Gamification and Impulsive Buying Behavior in Indian E-Commerce: An S-O-R Model Approach

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Abstract

In the fiercely competitive Indian e-commerce landscape, platforms like Amazon and Flipkart are increasingly adopting gamification strategies such as spin-the-wheel games, quizzes, and loyalty points to enhance user engagement and drive sales. This study examines the psychological mechanisms through which gamification influences consumers' impulsive buying behavior, employing the Stimulus–Organism–Response (SOR) framework. Specifically, it investigates how gamification (stimulus) affects customer engagement and the urge to buy impulsively (organism), which in turn impacts impulsive buying behavior (response). A quantitative survey was conducted among 205 Indian online shoppers who had prior experience with gamified features on e-commerce platforms. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess the reliability and validity of constructs and test the hypothesized structural relationships. Results confirm that gamification significantly enhances customer engagement and evokes impulsive urges, both of which strongly predict impulsive buying behavior. Mediation analysis also revealed that the effect of gamification on impulsive buying is largely indirect, operating through increased engagement and urge. The study contributes theoretically by integrating SOR with Self-Determination Theory and Flow Theory to explain how cognitive and affective states mediate the effect of gamified stimuli on consumer behavior. Practically, the findings offer insights for marketers on how gamification can be ethically leveraged

to boost engagement and purchase outcomes. However, the study's limitations, including a cross-sectional design and reliance on self-reported data, suggest avenues for future research, such as longitudinal studies or experiments that measure actual behavior.

Keywords: Gamification; Impulsive Buying; Customer Engagement; Urge to Buy; E-Commerce; SOR Framework.

I.INTRODUCTION

India's e-commerce landscape has witnessed remarkable growth, spearheaded by platforms like Amazon and Flipkart. To capture consumer attention and foster loyalty, these platforms increasingly deploy gamification, the integration of game-like elements into non-game contexts as a strategic tool to enhance user engagement and drive sales. Such features are designed not only to entertain users but also to foster a sense of achievement, progression, and fun, encouraging users to return more frequently and spend more time on the app.

A crucial question for researchers and practitioners is whether gamification merely boosts engagement or also contributes to impulsive buying behavior, a spontaneous act of unplanned purchasing. Studies show that impulse purchases account for up to 40% of online transactions globally. In a rapidly expanding e-commerce market like India, even a marginal increase in impulse buying due to gamified experiences can significantly impact platform revenues.

While existing literature has highlighted gamification's positive influence on customer engagement, satisfaction, and loyalty (Pour et al., 2021; Xi & Hamari, 2020), relatively little is known about its direct or mediated effects on impulsive buying. Given that impulse buying is driven more by emotional triggers than rational planning, gamified elements like countdown timers, leaderboards, or random reward mechanisms may act as stimuli that trigger positive affect, curiosity, and playful mood states. However, the psychological pathway connecting gamification to impulsive buying remains underexplored.

To fill this gap, this study applies the Stimulus–Organism–Response (S-O-R) model (Mehrabian & Russell, 1974) to investigate how gamification (Stimulus) influences two internal psychological states, customer engagement and urge to buy impulsively (Organism) which then lead to impulse purchasing behavior (Response). Customer engagement reflects the cognitive and emotional involvement of users with the platform, while urge to buy captures a spontaneous desire to purchase. We propose that gamification boosts engagement and positive affect, which in turn increases the urge to buy, ultimately resulting in impulsive purchases.

To further enrich this theoretical framework, we integrate insights from Self-Determination Theory (SDT) and Flow Theory. According to SDT (Rigby & Ryan, 2011), gamification can fulfil intrinsic needs like autonomy, competence, and

relatedness, thereby boosting engagement. Flow Theory (Csikszentmihalyi, 1990) posits that immersive, enjoyable experiences can lead to reduced self-regulation and heightened emotional responses, both of which are conducive to impulse buying.

We empirically tested our model using survey data from 205 Indian online shoppers, gathered through random sampling. Respondents reported their experiences with gamified shopping apps and their tendencies toward impulsive buying. Using PLS-SEM, we analyzed the data to validate both measurement and structural models. This method was chosen due to its suitability for exploratory research with latent constructs and modest sample sizes (Hair et al., 2019). The results shed light on how gamification indirectly fosters impulsive behavior through heightened engagement and urge.

Literature Review
Gamification in E-Commerce

Gamification refers to the use of game elements in non-game contexts to enhance user motivation and engagement (Deterding et al., 2011). In e-commerce, gamification is commonly implemented through point systems, loyalty rewards, missions, and mini-games, all designed to make the shopping process more interactive and enjoyable. These elements appeal to intrinsic human desires such as achievement, exploration, and competition (Huotari and Hamari, 2017).

Gamified experiences can significantly improve platform engagement by transforming otherwise utilitarian tasks into immersive and motivating activities. Prior literature has identified several gamification mechanisms including badges, leaderboards, avatars, challenges, and narratives (Klock et al., 2020; Koivisto and Hamari, 2019). These features act as motivational affordances that fulfill users' psychological needs and drive desired behaviors such as repeated visits, product exploration, and even impulsive purchases.

Gamification has proven effective in a variety of business contexts, including education, health, and retail (Hamari et al., 2014; Robson et al., 2016). In digital marketing, gamified strategies are shown to increase engagement, brand loyalty, and conversion rates. Studies reveal that gamified loyalty programs encourage continued interaction and boost purchase frequency (Hollebeek et al., 2021). Limited-time rewards, daily missions, and surprise incentives can evoke feelings of excitement and urgency, sometimes triggering impulsive purchases that would not have occurred in a standard interface (Zhao and Balagué, 2015).

Despite growing adoption, most gamification research focuses on outcomes like customer retention and satisfaction, with less emphasis on its potential to influence impulsive buying. This study addresses this gap by investigating whether the engagement and psychological stimulation from gamified experiences lead to unplanned purchases.

A well-documented effect of gamification is its positive influence on customer engagement, defined as a user's cognitive, emotional, and behavioral connection with a platform (Brodie et al., 2011). Gamified interfaces encourage deeper user involvement through exploration, feedback, and competition. Pour et al. (2021) found that gamification significantly enhances engagement, leading to better customer experiences. Similarly, Xi and Hamari (2020) showed that gamification in online brand communities increased engagement, which in turn improved brand equity.

These effects can be theoretically explained using Self-Determination Theory (SDT). According to SDT, human motivation is driven by the fulfillment of three innate needs: competence, autonomy, and relatedness (Ryan and Deci, 2000). Gamification meets these needs through feedback mechanisms (competence), customizable tasks (autonomy), and social features like leaderboards or team competitions (relatedness). When users experience fulfillment in these domains, they become intrinsically motivated to engage further (Rigby and Ryan, 2011; Suh et al., 2017). Studies in online and mobile shopping contexts confirm that well-designed gamified platforms lead to higher levels of voluntary participation and satisfaction (Xu et al., 2017).

From both empirical and theoretical perspectives, gamification enhances customer engagement by creating enjoyable, autonomous, and socially rewarding environments. This heightened engagement may play a crucial mediating role in leading consumers toward impulsive buying behaviors, particularly in e-commerce settings where decisions are made rapidly and with fewer constraints.

Customer Engagement, Flow, and Urge to Buy

Customer engagement (CE) refers to the cognitive, emotional, and behavioral investment a consumer makes in their interactions with a platform (Brodie et al., 2011). In online shopping, this may involve exploring products, interacting with content, and participating in gamified activities. A highly engaged customer is not merely browsing they are mentally and emotionally absorbed. This deep involvement often parallels the concept of flow, defined as an optimal psychological state of complete absorption, focus, and enjoyment in an activity (Csikszentmihalyi, 1990). Flow is marked by high intrinsic satisfaction and a loss of self-consciousness and time awareness.

In e-commerce, gamified shopping environments featuring challenges, rewards, and interactivity can facilitate flow states. When users experience such immersive involvement, they are more likely to act on affective impulses. Studies show that flow enhances positive emotions while diminishing rational control, thereby increasing the likelihood of impulse buying (Wu et al., 2020). Koufaris (2002) similarly found that enjoyable and engaging online experiences lead consumers to spend more time browsing and making unplanned purchases. Donovan et al. (1994)

observed that pleasure and arousal in shopping environments correlated with increased spending. Thus, while engagement improves satisfaction and loyalty, its emotional intensity may also weaken resistance to impulsive purchases, suggesting a mediating role for CE in gamification's effect on buying behavior.

The urge to buy impulsively is a key construct in understanding impulse buying. It refers to a sudden, strong desire to purchase, often triggered by external stimuli like discounts, visuals, or gamified rewards. Rook (1987) defined it as an immediate, irresistible impulse to buy without prior intention. This urge precedes and predicts impulse buying behavior (Beatty and Ferrell, 1998). It is emotional and affective in nature, typically driven by hedonic motives like excitement or anticipated pleasure (Verhagen and van Dolen, 2011; Huang, 2016). While not every urge results in a purchase, stronger urges significantly increase the probability of action (Rook and Fisher, 1995).

Digital features, especially gamified or interactive ones, are known to stimulate these urges. Research in social commerce shows that real-time stimuli such as livestreams or influencer content can elicit powerful impulsive urges (Song et al., 2015; Leong et al., 2018). These urges mediate the link between stimuli and buying behavior, serving as an "organism" variable in SOR-based studies (Xiang et al., 2016; Zafar et al., 2020).

Impulse buying behavior itself is a rapid, unplanned purchasing action made with minimal deliberation (Stern, 1962). It is characterized by emotional spontaneity, loss of control, and hedonic gratification (Hirschman, 1985). In online settings, the convenience, constant exposure to new products, and persuasive interface designs make such behavior more common (Donthu and Garcia, 1999). Reports indicate that up to 40% of online purchases are impulse buys. Given the commercial significance of such behavior, understanding the internal psychological mechanisms like engagement and urgeis crucial. As per the SOR model, gamified features act as stimuli that elevate internal engagement and urge, leading to increased impulsive buying responses.

Theoretical Framework
SOR Model Applied to Gamification and Impulse Buying

To investigate the psychological mechanism through which gamification influences impulsive buying, this study adopts the Stimulus–Organism–Response (SOR) model as the foundational theoretical framework. Originally developed by Mehrabian and Russell (1974), the SOR model posits that environmental stimuli (S) elicit internal affective or cognitive states (O) within individuals, which in turn lead to behavioral responses (R). This paradigm was first applied to understand how store atmospherics influenced emotions and shopping behavior (Donovan and Rossiter, 1982), and has since been adapted extensively to digital environments including

website design, social commerce, and mobile platforms (Eroglu et al., 2001; Kim et al., 2020; Islam et al., 2020).

In this study, gamification features on e-commerce platforms (e.g., points, badges, mini-games) serve as the stimulus. These elements are intentionally designed to engage users, trigger enjoyment, and induce excitement or urgency. The organism refers to the consumer's internal psychological state in response to these stimuli. We focus on two key organismic variables: customer engagement, representing cognitive and emotional involvement; and urge to buy impulsively, representing a strong affective desire to purchase spontaneously. These internal states are crucial in shaping behavioral outcomes. Finally, the response is conceptualized as impulsive buying behavior, or the tendency to make spontaneous, unplanned purchases online. This configuration aligns with established SOR pathways, where stimuli indirectly influence behavior through organismic mediators (Chang et al., 2014). As shown in Figure 1 (Proposed Model), gamification is hypothesized to increase both engagement and urge to buy, which in turn lead to higher impulsive buying. While a direct link between gamification and impulse buying is possible, particularly through extrinsic motivators like rewards, prior studies suggest that internal affective states often dominate such decision-making (Beatty and Ferrell, 1998; Zafar et al., 2020). Hence, the model emphasizes mediated effects, consistent with recent developments in SOR theory, which incorporate both emotional and cognitive organismic factors (Parboteeah et al., 2009; Chiu et al., 2014).

The framework is further strengthened by integrating Self-Determination Theory (SDT) and Flow Theory. Gamification satisfies intrinsic motivational needs such as competence, autonomy, and social connectedness (Ryan and Deci, 2000), thereby elevating user engagement. When this engagement reaches an optimal state, users may experience flow, a state of deep absorption and enjoyment (Csikszentmihalyi, 1990). Flow reduces self-monitoring and enhances emotional arousal, making users more susceptible to acting on impulses. The urge to buy thus acts as a bridge between heightened affect and behavioral response.

By incorporating both engagement (cognitive) and urge (affective) pathways, the present model offers a nuanced view of how gamification can foster impulsive purchases. This dual-pathway perspective responds to calls in the literature for more integrated models that address the complexity of digital consumer behavior (Verhagen and van Dolen, 2011; Leong et al., 2018).

Hypotheses Development

Building upon the SOR framework and existing literature, this study proposes the following hypotheses linking gamification, customer engagement, urge to buy, and impulsive buying behavior.

H1: Gamification → Customer Engagement

Gamification on e-commerce platforms is designed to capture attention, stimulate enjoyment, and enhance interactivity, factors known to drive customer engagement. Studies by Pour et al. (2021) and Xi and Hamari (2020) provide empirical support that gamified experiences heighten users' emotional and cognitive involvement. From a Self-Determination Theory perspective, such features fulfil users' needs for competence and stimulation (Ryan & Deci, 2000), motivating them to interact more frequently and intensely. Thus:

H1: The use of gamification elements in an e-commerce platform positively influences customers' engagement with the platform.

H2: Gamification → Urge to Buy Impulsively

Gamification introduces hedonic and utilitarian stimuli that can trigger emotional arousal and excitement. Features such as time-limited games, surprise rewards, and visual animations may generate an affective state conducive to impulse urges. While direct studies on gamification and impulse urges are limited, analogous research (e.g., Zafar et al., 2020) found that interactive shopping environments significantly increase buying urges. Therefore:

H2: Gamification elements on an e-commerce platform positively influence the consumer's urge to buy impulsively.

H3: Customer Engagement → Impulsive Buying

Engaged users are more likely to browse longer, interact more deeply, and experience higher levels of enjoyment and absorption (flow), all of which reduce deliberation and increase spontaneous purchases (Koufaris, 2002; Wu et al., 2020). Engagement heightens emotional arousal and focusses on the platform, making users more susceptible to unplanned purchases. Hence:

H3: Customer engagement positively influences impulsive buying behavior.

H4: Urge to Buy → Impulsive Buying

The urge to buy impulsively is a well-established immediate precursor of impulse buying behavior. It represents the affective drive that propels consumers to make unplanned purchases without deliberation (Beatty & Ferrell, 1998; Huang, 2016). Studies consistently show that a stronger urge leads to a higher likelihood of making a purchase on impulse (Verhagen & van Dolen, 2011). Thus:

H4: The urge to buy impulsively positively influences impulsive buying behavior.

Mediation Effects

Together, H1–H4 suggest indirect effects of gamification on impulse buying via engagement and urge. If gamification enhances both engagement and urge, and these in turn increase impulse buying, then mediated pathways should exist. Prior work confirms such patterns; for example, Zafar et al. (2020) found that the urge to buy mediated the relationship between stimuli and impulse purchases in social commerce. Thus, we test the mediation hypotheses:

- **H5a**: Customer engagement mediates the relationship between gamification and impulse buying.
- **H5b**: The urge to buy impulsively mediates the relationship between gamification and impulse buying.

Methodology
Research Design and Sample

This study employed a quantitative survey research design to investigate the impact of gamification on impulsive buying behavior among Indian online shoppers. Data were collected using a structured online questionnaire distributed through a combination of random sampling and snowball sampling via social media platforms in late 2024. Participants were screened to ensure they had prior experience with gamified features on e-commerce platforms such as Amazon Fun Zone or Flipkart Game Zone. Only those who had noticed or interacted with such features were included in the final analysis.

A total of 205 valid responses were collected. This sample size exceeds the threshold recommended for Partial Least Squares Structural Equation Modeling (PLS-SEM), considering model complexity (Hair et al., 2019), and aligns with similar digital consumer studies.

Participants ranged from 18 to 50 years of age, with 56% male and 44% female. The sample included university students (40%), working professionals (45%), and others (15%). All were regular users of Amazon or Flipkart, shopping at least once or twice per week. Over 70% confirmed interacting with gamified features, confirming the relevance of the sample. Participation was voluntary and anonymous, with informed consent obtained from all respondents.

Measures and Instrument

All constructs were measured using multi-item Likert-type scales adapted from established studies to ensure content validity. The questionnaire was developed in English and pretested with 10 Indian users, leading to minor wording refinements. Items were customized contextually by referencing the respondent's preferred platform. We also included control variables such as gender, age, monthly income, and trait impulsiveness using a brief version of Barratt's Impulsiveness Scale.

Data Analysis Approach

We utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the hypotheses and evaluate the proposed research model. The analysis was performed using SmartPLS 3.3, which is well-suited for predictive research involving latent constructs measured through multi-item indicators, and is robust with smaller sample sizes and non-normal data distributions (Hair et al., 2019). The analytical procedure involved two major stages: assessment of the measurement model and the structural model.

Measurement Model Assessment:

We first examined the reliability and validity of the constructs. Cronbach's alpha and composite reliability (CR) values were calculated to assess internal consistency, with values above 0.70 considered acceptable. Convergent validity was evaluated using average variance extracted (AVE), where values exceeding 0.50 indicate adequate convergence. We also verified indicator loadings, retaining items with loadings above 0.70 on their intended latent constructs (Hair et al., 2017). To confirm discriminant validity, we applied both the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT). The Fornell–Larcker test ensures that a construct's AVE square root exceeds its correlations with other constructs, while HTMT values below 0.85 indicate good discriminant validity (Henseler et al., 2015).

Structural Model Assessment:

Upon validating the measurement model, we assessed the structural relationships. Using bootstrapping with 5,000 resamples, we tested the significance of path coefficients (β), t-values, and p-values for each hypothesized path. We evaluated R^2 values to assess the model's explanatory power for engagement, urge, and impulse buying. We also calculated effect sizes (f^2) and predictive relevance (Q^2) using blindfolding. Model fit was examined using SRMR, with values below 0.08 indicating a good fit.

We report all results at a 0.05 significance level (two-tailed). The following section presents the empirical findings.

Results

Measurement Model Results

The measurement model exhibited good reliability and validity. Table 1 below presents the internal consistency and convergent validity metrics for each construct (Gamification, Customer Engagement, Urge to Buy, Impulsive Buying). Cronbach's alpha values ranged from 0.78 to 0.90, all well above the common threshold of 0.70, indicating strong internal consistency. Composite reliability (CR) values ranged from 0.858 to 0.923, also exceeding the recommended 0.70 level, confirming that the indicators reliably measure their constructs. The average variance extracted (AVE) for each construct was between 0.57 and 0.64, which is above the 0.50 benchmark, demonstrating convergent validity (i.e., each construct explains the majority of variance in its indicators). For example, the Gamification construct had an AVE of 0.599, meaning roughly 59.9% of the variance in its item scores is accounted for by the underlying gamification factor.

Table 1
Construct Reliability and Convergent Validity

Construct	Cronbach's α	Composite Reliability	AVE
Gamification (GM)	0.828	0.880	0.599
Customer Engagement (CE)	0.849	0.889	0.571
Urge to Buy (UTB)	0.782	0.858	0.605
Impulsive Buying (IMB)	0.900	0.923	0.634

All item loadings on their respective constructs were high (most above 0.75) and significant ($p < 0.001$). For instance, items measuring customer engagement loaded between 0.73 and 0.82 on the CE factor, indicating they are good indicators of engagement. No problematic cross loadings were observed; each item loaded highest on its intended construct compared to others, supporting indicator validity.

We also established the discriminant validity of the constructs. The Fornell-Larcker criterion was satisfied; each construct's AVE square root (for example, √AVE for Gamification = 0.774) was greater than its correlation with any other construct in the model. This implies that each construct shares more variance with its own indicators than with other constructs. Additionally, the HTMT (Heterotrait Monotrait) ratios were all well below the conservative threshold of 0.85. For example, the HTMT between Gamification and Customer Engagement was 0.37, between Gamification and Urge to Buy was 0.40, and between Engagement and Urge was 0.47. The highest HTMT value observed was ~0.46 (between Urge to Buy and Engagement), which is far below 0.85, indicating clear discriminant validity. These results give confidence that the constructs – gamification, engagement, urge, and impulsive buying – are empirically distinct and not unduly overlapping in what they measure.

In summary, the measurement model demonstrates that our survey instrument is reliable and valid. The constructs can be used in the subsequent structural model analysis with minimal concern for measurement error contaminating the relationships.

Structural Model Results

With a robust measurement model in place, we proceeded to test the hypothesized relationships using the PLS structural model. Figure 1 (shown earlier) visualized the model, and Table 2 below summarizes the results for each hypothesis, including the path coefficients (standardized β), t-statistics, p-values, and whether the hypothesis was supported.

Table 2
Structural Path Coefficients and Hypothesis Testing

Hypothesized Path	β (Coefficient)	T value	P value	Supported
Gamification → Engagement	0.314	4.850	0.000***	Yes (Supported)
Gamification → Urge to Buy	0.329	5.187	0.000***	Yes (Supported)
Engagement → Impulsive Buying	0.165	2.321	0.020*	Yes (Supported)
Urge to Buy → Impulsive Buying	0.242	3.087	0.002**	Yes (Supported)
Gamification → Impulsive Buying	0.116	1.634	0.102	No (Not significant)

**p < 0.001; *p < 0.01; p < 0.05 (two tailed tests)

As seen above, all four main hypotheses, H1 to H4, are supported by the data. Gamification showed a positive and significant effect on Customer Engagement ($\beta = 0.314$, $t = 4.850$, $p < 0.001$), confirming H1. This means users who perceived more gamified elements on the platform reported higher engagement levels. Likewise, gamification had a positive significant effect on Urge to Buy impulsively ($\beta = 0.329$, $t = 5.187$, $p < 0.001$), supporting H2. Thus, the presence of gamified features is associated with a stronger spontaneous desire to purchase in users.

Both organismic variables in turn significantly predicted the response variable. Customer Engagement had a significant positive impact on Impulsive Buying behavior ($\beta = 0.165$, $t = 2.321$, $p = 0.020$), supporting H3. Although the coefficient is modest in magnitude, it suggests that more engaged users indeed tend to make more impulse purchases, holding other factors constant. Urge to Buy had an even stronger effect on Impulsive Buying ($\beta = 0.242$, $t = 3.087$, $p = 0.002$), supporting H4. This aligns with the expectation that the urge or temptation to buy is a powerful driver of actual impulse purchasing. In our results, a one standard deviation increases in the urge to buy led to approximately a 0.24 standard deviation increase in impulsive buying tendency, reflecting a meaningful influence.

It is noteworthy that the direct path from Gamification to Impulsive Buying was not statistically significant ($\beta = 0.116$, $t = 1.634$, $p = 0.102$). This suggests that, when engagement and urge are accounted for in the model, gamification no longer has a significant direct effect on impulse buying. In practical terms, the relationship between gamified features and impulse purchases is fully mediated by the internal states of engagement and urge to buy. We conducted a Sobel test and bootstrapping of the indirect effects to confirm the mediation, the indirect effect Gamification → Engagement → Impulse Buying was positive (β 0.052) and significant (95% bootstrap CI did not include zero), and the indirect effect Gamification → Urge → Impulse Buying was about 0.080, also significant. The total indirect effect of gamification on impulsive buying (through both mediators) was ~0.132 and significant, whereas the direct effect was small and nonsignificant. This pattern

indicates full mediation – gamification influences impulse buying outcomes only through increasing customer engagement and purchase urges, rather than directly. We therefore find strong support for the SOR based interpretation that the organismic states carry the effect of the stimulus to the response.

In terms of model fit and variance explained, the structural model showed acceptable fit. The Standardized Root Mean Square Residual (SRMR) for the saturated model was 0.083 (and 0.096 for the estimated model), which is at or below the recommended threshold of 0.08–0.10, indicating a reasonable fit between the model and the empirical data. The Rsquared values (R^2) for the endogenous constructs were as follows, Customer Engagement $R^2 = 0.098$, Urge to Buy $R^2 = 0.109$, and Impulsive Buying $R^2 = 0.158$. These R^2 values suggest that gamification explained about 9.8% of the variance in engagement and 10.9% of the variance in urge to buy. Together, engagement and urge explained about 15.8% of the variance in impulsive buying behavior. While these percentages are in the low to moderate range, they are not unusual for consumer behavior research where many unmeasured factors (like individual traits, situational variables) also influence outcomes. The fact that gamification – a single broad factor – could account for around 16% of impulsive buying variance via two mediators is actually a notable finding, given the myriad influences on impulse purchases. It suggests gamification has a discernible, if not dominant, role in shaping impulse buys in this context.

We also looked at the effect sizes (f^2) for each path. Gamification's effect size on engagement was $f^2 = 0.11$ (small to medium), on urge was $f^2 = 0.12$ (small to medium). Engagement's f^2 effect on impulse buying was 0.03 (small), and urges was 0.06 (small to medium). These f^2 values further reinforce that urge to buy is a somewhat stronger mediator than engagement for the gamification $\rightarrow$ impulse link (urge had a larger effect on impulse buying). Nonetheless, both contribute meaningfully.

Discussion
Theoretical Implications

This study set out to examine how gamification influences impulsive buying in online retail, using the Stimulus–Organism–Response (SOR) framework. The findings provide empirical support for the SOR model in a novel context and contribute to several streams of literature,

Gamification as a stimulus in SOR, our results empirically validate that gamification elements function as significant stimuli affecting consumer psychology and behavior in E-Commerce. By confirming H1 and H2, we demonstrated that gamified features on a shopping platform provoke measurable internal responses – namely, enhanced engagement and heightened urge to buy – in consumers. This aligns with prior conceptual work by Gatautis et al. (2016), who posited that

gamification elements can be viewed as external stimuli in an SOR model of online consumer behavior. We extend that notion with concrete evidence, in our data, those who experienced a higher degree of gamification reported significantly greater engagement (an internal cognitive emotional state) and greater impulsive urges (an internal affective state). This finding bridges the gap between gamification studies and classical environmental psychology models. It underscores that gamification is not just a fun addon; it meaningfully alters the internal organism state of the consumer, which is a prerequisite step in driving behavioral outcomes as per SOR theory.

Mediating role of organism states, A key theoretical implication is the confirmation of full mediation by the organismic factors (engagement and urge) in the gamification → impulse buying link. The nonsignificant direct effect of gamification on impulse buying, coupled with significant indirect effects, suggests that gamification induces impulse purchases only through its impact on engagement and urge, rather than directly. This enriches SOR theory by pinpointing specific mediators, it's not gamification causes impulse buying in a vacuum, but rather gamification works by making the shopping experience more engrossing (engagement) and more tempting (urge to buy), which in turn propel the consumer to buy on impulse. Theoretically, this finding resonates with Mehrabian and Russell's idea that stimuli influence behavior via emotional states – here, engagement can be seen as involving emotions like enjoyment/arousal, and urge is explicitly an affective state of desire. Our results parallel findings in social commerce research where constructs like enjoyment or urge fully mediated the effect of social stimuli on impulse purchases (Leong et al., 2018; Zafar et al., 2020). We add the nuance that engagement (often overlooked in favor of pure emotion measures) is an important organism state, it captures the cognitive absorption aspect (flow/involvement) which works in tandem with the affective urge. The complementary mediation through engagement and urge observed in our model echoes Zafar et al.'s (2020) finding of complementary partial mediation of urge in their SOR model – except in our case, engagement and urge together fully account for gamification's influence. This contributes to theory by highlighting multiple organism pathways (cognitive and affective) in SOR applied to digital contexts.

Integration with psychological theories, the findings can be interpreted through Self Determination Theory (SDT) and Flow Theory, reinforcing those theoretical perspectives. Gamification's significant effect on engagement (β 0.31, p<0.001) suggests that the game design elements succeeded in fulfilling users' intrinsic motivations, thereby boosting their involvement. This is in line with SDT – when an activity (shopping in this case) satisfies needs for competence (through challenges/points), autonomy (through choices in gameplay), and relatedness (through social competition or community rewards), users internalize motivation

and become deeply engaged (Ryan & Deci, 2000; Rigby & Ryan, 2011). Our study empirically affirms that SDT mechanisms are at play, the platform's gamified rewards and feedback likely made users feel accomplished and in control, which manifested as greater engagement. The link between engagement and impulse buying (β 0.17, p<0.05) also ties to Flow Theory. It suggests that when consumers enter a state of flow or high engagement on the platform, they are more prone to act on impulse. As they are engrossed and enjoying the experience, their emotional positivity and narrowed focus (on the activity, not on consequences) can lead to disregard [for] other thoughts and decisions influenced by immediate emotions, culminating in spontaneous purchases. Prior research had theorized and found that flow states increase impulse buying in livestream and social media shopping (Wu et al., 2020; Qu et al., 2023). Our findings extend this to the context of gamified E-Commerce platforms, even outside of livestreams, when a user is highly engaged in the app (perhaps playing a shopping game or chasing rewards), they may experience something akin to flow, which can reduce their self-regulatory guard and encourage impulse purchases.

Urge as a pivotal mediator, The strong relationship we observed between urge to buy and actual impulse buying (β 0.24, p=0.002) reinforces the centrality of urge in impulse buying models. It confirms the work of Beatty & Ferrell (1998) and others in a new context – even on gamified online platforms, the immediate urge is what directly drives the final behavior. The fact that gamification significantly increased urge (β 0.33, p<0.001) is a novel insight. It implies that not only can website design or product displays evoke urges (as prior studies showed), but the interactive, fun elements of a platform themselves can trigger that sudden desire to buy. This finding might be explained by the emotional arousal and hedonic gratification provided by gamification. Our platform likely made shopping feel like a game to win; that excitement could translate into hedonic motivations for consumption, where buying an item feels like part of the rewarding game experience. This is consistent with the idea that hedonic inducement for immediate realization of desires is a key aspect of impulse buying. Gamification essentially adds hedonic inducement to the shopping process. Theoretically, this connects gamification research with the affective and emotional aspects of consumer behavior. It suggests a new perspective, gamification not only builds engagement (a typically positive outcome for loyalty) but also strategically heightens affective arousal (urge) that can be monetized through impulse sales.

Contributions to gamification literature, our study contributes empirical evidence to the growing literature on gamification in marketing, which has often called for linking gamification to actual consumer behavioral outcomes (Hamari et al., 2014). Many previous studies on gamification focused on engagement, brand attitude, or intention outcomes (Xi & Hamari, 2020; Hollebeek et al., 2021). We

extend this by showing a clear link to impulsive purchasing behavior – a hard outcome of direct relevance to sales. Notably, our findings caution that the effect on impulse buying is indirect and reliant on psychological mediation. This nuance adds depth to the discourse, it's not guaranteed that adding games will automatically spike sales, but if those games succeed in engaging customers and stirring their emotions (urge), then impulsive sales are likely to follow. This mediated insight might explain why some studies (Gatautis et al., 2016) found only a weak direct relationship between gamification and purchase behavior. It might be that only through the lens of internal responses do we see the true impact. Our integrative approach combining gamification with SOR and psychological theories could pave the way for more holistic models in future research, considering both extrinsic design factors and intrinsic psychological mechanisms.

Practical Implications

The findings also offer valuable implications for E-Commerce practitioners, particularly those operating in highly competitive markets like India's online retail sector.

Leveraging gamification to boost sales, our study provides empirical evidence that gamification can indirectly increase impulse purchases on E-Commerce platforms by first boosting user engagement and urge. For platform managers and marketers, this means that well-crafted gamification strategies are not just about improving engagement metrics, they can translate into tangible sales uplift via impulsive buys. The mechanism is clear, engross the customer and excite them, and purchase behavior follows. Therefore, companies should invest in gamified features that genuinely captivate users. This could include implementing daily challenges to encourage daily app visits and prolonged browsing, interactive minigames during big sale events to create buzz and keep users hooked on the app, or tiered reward systems to instill a sense of progress and competition among shoppers. When customers are in a playful mindset, enjoying their experience, they are more likely to explore products freely and act on temptation, leading to more items added to cart on a whim. Retailers can track engagement metrics time spent, number of interactions as leading indicators for impulse sales and adjust gamification designs to maximize these.

Design for intrinsic motivation and flow, not all gamification is equally effective. Our results imply that the quality of engagement matters only if gamification truly engages, as reflected in a significant engagement boost, which will drive impulses. Practitioners should thus design gamification that aligns with intrinsic motivators. This means focusing on fun, challenge, and user satisfaction rather than solely extrinsic rewards. For instance, a poorly designed game that just doles out coupons without being enjoyable might not engage users deeply; they

might just collect the coupon and leave. In contrast, a well-designed challenge that is enjoyable even if the reward is small can induce a flow state. E-Commerce platforms should test gamified elements for engagement. The goal is to make the shopping experience so absorbing that users lose track of time. One respondent in our survey effectively indicated this by strong agreement with I lose track of time on the app. When users are in this state, cross-selling and impulse buys become much easier they are effectively browsing in a state of play, less inhibited by rational checks. Triggering the urge to buy, our findings highlight the urge to buy impulsively as the proximal trigger of impulse purchases. E-Commerce platforms can incorporate elements specifically aimed at triggering that urge. One approach is to leverage gamified scarcity and rewards, and another approach is personalized gamification. Platforms might also implement social gamification, like showing a user their rank among shoppers. This can tap into competitive urge and FOMO fear of missing out on status or rewards, which are emotional drivers for impulse buys. The key is that urges are emotional and momentary so firms should design triggers that can spark sudden excitement or temptation. If a gamified feature is too slow-burning or purely cognitive, like solving a complex puzzle for a reward later, it might engage but not necessarily trigger an immediate buying urge. In contrast, small immediate rewards, surprises, and competitive elements likely stir emotions.

Customer segments and personalization, while our study focused on overall effects, it's plausible that certain customer segments respond more strongly to gamification. Practically, E-Commerce companies can use analytics to identify which users are most engaged by gamified features. For instance, younger users might appreciate gamification more and thus show bigger increases in impulse buying when engaged. Our sample skewed young, but older or more utilitarian shoppers might be less swayed by games. Therefore, personalization is key. Platforms can employ adaptive gamification for avid gamers among the customer base, provide rich gamified experiences, even complex challenges, leaderboards, etc., and for those less interested in games, perhaps offer simpler reward-based incentives. The ultimate aim is to maximise each user's engagement and impulse triggers without alienating those who find games frivolous. A/B testing can be done to fine-tune gamified elements for different cohorts. For example, Flipkart could introduce a gamified referral program where social shoppers earn badges for referring friends, whereas Amazon could use progress bars and levels for frequent solo shoppers to encourage them to reach the next loyalty tier. Both strategies use gamification but are tailored to the motivations of different users.

Limitations and Future Research

While this study provides valuable insights into the influence of gamification on impulsive buying behavior among Indian E-Commerce users, several limitations must be acknowledged.

First, the sample was geographically and demographically narrow, focusing on Indian consumers, primarily young adults. While appropriate for studying a digitally active population, the findings may not generalize across other cultures, age groups, or markets. Cultural differences significantly affect how consumers respond to gamified environments and impulsive stimuli. Future studies could test this model in other countries or among older consumers to examine potential cross-cultural or generational variations.

Second, the study adopted a cross-sectional survey design, which restricts our ability to make causal inferences. Although the conceptual model assumes a direction from gamification to engagement, urge, and finally impulse buying, the temporal sequence cannot be confirmed. Reverse causality is plausible. To strengthen causal claims, future research should adopt experimental or longitudinal designs, such as A/B testing, to observe behavioral changes over time.

Third, we relied on self-reported data for all key constructs, including impulsive buying and urge. This raises the potential for common method bias and social desirability bias, where respondents underreport behaviors viewed negatively. Although we included controls and randomized item orders, future research could enhance validity by incorporating objective behavioral data, such as actual purchase history or digital tracking.

Lastly, our model examined only two mediators, engagement and urge, within the SOR framework. While both are well-supported, there may be additional psychological variables, such as emotional arousal, pleasure, or time distortion, that mediate the effect of gamification on impulse buying. Including such constructs could provide a more nuanced understanding of the underlying mechanisms.

II. CONCLUSION

This study presented an in-depth empirical investigation of how gamification influences impulsive buying behaviour in the context of Indian E-Commerce platforms, using the Stimulus-Organism-Response (SOR) theoretical lens. Through a survey of 205 online shoppers and analysis via partial least squares SEM, we found strong support for our proposed model. Gamification (stimulus) significantly increases customer engagement and the urge to buy impulsively (organism states), and these in turn drive impulsive buying behaviour (response). In particular, gamification's effect on impulse buying is fully mediated by engagement and urge, indicating that game elements spur impulse purchases by first making the shopping experience more absorbing and exciting for consumers.

The findings integrate insights from psychology theories. Gamification seems to satisfy intrinsic motivations and induce a flow-like state of engagement, aligning with Self-Determination and Flow Theory, while also heightening immediate purchase desires, echoing impulse buying frameworks. This not only advances academic understanding of why gamification works by tracing the path from playful design to emotional urge to action, but also provides actionable knowledge for practitioners. E-Commerce companies can leverage gamification as a strategic tool to boost customer engagement and trigger incremental impulse sales, thereby improving both user experience and revenue. Designing gamified features that genuinely engage will create positive consumer involvement and moments of purchase impulse. Nonetheless, businesses should implement such strategies ethically, ensuring they enhance customer value and satisfaction in the long run.

III.REFERENCES

1. Beatty, S.E. and Ferrell, M.E., 1998. Impulse buying: Modeling its precursors. *Journal of Retailing*, 74(2), pp.169-191.

2. Brodie, R.J., Hollebeek, L.D., Juric, B. and Ilic, A., 2011. Customer engagement: Conceptual domain, fundamental propositions, and implications for research. *Journal of Service Research*, 14(3), pp.252-271.

3. Chen, Y., Shang, R.A. and Kao, C.Y., 2009. The effects of information overload on consumers' subjective state towards buying decision in the internet shopping environment. *Electronic Commerce Research and Applications*, 8(1), pp.48-58.

4. Deterding, S., Dixon, D., Khaled, R. and Nacke, L., 2011. From game design elements to gamefulness: defining "gamification". In *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* (pp. 9-15). ACM.

5. Hair Jr, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M., 2022. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 3rd ed. Thousand Oaks: Sage Publications.

6. Hamari, J., Koivisto, J. and Sarsa, H., 2014. Does gamification work?--a literature review of empirical studies on gamification. In *2014 47th Hawaii International Conference on System Sciences* (pp. 3025-3034). IEEE.

7. Huotari, K. and Hamari, J., 2017. A definition for gamification: anchoring gamification in the service marketing literature. *Electronic Markets*, 27(1), pp.21-31.

8. Koivisto, J. and Hamari, J., 2019. The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, 45, pp.191-210.

9. Mehrabian, A. and Russell, J.A., 1974. *An Approach to Environmental Psychology*. MIT Press.

10. Rook, D.W., 1987. The buying impulse. *Journal of Consumer Research*, 14(2), pp.189-199.

11. Verplanken, B. and Herabadi, A., 2001. Individual differences in impulse buying tendency: Feeling and no thinking. *European Journal of Personality*, 15(S1), pp.S71-S83.

12. Zafar, A.U., Qiu, J., Shahzad, M., Abbas, M. and Habib, M., 2020. Impulse buying in social commerce: A stimulus-organism-response perspective. *Internet Research*, 30(4), pp.1065-1092.

13. Robson, K., Plangger, K., Kietzmann, J.H., McCarthy, I. and Pitt, L., 2016. Game on: Engaging customers and employees through gamification. *Business Horizons*, 59(1), pp.29-36.

14. Suh, A., Cheung, C.M.K., Ahuja, M. and Wagner, C., 2017. Gamification in the workplace: The central role of the aesthetic experience. *Journal of Management Information Systems*, 34(1), pp.268-305.

15. Xu, B., Xu, Z. and Zhang, H., 2017. How does gamification affect users' stickiness in e-learning? An empirical study. *International Journal of Information Management*, 37(2), pp.431-442.

16. Zhao, M. and Balagué, C., 2015. Designing branded mobile apps: Fundamentals and recommendations. *Business Horizons*, 58(3), pp.305-315.

17. Hirschman, E.C., 1985. Primitive aspects of consumption in modern American society. *Journal of Consumer Research*, 12(2), pp.142–143.

18. Wu, L., Shen, C.W., Fan, Y.C. and Mattila, A.S., 2020. The impact of flow and brand experience on loyalty intentions in mobile commerce. *International Journal of Information Management*, 52, p.102-109.

19. Donthu, N. and Garcia, A., 1999. The Internet shopper. *Journal of Advertising Research*, 39(3), pp.52–58.

20. Leong, L.Y., Hew, T.S., Tan, G.W.H. and Ooi, K.B., 2018. Predicting the determinants of the NFC-enabled mobile credit card acceptance: A neural networks approach. *Expert Systems with Applications*, 107, pp.149–161.

21. Xiang, L., Zheng, X., Lee, M.K. and Zhao, D., 2016. Exploring consumers' impulse buying behavior on social commerce platform: The role of parasocial interaction. *International Journal of Information Management*, 36(3), pp.333–347.

22. Parboteeah, D.V., Valacich, J.S. and Wells, J.D., 2009. The influence of website characteristics on a consumer's urge to buy impulsively. *Information Systems Research*, 20(1), pp.60–78.

23. Chiu, C.M., Wang, E.T., Fang, Y.H. and Huang, H.Y., 2014. Understanding customers' repeat purchase intentions in B2C e-commerce: the roles of utilitarian value, hedonic value and perceived risk. *Information Systems Journal*, 24(1), pp.85–114.

24. Chang, H.H., Eckman, M. and Yan, R.N., 2014. Application of the Stimulus–Organism–Response model to the retail environment: the role of hedonic motivation in impulse buying behavior. *The International Review of Retail, Distribution and Consumer Research*, 24(3), pp.290–306.

25. Beatty, S.E. and Ferrell, M.E., 1998. Impulse buying: Modeling its precursors. *Journal of Retailing*, 74(2), pp.169–191.

26. Koufaris, M., 2002. Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*, 13(2), pp.205–223.

27. Pour, M.H., Alam, S.S. and Azad, N., 2021. The effect of gamification on customer engagement: An empirical study in online grocery. *International Journal of Information Management*, 58, p.102293.

28. Ryan, R.M. and Deci, E.L., 2000. Self-determination theory and the facilitation of intrinsic motivation. *American Psychologist*, 55(1), p.68.

29. Verhagen, T. and van Dolen, W., 2011. The influence of online store beliefs on consumer online impulse buying: A model and empirical application. *Information & Management*, 48(8), pp.320–327.

30. Wu, W.Y., Chen, K.W. and Lin, Y.S., 2020. The effect of flow and customer engagement on customer retention in online live streaming platforms. *Internet Research*, 30(4), pp.1099–1121.

31. Xi, N. and Hamari, J., 2020. Does gamification satisfy needs? A study on the relationship between gamification features and intrinsic need satisfaction. *International Journal of Information Management*, 46, pp.210–221.

32. Zafar, A.U. et al., 2020. Impulse buying in social commerce: A stimulus-organism-response perspective. *Asia Pacific Journal of Marketing and Logistics*, 32(1), pp.1–22.