

# Research on brand stickiness of gamification marketing under the perspective of immersion theory: Network social capital as mediating variable and fear of missing out as moderating variable effect

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**Abstract:** The advent of the experience economy in the 21st century has driven the development of the immersive industry. Now, how companies can retain customers and foster high brand stickiness is an issue that organizations should consider. Therefore, this study establishes gamified marketing as the independent variable, brand stickiness as the dependent variable, network social capital as the mediating variable, and fear of missing out (FOMO) as the moderating variable, based on immersive theory. Using a regional stratified sampling method, a total of 986 valid questionnaires were collected and analyzed through structural equation modeling. The results indicate that gamified marketing has a positive impact on brand loyalty. Additionally, network social capital mediates the relationship between gamified marketing and brand loyalty, while FOMO positively moderates this relationship. This study provides valuable guidance for businesses seeking to enhance user brand loyalty through gamified marketing, thereby increasing the likelihood of successful marketing implementation. It also strengthens the connection between consumers and businesses, helping to achieve marketing objectives and offering theoretical support for acquiring loyal customers.

**Keywords:** Brand stickiness, Fear of missing out, Gamification marketing, Immersion theory, Network social capital.

## 1. Introduction

### 1.1. Research Background

In the era of mobile Internet, brand is still an important element to establish and maintain a long-lasting connection between enterprises and customers. With the shift in marketing thinking, the commodity-driven logic is gradually replaced by service-driven logic, and customers are no longer regarded as eliminators of value, but as co-creators of value.

This relationship between enterprises and consumers can no longer be described simply by the concepts of customer participation, customer satisfaction, customer loyalty, but a higher degree of brand stickiness. It is difficult to provide consumers with a good consumer experience by relying on traditional marketing means, and at the same time, the ability to persuade customers to make decisions is gradually declining. Gamification marketing encourages user participation, strengthens the brand experience, and enhances brand stickiness by attracting consumers to actively participate in the company's marketing efforts and allowing consumers to have a game-like experience.

Immersive experiences can lead to the development of positive attitudes among online consumers, thus enhancing consumer preference for brand products [1]. By the same token, if consumers can experience mindstreaming in marketing activities, it will help maximize marketing performance. As an important part of a company's efforts to attract and retain users, gamification marketing can be used to make monotonous tasks fun and effectively enhance brand stickiness. Gamification revolutionizes human-computer interaction and user experience by providing motivating "game-like experiences" [2], and studies have shown that the fun and highly interactive nature of gamification can influence users'

mental states and behaviors, and that the use of game design elements in non-game goods or services can increase consumption and improve customers' continued use. can increase consumption and improve customers' continued willingness to use and satisfaction. Effective interaction between consumers and companies is a prerequisite for the co-creation of value [3], which therefore triggers thoughts on whether gamified marketing can further influence brand stickiness.

## 2. Literature Review and Hypothesis Development

### 2.1. Immersion Theory

Immersion Theory, also known as the theory of optimal experience, is a seminal concept in psychology first introduced by Csikszentmihalyi. The theory posits that individuals enter a state of flow when fully immersed in an activity, characterized by intense focus, absorption, and the exclusion of irrelevant perceptions. In this state, consciousness temporarily merges with the activity itself, reducing perceived challenges, enhancing self-affirmation, and motivating individuals to acquire new skills and engage in exploratory behaviors [4].

Central to Immersion Theory is the flow experience, facilitated by immersive media and technologies, which aids in understanding, explaining, and predicting organizational dynamics and human behavior. Csikszentmihalyi explored the psychological state where an individual's skills balance the challenge level of an activity, categorizing flow experiences into three degrees: engagement, engrossment, and total immersion [4, 5]. During such experiences, individuals report sensations like "loss of time awareness," "presence detached from reality," and "existential engagement" [6].

In marketing, flow experiences arise from interactions between the subject (consumer) and object (brand/product), shaped by three elements: environment, process, and touchpoints. Skadberg and Kimmel proposed a flow model for tourism websites, demonstrating that flow experiences positively influence visitors' attitudes and behaviors Skadberg and Kimmel [7]. Hoffman and Novak [8] pioneered the application of Immersion Theory to digital contexts, constructing a conceptual model of flow in hypermedia environments [8]. They argued that flow enhances learning, perceived control over interactions, exploratory tendencies, and positive subjective experiences. Their subsequent research confirmed that flow states are applicable to evolving internet environments and influence consumer behavior. Chen and Hsu [9] found that online users' flow experiences yield positive outcomes Chen and Hsu [9]. Koufaris revealed that online consumers are not purely utilitarian; the enjoyment and ambiance of digital shopping environments drive repeat visits Koufaris [10]. Lee and Chen [11] using the Theory of Planned Behavior (TPB), identified four dimensions of flow—focused attention, enjoyment, time distortion, and remote control—as antecedents of online consumer behavior Lee and Chen [11]. Soma and Asmita [12] highlighted that personality traits significantly correlate with perceived user satisfaction, mediated by online flow experiences [12].

### 2.2. Brand Stickiness

Brand Stickiness refers to the sense of dependence and re-consumption expectations formed through the interplay of consumer loyalty, trust, and positive experiences with a brand or product. A stronger sense of dependence correlates with higher consumer stickiness, while elevated re-consumption expectations amplify brand stickiness [13]. As a mature concept in business management, brand stickiness has been extensively studied for its role in fostering enduring brand-user relationships.

For instance, Sebastian et al. examined online brand communities, analyzing how social support, community identity, and community trust influence customer fit [14]. Their findings revealed that customer fit within these communities positively enhances brand-user stickiness, offering actionable insights for companies to leverage online communities for business objectives. Similarly, Ruiz-Mafe and Veloutsou [15] focused on online communities, demonstrating that customer fit drives value co-creation and strengthens brand stickiness [15]. Their work underscores strategies for improving user retention and word-of-mouth in digital environments.

A positive user experience is critical for boosting satisfaction, loyalty, and sustained usage behavior. In terms of reward mechanisms, incentivizing users through points, coupons, or other benefits can stimulate engagement, heighten satisfaction, and reinforce loyalty, thereby encouraging continued use [16]. Social factors also play a pivotal role in shaping user stickiness. Interactions among users during product or service usage foster social bonds, which cultivate a sense of belonging and identity. These connections enhance loyalty and sustain usage behavior over time [17].

### 2.3. Gamification Marketing

Gamification, the application of game design elements in non-game contexts, has emerged as a critical practice in service marketing, experiential marketing, and relationship marketing. Given marketing's inherent reliance on persuasion, motivation, and behavioral influence, gamification holds significant potential to enhance marketing outcomes Zichermann and Linder [18]. Deterding, et al. [19] defined gamification as "the use of game design elements in non-game contexts", a definition widely adopted in academia [19]. They emphasized that gamification integrates elements such as game mechanics, principles, frameworks, and interface designs into non-game environments to motivate user participation and retain existing users.

Huotari and Hamari [2] reframed gamification marketing as "a process of enhancing services by providing gaming experiences to support overall value creation for users" [2]. This definition underscores the centrality of customer experience but cautions against prioritizing sales metrics (e.g., digital transaction volumes) over meaningful engagement. Overemphasis on transactional goals risks undermining the experiential value of gamification, creating tension between commercial objectives and user-centric design Huotari and Hamari [2].

Lounis, et al. [20] focused on customer engagement, framing gamification as a strategy leveraging game thinking and mechanics to immerse consumers in non-game shopping environments and drive behavioral change [20]. Similarly, Lucassen and Jansen [21] identified three core marketing objectives achievable through gamification: enhanced engagement, brand loyalty, and brand awareness Lucassen and Jansen [21].

Robson, et al. [22]; Robson, et al. [23] highlighted gamification's social value, particularly for users motivated by socialization, networking, or community-building. For these "socializers," understanding, empathizing with, and learning from peers are critical drivers of participation.. Huotari and Hamari [2] further posited that gamified interactions align with service marketing principles, functioning as service systems that can be analyzed and optimized through service theory Huotari and Hamari [2].

Huotari and Hamari [2] gamification as a tool to embed game elements into persuasive systems, encouraging hands-on user activities Zuckerman and Gal-Oz [24]. Hsu and Chen argued that gamification marketing campaigns deepen user relationships by fostering engagement and incentivizing specific behaviors Hsu and Chen [25]. Tobon, et al. [26] expanded this view, conceptualizing gamification as "integrating game elements into non-game domains" through full-fledged virtual games or hybrid systems blending gamified features with existing functionalities Tobon, et al. [26]. Kühnbach, et al. [27] defined gamification through an experiential lens as "augmenting non-game entities with game elements to evoke a game-like experience" [27].

### 2.4. Network Social Capital

Network Social Capital (NSC), while rooted in traditional social capital theory, represents a distinct conceptual evolution. Traditional social capital refers to socially structured resources embedded in interpersonal relationships that individuals can mobilize to facilitate actions or achieve goals [28]. In contrast, Ellison et al. NSC encompasses both offline social ties and novel digital connections formed through pervasive information technology, enabling access to resources (e.g., information, influence) Ellison, et al. [29]. Spottswood and Wohn [30] define NSC as "social capital emerging from widespread IT adoption, empowering individuals to acquire resources through networked interactions"

[30]. This framework is particularly relevant in online brand communities, where consumers gather, share, and interact with brand-related information, constructing social networks to access resources like information, relationships, and influence. Empirical studies highlight NSC's role in consumer behavior: Sander and Lee demonstrated that information interaction among community members reduces consumers' search costs, enhancing brand awareness and perceived value Sander and Lee [31]. Habibi, et al. [32] conceptualize brand communities as platforms fulfilling members' social needs, where activities like knowledge sharing, opinion exchange, and content engagement (e.g., likes, retweets) elevate members' status, influence, and even position them as opinion leaders Habibi, et al. [32]. Dermawan, et al. [33] applied social capital theory to online group buying, showing that NSC positively drives sustained participation in such platforms [33].

### 2.5. Fear of Missing Out

The term Fear of Missing Out (FOMO) was first proposed by Herman [34] who believes that the fear of missing out is an important factor in maintaining the brand effect and influencing the psychology of consumers so as to stimulate individuals to spend money Herman [34]. Akbari, et al. [35] define FOMO as "the anxiety individuals anticipate about potential future regrets", positing that it permeates all aspects of life, including fears of missing beneficial social activities, investment opportunities, or novel experiences [35]. In consumption scenarios, Hodgkinson notes that miss fear can evolve into the fear of missing out on other values represented by goods, arguing that miss fear can be applied as a claim in commercial advertising, due to the fact that when an individual sees someone else's consumption activity there will be a generalized concern that others may have the beneficial experience that he or she is missing out on [36]. A perceived inability to successfully purchase scarce goods (limited-time and limited-quantity goods) in a scarcity promotion situation would be a threat to self-concept and self-worth Dogan [36]. Zhang, et al. [37] based on self-concept theory, stated that the dimensions of missing out fear should include both personal missing out fear and social missing out fear, that is, an individual's fear of missing out on an experience that could help the individual to maintain or enhance their private or social selves through an experience [37].

### 2.6. The Relationship between Gamification Marketing and Brand Stickiness

Gamification marketing can achieve an effective increase in user stickiness by attracting users to actively participate in the company's marketing efforts. Grammenos, et al. [38] demonstrated that advertisement games are an effective way to promote product promotions or branding, and that consumers can derive pleasure from them. Gamification can also encourage users to participate in marketing activities at a lower cost, increase user stickiness, and achieve the enterprise's marketing objectives Grammenos, et al. [38]. Conaway and Garay take the enterprise website as the object of study, pointing out that the enterprise can flexibly use competition, levels, medals, points, rewards, and other game design elements to attract the user to actively participate in marketing activities, and realize the significant increase in user stickiness, user loyalty, and product sales [39]. loyalty, and product sales. Berkel, et al. [40] take mobile APP as the research object, and argue that gamification experience can provide incentives for users at a lower cost, and the incentive effect will be higher than the traditional material incentives, which can effectively improve user engagement and generate stronger user stickiness Berkel, et al. [40]. Ueyama, et al. [41] in study of people's motivation to participate in gamification, it was found that the satisfaction of users' basic psychological needs has a positive impact on the formation of users' internal motivation Ueyama, et al. [41]. Harwood and Garry [42] through a case study of the Samsung Nation virtual brand community, found that the use of gamification mechanisms enables customers to make a positive investment in the brand emotionally and behaviorally, and at the same time brings about trust, commitment, brand fit outcomes such as repeat purchase and increased interaction [42]. In addition, according to the viewpoint of immersion theory, while the user's skills improve during the game, the game will also set higher challenges for the user, so that the user will not be bored because the challenge is too low or anxious because of insufficient skills, but will

always be in a state of immersion because of the balance of skills and challenges Csikszentmihalyi [43]. Lee, et al. [44] studied the AR game Pokémon GO, identifying that immersion, challenge, control, novelty, and focus positively influence user stickiness. These elements maintain a balance between skill development and escalating challenges, sustaining engagement [44]. Based on this, this research hypothesizes:

*H<sub>1</sub>: Gamification marketing positively affects brand stickiness*

## *2.7. The Effect of Network Social Capital on Brand Stickiness*

Brand community is a network of relationships, and social capital is the sum of actual and potential resources originating from and embedded in the network of relationships, and brand loyalty occurs only when the brand brings concrete value to the consumer. Dasgupta and Serageldin argues that brand as a historical concept, brand implies a kind of glue that binds social groups together, and it represents a complex multidimensional social relationship Dasgupta and Serageldin [45]. Bagozzi and Dholakia [46] pointed out that brand community value is an important driving force for consumers to participate in the brand community, when consumers get enough value from the brand community, their community participation will be increased, and they will be more likely to form a community commitment and ultimately affect their brand loyalty, which will enhance the adhesion between consumers and brands Bagozzi and Dholakia [46]. Zboja and Voorhees [47] showed that only when consumers feel the value of transference, it can generate consumer satisfaction and then form brand loyalty Zboja and Voorhees [47]. Van Durme, et al. [48]. believed that the financial value, social value, image value, information value and entertainment value of brand community will effectively enhance the sense of community and improve brand loyalty Van Durme, et al. [48]. Sicilia and Palazón [49] studied online communities and found that consumers who obtain valuable information or perceive a higher status in the community are more likely to participate in community activities and become loyal members of the brand Sicilia and Palazón [49]. Fournier and Lee [50] pointed out that for online brand communities, the community value has an impact on brand loyalty through the community awareness Fournier and Lee [50]. Jahn and Kunz [51] combined the three-dimensional theory of social capital with brand community research and concluded that brand community social capital influences brand community commitment through informational value and social value, which in turn influences brand loyalty Jahn and Kunz [51]. Dessart, et al. [52] found that community commitment is a mediator between community value and brand loyalty, and that entertainment value is a mediator between community value and brand loyalty. mainly affects brand loyalty via affective community commitment [52]. Based on this, this research hypothesizes:

*H<sub>2</sub>: Network Social Capital positively influences brand stickiness*

## *2.8. The effect of Network Social Capital on the Relationship between Gamification Marketing and Brand Stickiness*

Gamification marketing is essentially a social activity, and socializing is likely to bring new relationships, connections, and help people accumulate social capital. Previous studies have found that online social media use brings bridging social capital to people, as the spatial and temporal spanning nature of online technology allows people to reach out to a wider range of contacts, thus building and maintaining bridging social capital [53, 54]. Some studies have also found that specific usage motives and behaviors also increase consumers' bonding social capital, allowing them to develop closer relationships and emotional support online. On the one hand, gamification marketing can positively shadow the brand experience through perceived value, and consumers can obtain certain material incentives and participation fun in gamified products or services [9]. On the other hand, gamification elements can help to enhance brand experience. Gamification elements include immersive gamification elements, social gamification elements, and achievement gamification elements, and different gamification elements can satisfy the basic psychological needs of users, thus realizing customer brand fit, enhancing brand experience, and ultimately improving consumer loyalty to the brand [55]. On the

other hand, the interaction, communication, joint activities or co-creation between consumers and firms in gamified marketing is important for enhancing consumer experience, building intimate relationships, and increasing high stickiness between firms and consumers [56]. Based on this, this research hypothesizes:

*H<sub>3</sub>: Network Social Capital mediates gamification marketing and brand stickiness*

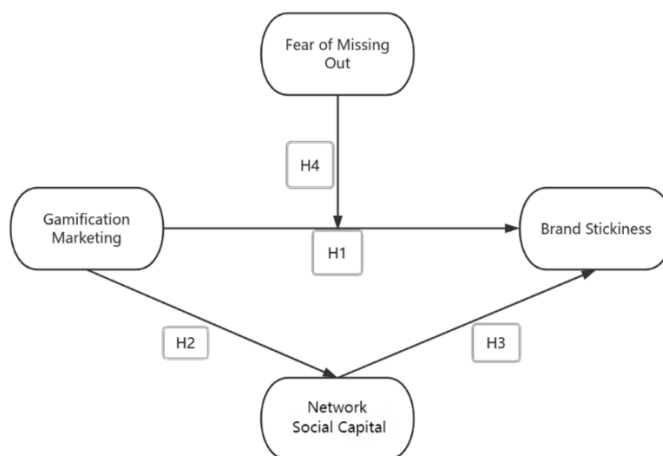
### 2.9 The Effect of Fear of Missing Out on the Relationship Between Gamification Marketing and Brand Stickiness

Mandel, et al. [57] constructed a model of consumer impulse purchase decision-making under the environment of community marketing, and the analysis found that community atmosphere plays a significant role in consumer impulse purchase Mandel, et al. [57]. Shah, et al. [58] conducted a questionnaire study on consumer participation behavior with community group purchasing as the research background, which showed that factors such as interaction and closeness with other members felt by consumers in the community as well as the convenience and economic characteristics of group purchasing itself promote consumers' group purchasing willingness and group purchasing behaviors through trust, relational commitment and satisfaction Shah, et al. [58]. Yuan, et al. [59] pointed out that in a brand gamification marketing situation, when consumers receive information about the scarcity of an item, they worry about not being able to purchase it due to limited quantity or time, and if other consumers in the same community show purchase intentions and behaviors towards the product, individuals are afraid of missing out on the other values that the product represents [59]. As a result, if they do not purchase products that are popular in their community, they will fall behind other members and even feel out of place in the group. The study suggests that if the product message conveys a sense of scarcity, it will lead to a greater degree of anxiety about missing out on the goods, which will lead to the purchase of such products and enhance the adhesion with the brand. Based on this: this research hypothesizes:

*H<sub>4</sub>: Fear of missing out plays a positive moderating role between gamification marketing and brand stickiness.*

## 3. Research Design

### 3.1. Research Framework



**Figure 1.**  
Research Framework Diagram.

### 3.2. Operational Definition and Measurement of Variables

This research adopts Hansen [60] statement on brand stickiness that the adhesion of brand and consumer behavior, brand stickiness is the embodiment of the dynamic practice of brand loyalty by

consumers, and the degree (stickiness) reflects the degree of active, dependent, frequent and habitual interaction with the brand, and it is an important indicator of the value of brand loyalty. But brand stickiness is not equal to brand loyalty. Brand stickiness is a behavioral state, while brand loyalty is a psychological realm, brand and consumer behavior of adhesion is a dynamic process, and the result of this dynamic process is brand loyalty. This research adopts Deterding, et al. [19] argues that gamification marketing is both the development and utilization of game potential in marketing activities and the active integration of game features and mechanisms into marketing communications. In other words, gamification marketing refers to a marketing concept and approach that uses game thinking for planning and design, integrates game features and mechanisms into marketing communications, and promotes the realization of objectives by creating entertainment experiences and providing motivation for consumer participation. This research adopts Nahapiet and Ghoshal [61] definition of social capital defines cybersocial capital as social capital centered on identity or trust that is generated and maintained primarily through the Internet, and built between Internet users or between Internet users and branded communities, for the purpose of exchanging and acquiring virtual or real resources. That is, social capital that is owned by individuals and can bring benefits to them, and that is maintained in relationships mainly through the Internet. This research adopts Hodgkinson [62] definition, defines fear of missing out as a diffuse anxiety that arises in individuals because of the fear that they are missing out on meaningful experiences or valuable information from others. It is mainly characterized by the anxiety of consumers who fear losing or missing out on products or brands in their daily lives and being abandoned or ostracized. This study takes consumers as the main measurement and research object, and this paper draws on the user stickiness and brand stickiness scale developed by Xi and Hamari [63] with a total of 9 questions. The gamification marketing scale developed by Yang, et al. [64] with a total of 11 questions. The network social capital scale proposed by Krishen, et al. [65] with a total of 11 questions. Fear of Missing Out Scale developed by Zhang, et al. [37] the scale totaled 9 questions. The Likert 7-point scale was used, with scores ranging from 1 to 7 on a scale from “agree” to “disagree”.

### 3.3. Sampling Method

The main purpose of this research is to explore the impact of personalized marketing and gamification marketing on brand stickiness. Sample selection, because of China's vast land and large population, in order to improve the representativeness of the sample, so as to improve the accuracy of the sample inference of the whole, five cities, Shanghai, Beijing, Guangzhou, Shenzhen and Hangzhou, were selected as the scope of the study. Brand is an important resource for enterprises to participate in market competition, an important grip to lead the high-quality development of economy, and an important indicator to measure the economic strength of cities. With strong business environments and market potential, these cities have attracted a large number of e-commerce enterprises and entrepreneurs to move in and become important centers of e-commerce in China. This research uses regional stratified proportional sampling, where sampling in a geographic area is done by first dividing the selected area (city, township, town, street, etc.) and then sampling, from which the well-divided area in the divided area is selected as the sample area, and then sampling or performing complete sample sampling in the area that is sampled to Everitt [66]. Consumers aged 18-60 years old in five cities, namely Shanghai, Beijing, Guangzhou, Shenzhen and Hangzhou, were used as the population for the study. According to Sudman [67] the scope of the research population is a nationwide study and it is recommended that 1,500-2,500 people be sampled and the statistical sample size of the sample survey requires a sufficiently large sample size in order to ensure the reliability of the analyzed results. Therefore, this study selects consumers in five cities: Shanghai, Beijing, Guangzhou, Shenzhen and Hangzhou as the research object, with a total sample size of 1,500 people, and then, according to the seventh national census, the number of resident population in Shanghai is 24,874,500, the number of resident population in Beijing is 21,893,100, the number of resident population in Guangzhou is 18,827,000, the number of resident population in Shenzhen is 17,790,100, the number of resident population in Hangzhou is 17,797,011, and the number of resident population in Hangzhou is



17,797,011. 1779.01, and the number of permanent residents in Hangzhou is 1252.20. Therefore, according to the regional stratified proportional sampling, 390 questionnaires were distributed in Shanghai, 342 questionnaires were distributed in Beijing, 295 questionnaires were distributed in Guangzhou, 278 questionnaires were distributed in Shenzhen, and 195 questionnaires were distributed in Hangzhou. In total, 1500 questionnaires were distributed.

## 4. Data Analysis and Results

### 4.1. Reliability Analysis

After validation, it can be seen that the Cronbach's  $\alpha$  value of brand stickiness is 0.921, the Cronbach's  $\alpha$  value of gamified marketing is 0.934, the Cronbach's  $\alpha$  value of network social capital is 0.972, and the fear of missing out is 0.960, and the corrected term to total correlation of these variables are all less than 0.4, and the corrected term to total correlation of these variables is less than 0.4. Cronbach's  $\alpha$  value of 0.960, and the corrected item-total correlation of all these variables is less than 0.4, The CITC coefficients for all question items were higher than 0.4, and the Cronbach's  $\alpha$  values after deletion were smaller than the total Cronbach's  $\alpha$ , indicating no improvement. The internal consistency was good.

### 4.2. Validity Analysis

The validity analysis was divided into convergent and discriminant validity. There are three main ways to determine whether there is convergent validity: the first is that all standardized factor loadings should be greater than 0.5, the second is that the combined reliability (CR) should be greater than 0.6, and the third is that the average variance extracted (AVE) should be greater than 0.5 [68]. The criterion for determining discriminant validity is that the square root value of the average variance extracted (AVE) should be greater than the correlation coefficient between variables [69]. Table 1 shows that the combined reliability (CR) values were all between 0.919 and 0.972 (greater than 0.7). The AVE values were all between 0.559 and 0.761 (greater than 0.5), which indicates good convergent validity, and the square root of the AVE was greater than the correlation coefficients between the two variables, which indicates good discriminant validity.

**Table 1.**  
Distinguishing and Convergent Validity, Correlation Analysis Table.

Variable	1	2	3	4
BS	<b>0.747</b>			
GM	0.255**	<b>0.741</b>		
NSC	0.336**	0.401**	<b>0.872</b>	
FOMO	-0.247**	-0.045	-0.229**	<b>0.852</b>
CR	0.559	0.548	0.761	0.727
AVE	0.919	0.930	0.972	0.960

**Note:** \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p \leq 0.001$ ; Bolded values are the arithmetic square root of AVE; Sources are compiled for this study.

### 4.2. Descriptive Statistics for Variables

Table 2 shows the data situation distribution analysis for brand stickiness, gamification marketing, network social capital and fear of missing out. If the absolute value of kurtosis is below 10 and the absolute value of skewness is below 5, then it is consistent with the provisions of normal distribution [70] and the quality of data is better and can be tested in the next step. From Table 4.4, it can be seen that the absolute value of skewness of the measured variables is between 0.210-1.062, and the absolute value of kurtosis is between 0.768-0.805, which meets the requirement of normal distribution.



**Table 2.**

Table of Descriptive Statistics of the Sample Data.

Variable	N	Min.	Max.	Average	S.D.	Skewness	Kurtosis
BS	986	1.444	6.778	4.276	1.164	-0.214	-0.779
GM	986	1.182	6.818	4.258	1.153	-0.210	-0.768
NSC	986	1.000	7.000	5.067	1.317	-1.076	0.805
FOMO	986	1.000	7.000	2.893	1.265	1.062	0.780

#### 4.3. Validation Factor Analysis

Validated factor analysis (CFA) was used to test the convergent and discriminant validity of each construct. According to Table 5, the  $\chi^2/df$  values for brand stickiness, gamification marketing, network social capital and fear of missing out all less than 5. The CFI and TLI were greater than 0.9, and RMSEA and SRMR were less than 0.08, all of which met the fitness criteria [71]. The factor loadings for the items of brand stickiness from 0.726 to 0.775, all of which were greater than 0.5, and the factor loadings for gamification marketing from 0.712 to 0.784, all of which were greater than 0.5; The factor loadings for each of network social capital from 0.865 to 0.891 which were all greater than 0.5; The factor loadings for each of fear of missing out from 0.816 to 0.879, which were all greater than 0.5; suggesting that the validity of the items met the criteria and there was good convergent validity [72].

**Table 3.**

Summary of the Analysis of the Validity Factors of Each Configuration.

Variable	Measurement item	$\chi^2/df$	CFI	TLI	RMSEA	SRMR
BS	9	1.202	0.999	0.999	0.014	0.011
GM	11	2.94	0.987	0.983	0.044	0.018
NSC	11	3.361	0.991	0.989	0.049	0.011
FOMO	9	1.208	0.999	0.999	0.015	0.007

The hypotheses were tested using MPLUS 8.3. As suggested by Hu and Bentler [71] regarding the guidelines for indicator assessment,  $\chi^2/df < 5$ ; TLI > 0.90; CFI > 0.90; RMSEA < 0.08; and SRMR < 0.08. The data were thus well adapted to the measurement model.

#### 4.4. Analysis of Empirical Results on Direct Effects

The path of the independent variable to the dependent variable needs to be examined first, including 2 models. Model 1 needs to regress gamification marketing(X) on brand stickiness(Y). Model 2 needs to regress network social capital(M) on brand stickiness(Y).

**Table 4.**

Summary of the Direct Effects Analysis.

Hypotheses Paths	Effect	S.E.	t	P
X→Y	0.086	0.037	2.343	0.019
M→Y	0.210	0.036	5.882	0.000

As can be seen from Table 4, the coefficient of gamification marketing on brand stickiness in Model 1 was 0.086 and significant ( $p = 0.019 < 0.05$ ), indicating that there is a significant gamification marketing on brand stickiness; therefore, H1 was valid. As can be seen from Table 5, the coefficient of network social capital on brand stickiness in Model 1 was 0.210 and significant ( $p = 0.000 < 0.05$ ), indicating that there is a significant network social capital on brand stickiness; therefore, H2 was valid.

#### 4.5. Analysis of Empirical Results on Mediating Effects

The main purpose of the mediation effect test is to better explain the mechanism of action of the relationship between the independent and dependent variables and to better integrate the relationship between the variables [73].

Table 5 shows that the total effect Bootstrap 95% confidence interval of “Gamification Marketing → brand stickiness” is  $[0.131, 0.263]$ , and the test result does not include 0, indicating that the total effect is significant. The direct effect is  $[0.006, 0.164]$ , the test result does not include 0, indicating that the direct effect is significant. Indirect effects need to be combined with two or more path regression results value multiplication obtained, such as the mediating variable M when the effect value of X-M and M-Y multiplied, that is, to obtain the indirect effect value, the indirect effect value of Bootstrap sampling test, and ultimately to verify whether there is a mediating effect. Indirect effect analysis using Bootstrap sampling test method for mediation effect research, the sampling number is 5000 times. Table 5 shows that the mediation path is “gamification marketing → network social capital → brand stickiness”, Bootstrap 95% confidence interval is  $[0.034, 0.082]$ , the test results do not include 0, indicating that this mediation effect path exists, when the mediating variable is added to the model, the independent variable significantly affects the dependent variable, which can be recognized as part of the mediation effect. dependent variable, which can be recognized as a partial mediator. Therefore, H3 was valid.

**Table 5.**  
Summary of the Effects Analysis.

Hypotheses Paths	Effect	S.E.	t	P	LLCI	ULCL
Gamification Marketing → Brand Stickiness	0.086	0.040	2.140	0.032	0.006	0.164
Total Effect	0.199	0.034	5.821	0.000	0.131	0.263
Total Indirect Effect	0.113	0.020	5.627	0.000	0.076	0.155
Gamification marketing → network social capital → brand stickiness	0.056	0.012	4.624	0.000	0.034	0.082
Direct effect	0.086	0.040	2.140	0.032	0.006	0.164

#### 4.6. Analysis of Empirical Results of Moderating Effects

In this study, the latent moderated structural equation method is used so as to test the role of the moderating variables. The advantage of the latent conditioning structural equation is that it can solve the problem of the generation of the product indicator and the non-normal distribution of the product term indicator, and it can regard the non-normal indicator as the mixed result of the variable and the conditional normal distribution, so that the effect of the interaction term no longer needs to be constructed, and it does not need to regard the hypothetical interaction effect as the inevitable normal distribution, which solves the problem that is difficult to be solved in the method of product indicators. It is difficult to solve the problem, not only can effectively avoid the problem of inconsistency between the parameters and the preset results caused by the product indicator generation method, but also can solve the prejudgment bias generated by the non-normality of the product term, so that the results of the experiment can maximize the restoration of the real performance of the data. As can be seen from Table 6, the standardized path coefficient of the interaction term of gamification marketing and misplaced fear on brand stickiness is 0.105, and the t-value is 3.336,  $P=0.000<0.05$ , which indicates that the interaction term of gamification marketing and misplaced fear has a significant effect on brand stickiness. Therefore, H4 was valid.

**Table 6.**  
Summary of Moderating Effects Hypothetical Path Results.

	Effect	SE	t	p
Gamification Marketing	0.261	0.031	8.320	0.000
Fear of Missing Out	-0.240	0.031	-7.659	0.000
Gamification Marketing×Fear of Missing Out	0.105	0.032	3.336	0.001

## 5. Conclusions and Discussion

### 5.1. Results

This paper draws the following four conclusions:

First, gamification marketing by companies affects brand stickiness. Gamification mechanism is different from other marketing strategies in that it views competition as a challenging motivation to get consumers actively invested in the brand emotionally and behaviorally, and brings about trust, commitment, repeat purchases, and increased interactions [44] e.g., badges and virtual rewards increase brand loyalty, leaderboards promote differentiation among players, and the time and resource finiteness forces players to make quick decisions, all of which can promote brand fit and ultimately create lasting and stable brand stickiness [21].

Second, Network Social Capital affects brand stickiness. For brand community Network Social Capital affects brand community commitment via informational value and social value [52] while consumers are willing and able to pay for experiences in brand communities to get the information they need, which creates a sustained commitment to online brand communities [74] and impacts brand loyalty via community commitment [50] at the same time, the brand community itself has a strong relationship, and consumers in social media are more inclined to share their opinions, produce content, and interact and communicate within the brand community around common interests, and in the process continue to strengthen brand stickiness [75]. so the establishment and operation of an online brand community so as to maintain the consumer relationship, is the a good way for companies to foster brand loyalty among consumers [76].

Third, Network Social Capital enhances the impact of gamification marketing on brand stickiness. Brand adherence is largely influenced by the consumer experience, which can be enhanced by building brand communities and using gamification marketing to enrich content and strengthen brand bonding [77]. Through gamification marketing can enable consumers to achieve a state of immersion and win game rewards as a result, which in turn increases the number of purchases, types of purchases, or frequency of purchases, thus promoting the creation of stickiness between consumers and brands [25].

Finally, consumers' fear of missing out will enhance the impact of corporate gamification marketing on brand stickiness. With the rapid development and popularization of mobile social media, it brings us convenient and fast information delivery as well as many negative impacts, such as cell phone addiction, problematic Internet use, low-tempered people, impulsive purchasing, competitive consumption, and other problematic behaviors, which are more or less influenced by the fear of missing out behind [59, 78]. Whereas reward-driven is a major factor influencing the fear of missing out [79]. the process of individuals desiring scarce goods is essentially a process of satisfying missing social needs and enhancing personal well-being, and this self-established goal (scarce goods) is further reinforced along with the purchasing behavior. Commodity sellers or firms may intentionally limit the number of commodities by gamification marketing as a way to increase the attractiveness and value of the commodities, and in this context, consumers experience strong competitive pressure, and that pressure increases as the number of limited promotional commodities decreases [80] and missing out on the consumption experience may pose a threat to the consumer's self-concept. Therefore, consumers tend to purchase and use goods to maintain or enhance their self-worth [37] and increase consumers' motivation and willingness to buy as a way to drive consumption and gain as many customers as possible [81].

### 5.2. Theoretical Implications

Under the digital eco-business environment, it is difficult to provide customers with a good consumption experience by relying on traditional marketing means, and the persuasive power of customer decision-making is gradually declining, while gamification marketing attracts and stimulates customers to participate spontaneously by adopting different elements of game design, and has more rights while customers feel multiple experiences, so as to immerse consumers in marketing activities. In the field of marketing, scholars' research on gamified marketing mostly stays on the study of gamification at the overall level [21] or only uses gamification as a research background, and more detailed research on gamification and marketing is still scarce.

So far, Jang et al. study confirms that gamified marketing promotes customer engagement [76] enriches the customer's consumption experience [82] enhances customers' intrinsic need for satisfaction [3] improves the image of the brand in the customer's mind [83] and maintain subsequent connection and development between customers and companies [84]. Mostly, gamification applications are used as a background, and the psychological and behavioral changes of consumers' participation in gamified marketing are not explored in depth.

Meanwhile, most of the previous investigations on stickiness have explored user stickiness in terms of technology, social factors, etc., based on TAM theory, self-determination theory, etc. in terms of users' overall feelings towards the product [85]. The research on gamification on consumer behavior mainly explores consumer behaviors such as purchase behavior and brand loyalty, and there is no research on whether corporate marketing affects the stickiness between brands and consumers.

### 5.3. Practical Implications

This paper draws on immersion theory research to identify the factors influencing the impact of gamified marketing on brand loyalty and its specific mechanisms. Taking consumers as the research subjects, the study employs relevant models and survey questionnaires to explore the effects of corporate gamified marketing strategies on brand loyalty, providing theoretical support for businesses seeking to acquire loyal customers. It not only offers guidance for businesses looking to leverage gamification to enhance user brand loyalty but also provides insights for businesses seeking to apply marketing strategies effectively in other marketing scenarios. This has practical significance for businesses implementing gamified marketing.

Additionally, this paper offers new insights and directions in exploring the boundaries of how marketing types influence brand loyalty. Different types of consumers exhibit varying emotional responses to external stimuli. By introducing the concept of consumer fear of missing out, this study explains how different consumer characteristics influence brand loyalty. On one hand, this provides new insights into the impact of gamified marketing on brand loyalty. On the other hand, it offers guidance for marketers in designing gamified marketing strategies by helping them better understand user psychology, enabling them to adopt more effective marketing approaches.

By understanding network social capital and the fear of missing out, businesses can select appropriate marketing methods during the marketing process, increasing the likelihood of successful implementation. This enhances consumers' purchasing experiences, strengthens customers' brand recognition of the company, increases purchasing behavior, fosters customer interaction, reinforces the connection between customers and the company, and achieves the company's marketing objectives. This approach helps businesses better anticipate future user needs and trends in communication, guide business innovation in marketing strategies, deepen understanding of marketing, and provide valuable insights and references for the practical implementation and future development of marketing.

### 5.4. Research limitations and Future Prospects

First, this study constructs a structural equation model with consumers of brand stickiness of Gamification Marketing as the research object, and adopts a more general research method in statistics in the stage of empirical research and data analysis, and does not analyze the possible moderating variables in depth due to the limitations of the author's academic level and objective resources of the study. For example, age, game experience, income, education and other demographic characteristics may all have an impact on the effect of enterprises to carry out Gamification Marketing, which can be expanded and deepened in future research. Second, model variable selection and hypothesized relationship construction. The variables in the theoretical model of this study mainly come from past relevant research literature and academic theories, and are extracted and hypothesized on the basis of combining one's own observations and reflections. Although the selection of the model variables integrates comprehensiveness and relevance, there may still be some important variables that are not included in the model of this study. Therefore, more diverse variables can be selected in subsequent

studies to further enrich the theoretical model and increase its explanatory power. Third, only one relevant theory, immersion theory, is used in this study, but important theories such as TAM theory and self-determination theory, which explore brand stickiness from the perspective of consumers' overall feelings toward products, are not included in this study, so whether they need to be improved or not needs to be verified in the future. Fourth, due to the limitations of the research conditions, it is not possible to organize and carry out real game-based marketing activities, and it is difficult to imagine the specific experience of the subjects when doing the questionnaire and their perception of the brand. Although the questionnaire required the subjects to recall in detail whether there was a heart flow when participating in the marketing activities before filling in the questionnaire, it was difficult for the subjects to reach the mental state during the participation process, and bias in emotional cognition might occur, affecting the accuracy of the questionnaire data. Therefore, future research can also try a variety of methods, such as case studies and experimental methods, etc. Consideration can be given to designing different types of gamification marketing programs to arrive at the experience and evaluation of the brand after the subjects have completed them, so that the results of the study will be more accurate.

### Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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