H2: accepted
CRE	--->	ATT	0.118	0.056	2.064	*	H3: accepted
PRI	--->	ATT	0.173	0.051	2.990	**	H4: accepted
INF	--->	ATT	0.192	0.049	3.346	***	H5: accepted
ENT	--->	ATT	0.054	0.058	0.920	0.358	H6: rejected
ATT	--->	AT_BR	0.265	0.059	4.114	***	H7: accepted

**** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.*

The relationships within the SEM model were assessed through estimates and significance levels. As detailed in Table 4, most correlations were significant at the 0.05 level, with the exception of the relationship between ENT and ATT, which was not statistically significant. To ensure the reliability of the estimates, the bootstrap method was employed with 1,000 samples (Preacher & Hayes, 2008). The bias values presented in Table 5 were minimal, confirming the robustness of the model estimates.

Table 5: Bootstrap (N = 1,000)

Parameter			SE	SE-SE	Mean	Bias	SE-Bias
INT	--->	ATT	0.079	0.002	0.172	0.002	0.002
AD_AV	--->	ATT	0.089	0.002	-0.229	0.004	0.003
CRE	--->	ATT	0.069	0.002	0.115	-0.002	0.002
PRI	--->	ATT	0.073	0.002	0.171	-0.001	0.002
INF	--->	ATT	0.072	0.002	0.187	-0.005	0.002
ENT	--->	ATT	0.062	0.001	0.053	-0.002	0.002
ATT	--->	AT_BR	0.061	0.001	0.264	0.000	0.002

In summary, the SEM results supported the majority of the research hypotheses outlined in Table 4, with the notable exception of the hypothesis related to the ENT_ATT relationship, which was not supported.

4.4.Discussion of Results

The study examined several factors influencing positive attitudes toward Facebook ads (ATT) and identified five significant predictors: Perceived Interactivity (INT), Advertising Avoidance (AD_AV), Credibility (CRE), Privacy (PRI), and Informativeness (INF). Among these, AD_AV was found to be the strongest negative predictor ($\beta = -0.233$), indicating that higher levels of ad avoidance correlate with less favorable attitudes toward Facebook ads. This suggests that users' tendencies to avoid ads substantially diminish their overall attitudes, underscoring the need to address the factors driving ad avoidance. Notably, the low average score for the variable AD.AV3 indicates that unclear ads are less effective at conveying their messages, pointing to a need for clearer and more engaging content.

INT positively influences ATT, with a standardized coefficient of $\beta = 0.170$. This finding aligns with the work of Azizul et al. (2012), who also observed that INT enhances users' positive attitudes toward Facebook ads, albeit at a lower impact in this study. This variation may reflect shifts in user engagement or differences in cultural contexts over time.

CRE, while positively associated with ATT, emerged as the weakest predictor with a standardized coefficient of $\beta = 0.118$. This aligns with findings from Ducoffe (1996) and Brackett and Carr (2001), who noted that CRE is important but may have a diminished influence in the context of Facebook ads compared to other online platforms. The weaker effect could stem from evolving advertising practices or changing user expectations.

PRI significantly affects ATT, with a standardized coefficient of $\beta = 0.173$. This finding mirrors Azizul et al. (2012), highlighting that privacy concerns remain pivotal in shaping attitudes toward Facebook ads. As users increasingly share personal information on social media, implementing robust privacy measures is essential for fostering positive attitudes toward advertisements.

INF was identified as the strongest positive predictor of ATT ($\beta = 0.192$). This result aligns with previous research, emphasizing that clear and relevant information in advertisements significantly enhances users' positive attitudes and influences their purchasing or usage decisions regarding advertised products.

The negligible effect of ENT on ATT ($p = 0.358 > 0.05$) contrasts with findings by Kaustav and Neelotpaul (2017), who highlighted entertainment as a significant driver of consumer engagement. This finding suggests a contextual shift in user expectations, particularly in saturated advertising environments like Vietnam, where entertainment may no longer differentiate advertising effectiveness. Instead, users appear to prioritize efficiency, relevance, and control over hedonic stimulation. This result highlights an important boundary condition: entertainment-based appeals may be less effective in information-dense platforms where advertising is perceived as a routine service component rather than a leisure activity.

Overall, the findings emphasize the relative importance of information quality, exposure management, and governance mechanisms over affective appeal, reinforcing the interpretation of Facebook advertising as a digital information service system whose sustainability depends on functional performance rather than novelty or entertainment.

5. Conclusion and Implications

5.1.Conclusion

This study investigates how Facebook advertising attributes influence consumer attitudes toward advertising and brands in a sustainability-oriented digital context in Vietnam. Using survey data from 368 Facebook users and applying EFA, CFA, and SEM, the study validates established relationships among perceived interaction, advertising avoidance, credibility, privacy, and informativeness. Entertainment was found to have no significant effect and was excluded from the final model.

The contribution of this research is primarily empirical and contextual. The findings confirm the robustness of commonly used social media advertising constructs in an emerging market setting, showing that advertising avoidance is the strongest negative predictor of attitudes, while informativeness and privacy are the most influential positive factors. These results reinforce prior evidence that users evaluate social media advertising largely based on information quality and data governance rather than hedonic appeal.

From a theoretical perspective, the study offers limited refinement rather than extension, supporting a service-oriented interpretation of social media advertising as part of an informatics-enabled digital service environment. Overall, the findings provide context-specific evidence and measurement validation that can inform future research at the intersection of social media advertising, service science, and informatics without claiming broad theoretical advancement.

5.2.Managerial Implications

Mitigating Advertising Avoidance through Service System Design

Rather than viewing advertising avoidance solely as a communication failure, managers should interpret it as a signal of service system misalignment within the social media platform. High avoidance reflects deficiencies in content relevance, delivery timing, and information overload, issues rooted in service operations and algorithmic targeting. Firms should therefore implement adaptive targeting and frequency management mechanisms that dynamically adjust content exposure based on user feedback and engagement histories. From an informatics perspective, sustainable advertising performance depends on optimizing service intensity and minimizing cognitive burden, ensuring that advertising remains a value-adding component of the overall information service rather than a disruptive intrusion.

Informativeness as Information Quality Management

The strong effect of informativeness highlights its role as a core information quality dimension within social media advertising systems. Managers should treat advertising content as part of an integrated information service, subject to standards of accuracy, completeness, and relevance. This implies establishing internal governance processes for content validation, especially for sustainability-related claims, and aligning advertising messages with verified organizational data sources. Informativeness thus functions as a service quality signal, enabling users to assess the reliability and usefulness of the platform's information outputs and reinforcing long-term trust in the service ecosystem.

Privacy Management as an Informatics Governance Mechanism

Privacy concerns reflect users' evaluations of data governance and control mechanisms embedded in the advertising service system. Rather than addressing privacy as a compliance requirement alone, managers should adopt privacy-by-design principles, integrating consent management, data minimization, and transparent data usage policies into advertising operations. Providing users with

clear explanations of how targeting decisions are made and how their data contribute to content personalization can reduce perceived risk and enhance service legitimacy. From a service science standpoint, effective privacy management supports sustainable value co-creation by aligning organizational data practices with user expectations of fairness and accountability.

Interactive as a Service Interface for Value Co-Creation. Interactivity should be understood as a service interface mechanism that enables reciprocal information exchange between firms and users. Interactive advertising features, such as polls, feedback tools, or sustainability-related challenges, serve not merely to increase engagement, but to facilitate real-time learning and service adaptation. Managers can leverage these mechanisms as decision-support inputs, using user responses to refine targeting algorithms, content strategies, and service offerings. When designed effectively, interactivity enhances both user experience and service system responsiveness, contributing to sustained service performance rather than short-term promotional gains.

Toward Sustainable Management of Social Media Advertising Systems

Collectively, these findings suggest that sustainable social media advertising requires a shift from campaign-centric thinking to information service management. Managers should focus on designing advertising systems that balance personalization, transparency, privacy protection, and content frequency as interconnected service elements. Tools such as transparency dashboards, adaptive algorithms, and feedback-driven content controls can help organizations monitor and manage advertising as a long-term service operation. By doing so, firms can strengthen consumer trust, improve service efficiency, and align social media advertising with the broader objectives of sustainable digital service ecosystems.

5.3.Limitations and Future Research

This study has several limitations that should be considered when interpreting the findings. First, the use of convenience sampling in Vietnam may limit the generalizability of the results beyond digitally active user groups in this context. Second, while the model focuses on five key advertising attributes, other relevant factors, such as economic conditions, social influences, or platform-specific features, were not examined and may also shape consumer responses to sustainable social media advertising.

User characteristics, including age, occupation, and digital literacy, may further condition responses to informatics-enabled advertising mechanisms such as interactivity, privacy management, and information processing. For example, younger users may be more receptive to personalization yet more sensitive to advertising overload, whereas older or less digitally literate users may evaluate advertising systems differently. These heterogeneities were not explicitly controlled for and therefore represent important boundary conditions of the study.

Future research should address these limitations by employing stratified or probability-based sampling strategies to improve representativeness across demographic and usage segments. Applying the model to other platforms (e.g., Instagram or YouTube), conducting comparative analyses across user groups, and using experimental designs would further strengthen understanding of how sustainable advertising functions as an informatics-enabled service system across diverse digital contexts.

Declaration

Generative AI and AI-assisted Technologies in the Writing Process: I confirm that generative AI tools were used solely for permitted copy-editing purposes, including improving language clarity, grammar, and formatting of our own original text. No AI tools were used to generate, modify, or contribute to the intellectual content of the manuscript.

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