Analyzing User Behaviors in Metaverse Brand Events that Drive Real-World Store Visit Intentions

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Figure 1: Overview of this study. The left side depicts the Christmas Area, an event world in "Metaverse AEON" designed for games and photography, while the right side represents the real-world outcome. We analyze how six types of user behaviors in the metaverse translate into real-world store visit intentions.

Abstract

As metaverse platforms evolve into social and commercial spaces, companies increasingly host virtual events to enhance brand awareness and customer engagement. However, how participation in such events translates into real-world outcomes—specifically, increased intention to visit physical stores—remains underexplored. We analyzed behavioral logs and survey responses from 814 participants at "Metaverse AEON," a month-long commercial event on the Cluster platform. Six behavioral metrics were compared between users who reported increased store visit intention and those who reported no change. Results show that active engagement—game play, photography, emote use, and revisits—was significantly associated with increased visit intention, while dwell time alone showed inconsistent effects. Moreover, these transfer patterns varied by user segment: Virtual YouTuber fans showed positive associations across multiple metrics, whereas non-fans responded mainly to general-audience content. These findings indicate that engagement quality drives the seamless transfer from virtual events to real-world behavioral intentions, offering design implications for metaverse brand experiences.

Index Terms: Metaverse, Social VR, Behavioral Survey, Branding.

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1 Introduction

Commercial metaverse platforms such as VRChat [8], Cluster [1], and Resonite [9], which enable avatar-mediated communication in virtual spaces, continue to expand their market. Statista forecasts that the global metaverse market will reach USD 507.8 billion by 2030 [6].

As these platforms mature into social and commercial spaces, companies increasingly leverage the metaverse to host virtual events aimed at enhancing brand awareness and customer engagement [3]. In metaverse spaces, users interact with others through avatars, enjoy mini-games, take photos at designated spots, and share them on social media—engaging in social and immersive activities similar to real-world theme parks or festivals. Prior work shows that social VR affords interpersonal interactions comparable to face-to-face communication and can influence offline social perceptions and relationships [7, 4]. Moreover, immersive virtual experiences (e.g., VR-based destination experiences) can shape users' intentions toward real-world entities such as physical visits [5]. These findings suggest that metaverse experiences can bridge cyber and physical spaces, potentially influencing real-world intentions such as store visits.

However, how participation in commercial metaverse events translates into increased intention to visit physical stores remains underexplored. "Brand Immersive Time" [2] has been proposed as a metric linking virtual immersion to brand outcomes, but it simply multiplies dwell time by device-based coefficients (1.0 for VR, 0.7 for PC, 0.4 for smartphone), failing to capture which specific user behaviors contribute to real-world behavioral intentions. Understanding this connection would enable more effective event design within metaverse spaces and targeted strategies for different user segments.

This study aims to identify which user behaviors in commercial metaverse events are associated with increased real-world store visit intention by analyzing behavioral logs and survey responses from

event participants. Specifically, we address the following research questions:

- **RQ1**: What types of user behaviors in metaverse events are associated with increased intention to visit physical stores?
- **RQ2**: How do these behavioral patterns and their effects differ based on user attributes and visit purposes?

2 Data Collection

2.1 Event Overview

This study focused on "Metaverse AEON," a commercial event held on Cluster from November 22 to December 25, 2024, spanning approximately one month. This event was hosted by AEON Retail Co., Ltd. The event space consisted of two areas: the Christmas Area (Fig. 1 left) and the AEON Store Area (Fig. 2). Participants could enjoy experiential content such as athletic activities, mini-games, and commemorative photography at designated photo spots. During the event period, special events featuring members of a popular Virtual YouTuber group were also held.

2.2 Collected Data

To capture participant behavioral patterns in the metaverse space from multiple perspectives, this study established six objective behavioral metrics (Tab. 1). Additionally, subjective evaluation surveys were collected via Google Forms from users who visited the target areas during the event period. The survey items used in this study included questions to confirm changes in store visit intention (i.e., branding effects) (Q1, Q2) and questions to understand users' purposes and interests for visiting the event (Q3, Q4).

Q1 Do you usually go to AEON?

- (1) Frequently (twice or more per month)
- (2) Sometimes (once or more per three months)
- (3) Rarely (less than once per three months)
- (4) Never been

Q2 After experiencing Metaverse AEON, did you feel more inclined to visit AEON in the future?

- (1) Yes, I want to go more
- (2) No change

Q3 Where did you learn about "Metaverse AEON"?

- (1) SNS of the collaborating Virtual YouTuber
  (*9 other options were not used in this study)

Q4 Please indicate your reason for visiting "Metaverse AEON."

- (1) I was interested in the collaborating Virtual YouTuber
- (2) I wanted the exclusive wallpaper illustrated by the collaborating Virtual YouTuber
  (*8 other options were not used in this study)

2.3 Participants

The final analysis included 814 participants who provided valid responses. The gender distribution was 157 males, 564 females, and 93 who did not respond. The age distribution was as follows: 123 aged 19 or under, 310 in their 20s, 227 in their 30s, 96 in their 40s, 52 in their 50s, and 6 aged 60 or above.

Figure 2: Ride game in the AEON Store Area. Users ride in carts, racing through the store while collecting items in a gaming experience.

Table 1: Definitions of Objective Behavioral Metrics

Behavioral Metric	Definition
Game Play Count	Number of participations in mini-games installed within the event space
Photo Count	Number of uses of the photography function within the event space
Dwell Time	Cumulative time from entry to exit in the event space
Revisit Count	Number of revisits to the target worlds during the event period
Emote Count	Number of uses of the avatar's emotional expression function (emote function)
Comment Count	Number of uses of the text chat function within the event space

3 Results

3.1 Analysis Methods

First, we defined two groups based on changes in store visit intention, focusing on users who do not regularly visit AEON stores. Among users who responded "(2) Sometimes," "(3) Rarely," or "(4) Never been" to Q1, those who responded "(1) Yes, I want to go more" to Q2 were classified as the P group (Positive attitude group: increased store visit intention), while those who responded "(2) No change" were classified as the N group (Neutral attitude group: no change in store visit intention). Overall, the P group consisted of 551 participants and the N group consisted of 113 participants.

Next, we compared the six objective behavioral metrics between the two groups. For statistical analysis, appropriate tests for between-subjects comparisons were used, with the significance level set at $p < .05$. First, normality was assessed using the Shapiro-Wilk test and homogeneity of variance was evaluated using the F-test. When both assumptions were satisfied, Student's t-test was applied; when only normality was maintained, Welch's t-test was applied; and when normality was not satisfied, the Wilcoxon rank-sum test was applied. The results are shown in the left portion ("Overall") of Fig. 3.

3.2 Analysis by Behavioral Patterns

Comparison of the six objective behavioral metrics between the P group and N group revealed that the P group showed significantly higher values in the following four metrics. Values in parentheses indicate p-values for the AEON Store Area (left) and Christmas Area (right), respectively: Game Play Count ($p < .01$, $p < .01$), Photo Count ($p = .042$, $p < .01$), Revisit Count ($p < .01$, $p < .01$), and Emote Count ($p = .024$, $p = .016$). On the other hand, for Dwell Time, a significant difference was observed in the Christmas Area

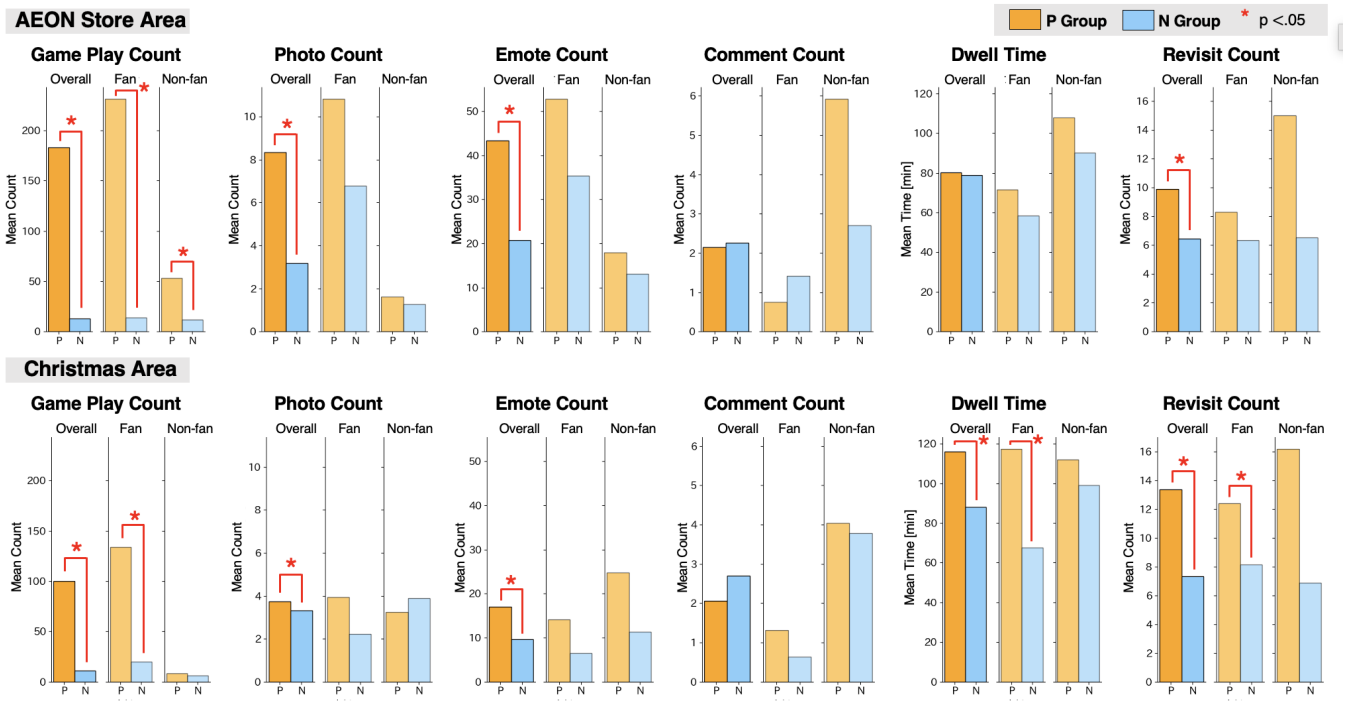

Figure 3: Comparison results of behavioral metrics based on changes in store visit intention. Six behavioral metrics (Tab. 1) were compared between the P group (increased store visit intention) and N group (no change in store visit intention). Each metric is shown separately by area and user attribute, with asterisks (*) indicating significant differences ($p < .05$).

($p = .011$), but no significant difference was found in the AEON Store Area ($p > 0.05$). For Comment Count, no significant differences were found in either area ($p > 0.05$).

3.3 Analysis by User Attributes

We analyzed differences in behavioral tendencies and store visit intention based on user attributes and visit purposes. Specifically, based on responses to the subjective evaluation survey, users were classified into two groups according to their interest in Virtual YouTubers. Participants who indicated they came because of "(1) SNS of the collaborating Virtual YouTuber" in Q3, or responded "(1) I was interested" or "(2) I wanted the collaboration goods" regarding Virtual YouTubers in Q4, were defined as the Virtual YouTuber fan group (hereafter, "Fan group"). Participants who gave other responses were defined as general participants without interest in Virtual YouTubers (hereafter, "Non-fan group").

The Fan group totaled 441 participants, of which 402 were in the P group and 39 were in the N group. Meanwhile, the Non-fan group totaled 223 participants, with 149 in the P group and 74 in the N group. The results are shown in the center ("Fan") and right ("Non-fan") portions of Fig. 3.

In the Fan group, among the six behavioral metrics, only Game Play Count showed significant differences in both areas ($p < .05$). Additionally, significant differences were observed in Dwell Time in the AEON Store Area ($p < .05$) and Revisit Count in the Christmas Area ($p < .05$). In contrast, in the Non-fan group, no behavioral metrics showed consistent significant differences across both areas; significant differences were confirmed only in Game Play Count in the AEON Store Area ($p < .05$).

4 Discussion

4.1 Relationship Between Behavioral Metrics and Store Visit Intention

In Sec. 3.2, as verification of RQ1, we compared six behavioral metrics in the metaverse space between users whose store visit intention increased (P group) and users who showed no change (N group). The results showed that the P group had significantly higher values for Game Play Count, Photo Count, Revisit Count, and Emote Count, while no significant difference was found for Comment Count. For Dwell Time, results varied by area (significant difference was found in the Christmas Area, but not in the AEON Store Area).

These results suggest that simply "staying longer" in a metaverse space does not directly lead to increased store visit intention; rather, how users engaged with the space—that is, the quality of their behavior—is important. In particular, experiences involving active interactions such as games, photography, and emotes are likely to contribute to the formation of favorable attitudes toward the brand. On the other hand, since no notable differences were observed in Comment Count (text chat), the depth of on-site experience and sense of immersion may have a stronger influence on psychological changes than interaction with surrounding users through comments.

Furthermore, the differences in results between areas indicate that the design of experiential content provided can change the quality of behavior, which in turn can affect ultimate brand attitudes.

Based on the above, to enhance store visit intention and brand attitudes, it is essential not simply to aim for increased dwell time, but to incorporate designs that encourage users' voluntary engagement (for example, introducing gamification, photogenic elements, and participation incentives or collaboration events to increase revisit frequency). This perspective provides important implications for the practical design of brand initiatives in metaverse spaces.

4.2 Differences in Behavior and Evaluation by User Attributes

In Sec. 3.3, as verification of RQ2, we analyzed the relationship between store visit intention and behavioral metrics by dividing participants into the Virtual YouTuber fan group (Fan group) and general participants (Non-fan group).

In the Fan group, significant differences were confirmed in several metrics including Game Play Count, Dwell Time, and Revisit Count, indicating that event experiences clearly contributed to increased store visit intention. On the other hand, in the Non-fan group, while there was a tendency for fewer significant differences across behavioral metrics overall, the P group significantly exceeded the N group in Game Play Count in the Store Area.

Considering that the in-store game was designed as the main content for the Non-fan group in this event, this result suggests that metaverse experiences do not exert effects uniformly across all metrics; rather, the fit between content and target user segments may influence branding effects. Therefore, while overall engagement was limited in the Non-fan group, specific experiences (in-store games) did influence store visit intention, indicating the importance of designing experiential elements that can attract the interest of non-fan audiences.

Overall, this suggests the necessity of different engagement pathways and experience designs for different target segments.

5 Conclusion and Future Work

This study collected behavioral logs and subjective evaluation data from visitors to a metaverse event and analyzed their relationship with store visit intention. The results demonstrated that active experiential behaviors such as game play and photography were more strongly related to increased store visit intention than the length of dwell time. This suggests that the quality of experience in the space and active engagement are important for branding.

Furthermore, differences in experiential behaviors and evaluation tendencies were observed based on user attributes and visit purposes. In particular, among fans interested in Virtual YouTubers, multiple behavioral metrics clearly contributed to increased store visit intention. On the other hand, while engagement was generally limited among non-fans, certain effects were observed in experiences that matched their interests, such as in-store games. This indicates that optimizing experiences according to user segments and methods for attracting interest will be important considerations for future brand design.

These results suggest that in designing brand experiences utilizing the metaverse, it is essential to design appropriate experience pathways for each target segment and to encourage active engagement. It should be noted that this study analyzed a single event, and verification based on continuous data accumulation remains a future challenge. In particular, comparing behavioral patterns across different devices (VR, PC, smartphone) may enable deeper understanding of how differences in immersion levels affect brand experiences. Additionally, for VR device users, utilizing sensing data such as gaze data and 3D skeletal information may enable experience evaluation that includes fine-grained movements that cannot be captured by conventional behavioral logs alone.

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