

Interactivity and Psychological Immersion in Online Impulse Buying: A Systematic-Integrative Review of FoMO and Telepresence

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ABSTRACT

Live-streaming commerce integrates product demonstrations, real-time communication, social pressure, and time-limited promotions. This systematic-integrative review synthesizes evidence on interactivity, fear of missing out (FoMO), telepresence, and online impulse buying within the Stimulus–Organism–Response framework. Following screening and eligibility assessment, 24 empirical studies retrieved through Google Scholar were analyzed using a concept-centric matrix. Findings show that interactivity operates primarily through telepresence, flow, inspiration, trust, perceived usefulness, and parasocial relationships. Evidence linking FoMO to impulse buying is relatively consistent but is more coherently positioned as an organismic state than an environmental stimulus. Telepresence links interactive affordances to purchasing responses, although evidence from virtual reality and metaverse settings should be applied cautiously to TikTok Live. The review clarifies evidence gaps and distinguishes impulse-related outcomes.

INTRODUCTION

Live-streaming commerce has transformed digital shopping from a relatively independent information-search activity into a synchronous social event. Consumers can watch product demonstrations, ask questions, read audience comments, respond to streamers' invitations, and receive time-limited offers without switching channels. Within this configuration, decisions are shaped not only by product attributes but also by response speed, interaction intensity, social proximity, perceived scarcity, and the experience of seemingly being present in the selling environment. Studies of live-streaming commerce indicate that social presence, promotions, flow, media cues, and interactive affordances can stimulate the urge to buy impulsively (Huo et al., 2023; Lee & Chen, 2021; Xia et al., 2024).

Online impulse buying should be distinguished from planned purchasing decisions. It refers to a relatively spontaneous and rapid purchasing response involving limited deliberation after a consumer encounters a particular stimulus (Rook, 1987). In digital commerce research, online impulse buying is often used interchangeably with the urge to buy impulsively, impulse buying intention, purchase intention, and even compulsive buying. Such interchangeable use creates problems of conceptual validity: an urge is a prebehavioral state, an intention indicates readiness to act, impulsive behavior is an enacted response, and compulsive buying reflects a recurrent pattern accompanied by difficulty controlling the behavior. Accordingly, the findings of Hussain et al. (2023) on compulsive buying are treated as evidence of a related mechanism rather than as evidence equivalent to online impulse buying.

Interactivity represents a central affordance because it reduces the temporal and informational distance among consumers, streamers, products, and audiences. Nevertheless, the available evidence does not support the simplistic conclusion that greater interactivity invariably produces stronger impulse buying. Real-time interactivity may generate inspiration (Khôi & Le, 2024), strengthen attachment through tie strength (Kang et al., 2021), shape perceived usefulness and parasocial relationships (Li, Zhang, et al., 2025), or operate in conjunction with other dimensions within configurational pathways (Zhang et al., 2025). Interactivity is therefore more appropriately understood as a multidimensional stimulus whose effectiveness depends on psychological processes and boundary conditions.

FoMO captures consumers' psychological vulnerability. The construct refers to apprehension that others may be enjoying valuable experiences or opportunities in one's absence (Przybylski et al., 2013). In digital commerce, countdown timers, limited stock, social trends, audience comments, and exclusive offers may intensify the perception that an opportunity is about to disappear. Several Indonesian studies report a positive relationship between FoMO and impulse buying on e-commerce platforms and TikTok (Ghaniyah, 2024; Mufti & Hariyanto, 2025; Rachman et al., 2024). However, classifying FoMO as an environmental stimulus within the S-O-R framework creates conceptual ambiguity because FoMO is itself an internal evaluation and motivational state.

Scarcity, time urgency, and social proof are more appropriately treated as the stimuli that elicit it.

Telepresence provides a mechanism for explaining how technological affordances are translated into psychological experience. Telepresence is the perception of being located within a mediated space rather than solely in one's immediate physical environment (Lee, 2004). Evidence from virtual reality, virtual tours, the metaverse, and live-streaming settings suggests that interactivity and vividness can enhance telepresence, which subsequently shapes attitudes or shopping responses (Jafar et al., 2024; Kim et al., 2021; Liu & Tian, 2024; Spielmann & Mantonakis, 2018). However, the level of immersion afforded by virtual reality is not equivalent to that offered by TikTok Live on a mobile phone. Cross-media transfer must account for differences in embodiment, viewpoint control, sensory depth, and interaction structure.

The available literature remains fragmented across three streams. The first examines how technological and social affordances affect engagement or impulse buying. The second positions FoMO as a predictor of consumption behavior, often without examining the experience of presence. The third explains telepresence in immersive environments but frequently adopts attitude or purchase intention as the outcome. This fragmentation complicates efforts to determine whether telepresence genuinely bridges interactivity and FoMO with online impulse buying, particularly among Generation Z consumers purchasing fashion products through TikTok Shop in Indonesia.

A recent systematic review of impulse buying in live-streaming e-commerce mapped 40 studies and highlighted the field's rapid development (Li, García-de-Frutos, & Ortega-Egea, 2025). In contrast to broad mappings of antecedents, the present review adopts a problem-driven focus to evaluate the coherence of the interactivity-FoMO-telepresence-online impulse buying nexus. This focus enables a more detailed assessment of construct positioning within the S-O-R framework, support for mediation mechanisms, outcome equivalence, and the limits of transferring findings across media.

This article makes three contributions. First, it reconfigures the S-O-R classification by positioning technological, social, and marketing affordances as stimuli; FoMO and telepresence as organismic processes; and impulsive responses as hierarchical outcomes. Second, it distinguishes direct evidence, mechanistic evidence, and cross-context evidence to prevent generalizations from extending beyond the designs of the underlying studies. Third, it develops an empirical agenda for testing the model among Generation Z consumers in Indonesia's live-streaming fashion market using designs that are more robust than a single cross-sectional survey.

Based on these theoretical and empirical gaps, the review is guided by the following four research questions.

Table 1. Research Questions and Analytical Focus

RQ	Research question	Analytical focus
RQ 1	Which technological, social, and marketing stimuli most consistently explain online impulse buying in live-streaming and immersive commerce?	Types of stimuli, patterns of convergence, and conditions that constrain their effects.
RQ 2	How do interactivity and FoMO influence impulse buying, either directly or through psychological processes?	Direct paths, mediators, moderators, and the distinction between trait and state FoMO.
RQ 3	How does telepresence connect interactive or immersive stimuli with consumer responses, and to what extent does the evidence support its role in impulse buying?	Antecedents of telepresence, outcomes, strength of mediation evidence, and media equivalence.
RQ 4	Which methodological patterns, limitations, and research priorities are relevant to Generation Z, fashion, live-streaming, and the Indonesian context?	Design, measurement, context, inferential validity, and priorities for future research.

LITERATURE REVIEW

The Stimulus-Organism-Response Framework

The S-O-R framework proposes that environmental characteristics (stimuli) influence an individual's internal states (the organism), which subsequently produce approach or avoidance responses (Mehrabian & Russell, 1974). In digital commerce, stimuli extend beyond interface design. They include technological affordances such as responsiveness and control; social cues such as streamer presence, audience comments, and parasocial relationships; and marketing cues such as discounts, scarcity appeals, and time limits. The organism encompasses cognitive and affective evaluations, including perceived usefulness, trust, inspiration, flow, FoMO, and telepresence. Responses may include engagement, impulsive urges, purchase intentions, or actual purchases.

The strength of the S-O-R framework lies in its capacity to organize mechanisms; however, this flexibility can also create inconsistency. The same construct is sometimes positioned at different levels without adequate justification. FoMO, for example, is frequently classified as a stimulus simply because it precedes purchasing. Temporal order, however, is not equivalent to theoretical position. When FoMO is measured as apprehension, pressure, or fear of being left behind, it represents an organismic psychological state. Scarcity and social proof function as the stimuli that trigger this state. This distinction produces a more testable S-O-R mechanism.

Online Impulse Buying as a Hierarchical Response

Online impulse buying is characterized by spontaneity, the strength of the urge, rapid decision-making, and reduced consideration of consequences (Rook, 1987). Live-streaming environments can shorten the path from exposure to action because information, persuasion, interaction, and purchasing functions are simultaneously available. Nevertheless, studies do not always measure the same response level. Lee and Chen (2021) emphasize the urge to buy impulsively, whereas other studies measure intention or self-reported behavior. Findings at one response level should not be presented as evidence for a stronger level without transactional data.

Interactivity as a Technological and Social Affordance

Interactivity is the degree of message exchange, reciprocal responsiveness, and user control over mediated communication (Rafaeli, 1988). In live-streaming commerce, this construct assumes at least four forms: streamer responsiveness, two-way communication, user control or choice, and interaction among viewers. Combining these forms into a single score may obscure distinct mechanisms. Interaction with a streamer may build trust, whereas interaction among users is more closely related to social proof and a sense of belonging.

Empirical evidence reveals both mediation and configurational patterns. Khôi and Le (2024) link real-time interactivity to inspiration before impulse buying. Kang et al. (2021) demonstrate a dynamic effect of interactivity on engagement through tie strength. Zhang et al. (2025) show that combinations of interactivity dimensions and social ties can produce high engagement, indicating that no single condition is invariably necessary. In the context of fashion products on TikTok, Martin et al. (2025) position perceived trust as a mediator. These patterns support interactivity as a stimulus but challenge overly simplistic direct-effect models.

FoMO as a Psychological Appraisal

FoMO arises from the perception that valuable experiences are occurring and that an individual is at risk of missing them (Przybylski et al., 2013). In digital shopping, FoMO may be triggered by temporal cues (flash sales), quantitative cues (remaining stock), social cues (viral products), or exclusivity cues (live-only vouchers). Ghaniyah (2024), Mufti and Hariyanto (2025), and Rachman et al. (2024) provide contextual evidence that FoMO is associated with impulse buying. Hussain et al. (2023) extend this understanding by demonstrating the role of mindfulness as a boundary condition in compulsive buying, although compulsive buying must be distinguished from impulse buying.

Conceptually, FoMO may be treated as a relatively stable trait, a situationally induced state, a mediator, or a moderator. Studies must specify the level being measured. Items assessing a general tendency to fear missing out indicate an individual predisposition, whereas items referring to a particular live-streaming session more closely represent an organismic state. Without this distinction, causal relationships become ambiguous and the risk of common method bias increases.

Telepresence as an Experiential Mechanism

Telepresence describes the perception of being situated in and interacting with a mediated environment as though it were real (Lee, 2004). It differs from social presence: telepresence emphasizes spatial or environmental presence, whereas social presence emphasizes the perceived availability and warmth of social actors. Both may occur simultaneously in live-streaming commerce, but they should not be treated as synonymous. Interactivity and vividness are the most stable antecedents of telepresence in immersive settings. Kim et al. (2021) demonstrate the mediating role of telepresence in virtual reality shopping, whereas Jafar et al. (2024) find that interactivity and vividness enhance telepresence in the metaverse. Liu and Tian (2024) show that sense of presence and telepresence do not respond identically to all affordances. This evidence supports the classification of telepresence as an organismic state rather than as a technological attribute.

The relationship between FoMO and telepresence is considerably less established. Aitamurto et al. (2021) found that FoMO did not compromise presence in a 360-degree video experience, but this finding does not establish that FoMO enhances telepresence. Theoretically, FoMO may increase attention to a live-streaming session and strengthen temporal involvement, yet it does not necessarily create spatial presence. Consequently, telepresence as a mediator of the relationship between FoMO and impulse buying remains an open hypothesis requiring direct empirical testing.

METHODOLOGY

Review Design

This study employed a systematic-integrative literature review. An integrative approach was selected because the corpus encompassed variations in contexts, designs, constructs, and outcomes that precluded the uniform aggregation of effect sizes (Snyder, 2019; Torraco, 2005). The identification, screening, eligibility, and inclusion processes were reported transparently, while the analysis followed a concept-centric synthesis to compare concepts and mechanisms across studies (Webster & Watson, 2002). Under this design, the unit of inference is the pattern of evidence within the eligible corpus rather than citation frequency or the reputation of an indexing platform.

Data Source and Study Selection

The literature was retrieved through Google Scholar using combinations of terms related to interactivity, FoMO, telepresence or presence, online impulse buying, live-streaming commerce, social commerce, virtual reality, and the metaverse. Google Scholar was treated as a discovery tool rather than as a publisher or an indicator of journal quality. The unit of analysis was the scholarly publication. Available metadata, abstracts, and full texts were examined to determine relevance, while bibliographic identities and duplicates were verified through DOIs and publishers' webpages. Selection was conducted in stages. Records were first deduplicated and subsequently screened by source type and topical relevance. Publications that passed screening were assessed for eligibility based on construct relevance, context, outcomes, adequacy of methodological

information, and traceability of findings. Relevant conceptual or foundational works were retained to establish the theoretical background but were not counted as empirical studies in the synthesis.

Quality Assessment and Coding

Each publication reaching the eligibility stage was qualitatively assessed across five domains: (1) clarity of context and unit of analysis; (2) alignment between construct definitions and operationalization; (3) correspondence between the research design and the level of the claims; (4) outcome equivalence; and (5) transparency of sampling and analytical procedures. Critical deficiencies in empirical status, relevance, or traceability constituted grounds for exclusion. For studies that continued to meet the criteria, design limitations informed their interpretive weight: findings from cross-sectional surveys were interpreted as associations, experiments provided stronger support for causal inference, and studies of virtual reality or the metaverse were treated as cross-context mechanistic evidence rather than direct evidence for TikTok Live.

Coding was conducted using a concept-centric matrix comprising the context or platform, design, sample where available, stimulus, organism, response, mediators or moderators, direction of relationships, correspondence with the research questions, and limitations on transferability. Analysis and synthesis proceeded in three stages: (1) tabulation of findings for each construct and relationship; (2) comparison of convergence, divergence, and strength of support according to design and outcome; and (3) cross-theme integration to reconfigure the S-O-R framework. A meta-analysis was not conducted because heterogeneity in constructs, outcomes, designs, and the availability of effect statistics precluded quantitative aggregation.

RESEARCH RESULT

Study Selection and Eligibility

From the 51 initial records, one duplicate was removed, leaving 50 records for screening. Source-type screening excluded 12 documents that did not meet the criteria for empirical scholarly publications, while substantive screening excluded 11 publications that did not satisfy topical or outcome eligibility. Three foundational works were separated for use in the theoretical background. Consequently, 24 empirical studies met the inclusion criteria and proceeded to quality assessment, coding, analysis, and synthesis.

Characteristics of the Study Corpus

The final corpus comprised 24 empirical studies published between 2018 and 2026. Publication activity increased after 2021 and was concentrated in 2024 and 2025, reflecting the expansion of research from website-based e-commerce to live-streaming, virtual reality, and the metaverse. Asian contexts, particularly China and Indonesia, predominated. Most studies employed cross-sectional surveys analyzed with structural equation modeling or regression, whereas experiments, mixed-method designs, dynamic studies, and fuzzy-set qualitative comparative analysis (fsQCA) were less common. This composition supports the

synthesis of associations and perceived mechanisms but constrains inferences regarding causality and actual purchasing behavior.

Table 4. Characteristics and Contributions of the Synthesized Empirical Studies

Study	Context/design	Focus	Contribution to the synthesis	RQ
Aitamurto et al. (2021)	360-degree video; repeated-measures/mixed design	FoMO/JOMO and presence	FoMO was not shown to compromise presence; the findings do not establish that FoMO enhances telepresence.	RQ3- RQ4
Gulfranz et al. (2022)	Taobao and JD; SEM survey	Online customer shopping experience, self-control, and online impulse buying	Functional and psychological experiences contribute to online impulse buying; self-control operates as a boundary condition.	RQ1- RQ2- RQ4
Zhang et al. (2025)	Live-streaming; SEM and fsQCA	Interactivity, tie strength, and engagement	The effect of interactivity is configurational rather than a universal single pathway.	RQ1- RQ2
Feng et al. (2024)	Live-streaming; survey	Scarcity, price perception, and impulse buying	Scarcity persuasion and price perceptions condition the effects of stimuli on impulse buying.	RQ1- RQ2- RQ4
Ghaniyah (2024)	Indonesian e-commerce; PLS-SEM	FoMO and impulse buying	FoMO is positively associated with impulse buying in a digital promotion context.	RQ2- RQ4
Gui et al. (2022)	Cross-border e-commerce; survey	Telepresence and purchase intention	Telepresence operates through evaluative mechanisms; the outcome is purchase intention rather than impulse buying.	RQ3
Ha et al. (2026)	Virtual commerce; survey	Interactivity, embodiment, virtual crowd, experience,	Interactive and social stimuli shape virtual and reality experiences and impulse buying.	RQ1- RQ2- RQ3- RQ4

		and impulse buying		
Huo et al. (2023)	Chinese live-streaming; survey	Social presence, promotions, flow, and impulse buying	Flow links social and promotional stimuli to impulse buying, while consumer resources condition these effects.	RQ1-RQ2-RQ4
Hussain et al. (2023)	Online shopping; survey	FoMO, mindfulness, and compulsive buying	Mindfulness attenuates the FoMO pathway; compulsive buying is not equivalent to impulse buying.	RQ2
Kang et al. (2021)	Live-streaming commerce; panel/dynamic design	Interactivity, tie strength, and engagement	Interactivity shapes engagement through tie strength and temporal dynamics.	RQ1-RQ2
Khôi and Le (2024)	Live-streaming commerce; survey	Real-time interactivity, inspiration, and impulse buying	Inspiration is a focal mediator between real-time interaction and impulse buying.	RQ1-RQ2
Kim et al. (2021)	Virtual reality shopping; survey	Interactivity, vividness, and telepresence	Telepresence mediates the effect of affordances on virtual reality shopping experiences and responses.	RQ3-RQ4
Lee and Chen (2021)	Live-streaming; PLS-SEM	Enjoyment, usefulness, and buying urges	Enjoyment stimulates buying urges, whereas usefulness does not necessarily exert a direct effect.	RQ1-RQ2
Li, Ji, et al. (2025)	Live-streaming; survey	Streamer attractiveness and impulse buying	Streamer attributes operate through psychological processes rather than exposure alone.	RQ2
Li, Zhang, et al. (2025)	Social live shopping; survey	Interactivity, information, parasocial interaction, belonging, and buying urges	Usefulness, parasocial interaction, and belonging link stimuli to buying urges.	RQ1-RQ2
Liu and	Virtual environment;	Autonomy, presence,	Presence and telepresence have	RQ3

Tian (2024)	comparative design	and telepresence	different antecedents and should not be combined.	
Liu et al. (2024)	Tourism live-streaming; experiment	Personal brand equity, telepresence, and consumer responses	Telepresence interacts with personal brand equity to shape tourists' responses.	RQ3-RQ4
Martin et al. (2025)	Indonesian TikTok fashion; survey	Interactivity, promotional information, trust, and impulse buying	Trust links interactivity and promotions to impulse buying.	RQ2-RQ4
Mufti and Hariyanto (2025)	Indonesian university students; survey	TikTok content, FoMO, and impulse buying	FoMO and content marketing are associated with impulse buying; the student context constrains generalization.	RQ2-RQ4
Jafar et al. (2024)	Metaverse; SEM	Interactivity, vividness, telepresence, and flow	Interactivity and vividness enhance telepresence; transfer to mobile live-streaming requires caution.	RQ3
Rachman et al. (2024)	Indonesian e-commerce/SMEs; survey	FoMO and impulse purchasing	FoMO explains impulse purchasing within a local e-commerce ecosystem.	RQ2-RQ4
Safitri et al. (2025)	TikTok Shop cosmetics; regression	Live-streaming, discounts, lifestyle, and impulse buying	Live-streaming, discounts, and shopping lifestyle explain variation in impulse buying.	RQ1-RQ4
Spielmann and Mantonakis (2018)	Virtual tour; experiment	User interactivity, telepresence, and attitudes	Interactive control changes attitudes through virtual experience; the outcome is not impulse buying.	RQ3
Xia et al. (2024)	Live-streaming; S-O-R survey	Social and media cues, organismic	Social and media cues operate through internal	RQ1-RQ2-

	states, and impulse buying	responses to influence impulse buying.	RQ3- RQ4
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RQ1: The Architecture of Stimuli in Live-Streaming Commerce

The synthesis identifies three relatively consistent groups of stimuli. First, technological stimuli encompass interactivity, vividness, informativeness, navigability, responsiveness, and control. Gulfraz et al. (2022) show that functional and psychological shopping experiences are jointly associated with online impulse buying. In live-streaming environments, rich media cues reduce uncertainty while increasing arousal and engagement (Lee & Chen, 2021; Xia et al., 2024). Nevertheless, technological effects are not uniform: perceived usefulness may fail to influence buying urges directly when enjoyment or other affective processes are more dominant.

Second, social stimuli include social presence, streamer attractiveness and expertise, virtual crowds, audience comments, and parasocial relationships. Huo et al. (2023) demonstrate that social presence operates through flow. Li, Zhang, et al. (2025) show that interactivity and information completeness are translated through perceived usefulness, parasocial interaction, and a sense of belonging. Ha et al. (2026) add virtual embodiment and virtual crowds, demonstrating that consumers respond not only to products but also to perceptions of who is present and how the self is represented.

Third, marketing stimuli encompass promotions, discounts, scarcity appeals, and incentive information. Feng et al. (2024) and Safitri et al. (2025) support their relevance, but these stimuli should not be reduced to the notion of a low price. Scarcity can heighten urgency, whereas discounts alter value assessments; the mechanisms differ. In a more comprehensive model, marketing stimuli interact with social and technological affordances. A countdown becomes more persuasive when a streamer responds promptly and other viewers appear to be competing for the product.

The synthesis for RQ1 indicates that live-streaming environments comprise complementary technological, social, and marketing stimuli rather than isolated predictors. Their configuration produces an experience that is informative, urgent, and immersive. The fsQCA findings of Zhang et al. (2025) reinforce the principle of equifinality: different combinations can generate high engagement. Future research should therefore examine interactions and configurations among conditions in addition to additive coefficients.

RQ2: Pathways from Interactivity and FoMO to Impulse Buying

Interactivity operates through informational and affective pathways. Along the informational pathway, real-time responses and product demonstrations increase diagnosticity, usefulness, and trust. Along the affective pathway, interaction enhances enjoyment, inspiration, flow, and a sense of belonging. Khôi and Le (2024) position inspiration as the focal mediator, whereas Martin et al. (2025) emphasize trust in the context of fashion products on TikTok. These different mediators demonstrate that interactivity is not the final mechanism; it is an affordance that must be perceived and processed before generating a buying urge.

A direct interactivity-impulse buying relationship may emerge when responsiveness shortens deliberation or provides immediate reassurance. However, a direct-effect model risks overlooking interaction quality. Frequent but irrelevant interaction may increase cognitive load without generating a purchase. Kang et al. (2021) and Zhang et al. (2025) demonstrate that tie strength and dimensional configurations determine the effectiveness of interaction. Direct interactivity hypotheses should therefore be tested alongside indirect effects and boundary conditions.

FoMO exhibits a more consistent pattern as a source of urgency. Evidence from Ghaniyah (2024), Mufti and Hariyanto (2025), and Rachman et al. (2024) indicates a positive association with impulse buying. This association may nevertheless have two sources. Trait FoMO makes individuals more sensitive to social proof, whereas state FoMO emerges from scarcity, trends, and exclusive promotions. Without distinguishing between these forms, a model may misinterpret a personal characteristic as a campaign effect.

Self-regulation helps explain why not all consumers who experience FoMO make a purchase. Gulfraz et al. (2022) position self-control as a negative moderator, while Hussain et al. (2023) demonstrate the role of mindfulness in the relationship between FoMO and compulsive buying. Although the latter outcome differs, both studies indicate that urgency does not inevitably translate into action. Time, money, product involvement, and mindfulness may interrupt the transition from organism to response.

The synthesis for RQ2 suggests that interactivity primarily influences impulse buying through experiential quality and social evaluation, whereas FoMO operates through urgency and anticipated loss. These pathways may converge in heightened arousal and reduced deliberation, but they are not identical. A more coherent model positions interactivity as a stimulus and FoMO as an organismic appraisal triggered by scarcity and social cues.

RQ3: Telepresence as a Linking Mechanism

The strongest evidence concerns the pathway from interactivity and vividness to telepresence. Kim et al. (2021), Jafar et al. (2024), Liu and Tian (2024), and Spielmann and Mantonakis (2018) show that control, sensory richness, and the ability to manipulate an environment enhance perceived presence. These findings are consistent with the definition of telepresence: users shift their attention from the medium to the represented environment. In live-streaming commerce, immediate streamer responses, product viewpoints, and synchronous

comments may produce a less immersive form of telepresence than virtual reality.

Evidence for the second stage, from telepresence to commercial responses, provides reasonable support for purchase intentions, attitudes, or engagement (Gui et al., 2022; Jafar et al., 2024; Liu et al., 2024). Ha et al. (2026) move the evidence closer to impulse buying through virtual and reality experiences. Nevertheless, not all studies measure actual impulse buying. A proportionate conclusion is therefore that telepresence represents a promising mediator of purchasing responses, while evidence of mediation specifically for online impulse buying remains limited.

The weakest evidence concerns the FoMO-telepresence pathway. Aitamurto et al. (2021) examined FoMO/JOMO and presence in 360-degree video, but their findings did not establish FoMO as a cause of telepresence. Psychologically, fear of missing an opportunity may increase attention to a live event, but temporal attention is not equivalent to spatial presence. A more plausible alternative is that FoMO and telepresence operate in parallel: scarcity and social cues trigger FoMO, whereas interactivity and vividness trigger telepresence, after which both increase the buying urge.

The synthesis for RQ3 provides theoretical and cross-context support for telepresence as a mediator of the effect of interactivity on purchasing responses. By contrast, telepresence as a mediator of the FoMO-online impulse buying relationship is not yet supported by sufficient direct evidence. Empirical research should compare serial mediation, parallel mediation, and alternative models and report bootstrap confidence intervals for indirect effects. Without such testing, mediation cannot be established empirically.

DISCUSSION

The synthesis indicates that online impulse buying in live-streaming commerce cannot be adequately explained by a single stimulus or a simple direct-effect relationship. Instead, it emerges from the interaction of technological, social, and marketing stimuli that activate different cognitive and affective processes. Technological affordances, including interactivity, responsiveness, user control, and vividness, determine how consumers access information and engage with streamers and products. Social cues, such as streamer presence, audience reactions, and social proof, provide validation and strengthen perceived proximity, while discounts, limited stock, exclusive vouchers, and time restrictions create value and urgency. However, these stimuli influence purchasing responses only when they are psychologically interpreted through trust, perceived usefulness, inspiration, flow, FoMO, or telepresence. This finding reinforces the role of the S-O-R framework as an explanation of psychological mechanisms rather than merely a structure for categorizing variables.

The evidence further supports a reconfiguration in which interactivity, vividness, social proof, and scarcity are positioned as stimuli, while FoMO and telepresence are treated as organismic states. Interactivity does not consistently produce impulse buying because its effects depend on the experience it generates. Streamer responsiveness may strengthen trust and perceived usefulness, whereas user control and vivid product demonstrations may increase telepresence. Interaction among viewers may instead operate through social proof or emotional contagion. FoMO follows a different mechanism because it represents consumers' psychological interpretation of scarcity, exclusivity, time pressure, or social popularity. Consequently, scarcity and social proof should be treated as environmental triggers, while FoMO represents the internal appraisal resulting from those triggers.

The relationship between FoMO and telepresence remains theoretically plausible but empirically underdeveloped. Interactivity and vividness are more direct antecedents of telepresence because they increase responsiveness, environmental richness, and perceived immersion. FoMO primarily intensifies urgency and anticipated loss and does not necessarily create a sense of spatial presence. A consumer may experience FoMO without feeling immersed in a live-streaming environment, just as telepresence may occur without pressure to purchase. The current evidence therefore supports FoMO and telepresence as parallel organismic pathways more strongly than a sequential mediation pathway. Interactivity and vividness may enhance telepresence, while scarcity and social proof trigger FoMO, after which both mechanisms may increase buying urges through different psychological processes. Serial relationships remain possible, but they require direct testing rather than inference from studies conducted in different media and commercial contexts.

The response component also requires greater conceptual precision. Buying urges, purchase intentions, self-reported impulse purchases, and compulsive buying represent different levels of behavioral realization and should not be used interchangeably. A buying urge is an immediate affective tendency, purchase intention reflects readiness to act, actual purchasing represents an enacted decision, and compulsive buying refers to a recurrent behavioral pattern. The transition between these levels may be interrupted by self-control, financial capacity, product involvement, available time, or payment conditions. Accordingly, evidence that a stimulus increases purchase intention cannot automatically be interpreted as evidence of actual impulse buying. A more precise S-O-R model should therefore position responses hierarchically and examine how organismic states influence each stage.

These theoretical conclusions must nevertheless be interpreted in light of the methodological structure of the reviewed evidence. Most studies rely on *cross-sectional self-report surveys* in which stimuli, mediators, and outcomes are measured simultaneously. Such designs can identify associations but cannot establish temporal precedence or confirm whether FoMO and telepresence cause purchasing responses. Common method variance may also inflate relationships when all constructs are assessed using the same questionnaire. Although the experiments conducted by Liu et al. (2024) and Spielmann and Mantonakis (2018) demonstrate the value of stimulus manipulation, comparable experimental evidence involving TikTok Live and fashion products remains limited. Construct inconsistency creates an additional problem because interactivity may refer to streamer responsiveness, two-way communication, system control, or viewer interaction, while telepresence is sometimes conflated with presence, immersion, social presence, or flow. These differences make it difficult to determine whether inconsistent findings reflect contextual variation or differences in conceptualization and measurement.

The geographical concentration of the evidence further constrains generalization. Much of the literature originates from China, where live-streaming commerce is supported by mature platforms, integrated payment systems, experienced streamers, and established consumer practices. Indonesian evidence is developing through studies involving TikTok, university students, cosmetics, fashion products, and SMEs (Martin et al., 2025; Mufti & Hariyanto, 2025; Rachman et al., 2024; Safitri et al., 2025). Differences in payment infrastructure, communication culture, streamer influence, and digital literacy limit the direct transfer of findings between these contexts. Pariaman City may therefore provide a relevant setting for testing theoretical boundary conditions among Generation Z consumers, but evidence from one city or product category should not be treated as representative of all Indonesian consumers.

The scarcity of behavioral data represents another important limitation. Most studies measure purchasing tendencies or retrospective perceptions rather than observable actions. Behavioral indicators such as viewing duration, product clicks, voucher use, cart additions, completed transactions, and purchase cancellations would provide stronger evidence of whether telepresence and FoMO translate into actual purchases. Future research should therefore separate the measurement of stimuli, organismic states, and responses over time and combine surveys with behavioral records. Experimental or two-wave designs could manipulate scarcity, social proof, interactivity, and vividness, measure state FoMO and telepresence independently, and compare parallel and serial mediation models using bootstrap confidence intervals. Trait FoMO should be controlled to distinguish situational responses from stable individual tendencies, while self-control, mindfulness, financial capacity, and product involvement should be examined as boundary conditions.

Future studies should also test whether mechanisms identified in virtual reality and metaverse environments remain valid in mobile live-streaming. These media differ in sensory depth, embodiment, viewpoint control, and interaction structure; therefore, findings from immersive environments cannot be transferred automatically to TikTok Live. Cross-media and multigroup studies involving different cities, platforms, fashion categories, and streamer characteristics would clarify the contextual stability of the proposed relationships. More importantly, buying urges, intentions, actual transactions, and compulsive behavior should be modeled as distinct outcomes and validated using transaction data. Post-purchase measures of satisfaction, regret, overspending, and cancellation would also extend the analysis beyond immediate conversion and address the ethical consequences of urgency-based marketing.

Theoretically, this review refines the S-O-R framework by distinguishing environmental stimuli from consumers' internal evaluations and by recognizing purchasing responses as hierarchical outcomes. It also shows that telepresence is not necessarily the only or dominant mediator in mobile live-streaming, as trust, inspiration, flow, perceived usefulness, and parasocial interaction may provide alternative mechanisms. The contribution of future models should therefore lie in comparing competing pathways and identifying their boundary conditions rather than simply increasing the number of mediators. Practically, effective interaction should be relevant, timely, and informative. Fashion demonstrations should clearly communicate sizing, materials, variations, product use, total costs, and return conditions while allowing consumers to request clarification. Scarcity messages and countdown timers should also reflect genuine promotional limitations. Although such cues may activate FoMO and accelerate decisions, manipulative scarcity can increase regret and weaken trust. Live-commerce strategies should therefore balance short-term conversion with transparency, consumer well-being, and the development of sustainable customer relationships.

CONCLUSIONS

This systematic-integrative review of 24 empirical studies indicates that online impulse buying in live-streaming commerce emerges from configurations of technological, social, and marketing stimuli that are processed cognitively and affectively. Interactivity most consistently operates through telepresence, flow, inspiration, trust, perceived usefulness, and parasocial relationships. FoMO is associated with urgency and impulsive responses but is theoretically more coherently positioned as an organismic appraisal than as an environmental stimulus.

Telepresence receives relatively strong support as a consequence of interactivity and vividness and moderate support as a predictor of commercial responses. However, evidence that telepresence specifically mediates the relationship between FoMO and online impulse buying remains limited. This conclusion was derived through eligibility assessment, quality appraisal, concept-centric coding, and cross-study synthesis that distinguished direct evidence, mechanistic evidence, and cross-context evidence.

Methodologically, the corpus remains dominated by cross-sectional, self-report surveys. Future research should compare parallel and serial mediation, distinguish trait from state FoMO, separate buying urges, intentions, behavior, and compulsive buying, and employ experiments, multiwave designs, and transaction logs. The limited scope of the literature search and the heterogeneity of study designs should also be considered when interpreting the generalizability of the findings.

ADVANCED RESEARCH

This review is limited by its reliance on Google Scholar, heterogeneous study contexts and outcome measures, and the predominance of cross-sectional self-report evidence, which restricts causal inference and generalizability. Future research should use multiple databases, longitudinal and experimental designs, and behavioral data to examine FoMO and telepresence across platforms, product categories, and cultural contexts.

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