

Bridging digital innovation, parasocial interaction, and loyalty through fan satisfaction: Insights from K-Pop fandom

Arif Muanas^{1*}, Ika Yoga², Vela Retna Widyastuti³

^{1,2} Universitas Islam Negeri Raden Mas Said Surakarta, Jawa Tengah, Indonesia

³ Nalanda University, Bihar, India

arif.muanas@staff.uinsaid.ac.id

*Correspondent Author

ARTICLE INFORMATION

Article History

Received: 05-08-2025

Revised: 06-10-2025

Accepted: 10-10-2025

Keywords

Digital Innovation,
Parasocial Interaction,
Fan Loyalty,
fan satisfaction

ABSTRACT

The global spread of K-pop demonstrates how digital innovation and emotional connections transform fandom culture. This study examines the influence of Metaverse-based digital innovation and parasocial interaction on fan loyalty, with fan satisfaction as a mediating variable. Using a survey of 200 K-pop fans with prior Metaverse experience and analyzing the data through PLS-SEM, the results indicate that digital innovation significantly enhances both satisfaction and loyalty, while parasocial interaction contributes to satisfaction but does not directly generate loyalty. Furthermore, satisfaction emerges as a critical bridge that transforms immersive experiences and emotional bonds into sustainable loyalty. These findings extend the application of uses and gratifications theory, experience economy theory, and the theory of planned behavior in the digital fandom context. Practically, they highlight the importance of designing immersive and satisfying digital strategies to maintain long-term relationships between idols and fans.

This article has open access under the [CC-BY-SA](#) license.



1. Introduction

The Korean Wave (Hallyu) has evolved from a cultural export into a digitally mediated global phenomenon, with K-pop at the forefront (Jin & Yoon, 2017; Parc & Kim, 2020). Rapid advances in information and communication technologies have expanded the ways fans consume, participate in, and co-create fandom culture. Beyond traditional broadcast and social media formats, immersive platforms such as the Metaverse now enable symbolic co-presence and novel forms of participation that reshape fan experiences (Jin & Yoon, 2017; Wang et al., 2023). As K-pop agencies and groups increasingly deploy Metaverse technologies, virtual concerts, avatar interactions, and exclusive virtual content, these affordances create new opportunities for emotional engagement and value co-creation between idols and fans (Cho et al., 2023; Parc & Kim, 2020).

Two core psychological and behavioral constructs are central to this study: parasocial interaction and fan satisfaction. Parasocial interaction refers to the one-way sense of intimacy and relationship fans develop toward media figures through mediated content, which can strengthen emotional attachment and community participation even without reciprocal interaction (Bond and Calvert, 2022). Fan satisfaction captures the extent to which

fans' experiential expectations are met or exceeded by digital interactions and content and is widely recognized as a proximal predictor of loyalty and sustained support (Huang et al., 2025). Together, these constructs suggest two plausible pathways to loyalty: the technological affordances of the Metaverse directly and indirectly increase loyalty by producing richer, more personalized, and exclusive experiences, and parasocial bonds may contribute to loyalty either directly or indirectly via increased satisfaction.

Previous studies have generally viewed digital innovation and parasocial interactions separately. For example, Yoo et al. (2025) emphasized fan financial support through crowdfunding, whereas Wang et al. (2023) highlighted online community interaction in building loyalty. Parc and Kim (2020) and Cho et al. (2023) discuss the digital transformation of the K-pop industry without reviewing fans' emotional involvement. In contrast, Mele et al. (2025) and Nadeem et al. (2025) highlight the potential of the Metaverse but do not link it to fan satisfaction and loyalty. Therefore, few studies have integrated Metaverse-based digital innovation and parasocial interaction within a single satisfaction-to-loyalty framework, particularly among fans who are truly experienced in the Metaverse.

Accordingly, this study investigates how metaverse digital innovation and parasocial interaction influence K-pop fan loyalty, with fan satisfaction as a mediating mechanism. Focusing on respondents with Metaverse experience, the study tested direct effects (Metaverse to loyalty; parasocial to loyalty), indirect effects via satisfaction (Metaverse to satisfaction to loyalty; parasocial to satisfaction to loyalty), and the relative importance of these pathways. This study aims to clarify whether satisfaction is a necessary conduit for parasocial effects and to offer theoretical and managerial insights for entertainment firms seeking to leverage immersive technologies and parasocial content to build sustainable fan loyalty.

In addition to the theoretical gaps outlined, the relationship between the variables in this study needs to be explained more in line with the phenomenon of K-pop fandom. Digital innovation through the Metaverse, for example, allows fans to attend virtual concerts and gain exclusive experiences that increase their satisfaction and emotional attachment. Parasocial interactions through social media and exclusive content play a role in strengthening feelings of closeness with idols, which can ultimately encourage loyalty (Wang et al., 2025; Yoo et al., 2025). The selection of K-pop fanbases as research subjects is based on their unique characteristics, which not only act as consumers but also as co-creators of value through promotion, crowdfunding, and active participation in digital spaces (Cho et al., 2023; Lee & Park, 2025). This makes the K-pop fandom an ideal context for understanding how digital innovation and emotional bonds can be transformed into loyalty.

Researchers' interest in this topic also stems from the phenomenon that K-pop fandom is one of the most active global communities in adopting Metaverse technology. Although this trend is growing, little research has simultaneously linked metaverse experiences, parasocial interactions, satisfaction, and loyalty. Therefore, this study aims to provide academic and practical contributions to the formulation of effective digital strategies for building long-term relationships between idols and fans (Mele et al., 2025; Nadeem et al., 2025).

2. Literature Review and Hypothesis Development

2.1. Theoretical Foundation

2.1.1. Uses and Gratifications Theory

Uses and gratifications theory (UGT) explains that individuals actively use media to fulfill their psychological and social needs, such as entertainment, identity, and connectedness (Joshi, 2025). In the context of K-pop fandom, digital innovation through the metaverse offers interactive experiences that can fulfill fans' needs for closeness and

participation. Tao et al. (2025) showed that Metaverse characteristics, such as virtual presence and exclusivity, drive user satisfaction. Thus, UGT is relevant for explaining how digital innovation can increase satisfaction and, ultimately, fan loyalty.

2.1.2. Experience Economy Theory

Experience economy theory (EET) emphasizes that consumers value memorable experiences more than just functional products (Afzal, 2023). In the world of entertainment, especially K-pop, immersive experiences offered through the Metaverse, such as virtual concerts or avatar interactions, create strong emotional value (Simoni et al., 2025). Mele et al. (2025) also asserted that digital experiments in the Metaverse provide more realistic experiences that enhance satisfaction. Therefore, this theory is relevant for understanding how digital experiences can translate into satisfaction that drives fan loyalty.

2.1.3. Theory of Planned Behavior

The theory of planned behavior (TPB) explains that behavioral intentions are influenced by attitudes, subjective norms, and perceived behavioral control. In the context of fandom, parasocial interactions reinforce positive attitudes and social norms to continue supporting idols (Du et al., 2025). Lim et al. (2020) showed that emotional identification through parasocial relationships can encourage repeated engagement. Lacap et al. (2024) confirmed that meaningful media interactions reinforce credibility and loyalty. Thus, TPB helps explain how parasocial interactions shape fans' intentions and loyal behavior through satisfaction.

2.1.4. Digital Innovation

Digital innovation in the entertainment industry, particularly through the Metaverse, refers to the use of immersive technologies, such as virtual concerts, avatars, and exclusive content, to create new experiences for fans. This innovation not only serves as a means of entertainment but also expands the space for fan participation and interaction with idols (Cho et al., 2023; Parc & Kim, 2020). Studies by Mele et al. (2025) and Nadeem et al. (2025) show that the Metaverse is capable of providing a more immersive and valuable experience, while Mansoor et al. (2024) and Yoo et al. (2025) emphasize that digital affordances can trigger financial support and promotional behavior. Thus, digital innovation is an important factor that shapes both fan satisfaction and loyalty.

2.1.5. Parasocial Interaction

Parasocial interaction is a one-way emotional relationship experienced by fans toward their idols through media and digital content. This relationship makes fans feel close, even without any real reciprocal interaction (Jin & Ryu, 2020; Zhang, 2022). Lim et al. (2020) and Lacap et al. (2024) confirmed that parasocial bonds can strengthen feelings of connectedness and community participation, while S. Wang et al. (2023) showed its link to loyalty through interaction in online communities. Muthaharah and Kusuma (2024) also found that fan-app platforms support the formation of intense parasocial bonds. However, several other studies (Su et al., 2021; Ma et al., 2022) emphasize that parasocial interactions do not always automatically result in loyalty without satisfaction.

2.1.6. Fan Satisfaction

Fan satisfaction is defined as the extent to which digital experiences and interactions with idols meet or exceed their emotional and social expectations. In the context of fandom, satisfaction is an important factor that strengthens commitment and supports long-term loyalty (Choi, 2024; Huang et al., 2025). Kim et al. (2022) and Chen et al. (2022) show that satisfaction encourages fans to continue supporting idols both financially and socially. Additionally, Okorie et al. (2023) and Simoni et al. (2025) emphasized that enjoyable and immersive digital experiences can strengthen emotional value, which leads to loyalty. Therefore, satisfaction was positioned as a mediating variable that bridges digital innovation and parasocial interaction with loyalty.

2.1.7. Fan Loyalty

Fan loyalty describes a long-term commitment to support idols through product purchases, event participation, and voluntary promotion. This loyalty is formed not only by emotional factors but also by the satisfaction of the experience gained by fans (Chen et al., 2022; Yoo et al., 2025). Mansoor et al. (2024) and Kumar et al. (2025) show that exclusive experiences in digital spaces, such as the Metaverse, strengthen sustainable support behavior. This indicates that loyalty is the final outcome of the synergy between digital innovation, emotional interaction, and fan satisfaction.

2.2. Hypothesis Development

2.2.1. Positive Effect of Digital Innovation on Fan Satisfaction

Digital innovation through technologies such as the Metaverse provides immersive opportunities for fans to attend virtual concerts, participate in exclusive events, and interact with idols in novel ways (Yoo et al., 2025). From a consumer psychology perspective, these innovations deliver emotional gratification by making fans feel closer to their idols, and they support symbolic consumption, where fans derive identity value from participating in exclusive digital events (Jin and Ryu, 2020). Such experiences enhance satisfaction because they exceed the basic expectations of media consumption, fulfilling fans' deeper emotional and social needs. In turn, satisfied fans are more likely to remain loyal, as satisfaction strengthens affective commitment and reinforces fans' willingness to support idols through purchases and advocacy (Dwivedi et al., 2021).

Based on the UGT, individuals use new media to fulfill their psychological and social needs, including entertainment and a sense of closeness (Joshi, 2025). Metaverse-based digital innovations can provide immersive experiences through virtual concerts, avatars, and personal interactions that exceed fans' expectations (Tao et al., 2025). Mele et al. (2025) and Nadeem et al. (2025) proved that immersive technology increases user satisfaction. Furthermore, Yoo et al. (2025) found that digital platforms offering unique experiences strengthen fans' emotional satisfaction. Thus, digital innovation is expected to positively affect fan satisfaction. **H₁: Digital Innovation Has a Positive Effect on Fan Satisfaction.**

2.2.2. Positive Effect of Digital Innovation on Fan Loyalty

Within the framework of EET, consumers seek memorable and meaningful experiences rather than just products (Afzal, 2023). Digital innovations in the form of Metaverse concerts or exclusive interactions provide emotional value that can strengthen long-term engagement (Simoni et al., 2025). Mansoor et al. (2024) showed that immersive digital experiences can encourage sustainable supportive behavior. Kumar et al. (2025) also found that exclusivity in the Metaverse increases

emotional attachment and willingness to continue supporting idols. Thus, digital innovation is expected to positively affect fan loyalty. The logic of this influence is that digital innovation not only entertains but also creates symbolic value and identity reinforcement among fans. Immersive and exclusive experiences meet deeper psychological needs, which then translate into affective commitment and repeated supportive behavior (Dwivedi et al., 2021; Cho et al., 2023). Thus, digital innovation is expected to have a positive effect on fan loyalty. **H₂: Digital Innovation Has a Positive Effect on Fan Loyalty.**

2.2.3. Positive Effect of Parasocial Interaction on Fan Satisfaction

Parasocial interaction describes the one-sided emotional bond that fans form with idols through mediated encounters. These bonds provide fans with a sense of intimacy, recognition, and symbolic social support, fulfilling their psychological needs for belonging and identity reinforcement (Lacap et al., 2024; Muthaharah & Kusuma, 2024). Such emotional connections enhance satisfaction because fans perceive their interactions as meaningful and personalized, even when they are unidirectional. Parasocial interaction also fosters loyalty directly by deepening emotional attachment, making fans more likely to continue supporting idols over time (Lim et al., 2020; Wang et al., 2023). Digital innovation can directly foster fan loyalty because it creates symbolic value and long-term commitment that extends beyond temporary satisfaction. Immersive features, such as virtual concerts, non-fungible token collectibles, and avatar-based interactions, provide exclusivity that strengthens emotional attachment and repeat support (Kumar et al., 2025; Mansoor et al., 2024). Fans also perceive innovative platforms as authentic and progressive, which enhances their advocacy and loyalty (Cho et al., 2021b; Cho et al., 2023). Moreover, the Metaverse turns ordinary entertainment into extraordinary experiences that anchor sustainable fan engagement (Simoni et al. 2025). **H₃: Parasocial Interaction Has a Positive Effect on Fan Satisfaction.**

2.2.4. Positive Effect of Parasocial Interaction on Fan Loyalty

According to TPB, attitudes and social norms influence behavioral intentions. The emotional connection formed through parasocial interaction reinforces positive attitudes toward continuing to support idols (Du et al., 2025). Ma et al. (2022) study proves that parasocial interactions through live streaming strengthen fan loyalty. Zhang (2022) also shows that perceived emotional closeness encourages fans to remain loyal to their idols. He and Sun (2022) added that emotional attachment from parasocial interactions results in long-term commitment. Thus, parasocial interaction is expected to positively affect fan loyalty. Parasocial interaction enhances fan satisfaction because it fulfills deeper psychological needs, such as intimacy, recognition, and belonging, even in the absence of reciprocal interaction. Fans perceive these interactions as meaningful, which strengthens their emotional value and leads to greater satisfaction (Lim et al., 2020; Lacap et al., 2024). Recent studies have also shown that parasocial bonds in online communities provide symbolic support that increases the perceived authenticity of experiences, thereby improving satisfaction (Muthaharah & Kusuma, 2024; Wang et al., 2025). **H₄: Parasocial Interaction Has a Positive Effect on Fan Loyalty.**

2.2.5. Positive Effect of Fan Satisfaction on Fan Loyalty

Fan satisfaction is central to explaining how digital innovation and parasocial interaction translate into fan loyalty. Satisfaction functions as a bridge variable by

fulfilling emotional needs (e.g., intimacy, entertainment, and belonging) and reinforcing perceived closeness with idols. In the case of digital innovation, satisfaction mediates the effect because it is immersive (An et al., 2025). Metaverse experiences produce enjoyment and exclusivity, which motivate fans to remain loyal (Paul et al., 2024; Mansoor et al., 2024). For parasocial interaction, satisfaction enhances the perceived authenticity and meaningfulness of the fan-idol bond, which, in turn, sustains loyalty behaviors such as advocacy and purchasing (Zhang, 2022). Satisfaction serves as the main determinant of loyalty because a satisfying experience encourages emotional commitment (Cho et al., 2023). Kim et al., (2022) show that satisfaction strengthens fan attachment, thereby encouraging long-term loyalty. Chen et al. (2022) confirm that satisfaction makes fans willing to support their idols financially and socially. Paul et al. (2024) also emphasize the role of satisfaction as a reinforcer of behavioral intentions in the digital context. Therefore, fan satisfaction is expected to positively affect loyalty.

Fan satisfaction is central to explaining how digital innovation and parasocial interaction translate into fan loyalty. Satisfaction strengthens emotional attachment and motivates supportive behavior because fans feel that their expectations are fulfilled. From the perspective of UGT, satisfaction reflects the fulfillment of psychological needs, which drives repeated engagement and loyalty (Joshi, 2025). In addition, the EET emphasizes that memorable experiences generate satisfaction, which then transforms into a long-term commitment (Afzal, 2023; Simoni et al., 2025). Empirical studies have also confirmed that satisfaction increases affective commitment and willingness to continue supporting idols financially and socially (Chen et al., 2022; Kim et al., 2022). **H₅: Fan Satisfaction Has a Positive Effect on Fan Loyalty.**

2.2.6. Positive Effect of Digital Innovation on Fan Loyalty through Fan Satisfaction

Within the framework of the EET, immersive and memorable experiences first create satisfaction, which then fosters loyalty (Afzal, 2023; Simoni et al., 2025). The logic of this influence is that digital innovation provides fans with unique experiences, such as virtual concerts, interactive avatars, or exclusive digital content that exceed expectations and generate strong emotional gratification. This satisfaction strengthens affective commitment and motivates loyal behaviors, such as continued support, advocacy, and repeat engagement (Mansoor et al., 2024; Mele et al., 2025). Empirical studies have also confirmed that satisfaction serves as a critical mediator, transforming innovative experiences into sustainable loyalty outcomes (Paul et al., 2024). **H₆: Fan Satisfaction Mediates the Effect of Digital Innovation on Fan Loyalty.**

2.2.7. Positive Effect of Parasocial Interaction on Fan Loyalty through Fan Satisfaction

The Theory of Planned Behavior explains that behavioral intentions are influenced by satisfaction with meaningful interactions. Lacap et al. (2024) found that satisfaction from parasocial interactions can strengthen loyalty. Wang et al. (2023) also showed that online communities increase satisfaction, which ultimately strengthens attachment. Su et al. (2021) emphasized that parasocial relationships result in loyalty only if they generate perceived satisfaction. Thus, satisfaction is expected to be an important mediator in the relationship between parasocial interaction and loyalty. Parasocial interaction can indirectly influence loyalty through satisfaction. The logic of this relationship is that one-sided emotional bonds with

idols create a sense of intimacy and symbolic support, but these bonds only translate into loyalty when fans feel satisfied with their experiences. According to TPB, satisfaction strengthens positive attitudes and intentions, making fans more likely to engage in loyal behaviors (Du et al., 2025). Prior studies have confirmed that parasocial interactions enhance satisfaction by providing authenticity and meaningfulness, which fosters sustainable loyalty. Similarly, Su et al. (2021) emphasized that parasocial relationships alone are insufficient to ensure loyalty unless they result in perceived satisfaction. **H₇: Fan Satisfaction Mediates the Effect of Parasocial Interaction on Fan Loyalty.**

2.3. Research Model

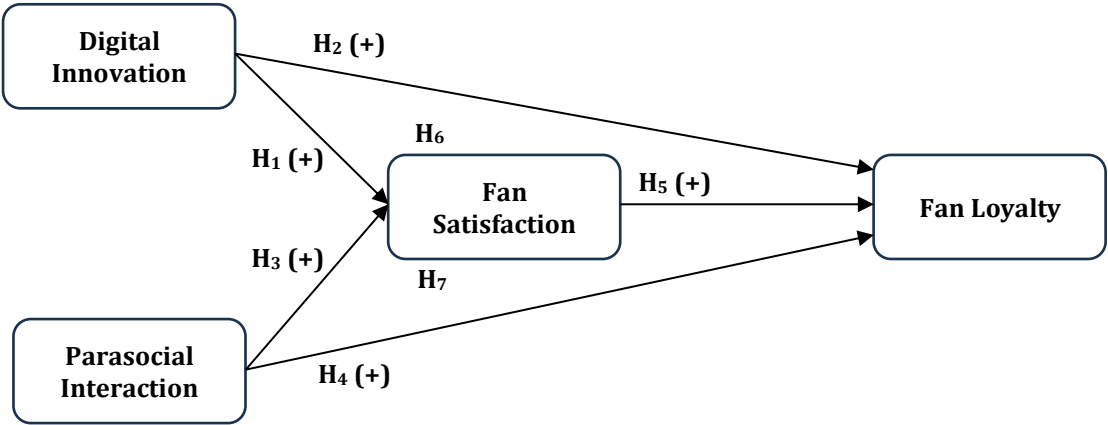


Figure 1. Research Model

The research model in Figure 1 was developed manually to illustrate the hypothesized relationships between variables, namely digital innovation, parasocial interaction, fan satisfaction, and fan loyalty. The arrows in the model indicate the direction of the hypotheses, including both direct and mediated effects. This model provides a visual representation of how digital innovation and parasocial interaction influence fan loyalty, directly or indirectly through satisfaction. In addition, the model is supported by the validity test, which shows the outer loading value for each indicator item per variable to ensure that the measurement model meets reliability and validity criteria.

3. Research Methods

3.1. Population and Sampling Method

The global population size is difficult to determine, but it is very large and spread internationally (Cho et al., 2023; Lee and Park, 2025). From this population, 200 respondents were selected using purposive sampling. Although the global population of K-pop fans is very large and dispersed, this study used purposive sampling with 200 respondents to ensure that the participants had direct experience with Metaverse-based activities in K-pop concerts. The decision to use 200 respondents was based on the recommendation of structural equation modeling with partial least squares sample adequacy, which requires a minimum of 5–10 times the number of indicators used (Hair et al., 2018). With 15 indicators, the minimum requirement is 75–150 respondents; therefore, the sample of 200 exceeds this threshold and is considered sufficient to achieve statistical power. Moreover, prior studies on digital fandom and Metaverse

adoption have also used similar sample sizes, demonstrating that 200 respondents are adequate for exploratory research in this context (Mele et al., 2025; Nadeem et al., 2025).

3.2. Data Collecting Method

This study used a quantitative approach with a survey method. The research population consisted of K-pop fans with experience using Metaverse platforms. The research instrument was a 1–5 Likert scale questionnaire with 15 indicators. The digital innovation variable consists of five indicators (Jin & Ryu, 2020; Mele et al., 2025; Nadeem et al., 2025), parasocial interaction three indicators (Lim et al., 2020; Wang et al., 2023; Lacap et al., 2024), fan satisfaction with four indicators (Chen et al., 2022; Cho et al., 2023), and fan loyalty with three indicators (Chen et al., 2022; Mansoor et al., 2024; Yoo et al., 2025).

3.3. Data Analysis Method

Data were analyzed using structural equation modeling with partial least squares (PLS) using Smart PLS. The testing process consists of three stages: validity testing assessed using outer loading and Average Variance Extracted (AVE); reliability testing assessed using Cronbach's alpha and composite reliability; and hypothesis testing assessed through path coefficients, p-values, and t-statistics obtained by bootstrapping 5,000 resamples. The validity test was conducted by examining the outer loading value of each indicator item. An indicator is considered valid if its loading is ≥ 0.7 , which means it contributes significantly to explaining the construct. However, loadings of 0.6–0.7 are acceptable in exploratory research (Hair et al., 2018). Meanwhile, the AVE must be ≥ 0.5 to indicate convergent validity (Hair et al., 2018). Reliability was evaluated using Cronbach's alpha and composite reliability. A variable is considered reliable if its value is ≥ 0.7 (Hair et al., 2018). In addition, a hypothesis test was performed to assess the relationship between each variable, with a p-value of < 0.05 .

4. Results and Discussion

4.1. Characteristics of Respondents

This study surveyed 200 respondents who were active K-pop fans with experience in Metaverse-based activities. The demographic composition shows that most respondents were female, aged between 18 and 25 years, and were predominantly university students. Such characteristics reflect the typical profile of K-pop fandom, which is largely composed of digitally literate and socially connected young people. Table 1 presents the detailed demographic distribution of the respondents.

Table 1. Characteristics of Respondents

Category	Sub-Category	Frequency	Percentage
Gender	Male	50	25
	Female	150	75
Age	< 18 Years Old	20	10
	18 – 25 Years Old	140	70
	> 25 Years Old	40	20
Education Level	High School	30	15
	University Student	130	65
	Graduate/post-graduate	40	20

4.2. Validity Test

The convergent validity test results in Table 2 and Figure 2 show that all indicators have outer loading values greater than 0.7. The AVE values for each construct were also greater than 0.5, so all indicators could be declared valid in explaining the constructs under study (Hair et al., 2018).

Table 2. Validity Test Results

Variable	Indicator	Loading Factor	Average Variance Extracted (AVE)
Digital Innovation	DI1	0.711	0.551
	DI2	0.742	
	DI3	0.730	
	DI4	0.760	
	DI5	0.768	
Parasocial Interaction	PI1	0.809	0.629
	PI2	0.826	
	PI3	0.742	
Fan Satisfaction	FS1	0.776	0.594
	FS2	0.823	
	FS3	0.741	
	FS4	0.739	
Fan Loyalty	FL1	0.744	0.580
	FL3	0.753	
	FL4	0.787	

The validity test results in Table 2 show that all indicators have been adjusted to the research constructs: digital innovation (DI1–DI5), parasocial interaction (PI1–PI3), fan satisfaction (FS1–FS4), and fan loyalty (FL1, FL3, FL4). All indicators had factor loadings above 0.7 and AVE above 0.5, thus meeting the criteria for convergent validity (Hair et al., 2018). The measurement model in Figure 2 shows that each construct was measured consistently and validly. Thus, the measurement model is suitable for use in reliability analysis and testing of relationships between variables in future studies.

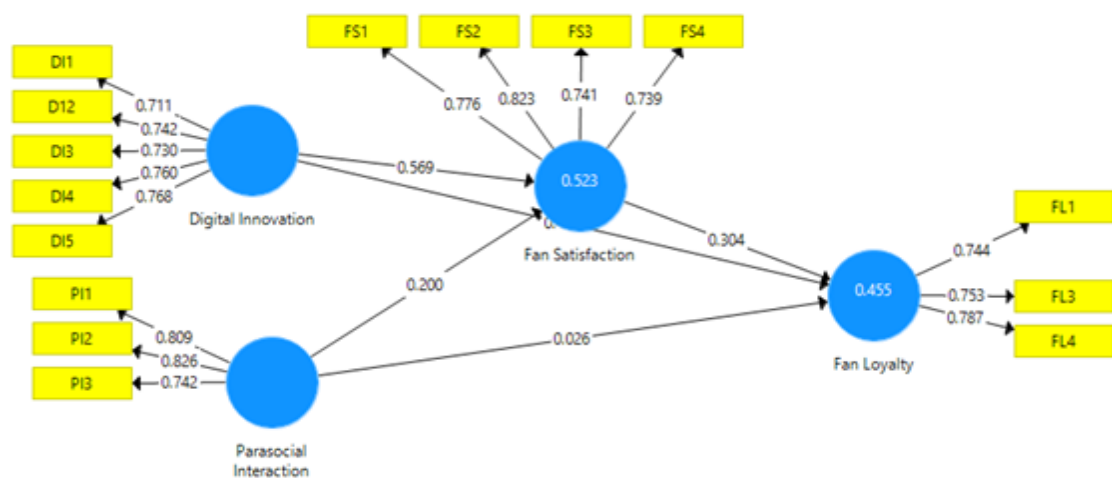


Figure 2. Measurement Model

4.3. Reliability Test

Table 3. Reliability Test Result

Variable	Cronbach's Alpha	Composite Reliability
Digital Innovation	0.796	0.860
Parasocial Interaction	0.704	0.835
Fan Satisfaction	0.772	0.854
Fan Loyalty	0.638	0.805

As shown in Table 3, all Cronbach's alpha and composite reliability values are above 0.7, indicating good reliability. This indicates that the research instrument has good internal consistency, making it reliable for measuring the research construct (Hair, 2021).

4.4. Hypothesis Test

Table 4. Hypothesis Test Result

Hypothesis	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
Digital Innovation → Fan Satisfaction	0.569	0.571	0.071	8.058	0.000
Digital Innovation → Fan Loyalty	0.404	0.401	0.077	5.254	0.000
Parasocial Interaction → Fan Satisfaction	0.200	0.202	0.081	2.479	0.014
Parasocial Interaction → Fan Loyalty	0.026	0.033	0.078	0.330	0.742
Fan Satisfaction → Fan Loyalty	0.304	0.302	0.073	4.188	0.000
Digital Innovation → Fan Satisfaction → Fan Loyalty	0.173	0.173	0.050	3.474	0.001
Parasocial Interaction → Fan Satisfaction → Fan Loyalty	0.061	0.060	0.027	2.248	0.025

Based on the hypothesis testing results, the first hypothesis (Digital Innovation → Fan Satisfaction) was supported, indicating that digital innovation significantly enhances satisfaction. The second hypothesis (Digital Innovation → Fan Loyalty) was also accepted, indicating that digital innovation directly fosters loyalty. The third hypothesis (Parasocial Interaction → Fan Satisfaction) is supported, while the fourth hypothesis (Parasocial Interaction → Fan Loyalty) is not supported as the effect is insignificant. The fifth hypothesis (Fan Satisfaction → Fan Loyalty) was accepted, confirming that satisfaction significantly contributes to loyalty. The sixth hypothesis, which proposed a mediating role of satisfaction between digital innovation and loyalty, was supported. Finally, the seventh hypothesis (Parasocial Interaction → Fan Satisfaction → Fan Loyalty) was also supported, with a significant mediating effect. Thus, six of the seven hypotheses tested in this study were supported, with the exception of the direct effect of parasocial interaction on loyalty, which was not statistically significant.

4.5. Discussion

4.5.1. The Effect of Digital Innovation on Fan Satisfaction

The results show that digital innovation through the Metaverse has a positive effect on fan satisfaction. This finding confirms the UGT, which views consumers as active users of media to fulfill their needs for entertainment, interaction, and social connection. The Metaverse provides an immersive experience in the form of virtual concerts or avatar interactions that exceed fans' expectations (Mele et al., 2025; Nadeem et al., 2025). In practical terms, these findings signal entertainment companies that adopting digital technology is not enough to be limited to technical

innovation but must be directed towards creating emotional experiences that provide satisfaction. For example, by providing exclusive interactions on digital platforms, K-pop agencies can ensure that fans feel closer to their idols, thereby maintaining their satisfaction. These results are also in line with the research by Simoni et al. (2025), who found that immersive digital experiences in virtual environments can increase emotional value and user satisfaction. In addition, Tao et al. (2025) emphasized that metaverse characteristics, such as virtual presence and exclusivity, play an important role in shaping a satisfying experience. Another study by Mansoor et al. (2024) shows that digital innovations that deliver realistic and interactive experiences can create higher emotional satisfaction among consumers.

4.5.2. The Effect of Digital Innovation on Fan Loyalty

The results show that digital innovation positively affects fan loyalty. These findings support the Experience Economy Theory (EET) framework, which emphasizes that consumers are now looking for meaningful and memorable experiences, not just products (Afzal, 2023). The digital experiences offered through virtual concerts, interactive avatars, and exclusive content in the Metaverse create emotional value that strengthens the long-term bond between fans and idols (Kumar et al., 2025; Simoni et al., 2025). Mansoor et al. (2024) prove that immersive digital experiences can encourage sustainable support behavior, while Paul et al. (2024) confirm that digital transformation in the context of entertainment increases emotional engagement and customer commitment. Cho et al. (2023) demonstrated that the implementation of digital innovation in the K-pop industry successfully builds loyalty by expanding the space for interaction between idols and fans through experience-based technology.

4.5.3. The Effect of Parasocial Interaction on Fan Satisfaction

Parasocial interaction increases fan satisfaction. This supports the TPB, in which positive attitudes are formed through intense emotional perceptions, even without two-way interaction. Emotional closeness to idols gives fans a sense of intimacy and symbolic recognition that can strengthen their satisfaction (Lim et al., 2020; Lacap et al., 2024). In practice, entertainment companies can integrate parasocial content, such as personal interactions on social media or dedicated fan apps, to maintain emotional connections. The greater the sense of closeness, the more likely fans are to feel satisfied with their involvement (Wang et al., 2023). These results are supported by research conducted by Muthaharah and Kusuma (2024), who found that parasocial interactions through fan apps strengthen emotional closeness and increase user satisfaction. Similarly, Zhang (2022) asserts that the perceived authenticity of virtual relationships between idols and fans in digital applications can increase their satisfaction and engagement. In addition, Y. Wang et al. (2025) show that online community interactions among fans play an important role in creating stronger symbolic support and emotional satisfaction.

4.5.4. The Effect of Parasocial Interaction on Fan Loyalty

The results indicate that parasocial interaction does not directly influence fan loyalty. This finding is in line with the Social Exchange Theory (Cook et al., 2006), which emphasizes the importance of reciprocity in building long-term commitment. In parasocial relationships, one-way interactions often result in emotional closeness without any real feedback, which is not strong enough to create lasting loyalty (Su et al., 2021; Zhang 2022). Ma et al. (2022) support this finding by showing that the

emotional connection between idols and fans through live streaming only encourages loyalty when accompanied by a satisfying experience. Similarly, He and Sun (2022) found that the absence of reciprocal responses can lead to a decline in fans' commitment to idols. In addition, Lacap et al. (2024) emphasized that although parasocial interactions can strengthen credibility and brand image, loyalty is only formed if the relationship generates real value and satisfaction for fans.

4.5.5. The Effect of Satisfaction on Fan Loyalty

Satisfaction has been proven to be a major factor influencing fan loyalty. This is in line with the classic view in marketing that satisfaction is the strongest predictor of long-term loyalty (Choi 2024; Kim et al. 2022). When the digital experience meets or exceeds fans' expectations, they are encouraged to remain committed to their idols. In a managerial context, these findings confirm that entertainment companies should prioritize fan satisfaction. Virtual concerts, exclusive content, and app-based interactions must be designed not only to entertain but also to ensure a satisfying experience that builds loyalty (Chen et al., 2022; Paul et al., 2024). Paul et al. (2024) reinforce these findings by showing that digital transformations that create satisfying experiences significantly increase emotional engagement and consumer loyalty. Similarly, Mansoor et al. (2024) found that pleasant customer experiences in digital environments directly impact long-term support intentions. Additionally, Simoni et al. (2025) confirmed that memorable digital experiences create emotional value that forms the basis of loyalty.

4.5.6. The Mediating Role of Satisfaction between Digital Innovation and Loyalty

The results show that satisfaction is an important mediator between digital innovation and loyalty. These findings support the Experience Economy Theory (EET), which explains that meaningful experiences result in satisfaction, which then develops into loyal commitment (Mele et al., 2025; Simoni et al., 2025). Practically, this means that every digital innovation launched by entertainment agencies must be oriented toward creating satisfaction. Innovations that are purely technical in nature will not have a long-term effect if they do not deliver emotional value (Mele et al., 2025). Therefore, fan satisfaction is key to converting digital innovation into loyalty (Mansoor et al., 2024; Paul et al., 2024). Mansoor et al. (2024) also confirmed that immersive digital experiences encourage emotional attachment, leading to customer loyalty. Additionally, Paul et al. (2024) found that experience-oriented digital transformation increases customer value through satisfaction as an intermediary variable. Meanwhile, Kumar et al. (2025) added that digital innovations that emphasize exclusivity and personalization strengthen emotional satisfaction, which then translates into loyalty behavior.

4.5.7. The Mediating Role of Satisfaction between Parasocial Interaction and Loyalty

The results indicate that fan satisfaction mediates the relationship between parasocial interaction and fan loyalty. Although the direct relationship between parasocial interaction and loyalty is not significant, satisfaction has been proven to be an important link that transforms emotional closeness into long-term commitment. These findings are in line with the Theory of Planned Behavior (TPB), which asserts that positive attitudes and behavioral intentions emerge when interaction experiences lead to satisfaction (Du et al., 2025; S. Wang et al., 2023). Previous studies have also supported these findings. Su et al. (2021) found that parasocial

relationships can foster loyalty only when accompanied by adequate emotional satisfaction. Lacap et al. (2024) confirmed that emotional interactions on social media build loyalty through satisfaction with digital relationships that are perceived as authentic. Additionally, Ma et al. (2022) demonstrated that positive experiences and satisfaction in virtual interactions with idols strengthen fans' commitment and loyalty.

5. Conclusion

This study analyzed the influence of metaverse digital innovation and parasocial interaction on K-pop fan loyalty, with fan satisfaction as a mediating variable. The findings indicate that metaverse innovations and parasocial interactions positively affect fan satisfaction. Furthermore, satisfaction enhances fan loyalty. However, not all hypothesized mediation paths were found to be statistically significant. Therefore, conclusions regarding mediation are limited to relationships that are empirically supported, while non-significant paths cannot be confirmed. In practical terms, the results highlight the importance of entertainment companies designing more targeted digital strategies, such as developing interactive virtual experiences through exclusive Metaverse-based concerts or offering more personalized parasocial features on social media and dedicated platforms. These approaches may strengthen emotional bonds, improve satisfaction, and foster greater fan loyalty. This study had some limitations. The sample was restricted to specific K-pop fans, which limited the generalizability of the findings. Moreover, given the rapidly evolving nature of Metaverse technologies, fan-idol interactions may take on new forms in the near future. Future research should therefore expand to other cultural contexts and entertainment industries and reassess the role of immersive technologies as they continue to develop.

References

- Afzal, H. (2023). The rise of the experience economy: Creating value through customer interactions. *Journal for Social Science Archives*, 1(2), 53–62. <https://doi.org/10.59075/jssa.v1i2.7>
- An, B. J., Jung, S. H., Ahn, G. H., & Kim, J. H. (2025). The process by which BTS's star attributes lead to loyalty through global fans' need fulfillment and satisfaction: implications for tourism marketing. *Tourism and Hospitality*, 6(3), 126. <https://doi.org/10.3390/tourhosp6030126>
- Chen, L., Chen, G., Ma, S., & Wang, S. (2022). Idol worship: How does it influence fan consumers' brand loyalty? *Frontiers in Psychology*, 13, 1–14. <https://doi.org/10.3389/fpsyg.2022.850670>
- Cho, J., Bian, Y., & Lee, J. (2023). Leading digital business model transformation in the K-pop industry: The case of SM Entertainment. *Pacific Business Review*, 25(5). <https://doi.org/10.1080/13602381.2023.2229761>
- Choi, H. J. (2024). Do K-Pop consumers' fandom activities affect their happiness, listening intention, and loyalty? *Behavioral Sciences*, 14(12). <https://doi.org/10.3390/bs14121136>
- Cook, K. S., Cheshire, C., Rice, E. R., & Nakagawa, S. (2013). Social exchange theory. In *Handbook of Social Psychology* (pp. 61–88). Dordrecht: Springer Netherlands. <https://doi.org/10.1007/978-94-007-6772-0>
- Du, Y., Xu, W., Piao, Y., & Liu, Z. (2025). How collectivism and virtual idol characteristics influence purchase intentions: A dual-mediation model of parasocial interaction and flow experience. *Behavioral Sciences*, 15(5), 582. <https://doi.org/10.3390/bs15050582>

- Dwivedi, Y. K., Ismagilova, E., Hughes, D. L., Carlson, J., Filieri, R., Jacobson, J., Jain, V., Karjaluoto, H., Kefi, H., Krishen, A. S., Kumar, V., Rahman, M. M., Raman, R., Rauschnabel, P. A., Rowley, J., Salo, J., Tran, G. A., & Wang, Y. (2021). Setting the future of digital and social media marketing research: Perspectives and research propositions. *International Journal of Information Management*, 59, 102168. <https://doi.org/10.1016/j.ijinfomgt.2020.102168>
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2018). The results of PLS-SEM article information. *European Business Review*, 31(1), 2-24.
- Hair, J. F. (2021). Next-generation prediction metrics for composite-based PLS-SEM. *Industrial Management and Data Systems*, 121(1), 5-11. <https://doi.org/10.1108/IMDS-08-2020-0505>
- H He, Y., & Sun, Y. (2022). Breaking up with my idol: A qualitative study of the psychological adaptation process of renouncing fanship. *Frontiers in Psychology*, 13, 1030470. <https://doi.org/10.3389/fpsyg.2022.1030470>
- H Huang, W., Zhou, J., Yi, X., & Jing, X. (2025). Fans' self-identity crisis and reconstruction in the context of idol disgraced: Evidence for a self-identity configuration. *Acta Psychologica*, 257, 105122. <https://doi.org/10.1016/j.actpsy.2025.105122>
- Jin, D. Y., & Yoon, T.-J. (2017). The Korean wave: Retrospect and prospect. *International Journal of Communication*, 11, 2241-2249.
- Jin, S. V., & Ryu, E. (2020). "I'll buy what she's# wearing": The roles of envy toward and parasocial interaction with influencers in Instagram celebrity-based brand endorsement and social commerce. *Journal of Retailing and Consumer Services*, 55, 102121. <https://doi.org/10.1016/j.jretconser.2020.102121>
- Joshi, G. (2025). Impact of social media on life satisfaction and body self image: A study on adults. *International Journal of Indian Psychology*, 13(2). <https://doi.org/10.25215/1302.452>
- Kim, J. H., Kim, K. J., Park, B. T., & Choi, H. J. (2022). The phenomenon and development of K-Pop: the relationship between success factors of K-Pop and the national image, social network service citizenship behavior, and tourist behavioral intention. *Sustainability*, 14(6), 3200. <https://doi.org/10.3390/su14063200>
- Kumar, A., Shankar, A., Behl, A., & Wamba, S. F. (2025). Do you believe in the metaverse NFTs? Understanding the value proposition of NFTs in the metaverse. *Technological Forecasting and Social Change*, 210, 123880. <https://doi.org/10.1016/j.techfore.2024.123880>
- Lacap, J. P. G., Cruz, M. R. M., Bayson, A. J., Molano, R., & Garcia, J. G. (2024). Parasocial relationships and social media interactions: building brand credibility and loyalty. *Spanish Journal of Marketing-ESIC*, 28(1), 77-97. <https://doi.org/10.1108/SJME-09-2022-0190>
- Lee, Y., & Park, S. (2025). Classifying and characterizing fandom activities: A focus on superfans' posting and commenting behaviors in a digital fandom community. *Applied Sciences*, 15(9), 4723. <https://doi.org/10.3390/app15094723>
- Lim, J. S., Choe, M. J., Zhang, J., & Noh, G. Y. (2020). The role of wishful identification, emotional engagement, and parasocial relationships in repeated viewing of live-streaming games: A social cognitive theory perspective. *Computers in Human Behavior*, 108, 106327. <https://doi.org/10.1016/j.chb.2020.106327>
- Ma, Z., Song, L., Zhou, J., Chong, W., & Xiong, W. (2022). How do comeback Korean pop performers acquire audience empathetic attachment and sustained loyalty? Parasocial interactions through live stream shows. *Frontiers in Psychology*, 13, 865698. <https://doi.org/10.3389/fpsyg.2022.865698>

- Mansoor, S., Rahman, S. M., & Bowden, J. L. H. (2024). Purchase spillovers from the metaverse to the real world: The roles of social presence, trialability, and customer experience. *Journal of Consumer Behaviour*, 23(5), 2501-2552. <https://doi.org/10.1002/cb.2353>
- Mele, C., Russo Spina, T., & Russo, S. P. (2025). Experimenting on the metaverse to foster innovation. *Spanish Journal of Marketing-ESIC*, 29(3), 270-292. <https://doi.org/10.1108/SJME-05-2023-0117>
- Muthaharah, A. S., & Kusuma, R. S. (2023). Parasocial Interactions in Online Fan Applications (Qualitative Study on NCTzen use of the LYSN application). *Proceeding ISETH (International Summit on Science, Technology, and Humanity)*, 1749-1758. <https://doi.org/10.23917/iseth.4567>
- Nadeem, W., Ashraf, A. R., & Shahid, S. (2025). What drives metaverse retail environments (non) usage? A behavioral reasoning theory perspective. *Technological Forecasting and Social Change*, 212, 123945. <https://doi.org/10.1016/j.techfore.2024.123945>
- Okorie, O., Russell, J., Cherrington, R., Fisher, O., & Charnley, F. (2023). Digital transformation and the circular economy: Creating a competitive advantage from the transition towards Net Zero Manufacturing. *Resources, Conservation and Recycling*, 189, 106756. <https://doi.org/10.1016/j.resconrec.2022.106756>
- Parc, J., & Kim, S. D. (2020). The digital transformation of the Korean music industry and the global emergence of K-pop. *Sustainability*, 12(18), 7790. <https://doi.org/10.3390/SU12187790>
- Paul, J., Ueno, A., Dennis, C., Alamanos, E., Curtis, L., Foroudi, P., Kacprzak, A., Kunz, W. H., Liu, J., Marvi, R., Nair, S. L. S., Ozdemir, O., Pantano, E., Papadopoulos, T., Petit, O., Tyagi, S., & Wirtz, J. (2024). Digital transformation: A multidisciplinary perspective and future research agenda. *International Journal of Consumer Studies*, 48(2), 1-28. <https://doi.org/10.1111/ijcs.13015>
- Simoni, M., Sorrentino, A., & Venturini, L. (2025). Metaverse as content or container? Exploring the future of customer experience in tourism. *Technological Forecasting and Social Change*, 220, 124334. <https://doi.org/10.1016/j.techfore.2025.124334>
- Su, B. C., Wu, L. W., Chang, Y. Y. C., & Hong, R. H. (2021). Influencers on social media as references: Understanding the importance of parasocial relationships. *Sustainability*, 13(19), 10919. <https://doi.org/10.3390/su131910919>
- Tao, M., Khan, J., Abbass, A., & Mehmood, K. (2025). Metaverse characteristics: The role of consumer experience shaping consumer behavior in the metaverse. *Journal of Theoretical and Applied Electronic Commerce Research*, 20(3), 166. <https://doi.org/10.3390/jtaer20030166>
- Wang, S., Kim, M. S., & Kim, S. (2023). The effects of idol fans' interactions in online fan community platforms on their well-being and loyalty. *Behavioral Sciences*, 13, 894-910. <https://doi.org/10.20944/preprints202308.1525.v1>
- Wang, Y., Huam, H. T., & Hamid, A. B. A. (2025). Virtual influencer effects in China's Gen Z market: How core characteristics and dual moderation shape purchase intentions. *Acta Psychologica*, 259, 105477. <https://doi.org/10.1016/j.actpsy.2025.105477>
- Yoo, S. C., Fan, H., Piscarac, D., & Puentes, S. T. (2025). Advertising together for our K-pop idol: The roles of trust, loyalty, and perceived value in K-pop crowdfunding for outdoor advertising. *Journal of Theoretical and Applied Electronic Commerce Research*, 20(1), 44. <https://doi.org/10.3390/jtaer20010044>
- Zhang, Y. (2022). A study on the para-social interaction between idols and fans in virtual applications. In *2021 International Conference on Social Development and Media Communication (SDMC 2021)* (pp. 1118-1124). Atlantis Press. <https://doi.org/10.2991/assehr.k.220105.205>