

# Ranking Key Indicators for Effective Brand Integration in Advergaming Experiences Using the Fuzzy AHP Method

Zohre Kazemi<sup>1\*</sup> | Mina Ranjbarfard<sup>2</sup>

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## Zohre Kazemi

Corresponding Author, Ph.D. Candidate in Business Management, Faculty of Management, Alzahra University, Tehran, Iran.  
E-mail: [z.kazemi@alzahra.ac.ir](mailto:z.kazemi@alzahra.ac.ir)

## Mina Ranjbarfard

Department of Management, Faculty of Social Sciences and Economics, Alzahra University, Tehran, Iran.  
E-mail: [m.ranjbarfard@alzahra.ac.ir](mailto:m.ranjbarfard@alzahra.ac.ir)

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## ABSTRACT

Advergaming is a popular strategy for attracting customers and enhancing brand awareness by integrating brand-related content into video games. However, the effectiveness of this integration depends on factors such as game design, player engagement strategies, and the alignment of game content with brand identity. Despite the growing importance of this field, limited research has systematically identified and ranked key indicators affecting brand integration in advertising experiences. Most existing studies focus on specific aspects of advertising, such as the impact of brand placement, the role of rewards, and the effect of game competition on brand acceptance, without providing a comprehensive framework for collectively evaluating these factors. This research employs the fuzzy analytical hierarchy process (FAHP) method to identify and rank the most influential factors for brand integration in video game advertising. The ranking results indicate that these three factors, in order of priority from first to third, are crucial for effective brand integration in advergaming: creating player engagement with the brand, matching game type with product/brand, and aligning advertising content with target players. The findings of this research help marketers and game developers design more impactful advertising experiences that align with brand objectives and player expectations. Games function as entertainment tools and can influence customer engagement and loyalty while conveying the brand's advertising message indirectly and without causing irritation.

## KEYWORDS

Advergaming, Decision Making, Fuzzy Analytic Hierarchy Process (FAHP).

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## Introduction

Technology's evolution has influenced our lives in many areas. One of the domains where technology has made a significant impact is "gaming." The emergence of digital games and continuous evolution in advertising has emphasized the importance of advergames (a combination of gaming and advertising) (Eyice Başev, 2024). Advergames create positive emotions among consumers by combining entertainment, advertising, and gaming elements, thereby increasing interest in products and services. Furthermore, advergames have been observed to increase consumers' conscious or unconscious willingness to purchase products or services (Elsayeh, 2020).

Consumer-brand engagement is a crucial consumer response to advertising and is conceptualized as consumers' cognitive, affective, and behavioral activities during or related to consumer-brand interactions. There has been an ongoing discussion about the dimensions of consumer-brand engagement (van Berlo & Chen, 2024). Consumer-brand engagement is an influential construct for creating customer satisfaction, brand love, and brand loyalty, improving advertising effectiveness and overall business performance (Cheung et al., 2020).

Customer engagement can be defined as a tool for creating and strengthening consumer relationships with commercial brands, as consumers often provide information and suggestions about brands to other consumers. They share their opinions, reviews, and questions about certain products, services, or companies. This concept, which represents consumer engagement with brands, indicates a shift in marketing research, as brands (and consumers) constantly seek new ways to increase their interaction (Marques et al., 2021).

Key performance indicators (KPIs) are one of the main concepts for increasing marketing effectiveness, both in digital marketing and in marketing for mobile applications (Reyes-Menendez et al., 2020). Improving business performance also requires delivering the highest added value to customers. KPIs are an essential element of performance measurement to help organizations achieve their goals. KPIs play a key role in measuring marketing effectiveness (Sychrová & Šimberová, 2012). It is important to define and monitor KPIs in marketing for a successful stay in the market and a competitive position at home and abroad. Today, the increase in competitive advantage includes mainly marketing, innovation, and information and communication technologies. New digital tools and innovations have changed how we approach data and decisions (Basile et al., 2023). KPIs play a role in increasing organizational efficiency and achieving long-term success. Metrics such as profitability, customer satisfaction, market share, sales growth, and planning efficiency are highlighted as essential tools for evaluating performance and refining marketing strategies. These indicators help managers assess the company's position relative to competitors, adjust strategies accordingly, and effectively meet market demand (Hennyeyová et al., 2021). The connection between KPIs and consumer engagement lies in the ability of businesses to use performance metrics to refine strategies that foster deeper, more interactive

relationships with consumers, ultimately enhancing both organizational efficiency and brand loyalty (Reyes-Menendez et al., 2020).

Consumer engagement goes beyond concepts like participation, as this concept demonstrates an active and interactive consumer connection with a specific focal objective (a product or brand). This concept is characterized by cognitive processing, affection, and activation characteristics (Cheung et al., 2020). With the growing role of advergaming in industry, and it is suggested that they take a more prominent position in future marketing strategies (Eyice Başev, 2024).

Entertainment is a crucial principle in the interactive and digital use of media. Advertisers consistently emphasize the "enjoyment" element in their gaming advertising strategies (Adis et al., 2015; Cicchirillo & Mabry 2016). Today, computer games are no longer merely a form of entertainment; they have evolved to encompass numerous capabilities and applications, extending beyond children to become integral to everyone's daily lives. This shift has moved them beyond mere entertainment, compelling game developers to increasingly utilize their capabilities in various social, economic, political, and cultural spheres (Sharma, 2014; Terlutter & Capella, 2013). In this context, advertising can serve an entertaining role as a form of social communication, a function often fulfilled by advergaming. Generally, advertising serves many functions, including information dissemination, education, persuasion, and sales (Ham et al., 2016).

While advertising serves multiple functions such as information dissemination, education, persuasion, and sales, a common limitation in many studies is the difficulty in measuring the effectiveness of these functions, especially in digital advertising formats like advergaming (Cicchirillo & Mabry, 2016; Terlutter & Capella, 2013). These limitations often stem from lacking clear, quantifiable metrics for engagement and long-term impact.

To address these challenges, it is essential to integrate a more comprehensive framework for assessing consumer interaction with the advergaming and how this engagement translates into measurable outcomes such as brand recall, purchase intent, and customer loyalty (Eyice Başev, 2024). By combining qualitative assessments with quantitative KPIs, advertisers can more effectively evaluate the broader impact of their campaigns and improve their strategies over time.

However, the success of advergaming depends on identifying and effectively utilizing key factors that enhance brand integration and player engagement. Despite the growing popularity of advergaming, the lack of a structured approach to evaluating and prioritizing these factors presents a significant challenge. This study addresses this gap by using the Analytic Hierarchy Process method to rank key indicators for effective brand integration in advertising experiences. This research aims to systematically prioritize these factors to provide practical insights for designing more effective advergaming, thereby bridging the gap between academic research and practical application.

## Literature Review

In the literature review, we first discuss advergaming and highlight its importance

through numerical data. Then, we address the effectiveness of advergames. Despite its current significance, the ranking of advergames has not received much attention.

### **Advergames**

In recent years, advergames have rapidly evolved as a creative platform for delivering advertising messages (Catalán & Martínez, 2020). Advergames is one of the newest marketing strategies that has gained increasing attention and emerged as a dynamic mass medium for marketers (Jami Pour et al., 2020). Advergames (a combination of "advertising" and "gaming") is a term used to describe digital games specifically designed from the outset to advertise a product, service, or brand. Typically, these interactive online games incorporate advertising so that the games themselves become the brand message (Smith et al., 2020; Vanwesenbeeck et al., 2017).

Gaming has always been important for humanity. As our society develops digitally, it is unsurprising that digital games have become prevalent, and their distribution continues to increase. Digital games have evolved into mass media, attracting millions of people (Terlutter & Capella, 2013). While the term advergames appears relatively new in advertising literature, the first advergames date back to 1983 (Catalán et al., 2019). Advergames are online games used to advertise products or brands and are most commonly used by the food industry. Evidence suggests that advergames encouraging food purchase and consumption can sometimes even improve children's food consumption patterns (Folkvord et al., 2020). Statistics about total internet users as of January 2021 show that the number of active internet users worldwide was 4.66 billion (59.5 percent of the global population). It is predicted that the online audience will reach 5,631.54 million users by 2025 (Statista, 2021).

Investment in advergames represents the third-largest investment budget (approximately 12% of the online advertising budget) on the Internet (Jami Pour et al., 2020). Gaming companies, analyzing the share of in-game advertising, have predicted a growth of \$3.54 billion in this industry during 2021-2025, progressing at an annual growth rate of 16 percent throughout the forecast period (Research & Markets, 2021). Advergames are widely used by famous companies implementing international marketing strategies; however, due to being a relatively new advertising method, there are few studies explaining the characteristics of advergames and its effect on consumer behavior, even in developed countries (Gure & Gura, 2016).

We expect advergames, compared to static advertising, to have a positive impact on all three dimensions of consumer-brand engagement. Advergames, as gamified advertisements, are designed to provide interactive, entertaining experiences between consumers and products. Interaction is a precursor to consumer-brand engagement and is therefore believed to be an important driver of engagement with brands embedded in advergames (van Berlo & Chen, 2024).

### **Impact of Gaming on User Attitudes**

Cognitive processing represents consumers' knowledge about a brand and is defined as

the level of consumer processing and thinking related to a specific brand (Bilro & Loureiro, 2020). The persuasive effectiveness of a game in brand evaluation is determined by its gameplay and the alignment of the message with the subject matter. The stronger the thematic connection between the game and the brand message, the stronger the persuasive effects on attitudes (Waiguny et al., 2012; Rifon et al., 2015; Grace & Coyle, 2011). If a game is entertaining, it positively impacts brand beliefs, brand attitudes, and brand selection behavior; all these factors demonstrate the power of advergaming. Explicitly, this method of implicit learning and persuasion mechanism is employed by advergaming for learning about brands and products (Waiguny et al., 2013; Waiguny et al., 2012). Players are exposed to company brands and their advertisements during gameplay. This enables advertisers to promote their brands through entertainment and information sharing, resulting in strong brand awareness among players (Sreejesh et al., 2018; Adis & Jun, 2013; Tina & Buckner, 2013).

In Reasoned Action Theory, it is assumed that intention or behavior directly affects an individual's attitude or object. Regarding exposure to advertising, the resulting responses and how they relate to attitudes and purchase intentions are further explained in the cognitive response model and are widely used (Patel et al., 2017). Attitudes toward advergaming demonstrate consumers' favorable or unfavorable feelings toward the advertisement and represent an effective mediating variable for commercial attitudes and purchase intention. This can play into consumer benefits toward advertising that lead to active user interactions (Hernandez et al., 2004).

Internet advertising through online games, viral marketing, or social networks are just some of the non-traditional advertising tools that major companies still use to advertise their brands (Vashisht & Royne, 2016). Studies in this field generally agree that advergaming can effectively influence brand-related information by fostering a positive and flexible connection with the game, thereby enhancing brand awareness, brand knowledge, and favorable brand attitudes. However, although many academic approaches have theoretically described advergaming as a new form of advertising with significant potential, research on them is still limited in number and scope (Lee & Cho, 2017).

### **Key Indicators for Effective Brand Integration in Advergaming Experiences**

Today, creating brand interest among customers is not a simple task. *Interest* can be defined as a feeling, passion, and pleasure experienced by consumers with brands. Activation refers to the energy, effort, and time consumers spend interacting with specific brands, meaning activation is the behavioral dimension of customer brand engagement (Agustina & Ardiyanto, 2020). Meanwhile, technological advancements have changed how customers interact and become loyal. Advertising in the digital space is interactive, and increased interaction in this type of advertising makes it more effective (Salciuviene et al., 2017).

Today's media environment is filled with numerous advertising messages that encompass every aspect of our society and culture. This has created confusion in advertising that appears on the internet and digital media, which can lead to negative

attitudes toward advertising. Due to this oversaturation, brands are forced to define their messages as entertainment; one way to create an engaging and entertaining experience with consumers is through advergames (Cicchirillo & Mabry, 2016).

Key Performance Indicators (KPIs) play a critical role in brand integration within advergames by helping to measure and optimize the effectiveness of the advertising experience. Some of the key indicators include:

1. **Brand Recall and Recognition:** This measures how well consumers remember the brand after interacting with the advergame. Strong brand recall often translates into better customer retention and loyalty (Terlutter & Capella, 2013).
2. **Consumer Engagement:** This is assessed by players' active participation and emotional investment in the game, which enhances the depth of brand interaction (Cheung et al., 2020). The more engaged the consumer, the more likely they are to internalize the brand message and develop a positive attitude toward it.
3. **Purchase Intent:** This indicator measures the likelihood of a consumer purchasing a product or service after interacting with the advergame. It is the direct link between the advertising experience and real-world consumer behavior (Cicchirillo & Mabry, 2016).
4. **Emotional Response:** This evaluates consumers' emotional reactions- such as enjoyment or excitement- to the game and can provide insights into how effectively the brand is integrated into consumers' experience (Eyice Başev, 2024). Positive emotional responses are often associated with stronger brand affinity.

By measuring these KPIs, businesses can ensure that their advergames not only entertain but also reinforce brand messages, drive sales, and foster long-term customer relationships. A comprehensive approach to monitoring and analyzing these indicators can bridge the gap between entertainment and brand integration, ensuring that advergames achieve marketing and consumer engagement goals.

## Research Background

Overall, the studies that were conducted emphasize the importance of advergaming design elements, including interaction, game speed, and brand placement, as factors that can significantly impact on consumer behavior. These studies necessitate establishing a comprehensive model for examining advergames and their impact on brand recall. The following table reviews these previous studies.

**Table 1.**

**Key Factors for Effective Brand Integration in Advergaming: A Literature Review**

Title	Authors & Year	Methodology	Finding
A General Review of the Impact of Advergames on Consumer Purchasing Behavior: A Literature Review	Eyice Başev (2024)	Documentary review method analyzing existing literature on advergames and consumer behavior. Various sources were examined to obtain sufficient evidence for analysis.	- Emotional Impact: Advergames increase interest in products and services by creating positive emotions in consumers. - Increased Purchase Intent: Evidence shows these games can strengthen consumers' conscious or unconscious

Title	Authors & Year	Methodology	Finding
			<p>willingness to purchase products or services.</p> <ul style="list-style-type: none"> <li>- Role in Marketing Strategies: Advergaming are growing as an effective tool in the advertising industry and are predicted to have a more prominent position in future marketing strategies.</li> </ul>
Understanding Customer Attitude Towards Advergaming: An Extended TAM Approach	Jami Pour et al., (2023)	<p>Used a mixed approach conducted in two phases:</p> <ol style="list-style-type: none"> <li>1. Qualitative phase: Literature review and 15 semi-structured interviews.</li> <li>2. Quantitative phase: Validating the proposed model using 102 questionnaires completed by advergaming players.</li> </ol>	<ul style="list-style-type: none"> <li>- Main attitude factors identified in three categories added to TAM</li> <li>- Advertising content and game-related factors positively affect the perceived ease of use.</li> <li>- Advertising content and player-related factors significantly impact perceived usefulness</li> </ul>
Engaging Consumers with Advergaming: An Empirical Evaluation of Interactivity, Fit and Expectancy	Goh & Ping (2014)	<p>Created an online 3D virtual environment with 8 modes based on different combinations of interaction (low/high), fit (low/high), and expectancy (low/high).</p>	<ul style="list-style-type: none"> <li>- High fit, high interaction, and low expectancy led to more favorable attitudes.</li> <li>- Under low interaction, low expectancy led to more positive attitudes</li> <li>- Brand attitudes significantly affect purchase intention.</li> <li>- Interaction directly impacts consumer attitudes toward game and brand.</li> </ul>
Using Mobile Advergaming as a Tool for Brand Communication: A Case Study	Gura & Gura (2016)	<p>A case study of an Albanian company using mobile advergaming for brand experience advertising.</p>	<ul style="list-style-type: none"> <li>- Impact on Brand Recognition: Helps measure campaign effects in the short term and builds a customer database.</li> <li>- Customer Relationship Management: Effective design helps brands manage social responsibilities and maintain customer relationships.</li> </ul>
Impact of Advergaming Speed and Brand Recall: Moderating Effects of Brand Placement Strength and Gamers' Persuasion Knowledge	Vashisht & Royne (2016)	<p>The research examined the effects of low and high speed in advergaming and analysis of differences related to customer persuasion power.</p>	<ul style="list-style-type: none"> <li>- Lower-speed games have a greater impact on brand recall.</li> <li>- A two-way interaction was found between advertising speed and brand placement strength.</li> <li>- No difference was observed between high and low persuasion power in brand recall.</li> </ul>
Purchase Behavior in Advergaming and the Mediating Role of Brand Attitude	Adis et al., (2015)	<p>Used Structural Equation Modeling (SEM) to examine direct and indirect effects of brand congruity and entertainment on brand attitude and purchase intention.</p>	<ul style="list-style-type: none"> <li>- Brand congruity and entertainment directly affect brand attitude.</li> <li>- These factors indirectly influence purchase intention through brand attitude.</li> <li>- Positive brand attitude strengthens the relationship between brand congruity, entertainment, and purchase intention.</li> </ul>
Effects of Brand Placement Strength, Prior Gaming Experience, and Game Involvement on Brand Recall in Advergaming	Vashisht & Sreejesh (2015)	<p>Quantitative approach using interactive experiment design and statistical modeling.</p>	<ul style="list-style-type: none"> <li>- Stronger brand placement significantly increases brand recall.</li> <li>- Players with prior experience show higher brand recall.</li> <li>- Active player participation leads to stronger emotional brand connection.</li> <li>- Player interaction directly affects brand recall.</li> </ul>

(Source: Researcher's Findings)

Eyice Başev (2024) identifies factors affecting advertising games, including their emotional impact, their effect on increasing purchases, and their role in shaping marketing strategies. Similarly, Gura and Gura (2016) points out that advergaming can measure short-term campaign impact, collect customer data for future use, support customer relationship management, and help brands fulfill social responsibilities through sustained engagement.

A review of the literature has identified key indicators of brand effectiveness in advergaming, as provided in Table 2.

**Table 2.**  
**Categories extracted from literature concepts**

Indicators	Literature Sources
Matching game type with product/brand	Martí-Parreño et al., (2013); Smith et al., (2013); Terlutter & Capella (2013); Adis & Kim (2013); Hernandez et al., (2004); Jashnabadi et al., (2023).
Creating player engagement with the brand	Cicchirillo & Mabry (2016); Vashisht & Royne (2016); Wang et al., (2018); Ham et al., (2016); Vashisht & Sreejesh (2015); Gure & Gura (2016); Choi et al., (2015); Sharma (2014); Sreejesh & Anusree (2017); Dahl et al. (2009); Fariás (2018); Amiri Sardari et al., (2024).
Matching advertising content with target players	Terlutter & Capella (2013)
Providing information about product/brand features	Catalán et al., (2019); Çardici & Gungor (2019); Liu & Jang (2011); Unal et al., (2011); Rodrigues et al., (2017); Rese et al.; (2017, 2014); Nazarian-Jashnabadi et al., (2024).
Offering comparison capability between different brand products in-game	Martí-Parreño et al., (2013); Liu & Jang (2011); Unal et al., (2011); Rodrigues et al., (2017); Rese et al., (2017, 2014).
Facilitating brand selection through gameplay	Terlutter & Capella (2013); Jami Pour & Kazemi (2020).
Providing positive social experience for players	Grace & Coyle (2011); Terlutter & Capella (2013).
Offering various rewards to players	Terlutter & Capella (2013); Grace & Coyle (2011).
Using visually-appealing games	Grace & Coyle (2011).
Using celebrities in games	Terlutter & Capella (2013); Jami Pour & Kazemi (2020); Nazarian-Jashnabadi et al., (2023).
Designing competitive game in brand acceptance	Terlutter & Capella (2013); Jami Pour & Kazemi (2020).

(Source: Researcher's Findings)

### Key Indicators for Effective Brand Integration in Advertising Experiences

With technological advancements, the way customers interact and develop loyalty has changed. Advertising in the digital space is interactive, and increased interaction in this type of advertising leads to more effective advertising (Salciuviene et al., 2017).

Overall, numerous studies have been conducted in various areas, including:

- Appropriate overlap between the message and game (Roettle et al., 2016);
- The impact of brand congruity and entertainment factors on attitudes (Adis et al., 2015);
- The effects of game speed in advergaming on brand attitude and recall among young Indian players (Sharma, 2014)

- The influence of brand recall and brand attitude on Malaysian players' purchase intentions (Adis & Jun, 2013)
- A model of reactions generated by exposure to advergaming among Mexicans, Peruvians, and Americans; "HISPANIC ATTITUDES TOWARD ADVERGAMES: A PROPOSED MODEL OF THEIR ANTECEDENTS"

Recent scientific studies have focused on product and brand presentation effectiveness in electronic games by evaluating brand recall and attitudes toward brand placement (Hernandez et al., 2004). However, at the time of this research, no study had examined this field from a technology acceptance perspective.

## Methodology

To rank the indicators in advergaming, we first reviewed previous studies. After identifying the indicators obtained from these studies, the Analytic Hierarchy Process (AHP) method was used to prioritize these indicators. AHP is one of the most widely used multi-criteria decision-making methods with numerous advantages. This method structures complex problems hierarchically, allowing decision-makers to examine and analyze different factors at various levels (de FSM Russo & Camanho, 2015). Other advantages of this method include the capability for pairwise comparison, the ability to combine quantitative and qualitative data, and flexibility in application across different problems. Additionally, AHP is highly effective in managerial and strategic issues where precise and complete data is unavailable, due to its calculation of relative weights of criteria based on decision-makers judgments (de FSM Russo & Camanho, 2015).

To improve the accuracy and performance of the AHP method in dealing with ambiguities and uncertainties in human judgments, the fuzzy version of this method was used. Fuzzy AHP, utilizing fuzzy logic, provides the ability to model and manage uncertainty ranges. In this version, decision-makers judgments are expressed as fuzzy values rather than exact numbers, creating more flexibility in data analysis (Nezhad et al., 2023). Moreover, using fuzzy logic allows decision-makers to manage uncertainty and fluctuations in data better. Consequently, Fuzzy AHP increases accuracy in prioritization and makes the outputs closer to actual conditions (Gupta et al., 2024). This approach provides more optimal solutions, especially in complex problems with unclear data.

This research used opinions from five experts specialized in advergaming and digital marketing. Experts were selected based on their expertise and experience. They had at least five years of practical or research experience in the related field, held master's or doctoral degrees, and were sufficiently familiar with concepts related to multi-criteria decision-making and fuzzy logic. Additionally, these individuals were selected based on criteria such as diversity of perspectives, access to up-to-date information, and willingness to collaborate in the research process. The presence of these experts ensures the quality and validity of input data and final research results. The stages of the Fuzzy AHP method are presented in sequence below.

In addition to the general criteria mentioned, the expertise of the selected

professionals was defined based on the following: these individuals had at least five years of practical experience in the advergaming and digital marketing industry, with specializations in areas such as designing advergaming, developing digital marketing strategies, and integrating brands within gaming environments. Furthermore, their current roles included project management for advertising campaigns, designing branded games, or serving as consultants in the advergaming field. These experts also had a track record of published academic papers or significant professional accomplishments, further validating their expertise level.

The statistical validation process has been elaborated further to enhance the credibility and reliability of the FAHP results. First, the consistency ratio (CR) test was conducted to ensure the logical coherence of the pairwise comparison matrices. Next, a sensitivity analysis was performed on the derived weights to assess the robustness of the results. This analysis revealed that slight changes in the input priorities had no significant impact on indicators' ranking, indicating method stability. Additionally, a comparison of the results obtained with those of similar studies was conducted to verify the alignment and consistency of the findings.

### Step One: Determining Indicators

In the first step of the Fuzzy AHP method, indicators were determined as the ranking basis. For this purpose, previous studies were first identified and reviewed to extract a comprehensive set of proposed indicators. Then, these indicators were reviewed and evaluated by expert specialists in advergaming and digital marketing fields. Finally, the following 11 indicators were confirmed as final indicators and selected for ranking. These indicators are presented in Table 3.

**Table 3.**  
**Advergaming Indicators**

Code	Criterion
C1	Matching game type with product/brand
C2	Creating player engagement with the brand
C3	Matching advertising content with target players
C4	Providing information about product/brand features
C5	Offering comparison capability between different brand products in-game
C6	Facilitating brand selection through gameplay
C7	Providing positive social experience for players
C8	Offering various rewards to players
C9	Using visually-appealing games
C10	Using celebrities in games
C11	Designing competitive game in brand acceptance

(Source: Researcher's Findings)

### Step Two: Pairwise Comparison Matrix

After determining the indicators, the pairwise comparison process began to evaluate and prioritize them. In this stage, each indicator was evaluated and compared to other

indicators in pairs to determine their relative importance. For this purpose, Saaty's 9-point scale was used, which is widely applied in the Analytic Hierarchy Process (AHP) due to its high precision and interpretability. This scale enables more precise judgments and meaningful comparisons between indicators. Data for pairwise comparison was collected through the opinions of five expert specialists. These experts provided their judgments using the 9-point scale, considering each indicator's characteristics, relationships, and impacts. This stage plays a key role in determining the relative weight of each indicator and serves as the basis for subsequent analyses. Expert opinions were obtained based on the 9-point scale provided in Table 4.

**Table 4.**  
Saaty's 9-Point Scale

Judgment	Equal Preference	Slightly Better	Better	Much Better	Absolutely Better
Row importance relative to the column	1	3	5	7	9
Column importance relative to row	1	0.33	0.2	0.142	0.111

(Source: Researcher's Findings)

### Step Three: Formation of Fuzzy Integration Matrix

This step collects and integrates expert opinions and judgments to obtain a comprehensive view of indicator prioritization. The integrated numbers represent triangular fuzzy numbers. A triangular fuzzy number is one of the main tools in fuzzy logic that is defined by a range including three specific values: minimum value (lower bound), most likely value (middle bound or highest probability), and maximum value (upper bound). This range accurately and flexibly shows the degree of uncertainty in human judgments.

This method's use of triangular fuzzy numbers enables a more precise calculation of weights, as subtle differences in expert opinions are appropriately considered. This approach reduces ambiguity in judgments and increases the accuracy and reliability of the ranking process. Thus, the triangular fuzzy number serves as a powerful tool in combining opinions and decision-making in situations where ambiguity and uncertainty exist.

(1)

$$\tilde{a}_{ij} = [a_{ij}, b_{ij}, c_{ij}]$$

The three components are:

1. Minimum of expert opinions (a)
2. Geometric mean of expert opinions (b)
3. Maximum of expert opinions (c)

### Step Four: Calculating Fuzzy Weights from the Integration Matrix

In this step, the score for each criterion is obtained by calculating the geometric mean of the values in each row of the integrated pairwise comparison matrix. Due to its use of geometric mean, this method provides high accuracy in combining values and minimizes potential inconsistencies in pairwise judgments. The geometric mean of each row

represents the relative weight of each criterion compared to other criteria and serves as a key step in the prioritization process. The advantage of this method is creating balanced weights that align with the structure of the initial matrix, ensuring that the final output is presented with minimal distortion of input data. The results obtained in this stage form the basis for the final ranking and analysis of criteria.

(2)

$$Z_i = \left[ \frac{a_{i1} \times a_{i2} \times a_{i3} \times \dots}{n} \right]$$

The score of each indicator is divided by the sum of all scores to convert it to a weight (a number between 0 and 1).

(3)

$$W_i = \frac{Z_i}{(Z_1 + Z_2 + Z_3 + \dots)}$$

### Step Five: Defuzzification

A definite value can be obtained using a simple arithmetic mean between the three components of a fuzzy number (i.e., the minimum, middle, and maximum values). This process is designed to reduce the inherent uncertainty of fuzzy numbers and present a real number as its representative by combining these three values. This method is one of the most widely used approaches in analyzing fuzzy numbers because it provides easier interpretation and direct comparison of results in addition to its simplicity. This technique, particularly in problems requiring final decision-making or ranking based on definite values, helps increase accuracy and clarity in the output.

(4)

$$W_i = \frac{W_{ai} + W_{bi} + W_{ci}}{3}$$

### Step Six: Normalization

The weight normalization process is performed to determine the weighted nature of each indicator. In this process, the weight assigned to each indicator is divided by the sum of total weights to determine the relative share of each indicator. Then, for a better and more understandable representation of the indicators' importance, the obtained value is multiplied by 100. Thus, the importance of each indicator is expressed as a percentage of total weights, where this percentage shows the relative share and role of each indicator compared to other indicators.

In addition to its simplicity, this normalization method enables comparing indicators and provides a clearer view of their prioritization and importance. Using percentage as the final scale increases the capability for result analysis and more precise decision-making. Such an approach in analyzing indicators, especially in multi-criteria problems, enhances the accuracy and transparency of results and provides a suitable framework for strategic decision-making.

(5)

$$NW_i = \frac{W_i}{\sum_{i=1}^n W_i} \times 100$$

## Findings

The Fuzzy AHP method was used to rank advergaming indicators. Initially, expert opinions in this field were collected and then combined. Expert opinions were defuzzified to remove ambiguity and convert fuzzy data to more precise values. The results from defuzzification were presented as non-normalized weights in Table 5. The normalization process was performed to convert these weights into comparable and standardized values. In this stage, non-normalized weights were divided by the total sum of weights, and finally, normalized weights were obtained, which were used for ranking the indicators. This process significantly increases the model's accuracy because using the Fuzzy AHP method enables consideration of uncertainties and ambiguities that may exist in expert evaluations. Converting opinions to fuzzy values and then defuzzifying them allows the researcher to analyze data more flexibly and with greater precision.

**Table 5.**  
**Non-normalized and Normalized Weights**

Code	Criterion	Non-normalized Weight	Normalized Weight
C1	Matching game type with product/brand	1.124	0.207
C2	Creating player engagement with the brand	1.292	0.237
C3	Matching advertising content with target players	1.023	0.188
C4	Providing information about product/brand features	0.415	0.076
C5	Offering comparison capability between different brand products in-game	0.132	0.024
C6	Facilitating brand selection through gameplay	0.105	0.019
C7	Providing good social experience to player	0.139	0.025
C8	Offering various rewards to players	0.256	0.047
C9	Using visually-appealing game	0.517	0.095
C10	Using celebrities in games	0.125	0.023
C11	Designing competitive game in brand acceptance	0.315	0.058

(Source: Researcher's Findings)

Following the weight normalization process, the weight percentage of each indicator was calculated and extracted to increase accuracy and ease of comparison between indicators. These percentages represent the relative importance of each indicator in the decision-making and prioritization process. Then, based on these weight percentages, the final ranking of indicators was performed and displayed in Table 6. In addition to helping decision-makers identify indicator prioritization, this stage of analysis aids in more precise comparison between different indicators in complex conditions. As a result, this method can be used to optimize decision-making processes and determine more accurate weights for each indicator.

**Table 6.**  
**Weight Percentages and Final Rankings**

Code	Criterion	Weight Percentage	Rank
C1	Matching game type match with product/brand	20.656	2
C2	Creating player engagement with the brand	23.735	1
C3	Matching advertising content with target players	18.806	3
C4	Providing information about product/brand features	7.619	5
C5	Offering comparison capability between different brand products in-game	2.431	9
C6	Facilitating brand selection through gameplay	1.923	11
C7	Providing good social experience to player	2.545	8
C8	Offering various rewards to players	4.711	7
C9	Using visually-appealing game	9.499	4
C10	Using celebrities in games	2.295	10
C11	Designing competitive game in brand acceptance	5.780	6

(Source: Researcher's Findings)

The game type matching with the product or brand (20.656%) emerged as a crucial factor, as aligning the game's theme with the brand creates a coherent and engaging experience. Creating player engagement with the brand (23.735%) was ranked highest, highlighting the importance of immersing players and fostering brand connection. Matching advertising content with target players (18.806%) ensures that the promotional messages resonate with the intended audience, boosting advergaming effectiveness. Providing information about product or brand features (7.619%) supports informed decision-making while offering comparison capability between brand products in-game (2.431%) adds depth by enabling product evaluation. Facilitating brand selection through gameplay (1.923%) reflects the potential of interactive choices to influence player preferences.

Ensuring a good social experience (2.545%) emphasizes the value of community and interaction during gameplay. Offering various rewards (4.711%) motivates players and reinforces positive brand associations. The game's visual appeal (9.499%) plays a significant role in capturing attention and retaining interest. Using celebrities in games (2.295%) leverages their influence to strengthen brand credibility, while game competitiveness in brand acceptance (5.780%) underscores the role of challenge and achievement in fostering positive brand attitudes. These indicators collectively outline a comprehensive framework for designing effective advergaming that enhance brand integration and audience engagement.

## Discussion and Conclusion

In summary, from analyzing the existing literature on advergaming, it can be inferred that game-related characteristics act as either primary or conditional causes. These characteristics play a central role in influencing the effectiveness of brand implementation and delivery. This research has examined and ranked key indicators for

effective brand integration in advergaming experiences using the Fuzzy AHP method. In today's world, advergaming has become one of the influential tools in marketing strategies. These tools can convey the brand message in an attractive and lasting way by capturing the audience's attention and creating interactive experiences. Therefore, identifying and ranking key indicators for the success of this type of advertising is essential so that brands can best utilize the potential of advergaming and create a distinct and effective experience for their audience. The Fuzzy AHP method was used to rank indicators and clarify their priorities. This method, combining expert judgments and fuzzy logic, helps analyze and evaluate indicators in complex and uncertain conditions.

The ranking results indicated that the top three indicators were: creating player engagement with the brand (C2), matching the game type with the product/brand (C1), and aligning advertising content with the target players (C3), which ranked first, second, and third, respectively.

Creating player engagement with the brand (C2) achieved the first rank. This indicator is highly important because player engagement with the brand can have a profound impact on audience memory and willingness to interact more with the brand. To improve this indicator, brands should use game designs where players play an active role in the game's story, and the brand is naturally and attractively incorporated into the game flow. This can be achieved through interactive stories, rewards, and challenges that align with brand identity.

Matching game type with product/brand (C1) achieved the second rank. The integration of game type with the product or brand can have a significant impact on the audience's experience and their perception of the brand. Improving this indicator requires designing games that showcase the brand or product's nature in an attractive way that relates to the target audience. This can be accomplished by creating games where product features are utilized throughout different game levels, or brand messages are effectively conveyed through in-game interactions.

Matching advertising content with target players (C3) achieved the third rank. Advertising content must align with the needs and interests of target players to be impactful and effective. More precise research about the demographic and psychological characteristics of target players is necessary to improve this indicator. This way, advertising can be designed to be attractive and relevant for each group of players, thereby introducing the brand more precisely and effectively.

These results can help brands create more optimal strategies for advertising in the gaming world and provide more engaging interactive experiences for their audiences. Generally, advergaming increases brand memory, has a positive effect on brand evaluation, and influences product selection. Advergaming can transfer the pleasure of gaming to the brand placed in the game through psychological mechanisms. Through gaming experiences, games can help children acquire knowledge and behavioral norms; consequently, gaming can be described as a learning process in which entertaining content enhances the persuasive messages embedded within the game, thereby positively influencing the evaluation and preference for the presented product and brand.

This study contributes significantly to the theoretical understanding of brand integration in advergames, mainly through applying the Fuzzy AHP method to rank key indicators. By highlighting the importance of player engagement with the brand, the match between game type and product, and the alignment of content with target players, the research adds a structured framework for understanding how advergames can be optimized for maximum marketing impact.

From an academic perspective, this work advances the field of digital marketing by providing a methodologically sound approach to assessing advergame effectiveness. It also offers a conceptual framework for future studies examining how different factors such as game mechanics, player behavior, and brand storytelling affect brand memory and preference. From a practical standpoint, the findings offer actionable insights for marketers seeking to leverage advergames as part of their digital strategy. By focusing on these ranked KPIs, brands can create more targeted, engaging, and memorable experiences for their audiences, leading to stronger brand connections and increased loyalty.

### **Managerial Recommendations**

1. **Player Engagement Strategy Development:** Brand managers should prioritize fostering deep player engagement with the brand. This can be achieved by designing captivating levels and advergame challenges that seamlessly integrate the brand into the gameplay. Employing game mechanics such as competition, brand-related rewards, and customizable content can further enhance player engagement and strengthen the brand connection.
2. **Game Alignment with Brand Identity:** For the brand to be effectively integrated into games, the game type must align with brand and product characteristics. Brand managers should ensure that the brand message is consistent with the gaming experience and is naturally introduced throughout the gameplay process.
3. **Precise Player Targeting:** Matching advertising content with target audiences is another key factor. For this purpose, managers can use audience analysis data to ensure that advergames are accessible to target groups and that the advertising content is appropriate and attractive.
4. **Designing Attractive and Non-Intrusive Advergames:** Since advergames can become a highly effective advertising tool, managers should focus on designing entertaining and engaging games for audiences. These games should be designed to convey the brand message indirectly and avoid causing player irritation or annoyance.
5. **Integration of Multimedia Experiences:** Alongside gaming, content such as promotional videos, social campaigns, and online surveys can help strengthen advertising effectiveness and establish the brand in players' minds.

These recommendations can help marketers and game developers establish more effective and lasting connections with their audiences through advergames.

### Research Limitations

While the study presents valuable insights into the ranking of KPIs for effective brand integration in advergaming, it is important to address several limitations:

- The research may be limited by the sample size and context, as it focuses on a specific group of players or types of games. This could limit the generalizability of the findings to broader populations or game types.
- The dynamic nature of digital marketing and gaming means that trends and effective strategies may evolve quickly, making the findings time-sensitive.
- Emotional engagement, a crucial element in advergaming, is challenging to quantify, which may have constrained the depth of analysis in certain aspects.
- This research is mainly based on qualitative analyses and expert opinions and does not use extensive empirical or test data in a real environment.

### Future Research Directions

- *Emerging Technologies*: Future research can investigate the influence of augmented reality (AR) and virtual reality (VR) on advergaming to understand their potential to enhance user engagement and brand integration.
- *Personalization Strategies*: Future research can explore the impact of data-driven and customized advergaming experiences on improving brand connection and fostering consumer loyalty.
- *Psychological Mechanisms*: Future research can study the psychological aspects of player-brand interactions, such as the role of gamification elements in long-term brand preference.
- *Demographic Variability*: Future research can examine the effectiveness of advergaming across diverse demographics, focusing on how cultural, age or gender differences shape brand perception and player engagement.

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