The Study of Game Dynamics and Community Characteristics in The Metaverse Affecting on Brand Engagement and Brand Loyalty

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Abstract

This study investigates the factors that impact brand loyalty using dynamics in gamification design and the characteristics of online communities within the metaverse. To develop the conceptual framework, focusing on perceived benefits in social and emotional aspects, brand engagement, and brand loyalty. Respondents must be over 18, have joined the brand's community in the past six months, and answer at least 2/3 of the screening questions about Metaverse. This study collected 327 samples via an online survey using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to compare the hypothesis-based models. The result found that brand engagement affects brand loyalty, social benefits, and emotional benefits affect brand engagement. However, the social benefit involving brand engagement outweighs the emotional benefit affecting brand engagement with statistical significance. It is discovered that context in game dynamics has the most impact on social benefit, followed by community value and freedom to express. Moreover, rewards and recognition in online communities in the metaverse affect social benefits oppositely. The research also found that cooperation in game dynamics does not impact social benefits, and completion in game dynamics does not affect emotional benefits.

Keywords: Metaverse; Game Dynamic; Online Brand Community Characteristics; Brand Engagement; Brand Loyalty

Received: August 2, 2023 | **Revised:** August 25, 2023 | **Accepted:** September 15, 2023

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Introduction

The concept of metaverse exploration has gained significant interest, particularly among businesses looking for new opportunities in the virtual world. It is being hailed as a crucial development in the business landscape. The modern-day metaverse is different from the previous one. The main reason is the development of advanced augmented reality technology to enhance the augmented reality experience for users (Hollensen et al., 2022; Park & Kim, 2022). By utilizing blockchain technology, Metaverse enables users to own their property altogether. This technology combines the benefits of encryption, databases, and decentralized control to achieve its unique properties (Viriyasitavat et al., 2022). Metaverse currently has both centralization and decentralization blockchain technology depending on Metaverse ‘s developer, but all blockchains share the expected benefits of different levels of decentralization. Which reduces failure and data integrity to a single point (Viriyasitavat & Hoonsopon, 2019). Nowadays, Accessing the Metaverse has become more accessible than ever. With the advent of mobile technology, it is now possible to access this virtual world from any location, anytime. This advancement has allowed individuals to experience the Metaverse on the go without the need for a personal computer (Park & Kim, 2022). People will spend more time and engage with each other through virtual spaces (Chohan, 2022). There is a growing perception among consumers that living in virtual worlds is comparable to living in physical realities (Foutty & Bechtel, 2022).

Gamification and Brand are meaningful integrating that cannot be overstated (Biloš, 2022; Lucassen & Jansen, 2014; Raj & Gupta, 2018). It also found that gamification is an integrated development of a highly effective online strategy for your brand and is paramount in establishing and maintaining a formidable online presence and attracting and retaining new customers (Kankanhalli et al., 2012; Noorbehbahani et al., 2019). Using gamification has become a general approach to creating a comprehensive brand experience for customers (Hazan et al., 2022). The MDA gamification design model facilitates the creation and analysis of games from a player-centric standpoint. This approach aids in developing gamification that provides both functional and hedonistic value that enhances the overall experience for the user (Xu et al., 2017). In the year 2016, Ruhi expanded upon the details of the design model, further refining its specifications of the MDA Model. The research conducted by Ruhi in the year 2016 delves into the intricacies of the MDA Model. This research study examines the dynamic variables in Ruhi's research framework, explicitly focusing on completion, competition, context, and cooperation of gamification fields (Ruhi, 2016).

Online Brand Community Characteristics create an online community to connect with customers and enthusiasts for effective brand communication (Seraj, 2012). Creating an online community boosts brand image and facilitates sharing of product or service information (Kim & Lee, 2015; Kim et al., 2008; Santos et al., 2022), the exchange of ideas between brands and customers or between customers (Jang et al., 2008; Seraj, 2012) and Brand sales can be increased by listening to the feedback of customers (Kim et al., 2008). Moreover, it has been discovered that positive social and emotional benefit outcomes can significantly enhance the likelihood of purchase intention (Hoonsopon & Puriwat, 2016). Brand Engagement involves emotional benefits like enjoying and loving the brand while using it. These benefits and Social Benefits are fundamental to building a strong connection with the brand Field (Alexander et al., 2018; Hollebeek, 2011). One of the social benefits of using this brand is enjoying conversations with friends and acquaintances about the positive experience of using their products or services and sharing this experience with others (So et al., 2014; Xi & Hamari, 2020). By engaging brands, both emotional and social benefits can be built on customer

engagement with the brand. It can lead to brand loyalty (Al-Zyoud, 2021; Helme-guizon & Magnoni, 2017; Hollebeek et al., 2014; Raj & Gupta, 2018).

Literature Review

Dynamics in The MDA gamification design

In gamification design, dynamics refer to how a player's choices and decisions interact with the game's mechanics to create emotional experiences and feelings (Hunicke et al., 2004) and the player's interaction with the game system called Gamify System (Werbach & Hunter, 2012). In 2016, Ruhi studied the details of gamification design by exploring the MDA Model. This investigation thoroughly analyzes the dynamic variables within Ruhi's research framework, specifically emphasizing completion, competition, context, and cooperation as integral components of The MDA gamification design (Ruhi, 2016)

Completion (COM) refers to completing a mission in gaming as a huge accomplishment that can boost self-esteem and overcome negative emotions (Hudlicka, 2008). When a player accomplishes a major task in the game, such as defeating the ultimate boss, it often leads to a sense of euphoria, commonly referred to as a "euphoric experience." Game mechanics like leaderboard scores, player level, and avatar level enable players to gauge their level of achievement and compare it to others, promoting greater self-esteem in their accomplishments (Gatautis et al., 2016).

Competition (COP) refers to the drive to win, whether it is against oneself or others (Gatautis et al., 2016; Morschheuser et al., 2019; Ruhi, 2016). Players thrive in challenging environments, and team competitions, whether internal or external, provide just that. The satisfaction and pleasure that come with completing these competitions are unparalleled (Vorderer et al., 2003). The stimulation and enjoyment of gaming experiences are significantly enhanced by the competition (Lei & Rau, 2023). Additionally, competition between teams can be more entertaining for players than competing against one another (Morschheuser et al., 2019).

Context (CON) refers to the story (Gachkova et al., 2020) creating an immersive experience for players, which involves considering the environment, the avatar's role-play, and the storytelling. This helps players find activities they can do on their own Fields (Ruhi, 2016; Xi & Hamari, 2020). In addition to what the gamification designer will create/simulate. Scenarios and environments allow players to play different roles. The context of the gamification also allows players to imagine. Creativity and cooperation among team members or people in the community (Ibarra-Herrera et al., 2019; Ruhi, 2016) result in the creation of shared values (Bowman, 2010; Jeon et al., 2020). A well-crafted gamification context can captivate the player throughout each phase, motivating them to continue exploring and playing whenever possible (Zhao & Fang, 2009).

Cooperation (COO) refers to a team that involves sharing information, mutual encouragement, and utilizing each person's expertise to complete tasks (Riar et al., 2022). Activities that promote teamwork are an effective way to increase game time resulting in greater stickiness between players and the game (Zichermann & Linder, 2010). People who work together on brand-related tasks often build strong, lasting relationships with the brand (Leclercq et al., 2018).

Online Brand Communities Characteristic

Building an online brand community boosts brand exposure and offers a space for sharing details about products or services (Kim & Lee, 2015; Kim et al., 2008; Santos et al., 2022). The ideas can be exchanged between brands and their customers or between customers themselves (Jang et al., 2008; Seraj, 2012). Generating favorable word-of-mouth marketing through online communities is an effective way to increase brand loyalty. (Kim & Lee, 2015)

Freedom to express (FRE) refers to the level of information exchanged within the community, either between community members themselves or between members and community administrators (Chan et al., 2014). Free discussion of possible views helps community members feel that their opinions are valued and not criticized by those in the community who think differently (Kang et al., 2007; Li et al., 2014). Creating shared value among community members is often achieved by jointly solving problems through the mobilization of diverse opinions (Leclercq et al., 2018).

Rewards and Recognition (RWR) refers to a monetary prize, sentimental value, or recognition from others in the online community (Social Rewards) (Yang et al., 2012). This is intended for members who actively participate in the community. Kindly extend assistance to other members of the community (Kim & Lee, 2015). Encouraging active participation and fostering a sense of community among members is best achieved through the reward of recognition (Li et al., 2014).

Community Value (VLU) refers to the value generated by sharing common interests (Kang et al., 2007). Interaction between people in the online brand community Both the issue of reading comments and giving feedback add value to the community (Kang et al., 2007; Yang et al., 2012). The perceived value of a brand's online community increases when members actively seek out and benefit from being a part of it (Kim et al., 2008). The brand's online community is highly valued by its members, who actively cultivate and nurture relationships within it (Jang et al., 2008).

Social and Emotional Benefits

A customer's perception of value towards a product or service is referred to as benefit. This perception is derived from the fulfillment of basic needs and desires (Kotler, 2009; Leung, 2013). As a result, customers use it to achieve personal value (Lai, 1995).

Social Benefits (SOC) refers to the benefit derived from an individual's desire to interact and build relationships with people he knows, including others in the community (Vander Schee et al., 2020). When conversing with friends or acquaintances, it would be beneficial to relay a pleasant encounter involving the brand's merchandise or amenities (So et al., 2014; Xi & Hamari, 2020). Social benefit is the intrinsic drive each member feels for one another. It molds that feeling into We-ness. This feeling gives each brand's online community member a sense of responsibility. It is the individual's duty to maintain the brand's community (Wirtz, Ambtman, et al., 2013).

Emotional Benefits (EMO) refers to the emotion or feeling received, such as feeling joyful, participation, excitement, and impression (Candi & Kahn, 2016; Sheth et al., 1991; Wirtz, den Ambtman, et al., 2013) gaining momentum in life (Lei & Rau, 2023). infatuation and loving feelings (Lei & Rau, 2023) etc. A study by Hollebeek (2011) found that customers perceive emotional benefits when they get what they want (Hollebeek, 2011)

Brand Engagement and Brand Loyalty

Brand Engagement (BEG) refers to a customer mechanism that directly or indirectly provides additional value to a brand (Pansari & Kumar, 2017). Brands are focused on growing and sustaining their business. Creating positive customer engagement is essential for establishing a strong brand foundation and achieving long-term business growth (Nammir et al., 2012), Comments on the platform sharing information about brands or talking about them online, for example (Helme-guizon & Magnoni, 2017; Vander Schee et al., 2020; Xi & Hamari, 2020). By building customer engagement with a brand, it will result in customer loyalty to the next brand (Kotler et al., 2019).

Brand Loyalty (BLY) refers to a positive attitude towards a brand after a brand experience leads to loyalty in both attitude and behavior (Cho, 2011) . When the customer knows that the brand has the strength of the product that the customer is looking for, image or quality at a good price leads to repeat purchases and brand adherence (Ishak & Abd Ghani, 2013). According to a study by Aaker (2009), brands measure customer loyalty by studying customer behavior, such as the number of brands customers choose to buy. Product/Service Percentage of purchase and purchase intention in the future (Aaker, 2009).

Hypothesis Development

COM and EMO

According to Hudlicka (2008), gamification allows players to create complex emotions, such as player pride. who has completed the mission or overcome some of their own emotions has a very positive effect on the game design (Hudlicka, 2008). Gamification can boost productivity for employees, according to Ruhi (2016), and show success in training or doing various activities related to work, Helping employees feel more confident in their work Also found that gamification elements like badges, levels, and leaderboards motivate players to feel proud and compare their success to others (Gatautis et al., 2016; Ruhi, 2016). Players feel euphoric after completing major missions in games, according to Vorderer's study in 2003 (Vorderer et al., 2003). Therefore, the following hypothesis is formulated:

H1: In Game Dynamics, Completion has a positive effect on Emotional Benefits

COP and EMO

Vorderer's (2003) Competition and challenge influence game enjoyment. Competitive game dynamics are the most significant factors. Games also provide entertainment and boost self-worth and self-esteem (Vorderer et al., 2003). Gamification through team competition has the greatest impact on donor satisfaction and project recommendations, according to a study on IT company crowdfunding (Morschheuser et al., 2019). This is in line with the research of Suh et al. (2018), who studied the dynamic factors of gaming and found that it caused the players to enjoy the field the most (Suh et al., 2018). Therefore, the following hypothesis is formulated:

H2: In Game Dynamics, Competition has a positive effect on Emotional Benefits

CON and SOC

Xi and Hamari (2020) studied the use of gamification in online communities of brands. story simulation Characteristics of the avatar that players can adjust according to their needs

storytelling these factors Helps promote an immersive experience for the player (immersion), creating a context that promotes connection. communicate and creativity between players about product information or brand services (Xi & Hamari, 2020). Player character roles and environment. Whether it is a simulation problem-solving simulation and skill training in gamification that requires working together as a team, Facilitates interaction among team members (Vander Schee et al., 2020), using different roles and skills of team members. This results in building team values (Bowman, 2010; Ruhi, 2016; Xi & Hamari, 2020). Therefore, the following hypothesis is formulated:

H3: In Game Dynamics, Context has a positive effect on Social Benefits

COO and SOC

A study by Cao et al. (2022) explores the utilization of gamification as a means to inspire individuals to lessen their carbon footprint. Collaborative play is utilized to attain carbon reduction targets, fostering mutual support and promoting team participation via constructive feedback (Cao et al., 2022), consistent with the study of Riar et al. (2022). Whether sharing information, mutual encouragement showing help and the expertise of each person on the team to complete the mission, This induces a sense of belonging in a team (Cao et al., 2022; Ibarra-Herrera et al., 2019; Leclercq et al., 2018; Riar et al., 2022; Ruhi, 2016) as The cohesion of the team members (Bowman, 2010). Therefore, the following hypothesis is formulated:

H4: In Game Dynamics, Cooperation has a positive effect on Social Benefits

FRE and SOC

Kim et al. (2008) studied the online community factors of herbal product brands that can create value for customers. In the study, it was found that Freedom of expression in the brand's online community make members feel get a variety of information The information is valuable to the community and its members. The information discussed is useful (Kim et al., 2008), in line with the research of Leclercq et al. (2018) to find solutions to some of the problems discussed in the community It is considered to create shared values among people in the community (Leclercq et al., 2018), Freedom of expression allows community members to create and share content, express opinions, and build closer relationships, fostering a sense of belonging (Li et al., 2014). Moreover, unblocked commenting helps members feel more trusted in online communities (Jang et al., 2008). Therefore, the following hypothesis is formulated:

H5: In Online Brand Communities Characteristic, Freedom to express has a positive effect on Social Benefits

RWR and SOC

Kang et al. (2007) studied factors affecting volunteer behavior to participate in online community activities. It was found that members perceived the value of online communities. through sharing the same interests and consistently seeking benefits (Kang et al., 2007). Both the issue reading comments and feedback comments will increase the value of the community altogether Similarly, a study by Kim et al. (2008) that studied online communities of herbal product brands found that when online community members perceived the value of online communities, will result in members feel more attached to online communities (Kim et al., 2008). Furthermore, it has been found that online communities hold value in maintaining relationships between members and within the community. This is due to a sense of self-worth

derived from these relationships (Jang et al., 2008). Therefore, the following hypothesis is formulated:

H6: In Online Brand Communities Characteristic, Rewards and Recognition has a positive effect on Social Benefits

VLU and SOC

Xi and Hamari (2020) studied gamification in a brand's online community context. It creates an interaction between each other. Make members feel part of the online community. affects brand engagement (Xi & Hamari, 2020) . A study by Wirtz et al. (2013) found that what drives brand engagement is caused by the inner drive of each member who feels towards each other. Until each member's feelings become a collective feeling Being ours (We-ness) makes each member of the brand's online community feel responsible and the duties of each In caring for a brand's community (Wirtz et al., 2013) is in line with Hollebeek's (2014) study of factors that promote customer engagement with a brand. for brands to increase customer engagement in their online communities, and Leclercq et al. (2018) share information to Develop common skills of people in the community. It helps build engagement among people in the brand's online community. is a shared value creation (co-creation) that leads to customer engagement with the brand (Hollebeek et al., 2014; Leclercq et al., 2018). Therefore, the following hypothesis is formulated:

H7: In Online Brand Communities Characteristic, Community Value has a positive effect on Social Benefits

SOC and BEG

It is imperative for individuals to engage in interactions and establish relationships with familiar individuals, as well as welcome others into their community, for their own benefit (Vander Schee et al., 2020), When conversing with friends and acquaintances about a brand, it's important to share positive experiences of using their products or services with others.(So et al., 2014; Xi & Hamari, 2020) . Being part of a community improves customer engagement, and satisfaction, and fosters collaboration and skill development through interactions and information sharing. Co-creation is a process of creating shared value It molds that feeling into We-ness. (Leclercq et al., 2018). The growth of the brand's online community relies on the sense of responsibility felt by its members. Each individual is duty-bound to contribute towards nurturing the community (Wirtz et al., 2013). Customer engagement is the key to fostering brand loyalty (Hollebeek et al., 2014; Leclercq et al., 2018).

H8: Social Benefits have a positive effect on Brand Engagement

EMO and BEG

Hollebeek (2011) found that customers perceive emotions when they receive what they want. Positive emotional benefits, such as liking, result in higher levels of customer engagement with brands (Hollebeek, 2011). Studies from Gatautis et al. (2016) show that customers engage more with brands when gamification is used, as it provides emotional benefits like fun, curiosity, pride, and a positive impression of the brand (Gatautis et al., 2016). Feelings of impression, fascination, faith, and surprise have a positive effect on customer engagement with a brand (Xi & Hamari, 2020). Therefore, the following hypothesis is formulated:

H9: Emotional Benefits have a positive effect on Brand Engagement

BEG and BLY

Abou-Shouk and Soliman (2021) studied customer engagement with brands. and brand loyalty through the use of gamification in the travel industry. It was found that customer engagement with brands affects brand loyalty. Make customers more likely to use the brand's products or services continuously. There are positive mentions of the brand. and are more likely to recommend the brand to friends or acquaintances (Abou-Shouk & Soliman, 2021). Affects brand loyalty in the same direction (Helme-guizon & Magnoni, 2017). In addition, Xi and Hamari (2020) studied gamification in brand online communities. It is likely that brand-moving agents result in higher levels of brand loyalty (Xi & Hamari, 2020) .Therefore, the following hypothesis is formulated:

H10: Brand Engagement has a positive effect on Brand Loyalty

Theoretical Model

The theoretical model presented by the authors is based on strong hypothetical relationships (Figure 1). This model was tested with empirical data, and the process is explained in the next section

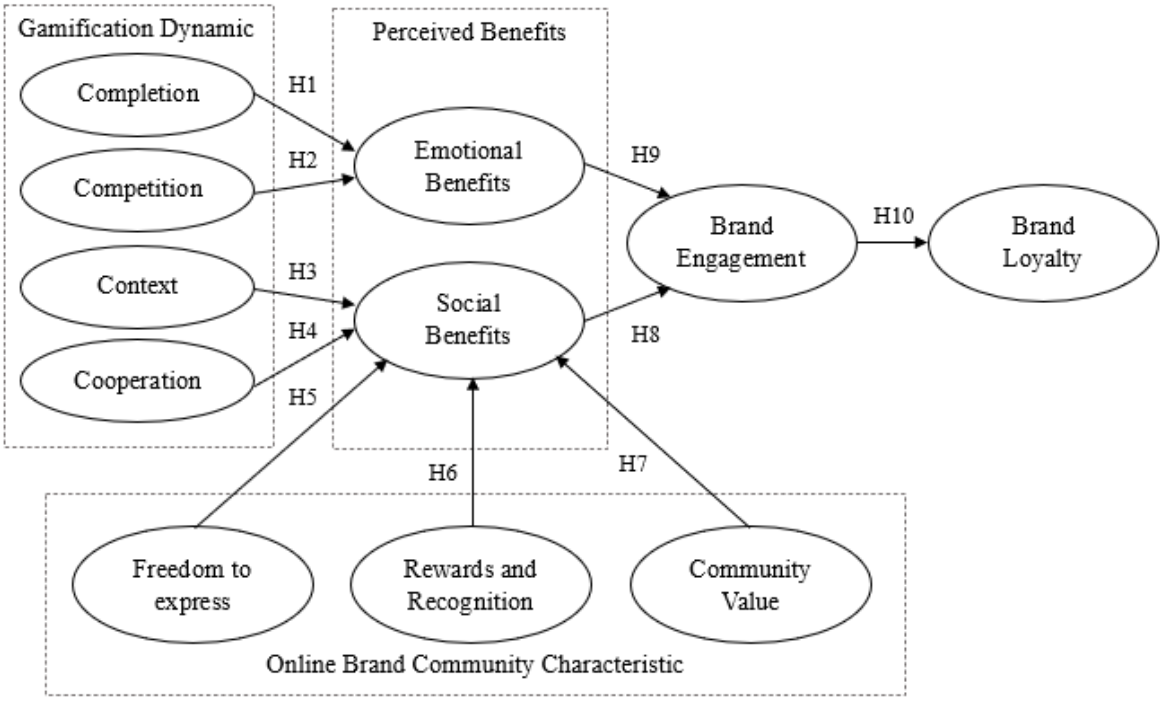


Figure 1: Theoretical Model of the Study

Research Methodology

The study involved Thai players of Metaverse games who had participated in online brand communities and gamification like The Sandbox, Roblox, and Decentraland. To participate, individuals must meet the following criteria: being 18 years or older, having joined the brand's gamification and online Brand community in The metaverse within the last six months, and correctly answering at least two-thirds of the Metaverse screening questions, and

They then provided their consent to answer the questionnaires. A questionnaire survey was created based on a literature review, reviewed by experts in environmental management, and translated into Thai and back into English for accuracy. An online questionnaire was used to select the sample group, gather general information about the respondents, and construct evaluation questions. The sample size was established using Hair et al. (2010) approach, The sample size used in structural equation analysis (SEM) is recommended to be 5-10 times the indicator (Hair et al., 2010). As a result, a minimum sample size of 200. A total of 393 completed questionnaires were received, but only 327 valid questionnaires can be used. The model fit was confirmed by the authors using SEM. However, there are still several unproven hypotheses. The measurement model employed CFA

Research Findings

Demographic Data Analysis

Table 1: Demographics of The Survey Respondent's Variables

Variable	Category	Freq.	%
Gender	Male	188	57.49
	Female	139	42.51
Ages	18-20	41	12.54
	21-25	167	51.07
	26-30	76	23.24
	31-35	37	11.31
	Over 35	6	1.83
Education	less than bachelor's	38	11.62
	Bachelor's Degree	239	73.09
	Master's Degree and Over	50	15.29
Freq. of activities on Metaverse	Less than 1 time/week	110	33.64
	2-3 times/week	164	50.15
	4-5 times/week	42	12.84
	Over 6 times/week	11	3.36

Source: Survey data (2023). Notes: The total number of respondents (n = 327), Freq = frequency, % = Percentage

Demographic data for 327 samples is presented in Table 1, revealing a clear majority of male respondents (57.49%) and a significant representation from the 21-25 age group (51.07%). Moreover,73.09% said their highest educational achievement was a bachelor's degree. Additionally, 50.15% of the survey participants reported engaging in activities on Metaverse 2 to 3 times per week. 57.87% of participants said The Sandbox was their most recent activity.

Data analysis and results

To examine the proposed hypothesis, using SEM approach was utilized to analyze the data and test hypotheses using the AMOS program based on overall fit with data, reliability, convergent validity, and discriminant validity. Based on the normality test conducted on the Kurtosis and Skewness values, the dataset is confidently deemed reliable. The conclusive results are presented below.

Table 2: Preliminary Test

Variable	Results
Skewness	-0.106 – 0.227
Kurtosis	-0.459 – 0.071
Tolerance	0.311 - 0.470
VIF	2.126 - 3.218
N	327

Notes: N = amount, VIF = variance inflation factor.

Table 3: The Construct Convergent Validity and Reliability

Construct	Items	Factor Loading	CR	AVE	Cronbach's Alpha
Gamification Dynamic	**Completion (COE)**		**0.65**	**0.48**	**0.78**
	COE 1	0.68			
	COE 2	0.71			
	COE 3	0.71			
	COE 4	0.69			
	Competition (COP)		**0.66**	**0.49**	**0.80**
	COP 1	0.65			
	COP 2	0.70			
	COP 3	0.74			
	COP 4	0.71			
	Context (CON)		**0.70**	**0.53**	**0.82**
	CON 1	0.69			
	CON 2	0.72			
	CON 3	0.75			
	CON 4	0.75			
	Cooperation (COO)		**0.77**	**0.59**	**0.85**
	COO 1	0.71			
	COO 2	0.79			
	COO 3	0.81			
	COO 4	0.76			
Online Brand Community Characteristic in The Metaverse	**Freedom to Express (FRE)**		**0.67**	**0.51**	**0.81**
	FRE 1	0.66			
	FRE 2	0.73			
	FRE 3	0.76			
	FRE 4	0.70			
	Rewards and Recognition (RWR)		**0.76**	**0.58**	**0.84**
	RWR 1	0.78			
	RWR 2	0.77			
	RWR 3	0.75			
	RWR 4	0.76			

Table 3: The Construct Convergent Validity and Reliability (Cont.)

Construct	Items	Factor Loading	CR	AVE	Cronbach's Alpha
	Community Value (VLU)		**0.80**	**0.62**	**0.87**
	VLU 1	0.73			
	VLU 2	0.78			
	VLU 3	0.79			
	VLU 4	0.84			
Perceived Benefits	**Social Benefits (SOC)**		**0.69**	**0.52**	**0.83**
	SOC 1	0.67			
	SOC 2	0.69			
	SOC 3	0.74			
	SOC 4	0.78			
Perceived Benefits	**Emotional Benefits (EMO)**		**0.62**	**0.47**	**0.80**
	EMO 1	0.72			
	EMO 2	0.72			
	EMO 3	0.62			
	EMO 4	0.68			
	Brand Engagement (BEG)		**0.78**	**0.56**	**0.87**
		0.71			
	BEG 1	0.71			
	BEG 2	0.80			
	BEG 3	0.78			
	BEG 4	0.75			
	BEG 5	0.71			
	Brand Loyalty (BLY)		**0.79**	**0.60**	**0.85**
	BLY 1	0.73			
	BLY 2	0.81			
	BLY 3	0.80			
	BLY 4	0.78			

Notes: CR = composite reliability, AVE = average variance extracted, α = Cronbach's Alpha

Measurement Model

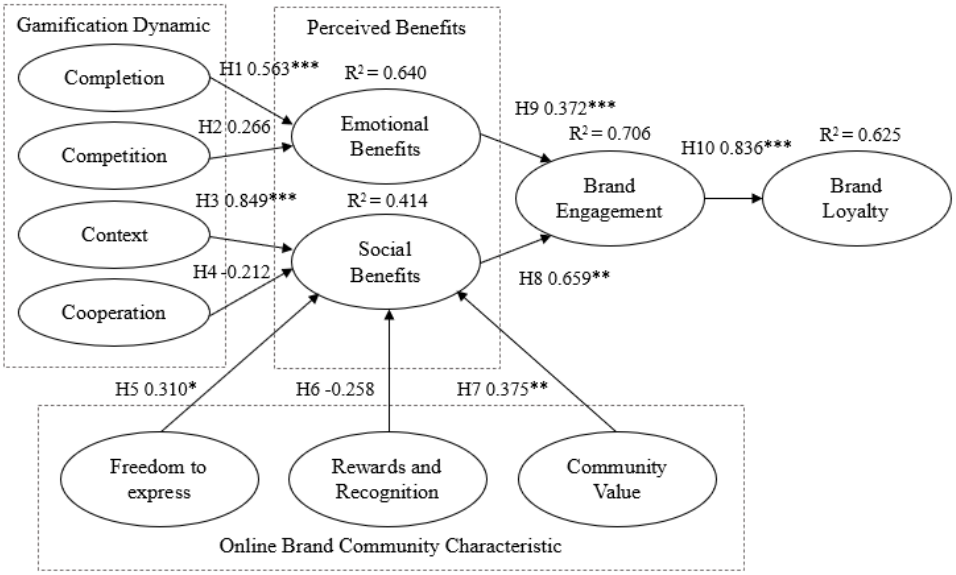
The questionnaire's reliability was analyzed using Cronbach's alpha, with a value range of 0.78 to 0.87, meeting the criterion of 0.7 (Hair et al., 2019). The CR value falls between 0.78 and 0.86, meeting the requirement of 0.70 (Hair et al., 2019). Some variables met the threshold of 0.50 for the AVE value between 0.47 and 0.62, but not all of them. However, when considered together with the CR, all variables were greater than 0.6. Therefore, they were considered to be at an acceptable level (Fornell & Larcker, 1981). In addition, the convergent validity was analyzed by Factor Loading, as shown in table 3. It was found that the value was between 0.65 - 0.84, which was greater than 0.4 according to the specified criterion (Stevens, 2012). Overall, all latent constructs exhibited adequate convergent validity and discriminant validity.

Structural Model

The utilization of the Path Analysis technique in Structural Equation Modeling (SEM) allowed the researchers to confidently establish the relationships between different variables through maximum likelihood estimates. For the model fit, the results of the analysis revealed the data, and the proposed measurement model are compatible ($\chi 2/df = 1.571$, CFI = 0.945, TLI =0.936, RMSEA = 0.043, NFI=0.865 and GFI=0.863). Chi-square/degree of freedom (CMIN/DF) is suggested to be less than 2.000 for a parsimonious fit (Tabachnick & Fidell, 2007) ; the comparative fit index (CFI) and the Tucker-Lewis coefficient (TLI) are suggested to be greater than 0.900 for an incremental fit (Hooper et al., 2008); Root Mean Square Error of Approximation (RMSEA) is suggested to be less than 0.080 for a model absolute fit (Hooper et al., 2008); the Normed Fit Index (NFI) is suggested to be greater than 0.800 (Hooper et al., 2008) and the Goodness of Fit Index (GFI) is suggested to be greater than 0.800 (Baumgartner & Homburg, 1996; Doll et al., 1994; Hooper et al., 2008). As a result, all the fitness indicators achieved levels considered acceptable.

Hypothesis Testing

The results were confirmed using structural equation modeling (SEM) as shown in Table 4. The model estimation results showed that Completion in gamification dynamics positively influences Emotional benefits (β =0.563), Competition in gamification dynamics does not influence Emotional benefits, Context in gamification dynamics positively influences Social benefits, Cooperation in gamification dynamics does not influence Social benefits while Freedom to express. Community value in online brand community characteristic were positively influencing Social benefits (β =0.310 and β =0.375, respectively). Rewards and recognition in online brand community characteristics do not influence social benefits. Both Social benefits and Emotional benefits were positively influencing Brand Engagement (β = 0.659 and β = 0.372, respectively). Moreover, Brand Engagement positively influenced brand Loyalty (β =0.836). As a result, the overall model can explain 70 percent of the variance in Brand engagement and 62 percent of the variance in Brand Loyalty.



Notes: *p is significant at level .5, **p is significant at level .01, ***p is significant at level .001

Figure 2: Relationship between Gamification Dynamic, Online Brand Community Characteristic, Perceived Benefit, Brand Engagement and Brand Loyalty

Table 4: Hypothesis Testing

Hypothesis			β	Expected Results	P-Value	Results
H1	COE	→ EMO	0.563	Positive	0.000***	Supported
H2	COP	→ EMO	0.266	Positive	0.053	Not Supported
H3	CON	→ SOC	0.849	Positive	0.000***	Supported
H4	COO	→ SOC	-0.212	Positive	0.11	Not Supported
H5	FRE	→ SOC	0.310	Positive	0.044*	Supported
H6	RWR	→ SOC	-0.258	Positive	0.032*	Not Supported
H7	VLU	→ SOC	0.375	Positive	0.000***	Supported
H8	SOC	→ BEG	0.659	Positive	0.000***	Supported
H9	EMO	→ BEG	0.372	Positive	0.000***	Supported
H10	BEG	→ BLY	0.836	Positive	0.000***	Supported

Notes: *p is significant at level .5, **p is significant at level .01, ***p is significant at level .001

Discussions

The study findings indicate that in gamification dynamics within the metaverse, competition does not impact emotional benefits, and cooperation does not affect social benefits. However, completion has a positive effect on emotional benefits, and context has a positive influence on social benefits. Regarding online brand communities in the metaverse, freedom of expression and community value have a positive impact on social benefits, whereas rewards and recognition do not. Additionally, both social and emotional benefits contribute to brand engagement, and the study shows that brand engagement leads to brand loyalty.

Theoretical Contributions

Through extensive research, this study has made remarkable strides in understanding the intricacies of gamification, online brand communities, and their profound influence on brand engagement and loyalty in Thailand's metaverse. Firstly, this study extends MDA is a model invented by game designers and researchers Hunicke et al. (2004) (Hunicke et al., 2004) and further modified by Ruhi (2016) (Ruhi, 2016) in Gamification Dynamic Model by identifying the relationship between Gamification Dynamic and Emotional benefits in the meteverse (Bowman, 2010; Hudlicka, 2008; Ruhi, 2016; Vorderer et al., 2003; Xi & Hamari, 2020). Moreover, this research explores the relationship between Gamification Dynamic and Social benefits in the metaverse (Cao et al., 2022; Ibarra-Herrera et al., 2019; Leclercq et al., 2018; Riar et al., 2022; Ruhi, 2016). The positive influences of the Gamification Dynamic Model found in this study provide that It appears that emotional benefits are not affected by competition or cooperation, while social benefits are not influenced by cooperation or competition. However, it seems that completion has a positive impact on emotional benefits, and context can positively influence social benefits. Secondly, finding the relationship between online brand communities characteristics and social benefits in freedom to express useful (Jang et al., 2008; Kim et al., 2008; Leclercq et al., 2018; Li et al., 2014), rewards and recognition (Hollebeek et al., 2014; Leclercq et al., 2018; Wirtz, Ambtman, et al., 2013; Xi & Hamari, 2020) and community value (Hollebeek et al., 2014; Leclercq et al., 2018; Wirtz, Ambtman, et al., 2013; Xi & Hamari, 2020). Thirdly, Exploring the connection between emotional benefit (Gatautis et al., 2016; Hollebeek, 2011; Xi & Hamari, 2020), social benefits (Hollebeek et al., 2014; Leclercq et al., 2018; Wirtz, Ambtman, et al., 2013) and brand engagement. Finally, The results indicate a positive connection between theory in brand engagement and brand loyalty (Abou-Shouk & Soliman, 2021; Helme-guizon & Magnoni, 2017; Xi & Hamari, 2020).

Managerial Implications

Emotional and social benefits drive customer engagement and brand loyalty. Social benefits have a bigger impact than emotional ones. Gamification and a brand's online community can influence both.

Building Brand Loyalty in Metaverse. Brands can involve their community by hosting a Metaverse gamification event with community input. Community involvement in contests and Q&A contributes to product/service development and boosts participation in brand events. Brands can display their social contributions on Metaverse and organize events based on members' interests, such as sports activities and NFT art related to the brand. Metaverse uses gaming to create positive emotional connections with its members and encourage participation through exciting gamification design. Setting a goal for gameplay that is both suitable and challenging based on the player's abilities, among other factors.

Dynamic development of gamification on Metaverse by enhancing gamification design creating inspiring missions, and gradually increasing the challenge for players. Including the design of the number bar display that the player has reached the goal in the activity and future activity goals. Designing a dynamic metaverse game with leaderboards and player levels is crucial to the player experience. Gamification designers should focus on creating an engaging story to enhance the fun and compelling nature of the game. Assign players to perform in-game activities and roles for players, respectively.

Building a Dynamic development of gamification on Metaverse. Brands and gamification designers on Metaverse should focus on improving the gamification dynamics in gamification design by creating missions that motivate players to complete and increase the level of challenge of missions over time. Including the design of the number bar display that the player has reached the goal in the activity and future activity goals. leaderboards and player levels, etc. The feeling that players get from the dynamic design of the metaverse achievement game in this research finds that Next, metaverse gamification designers should develop a contextual/story dynamic, whether it's making it fun, followed by a compelling and engaging story design. Assign players to perform in-game activities and roles for players respectively.

Building a Brand's Online Community on Metaverse and Its Social Benefits. Brands should focus on building their brand's online community on Metaverse by first creating the brand's community values on Metaverse for community participants, e.g., by encouraging them to raise issues or encouraging members to discuss information that the community finds useful or issues that can help their community and differentiate the community compared to other brands' online communities, e.g., Sharing of use of the brand's products/services. This was followed by promoting the freedom of expression of the brand's online community on Metaverse by allowing people in the community to express diverse and different opinions, which is what community members value the most. Brand community moderators should not solely control brand-related content. There should be an opportunity to discuss other issues as well and be open to issues that are both positive and negative, etc.

Conclusion

Brief Summary

This research delves into how customer engagement and brand loyalty are affected by dynamic gamification factors and online community traits on Metaverse. The data was

collected through a web-based survey. The study's key findings are as follows: customer engagement has an impact on brand loyalty, with social and emotional benefits being factors that influence customer engagement. The study also reveals that contextual gamification has the greatest impact on social benefits. The value of a brand's online community and freedom of expression also contribute to social benefits. Surprisingly, rewards and recognition have a negative impact on social benefits, which goes against the original research assumptions. The dynamism of achievement gamification affects emotional benefits, while the dynamism of competitive gaming does not. Cooperative dynamics of gamification do not result in social benefits, which is also inconsistent with the hypothesis.

Limitations and Directions of Future Research

This study examines how dynamic gamification factors and brand online community traits affect customer engagement and brand loyalty outcomes on Metaverse. The research limitations come from the diversity of metaverse platforms that have different limited capabilities in gamification design, such as the team play limitations some metaverse platforms have. Some Metaverse platforms are in beta and are not yet available for full access. In the future, as the Metaverse platform develops more, it will bring more competitive and cooperative gamification dynamic factors. as well as the brand's online community on the Metaverse of awards and recognition for ongoing research. In addition, some brands create marketing activities on certain metaverse platforms and are limited to a mere digit of a week. This makes the experience of respondents vary according to time and occasion and does not match those of brand respondents. In the future, they may choose to research specific metaverse platforms that are of interest to conduct specific research. In this research, there was also a limitation of the analysis of the extracted mean variance (AVE) that did not meet the specified criteria. Still, when considering the coupled between the extracted mean variance (AVE) and the combined confidence (CR), all variables had value. Therefore, it is considered that it passed the criteria and is at an acceptable level. In addition, most of the research subjects were those who had experience with the Metaverse. In the future, it may be possible to study other groups with no Metaverse experience, such as those who play social media games and those who play mobile games, to study the possibility of this group entering the Metaverse. In addition, the trend of the metaverse industry related to music and artists announced to launch of more metaverse platforms such as Korean artists such as Blackpink, BTS, Bigbang and Treasure, etc., which have fan bases around the world and are grouped with high paying power. A research study on gamification design and the characteristics of an artist brand's online community. It may help to understand your customers better and design marketing activities that have the greatest impact on your brand in the future.

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Appendix

Questionnaire
Instruction: Please fill in the information or mark an X in the box corresponding to the truth.

Part 1 Screening Questions
A1. You are currently over 18 years old.
☐ Yes ☐ No (End of The Survey)
A2. You've played Brand's Gamification before and joined the Online Brand Community in "The Sandbox Metaverse" for the last 6 months.
☐ Yes ☐ No (End of The Survey)
A3. Currently, what is the latest The Sandbox Alpha Season?
☐ Alpha 1 ☐ Alpha 2
☐ Alpha 3 ☐ Alpha 4
A4. What are the ERC-20 standard coins on the Ethereum network used in The Sandbox?
☐ MANA ☐ SAND
☐ AXS ☐ CBX
A5. What is the land in The Sandbox called?
☐ LAND ☐ PARCELS
☐ PLACE ☐ PLOT

Part 2 General information of the respondents
1. Gender
☐ Male ☐ Female
2. Age
☐ 18-20 years ☐ 21-25 years
☐ 26-30 years ☐ 31-35 years
☐ Over 35 years
3. Education
☐ Lower Bachelor's Degree ☐ Bachelor's Degree
☐ Master's Degree and Over
4. The frequency of participating in activities in the Sandbox Metaverse
☐ Less than 1 time/week ☐ 2-3 times/week
☐ 4-5 times/week ☐ Over 6 times/week

Part 3 Attitude towards Gamification's Dynamic and Online Brand Community Characteristics in the Metaverse

Detail	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Completion (COE) 5.Complete playing gamification in the metaverse will require consistent effort on your part. 6.Complete Playing gamification in the metaverse will bring you happiness.					

Detail	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7.Complete Playing gamification in the metaverse, achieving the goals, you set for yourself can give you a sense of pride 8.Complete Playing gamification in the metaverse, It gives you a sense of accomplishment and A desire to achieve higher levels.					
Competition (COP) 9. Competing gamification in the Metaverse, you feel a fun and enjoyable experience. 10. Competing gamification in the Metaverse, you feel the entertainment. 11. Competing gamification in the Metaverse, you feel challenged. 12. Competing gamification in the Metaverse, you feel motivated to play.					
Context (CON) 13. Gamification in Metaverse assigning roles to the player. 14. Gamification in Metaverse assigned to players have done activities in gamification. 15. Gamification context/story in Metaverse is fun. 16. Gamification context/story in Metaverse is addictive and discoverable.					
Cooperation (COO) 17. If there is a feature for team play in the metaverse requires everyone on the team to work together as a team. 18. If there is a feature for team play in the metaverse team members will show help to each other. 19. If there is a feature for team play in the metaverse team members will encourage each other. 20. If there is a feature for team play in the metaverse.					

Detail	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
21. People in the team will use different expertise to work together.					
Freedom to express (FRE) 22. The brand's online community on Metaverse is open to discussions on a wide range of topics. 23. The branded online community on Metaverse is open to positive and negative messages or comments from community members. 24. Brand's Online Community on Metaverse, Complaints about brands or other services from community members are well handled. 25. The brand's online community on Metaverse has no control over the content of discussions within the community. Only have brand-positive content.					
Rewards and Recognition (RWR) 26. Community members are appropriately rewarded. 27. Members of the brand's online community on metaverse, there is pride in awards and recognition. 28. Brand's Online Community on Metaverse show gratitude who have appropriately contributed to the community. 29. Brand's Online Community on Metaverse Member privilege levels are adjusted and members are lowered accordingly.					
Community Value (VLU) 30. Always get useful information in the brand's online community on this metaverse. 31. You feel part of the brand's online community on this metaverse. 32. The brand's online community on this Metaverse valuable to you.					

Detail	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
33. The brand's online community on this Metaverse differs from other communities.					
Social benefits (SOC) 34. You are satisfied with the interactions between members of the Metaverse game/virtual gamification /community. 35. You can link with members of the gamification/virtual community on Metaverse. 36. You can make other members of your Metaverse gamification /virtual community can realize your ideas and knowledge. 37. You meet other people who share your interests between you and members of the Metaverse gamification/virtual community.					
Emotion benefits (EMO) 38. When playing gamification with brands on Metaverse, you will feel excited about brands, products/ services. 39. When playing gamification with brands on Metaverse, you will feel appreciated about brands, Products /services. 40. When playing gamification with brands on Metaverse, you will feel faith about brands, products/services. 41. When playing gamification with brands on Metaverse, you will feel loved about brands, products/ services.					
Brand Engagement (BEG) 42. You will share information about the brand, goods/services in the gamification/ Online Brand Community with your acquaintances. 43. You are welcome to participate in brand activities/services in the gamification/ Online Brand Community again in the future.					

Detail	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
44. You are excited about the brand, products/services in the gamification /Online Brand Community. 45. You are enthusiastic about your brand, products/service in gamification Online Brand Community. 46. You will be involved with the brand, products / services in more gamification/ Online Brand Community.					
Brand Loyalty (BLY) 47. You will use the brand of products / services. 48. You will speak positively of the brand, product/service. 49. You will recommend the brand, products/services to your friends. 50. You will buy branded products/services in the future.					