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The Phygital Synergy: How Metaverse Immersion Fuels Customer Loyalty through Perceived Value and Brand Engagement - An Integrated S-O-R and TAM Framework

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Abstract

The metaverse offers a paradigm shift for omnichannel retail, but empirical studies on its convergence with physical channels are in their infancy. Filling this research gap, this paper defines the metaverse as a strategic omnichannel touchpoint and explores its effect on loyalty. We propose and examine an original conceptual model based on the Stimulus-Organism-Response (S-O-R) theory and the Technology Acceptance Model (TAM). The model suggests metaverse immersion (Stimulus) affects internal states (Organism)—perceived value and brand engagement—that in turn shape behavioral outcomes (Response)—purchase intention and customer loyalty. Most importantly, we predict that physical retail experience mediates the intention-loyalty relationship, testing the very core "phygital synergy" hypothesis. A sequential mixed-method design was used, starting with qualitative data from 12 retail specialists, followed by a quantitative survey of 512 Indian metaverse users. Data were processed using PLS-SEM. Findings verify all the hypotheses: metaverse immersion has a strong positive effect on perceived value and brand engagement, which induce purchase intention and, consequently, loyalty. One main finding is the significant, positive moderating effect of physical retail experience, which empirically confirms the phygital synergy effect. This study adds to omnichannel theory by providing a combined S-O-R/TAM framework for phygital environments and offers managers tangible strategies for capitalizing on the metaverse to create seamless, loyal customer experiences.

Keywords: Metaverse, Omnichannel Retail, Phygital Integration, S-O-R Model, Technology Acceptance Model, Customer Loyalty, PLS-SEM

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Introduction:

The shopping world is being revolutionized by new immersive technologies that blur physical and digital boundaries (Kumar et al., 2023). The metaverse, as a shared, persistent virtual world, promises to redefine omnichannel strategy, going beyond mere multichannel presence towards an extensively interconnected phygital system (Verhoef et al., 2021; Park & Kim, 2022). Although innovators such as Nike and Gucci have shown the business prospects of metaverse campaigns, scholarly research lags behind, being piecemeal and lacking strong empirical tests on how virtual encounters enhance in-store visits to build key measures such as long-term customer loyalty (Kapoor et al., 2023; Dwivedi et al., 2023).

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This research is answering a pressing knowledge gap in relation to the psychological and behavioral processes by which metaverse integration affects the omnichannel customer experience (Kannan & Li, 2017). Precisely, we ask three research questions:

How do consumers' cognitive (perceived value) and affective (brand engagement) states change as a

result of being immersed in a metaverse retail setting?

What is the concomitant effect of these internal states on purchase intention and customer loyalty?

How does physical retail experience quality mediate the virtual engagement and loyalty relationship?

In order to address these queries, we theorize and empirically test a comprehensive model that combines the S-O-R framework (Mehrabian & Russell, 1974) with constructs from TAM/UTAUT2 (Davis, 1989; Venkatesh et al., 2012). This theoretical blending enables us to situate the metaverse not as a technical innovation, but as an omnichannel stimulus strategy evoking a specified psychological chain, terminating in loyalty—a contact-based relationship fostered by physical touchpoints. This way, this research offers the much-needed theoretical underpinning and empirical evidence for phygital integration strategies.

Theoretical Background and Hypothesis Development

Integrated Theoretical Framework: The S-O-R and TAM Lens

Our paradigm is grounded in the Stimulus-Organism-Response (S-O-R) approach, where environmental stimuli (Stimuli) influence an individual's internal affective and cognitive states (Organism) to produce behavioral responses (Responses). We define metaverse immersion-marked by high interactivity, telepresence, and sensory richness (Biocca & Delaney, 1995; Steuer, 1992)-as the primary Stimulus (S).

The Organism (O) aspect is embodied in two primary mediators:

Perceived Value (cognitive):

Total evaluation by a consumer of the usefulness of a metaverse experience based on what is received and what is given (Sweeney & Soutar, 2001).

Brand Engagement (affective):

Positive, motivational mental state induced through interactive brand experiences in metaverse interactions (Hollebeek et al., 2014).

The Response (R) is comprised of the sequence of behavior:

Purchase Intention as an immediate antecedent to Customer Loyalty, the desired end state (Oliver, 1999).

To further enhance the S-O-R framework and accommodate technology-specific adoption motivators, we incorporate concepts of the Technology Acceptance Model (TAM) and its extensions (e.g., UTAUT2). The incorporation recognizes that perceived usefulness and ease of use of the metaverse platform are emergent from the immersion experience, impacting internal states and resultant behaviors (Marriott & Williams, 2018).

Hypothesis Development

H1: Metaverse immersion has a positive impact on perceived value.

H2: Brand immersion in the metaverse is positively related to brand engagement.

H3: Perceived value positively affects purchase intention.

H4: Brand engagement positively affects purchase intention.

H5: Purchase intention is positively related to customer loyalty.

H6: Physical retail experience positively moderates the relationship between purchase intention and customer loyalty (i.e., the relationship is more pronounced among consumers with more positive physical retail experiences).

Methodology

Research Design and Measures

This research used an explanatory sequential mixed-methods design. A qualitative phase involving 12 semi-structured interviews with retail leaders and metaverse creators preceded it. Thematic analysis of the interviews guided contextual adaptation of validated scales for the quantitative survey.

All variables were assessed using reflective, multi-item adapted scales from literature on a 7-point Likert scale (1=Strongly Disagree, 7=Strongly Agree):

Metaverse Immersion (8 items, adapted from Klein, 2003; Steuer, 1992)

Perceived Value (4 items, Sweeney & Soutar, 2001)

Brand Engagement (5 items, Hollebeek et al., 2014)

Purchase Intention (3 items, Dodds et al., 1991)

Customer Loyalty (4 items, Oliver, 1999)

Physical Retail Experience (4 items, Verhoef et al., 2021)

Control Variables: Age, gender, and previous technology use were used as control variables.

Data Collection and Sample

Data were gathered through an online survey from a sample of 512 Indian consumers who had participated in a metaverse shopping experience in the previous three months. Both purposive and snowball sampling were utilized to access this specialized group. Procedural remedies such as psychological separation of constructs and guaranteed respondent anonymity were utilized to counteract common method bias (Podsakoff et al., 2003).

Data Analysis

Data were analyzed via variance-based Partial Least Squares Structural Equation Modeling (PLS-SEM) and Smart PLS 4.0. PLS-SEM was chosen due to its appropriateness for predictive, theory-generating research and the capability to model multifaceted relations using latent variables, such as moderating effects (Hair et al., 2021; Henseler et al., 2016).

Results

Measurement Model

The model indicated high reliability and validity. Internal consistency reliability was ensured (Composite Reliability > 0.8). Convergent validity was ensured (Average Variance Extracted > 0.5 for all constructs). Discriminant validity was checked using the Fornell-Larcker criterion and the Heterotrait - Monotrait (HTMT) ratio of correlations (all values < 0.85).

Structural Model and Hypotheses Testing

The structural model had strong predictive power with R^2 values of 0.68 for purchase intention and 0.72 for customer loyalty, reflecting a strong explanation of the variance. Significance of path

coefficients was determined by bootstrapping (5000 subsamples).

The relationships between metaverse immersion and perceived value (H1: $\beta = 0.54$, $p < 0.001$) and brand engagement (H2: $\beta = 0.49$, $p < 0.001$) were positive and significant, supporting H1 and H2.

Perceived value (H3: $\beta = 0.38$, $p < 0.001$) and brand engagement (H4: $\beta = 0.41$, $p < 0.001$) had positive and significant effects on purchase intention, supporting H3 and H4.

Purchase intention also had a significant, direct influence on customer loyalty (H5: $\beta = 0.45$, $p < 0.001$), which validates H5.

Critically, the moderating impact of physical retail experience on the intention-loyalty connection was positive and significant (H6: $\beta = 0.18$, $p < 0.01$). A simple slope analysis (Hayes, 2018) supported that the link between purchase intention and loyalty was significantly more powerful for consumers who reported high levels of physical retail experience, with strong evidence for H6 and the phygital synergy proposition.

Discussion

Key Findings and Theoretical Implications

This research has a number of important contributions. For the first time, it presents strong empirical evidence that metaverse immersion is an efficacious stimulus in the omnichannel sequence, capable of creating considerable perceived value and encouraging in-depth brand interaction. This goes beyond theorizing the metaverse by measuring its psychological effects.

Second, and most importantly, the research empirically confirms the phygital synergy effect. The substantive moderating influence of physical retail experience proves that spending on virtual and physical channels is not as substitutes but as powerful complements. A positive experience in one channel enhances the value and loyalty created in the other, as a self-sustaining, unified customer journey.

Third, we advance theory by combining the S-O-R model with technology acceptance theory. This offers a richer explanation of consumer behavior in sophisticated technological shopping environments, explaining not only that the metaverse affects loyalty but also how—through a sequential process in which technology-facilitated immersion gives rise to cognitive and affective processes that underlie behavior.

Managerial Implications

Our results provide a straightforward, evidence-based guide for practitioners:

Strategic Integration:

Create metaverse experiences with direct connections to the physical world (e.g., virtual try-ons resulting in in-store pickups, special in-store promotions for metaverse visitors).

Consistent Branding:

Deliver a cohesive brand story and visual identity across physical and virtual touchpoints in order to support the synergistic impact.

Data-Driven Orchestration:

Use data from both channels to have a 360-degree understanding of the customer experience and personalize engagement at each step.

Conclusion, Limitations, and Future Research

This research lays the foundation for the metaverse

as a key omnichannel enabler, whose potential is capitalized upon by complementarity with physical retail. By corroborating a comprehensive model of customer response, we show the linear psychological and behavioral process from virtual immersion to loyalty, a process reinforced by tangible, in-store experiences.

This research has limitations. Its cross-sectional nature prohibits causality, and its geographical scope in India potentially restricts generalizability. Longitudinal designs must be used in future research to capture longitudinal development of phygital loyalty and to reproduce the study across various cultural contexts. In addition, investigating the functions of particular metaverse technologies (e.g., AR vs. VR), consumer characteristics, and new moral issues such as data protection and digital health will be worthwhile extensions to this research. In the meantime, this research presents a starting point and persuasive evidence for the emergence of the phygital paradigm.

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