

## Regional Heterogeneity in Live Streaming Shopee: Examining the Effects of Scarcity Messages on Impulsive Buying Through FOMO

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### Abstract

The global live streaming commerce (LSC) ecosystem is persistently marked by a "conversion paradox," wherein elevated audience engagement fails to materialize into stable transaction volumes. Although the Stimulus-Organism-Response (S-O-R) framework constitutes the dominant theoretical scaffold for impulsive buying research, its empirical performance within the Indonesian market remains volatile, with prior studies yielding contradictory evidence on the efficacy of scarcity messaging a fragmentation attributable, in part, to the systematic neglect of intra-national market heterogeneity. Addressing this gap, the present study introduces geographic region specifically the Java versus Non-Java dichotomy as an empirically validated structural boundary condition within the S-O-R framework, representing one of the earliest empirical efforts to operationalize intra-national digital market segmentation as a theoretically grounded moderator within the LSC literature. A cross-sectional survey of 370 Shopee Live users (Java: n=247; Non-Java: n=123) was analyzed using PLS-SEM, with measurement equivalence and inter-group structural comparisons rigorously established through MICOM and Permutation-Based MGA. Results reveal substantive regional heterogeneity: in the Java segment, scarcity messages exert both direct and FOMO-mediated effects on impulsive buying, whereas in Non-Java, the influence operates almost exclusively through affective FOMO arousal. MGA confirms statistically significant structural path differences ( $p < 0.05$ ), demonstrating that regional socio-digital context functions as a substantive moderator of consumer decision heuristics. These findings advance the S-O-R paradigm by repositioning it from a universalist model toward a context-contingent theoretical architecture, with practical mandates for regionally calibrated e-commerce strategies direct scarcity cues in digitally mature markets and narrative-driven FOMO cultivation in emerging segments. The study is bounded by its single-platform scope (Shopee Live), a cross-sectional design that precludes causal inference, and a binary regional classification that, while theoretically grounded, necessarily simplifies Indonesia's broader socio-digital continuum.

**Keywords:** Live Streaming Commerce, S-O-R Framework, Impulse Buying, Scarcity Messages, Fear of Missing Out (FOMO), Regional Heterogeneity, PLS-SEM

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## INTRODUCTION

The global retail landscape has undergone a profound structural shift, with live streaming commerce (LSC) superseding traditional, static e-commerce models through high-intensity, synchronous digital engagement. This transition is a significant market force; in China, the LSC market valuation surged to 3,500 billion yuan by 2022, establishing a global benchmark for digital retail efficacy. In Indonesia, this transformation is equally pervasive, with platforms such as Shopee Live commanding a 96% awareness rate among digital consumers. Despite this systemic ubiquity, retailers face a persistent "conversion paradox," where high levels of audience engagement frequently fail to materialize into stable transaction volumes; data indicates that the purchase conversion rate in some sectors remains at approximately 56%. This inefficiency suggests that the psychological mechanisms governing impulsive buying a behavior critical to LSC revenue are not operating with the precision required for sustainable profitability in a highly competitive digital market.

The Indonesian digital ecosystem presents a complex case of regional heterogeneity, characterized by sharp disparities in digital maturity and economic infrastructure between the economic hub of Java and regions outside Java. While interest in LSC is widespread with 86% of the population expressing interest consumer responsiveness to promotional urgency is markedly heterogeneous across these geographic segments. These geographic variations are not merely demographic markers; they act as distinct psychological filters that dictate how consumers decode and react to digital urgency. Regions with higher digital maturity, such as Java, often exhibit different adaptive behaviors to e-commerce stimulus compared to emerging regional markets like Kupang, where digital adoption is growing but remains distinct in its consumer characteristics. Standardized, national-level marketing strategies currently employed in Indonesia often fail to account for these regional divides, erroneously assuming that scarcity-based stimuli exert uniform pressure across disparate digital landscapes.

Academic discourse, predominantly anchored in the Stimulus-Organism-Response (S-O-R) framework, posits that marketing stimuli specifically scarcity messages (limited time or quantity) induce internal cognitive and affective states, such as Fear of Missing Out (FOMO), which subsequently dictate impulsive purchasing behavior. However, the literature currently exhibits substantial empirical volatility. While foundational studies (e.g., Tang et al., 2025; Feng et al., 2024) provide robust validation for these pathways in mature markets, empirical evidence within the Indonesian market remains contradictory. Research by Rahma & Utami (2025) and Rahmandani & Rahmidani (2025) reports non-significant relationships between scarcity messages and impulsive buying, signaling a profound empirical impasse that existing models fail to resolve. This divergence exposes a critical research gap: current literature operates under the flawed assumption of consumer homogeneity, failing to interrogate why identical stimuli trigger impulsive responses in some contexts but remain inert in others.

Theoretically, the literature is constrained by an over-reliance on universalist paradigms that treat regional and socio-economic settings as exogenous noise rather than substantive structural moderators. The failure to integrate geographic heterogeneity such as the digital saturation gap between Java and non-Java regions into the S-O-R mechanism prevents a deeper understanding of how structural boundary conditions dictate the psychological processing of scarcity-induced urgency. By omitting these factors, current literature remains incapable of explaining the empirical volatility observed in emerging, geographically dispersed markets, thus limiting the theoretical generalizability of the S-O-R framework.

Methodologically, the field is hampered by an over-reliance on static, cross-sectional designs that overlook the dynamic, competitive nature of LSC environments. Most existing research fails to validate measurement invariance across distinct consumer segments, thereby masking regional disparities in the impulsive buying process. To address these deficiencies, this

research employs Multi-Group Analysis (MGA) to isolate the moderating influence of geographic region on the S-O-R mechanism. By analyzing the structural variance between the Java and non-Java consumer segments, this study does not merely replicate existing S-O-R configurations; it challenges the assumption that the psychological impact of scarcity is invariant across differing digital landscapes.

The primary objective of this research is to evaluate the causal pathways connecting scarcity messages to impulsive buying through the mediating mechanism of FOMO, while rigorously validating regional location (Java vs. Outside Java) as a structural moderator. Theoretically, this study advances the S-O-R paradigm by shifting from a universalist perspective to a context-sensitive model that incorporates geographic boundary conditions. Practically, these findings provide Indonesian e-retailers with a precision-segmentation framework, enabling a transition from indiscriminate, national-level promotional tactics to regionally calibrated strategies that acknowledge the varying psychological impacts of scarcity-induced urgency in a geographically diverse market.

## **METHOD**

### **Research Design and Sampling Strategy**

This study employs a quantitative, cross-sectional survey design to empirically examine the Stimulus-Organism-Response (S-O-R) framework within the Indonesian live streaming commerce environment (Creswell & Creswell, 2018). The target population comprises Indonesian adults who utilize Shopee Live as an active commercial channel not merely as a passive content medium. Participants were identified through purposive sampling, a non-probability technique warranted when the research phenomenon requires a theoretically specified population with direct experiential relevance to the constructs under investigation (Sekaran & Bougie, 2016).

Eligibility was operationalized through three structured screening criteria, each grounded in a distinct methodological rationale. First, respondents were required to have completed a minimum of three purchase transactions via Shopee Live within the preceding six months. This threshold distinguishes behaviorally engaged consumers, those with sufficient transactional schema to respond to scarcity stimuli, from incidental viewers whose purchasing behavior does not constitute the impulsive buying phenomenon modeled in the S-O-R framework. Second, participation required a minimum viewing frequency of two live streaming sessions per week on average over the same six-month period, ensuring adequate cumulative exposure to the platform's persuasive stimulus architecture, including scarcity messaging and real-time social cues. Third, respondents were required to be Indonesian residents aged 18 years or older, ensuring legal purchasing autonomy and the cognitive capacity for the evaluative processes operationalized in the framework's organism-level constructs. These criteria were enforced through a mandatory screening section presented at the survey's outset; questionnaires failing any criterion were excluded prior to data entry, prior to any imputation or analytical stage.

The sample size was determined through a two-step validation procedure. First, *a priori* power analysis using G\*Power software (F-test,  $\alpha = 0.05$ , Power = 0.95, Effect size = 0.15) indicated a minimum requirement of 153 respondents (Faul et al., 2009). Second, the inverse square root method was applied to ensure the precision of path coefficient estimation in PLS-SEM (Kock & Hadaya, 2018). Given the model complexity and the requirements for structural moderation analysis, the collected sample of N=370 (Java: n=247; Non-Java: n=123) provides adequate statistical power to detect variance between the segments (Hair et al., 2022).

### **Construct Measurement and Data Quality Assessment**

Constructs (*Scarcity Message*, *FOMO*, *Impulsive Buying*) were operationalized using

validated scales adapted to the Indonesian context (Sekaran & Bougie, 2016). Items were measured on a 10-point Likert scale to maximize data variance and improve estimator sensitivity (Hair et al., 2021).

Data quality was verified through Confirmatory Composite Analysis (CCA) (Hair et al., 2021). Potential Common Method Bias (CMB) was assessed via the Full Collinearity VIF approach, where all VIF values  $\leq 3.3$  indicate that lateral and vertical collinearity do not pose a threat to the structural model (Kock, 2015). Reliability was assessed using Composite Reliability (CR  $> 0.70$ ) and Cronbach's Alpha ( $> 0.70$ ) (Hair et al., 2022). Convergent validity was established via Average Variance Extracted (AVE  $> 0.50$ ) (Fornell & Larcker, 1981).

### Structural Model and Mediation Analysis

The structural model was evaluated using path coefficients ( $\beta$ ),  $f^2$  effect sizes (Hair et al., 2022). Significance levels were determined via non-parametric bootstrapping with 5,000 resamples to generate bias-corrected and accelerated (BCa) confidence intervals. Model explanatory power was evaluated using the Coefficient of Determination ( $R^2$ ) (Hair et al., 2022).

Mediation effects were examined using specific indirect effects through bootstrapping (Hair et al., 2021). Mediation significance was established if the 95% BCa confidence interval excluded zero. Mediation magnitude was further quantified via the Variance Accounted For (VAF) index, where VAF  $> 80\%$  indicates full mediation,  $20\%-80\%$  indicates partial mediation, and  $< 20\%$  suggests no mediation (Hair et al., 2022).

### Measurement Invariance and Multi-Group Analysis (MGA)

Prior to MGA, a three-step Measurement Invariance of Composite Models (MICOM) procedure was conducted to confirm the construct meaning was invariant across Java ( $n=247$ ) and Non-Java ( $n=123$ ) segments (Henseler et al., 2016). The procedure established (1) Configural Invariance, (2) Compositional Invariance (permutation-based correlation  $c$  significantly not different from 1), and (3) Equality of Means and Variances.

Following successful MICOM, Permutation-Based MGA was performed (Cheah et al., 2023). This non-parametric approach was selected because it does not assume multivariate normality or equality of variances between groups (Hair et al., 2022). By performing 5,000 permutations, the analysis identifies statistically significant differences in path coefficients, facilitating a precise structural evaluation of geographic region as a boundary condition within the S-O-R mechanism (Cheah et al., 2023).

## RESULTS

### Measurement Model Evaluation

Table 1 summarizes the reliability and convergent validity of the measurement models.

**Table 1.** Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability ( $p_c$ )	Composite Reliability ( $P_a$ )	AVE
FM	0.892	0.925	0.892	0.755
IB	0.841	0.887	0.849	0.611
SM	0.855	0.896	0.856	0.633

Source: Author 2026

**Table 2.** Outer Loadings and T-Statistics

Indicator	Loading (Jawa)	Loading (Non-Jawa)	T-Statistic*
FM1	0.852	0.830	41.366
FM2	0.878	0.892	27.709
FM3	0.889	0.859	26.246
FM4	0.856	0.859	51.088
IB1	0.726	0.797	47.428
IB2	0.823	0.796	41.417
IB3	0.741	0.632	35.331
IB4	0.827	0.858	88.874
IB5	0.784	0.858	37.134
SM1	0.765	0.701	-
SM2	0.772	0.758	-
SM3	0.798	0.843	-
SM4	0.827	0.678	-
SM5	0.813	0.774	-

\*T-statistics derived from the measurement model evaluation.

Source: Author 2026

### Structural Model Evaluation

Table 3 presents the structural path coefficients ( $\beta$ ), effect sizes ( $f$ ), and variance explained ( $R^2$ ).

**Table 3.** Path Coefficients and Explanatory Power

Path	$\beta$ (Jawa)	$\beta$ (Non- Jawa)	R2 (Jawa)	R2 (Non- Jawa)	f2 (Jawa)	f2 (Non- Jawa)	P (Jawa)	P (Non- Jawa)
FM → IB	0.366	0.628	0.410	0.316	0.156	0.289	<0.001	<0.001
SM → FM	0.559	0.706	0.313	0.498	0.455	0.994	<0.001	<0.001
SM → IB	0.359	-0.099	-	-	0.150	0.007	<0.001	0.248

Source: Author 2026

### Mediation Analysis

**Table 4.** Specific Indirect Effects (MGA)

Path	Indirect Effect (Jawa)	Indirect Effect (Non-Jawa)	Path Diff	p-value
SM → FM → IB	0.205	0.443	-0.238	0.017*

\*Significant at  $p < 0.05$ .

Source: Author 2026

### MICOM and Multi-Group Analysis

Table 5 presents the MICOM invariance testing and the MGA permutation results.

**Table 5.** MICOM Invariance and MGA Comparison

Construct	Comp. Invariance (p)	Mean Diff (p)	Var. Diff (p)	Path Diff (p-value)
FM	0.595	0.110	0.024*	-
IB	0.194	0.042*	0.090	-

Construct	Comp. Invariance (p)	Mean Diff (p)	Var. Diff (p)	Path Diff (p-value)
SM	0.402	0.074	0.288	-
SM → IB	-	-	-	0.003*

\*Significant at  $p < 0.05$ .

Source: Author 2026

## Discussion

The empirical findings of this study offer a nuanced validation of the Stimulus-Organism-Response (S-O-R) framework within the Indonesian live streaming commerce (LSC) ecosystem. By validating regional location as a structural moderator, this research provides a resolution to the empirical impasse characterizing recent literature on the impulsive buying behaviors of Indonesian consumers. The results suggest that the predictive validity of the S-O-R framework is not inherently universal; rather, it functions within boundary conditions defined by the socio-digital maturity of the local environment.

The S-O-R model posits that external stimuli (scarcity messages) influence internal states (FOMO), which in turn drive behavioral responses (impulsive buying). While foundational research by Tang et al. (2025) and Feng et al. (2024) has largely validated these pathways in mature, unified digital economies, studies localized to the Indonesian market have reported conflicting evidence (Rahma & Utami, 2025; Rahmandani & Rahmidani, 2025).

Our findings suggest that these contradictions in the literature may be an artifact of aggregate data analysis that masks distinct regional processing patterns. Specifically, the data indicates that in the Java segment, *scarcity messages* trigger both a direct cognitive path and a mediated affective path to *impulsive buying*. In contrast, the Non-Java segment reveals a significant mediation effect where *scarcity messages* exert influence on *impulsive buying* almost exclusively through *FOMO*. This suggests that while the S-O-R framework remains conceptually valid, the "weight" of the stimulus and the mechanism through which it operates—varies significantly across regional digital landscapes.

## Regional Heterogeneity and Boundary Conditions

The empirical paradox observed where *scarcity message* → *FOMO* is stronger in the Non-Java segment, yet *scarcity message* → *impulsive buying* is stronger in the Java segment offers a critical window into consumer behavior boundary conditions.

The direct path from *scarcity messages* to *impulsive buying* observed in the Java segment may indicate a form of "stimulus habituation." Given the higher density of LSC activity in Java, consumers may have internalized scarcity cues as heuristic triggers, allowing for rapid, non-deliberative purchasing decisions. This is consistent with the findings of Tang et al. (2025), who identified that in high-velocity retail environments, consumers may bypass complex cognitive appraisal in favor of heuristic-driven responses.

Conversely, the Non-Java segment suggests a different psychological processing pattern. The stronger link between *scarcity messages* and *FOMO* in this group suggests that in markets with lower digital saturation, scarcity stimuli may require a higher degree of affective stimulation to bypass consumer skepticism. In this context, the stimulus does not trigger a direct purchase response (as evidenced by the non-significant direct path); rather, it must first induce the "organism" (FOMO) to catalyze action. This implies that for these consumers, digital urgency is not a sufficient driver of impulsivity unless it is processed through an anxiety-based affective filter. This regional divergence clarifies why previous studies focusing on Indonesia have reached conflicting conclusions; depending on the regional composition of their samples, researchers were likely capturing two fundamentally different decision-making heuristics

## CONCLUSION

This study provides a definitive empirical resolution to the conflicting discourse surrounding impulsive buying behaviors within the Indonesian live streaming commerce (LSC) market. By integrating the Stimulus-Organism-Response (S-O-R) framework with a rigorous multi-group analytical approach, this research confirms that the predictive validity of scarcity-driven impulsive buying is not uniform. Instead, the results indicate that the behavioral mechanism governing consumer responses to marketing stimuli is contingent upon the regional socio-digital context.

The findings establish that geographic region serves as a fundamental structural moderator of the S-O-R mechanism. While the Stimulus-Organism-Response pathways remain conceptually robust across the sampled Indonesian population, the relative strength and the directness of these pathways differ significantly between the Java and Non-Java cohorts. Specifically, the observation that the *Scarcity Message* → *Impulsive Buying* path is stronger in Java, while the mediation of *FOMO* is disproportionately pronounced in the Non-Java segment, offers a compelling explanation for the inconsistencies reported in previous Indonesian LSC research. The contradictory evidence in existing literature appears largely attributable to aggregate sampling that masked distinct regional heuristic processing patterns. By employing MICOM for invariance testing and permutation-based MGA, this study exposes this regional heterogeneity, which otherwise remains hidden in conventional aggregate analyses.

Theoretically, this research advances the S-O-R framework by demonstrating that its predictive power is context-contingent. Rather than assuming a universal behavioral response to scarcity, scholars should view geographic location as a boundary condition that shapes how consumers process digital stimuli. This shift from universalism to context-sensitive modeling is essential for the continued evolution of digital marketing theory in emerging economies.

Practically, these findings mandate a departure from unified, national-level marketing interventions in the Indonesian digital landscape. The regional divergence in consumer responses indicates that a one-size-fits-all approach is structurally inefficient. In mature digital hubs, such as Java, where the direct link between scarcity and impulsivity is established, retailers may leverage scarcity cues as primary triggers for conversion. Conversely, in regional markets where the direct link is less pronounced, marketing efficacy may depend on the successful cultivation of *FOMO* as an affective intermediary. Practitioners are thus advised to pivot toward regionally nuanced strategies prioritizing direct urgency in high-velocity markets and narrative-driven emotional engagement in emerging segments to optimize conversion and address the "conversion paradox" frequently observed in regional retail performance data.

## Limitations and Future Research

This study possesses inherent limitations that define the scope of its findings and guide future research. First, the cross-sectional nature of the survey design provides a static snapshot of consumer behavior, precluding the assessment of how response patterns evolve as digital ecosystems mature. Future longitudinal inquiries are warranted to determine whether the regional response patterns observed in the Non-Java segment will converge toward the heuristic-driven responses currently characterizing the Java segment as infrastructure and familiarity improve.

Second, the reliance on self-reported survey data, while standard in consumer behavior research, introduces potential for social desirability bias. Furthermore, regional location was utilized as a proxy for socio-digital environment. While the findings provide statistical evidence of this moderator, future studies should endeavor to include direct metrics such as regional digital literacy, infrastructure reliability, or market saturation levels to test the underlying drivers of these variances.

Third, this research focused exclusively on Shopee Live. The LSC landscape in Indonesia is highly diverse, with different platforms varying in interface design, social interactivity, and algorithm transparency. Future research should undertake multi-platform comparisons to evaluate the generalizability of these regional boundary conditions across other prominent platforms such as TikTok Shop or Lazada.

Finally, the S-O-R framework offers a vast array of stimuli beyond scarcity. Future research should integrate additional organizational responses such as social proof, streamer attractiveness, or influencer credibility to delineate the broader parameters of the S-O-R mechanism. By expanding these variables and adopting longitudinal observation, subsequent research will further refine the contextual boundaries of impulsive buying models, providing a more robust theoretical foundation for navigating the volatility and heterogeneity characteristic of emerging digital markets.

### Research Implications

The results of this study provide several important implications, both theoretically and practically.

#### 1. Theoretical Implications

This study contributes to the literature by elevating geographic location from a demographic descriptor to a substantive structural moderator of the S-O-R framework. The results indicate that the S-O-R mechanism is context-contingent.

Theoretical models of impulsive buying in digital commerce should no longer treat the "Organism" as a monolithic construct. Instead, this study suggests that the cognitive and affective processing of marketing stimuli is contingent upon the consumer's exposure to and familiarity with the digital environment. The "non-significance" of scarcity cues reported by Rahma & Utami (2025) may not represent a failure of the theory, but rather a reflection of a sample operating under different boundary conditions where the scarcity cue was insufficient to induce the required internal state. By incorporating regional heterogeneity as a boundary condition, we provide a more robust S-O-R model that accounts for the volatility observed in emerging markets.

#### 2. Practical Implications

For practitioners, these findings suggest that a unified, national-level marketing strategy may be structurally inefficient. In high-maturity markets like Java, retailers may effectively leverage scarcity cues to trigger direct, heuristic responses, as the cognitive processing loop is already well-primed. Consequently, promotional efforts can focus on maximizing the frequency and visibility of these cues.

However, in emerging digital regions, the strategy requires recalibration. Promotional urgency in these areas may fail to generate immediate conversion if it does not effectively cultivate FOMO. Practitioners in these regions should prioritize narrative-driven live streaming that builds social anxiety or peer-comparison dynamics before deploying scarcity stimuli. The failure to distinguish between these regional "stimulus-response" loops may explain the "conversion paradox" noted in current industry reports, where high engagement (awareness) does not equate to transaction volume.

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