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Research Article

Mobile Phone Interaction and Impulse Buying in Indian Grocery Chains: An S-O-R Perspective on Emotional and Situational Factors

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ABSTRACT

This study develops an impulse buying model by examining how non-shopping mobile phone use, emotional states, and situational factors affect impulse buying in Indian grocery stores, extending the S-O-R framework to include digital distractions. A mall intercept survey collected data via a structured questionnaire from 326 participants post-purchase, analysed using structural equation modelling via Smart-PLS. The findings support the framework, indicating that non-shopping mobile use increases impulsive buying among Indian consumers. Mobile device usage in non-retail settings influences purchasing decisions, suggesting new shopper marketing strategies to enhance these unplanned purchases. Previous research has identified factors such as personal traits and situational influences on impulse buying, but has overlooked non-shopping mobile use. This study addresses this gap by modelling the effects of such usage on consumer behaviour.

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Introduction

Over the last 10 years, gadgets like smartphones, tablets, and wearables have significantly changed how we manage our daily activities. The mobility they provide, in conjunction with advancements in both software and hardware, has facilitated the adoption of lifestyles that are markedly different from previous norms. Consequently, the transformation of mobile phones has significantly affected how consumers make purchasing decisions (Wilson et al., 2024). This phenomenon has been extensively researched, particularly over the last ten years (Cavalinhos et al., 2021), yet the global pandemic and its aftermath have renewed focus on the interaction between consumers and technology (Hartini et al., 2021). For many years, the role of impulsive buying in consumer behaviour has been acknowledged. Research in both scholarly and professional fields indicates that impulsive purchases account for 40–80% of all buying decisions, varying with the type of product (Dang et al.,

2025). Interestingly, even though buying groceries is often seen as a low-engagement task and grocery items are typically regarded as low-engagement products (Monoarfa et al., 2024), nine out of ten shopping trips are made on impulse (Aiolfi et al., 2022). Technological advancements and digitalisation have transformed the grocery retail industry, creating new contexts for consumer behaviour. Retailers increasingly implement mobile-based strategies to enhance customer engagement and profitability (Siyal et al., 2024). Recently, there has been a steady increase in mobile phone usage. Customers use these devices both in stores and when they are outside. In stores, mobile phones function as shopping tools, enabling activities such as using retail apps, accessing digital shopping lists, comparing prices online, and viewing digital flyers or advertisements (Sciandra et al., 2019). A 2020 study conducted by the Department of Economics and Management at the University of Parma, Italy, revealed that 43.5% of 406 individuals in Italy regularly used their smartphones while shopping in physical stores (Aiolfi et al., 2022). Consumers primarily engage in shopping-related activities on their mobile devices: 58.6% use them to check digital shopping lists, 20.7% reach out to a relative or friend for grocery shopping details, 3.4% compare prices with competitors, and 27.1% use them to access app-based discounts. Furthermore, a recent statistical survey (2020) showed that about 46% of global consumers felt comfortable using their mobile devices for in-store activities. Notably, 73% of respondents were confident in using their devices for shopping-related tasks, such as researching products while in a retail environment. This mobile usage during in-store shopping enhances consumers' access to information throughout their shopping experience. Consequently, when shoppers use their mobile devices as a reference in-store, they tend to pay less attention to retailers' marketing efforts, resulting in a decrease in impulsive buying (Aiolfi et al., 2022). This study investigates the impact of mobile phone use on consumer purchasing behaviour in retail settings. In the analysis, the study followed that previous research confirmed the effectiveness of mobile use. Customers who engage in non-shopping-related activities on their mobile phones in-store are more likely to make impulse purchases than those who use their phones for shopping-related activities.

Literature Review

Impulse Buying

Impulse purchases are defined as spontaneous buying decisions prompted by an intense and urgent urge to obtain a product (Chaudhary et al., 2025). Consumer behaviour in retail environments has captivated researchers for more than 60 years (Bellini & Aiolfi, 2020). Impulse buying illustrates how retailers can quickly generate a desire and redirect consumer spending toward products or categories that were not originally planned for purchases. In the context of grocery shopping, individuals can manage their impulsive tendencies in two ways: by setting a mental budget to adhere to during their shopping excursion (Parfenova & Romashova, 2020) and by dedicating time to plan their shopping (Davydenko & Peetz, 2020). In recent times, the growing reliance on digital technology has facilitated the move towards self-regulation, enabling people to plan their shopping excursions using a variety of tools beyond just written lists (Shen et al., 2024). Today, consumers enter stores more prepared than in the past. Technological advancements have enabled consumers to gather information outside the store and engage in pre-trip activities such as promotions, price comparisons, and product selections across different retailers. Consequently, they arrive with greater knowledge and can shop more efficiently, often utilising digital shopping lists, e-coupons, or personalised printed promotions for their planned purchases (Punj, 2022). Impulse buying is influenced by numerous factors, including personality, timing, location, economic conditions, and cultural contexts. These factors can vary not only among individuals but also across different purchasing scenarios involving the same product (Aiolfi et al., 2022). This diversity results in various types of impulse-buying behaviours. Impulse purchases are categorised into four distinct types: pure, reminder, suggestion, and planned.

1. Pure impulse buying: This category represents the most readily identifiable form of impulse buying. It encompasses acquisitions that are novel, spontaneous, or escapist and markedly diverge from planned or

routine shopping activities. Pure impulse buying is relatively infrequent because many consumers cultivate robust habits related to budgeting and pre-shopping planning. These habits facilitate more deliberate and efficient purchasing, thereby diminishing the likelihood of impulsive purchases.

2. Reminder impulse buying: This phenomenon occurs when shoppers see a product in-store and recall that they need it at home. This mainly stems from their existing knowledge of the product and their experiences. This leads to spontaneous purchases, even when consumers do not plan to buy an item.

3. Suggestion impulse buying: This type of impulse buying occurs when a consumer sees a new or unfamiliar product and starts to feel that they might need it. The choice to buy is made without knowing much about the product, relying on its usefulness or appeal. Suggestion impulse buying differs from pure impulse buying because it involves a more thought-out assessment rather than being emotional or escapist.

4. Planned impulse buying: This occurs when shoppers enter a store intending to buy certain items but end up making extra unplanned purchases because of special prices, discounts, or promotions. Although these purchases are unplanned, the likelihood of making them is expected to be high. This behaviour is often observed in situations such as grocery shopping, where budget-conscious buyers react to perceived value (Monoarfa et al., 2024).

Impulse Buying and In-Store Mobile Device

Consumer decision-making has been significantly influenced by the increasing use of mobile devices and the widespread availability of mobile connectivity (Wilson et al., 2024). Retailers are impacted in different ways by the ways that customers utilize their mobile devices inside the store for both shopping-related tasks, such as researching competitors, accessing shopping lists, and using coupons, as well as non-shopping activities, such as social media browsing, entertainment, or work-related duties (Sciandra et al., 2019). People's use of mobile devices is categorised as unrelated to shopping when they are doing things such as browsing the Internet, sending private texts, checking emails, or having private conversations that are not directly related to shopping. However, when a mobile device directly facilitates a shopping task, it is considered related to shopping. This includes using mobile shopping apps, scanning barcodes, comparing prices, accessing digital shopping lists, obtaining product and price information, and obtaining digital coupons for in-store use when grocery shopping. Because it requires less cognitive effort in-store and less sensitivity to environmental influences, this type of usage can improve consumer decision-making (Bellini & Aiolfi, 2020). As a result, digital and mobile technologies can improve the calibre and effectiveness of in-store decision-making and purchasing procedures. According to Punj (2022), by increasing their preparedness for shopping tasks, mobile devices can help consumers during both the pre-purchase and purchase decision stages, reducing perceived risk and speeding up the purchasing process. Numerous studies have demonstrated that mobile phone use in stores can affect retail performance in several ways from the retailer's standpoint. For instance, distraction from mobile devices was found to be a major factor in higher sales and profitability (Aiolfi et al., 2022), because customers who are preoccupied tend to spend more time in stores and focus more on product displays. Conversely, Punj (2022) offer a more detailed classification of mobile phone usage, distinguishing between shopping-related and unrelated use, and demonstrates that customers who use their devices for shopping-related tasks tend to make a smaller number of impulsive purchases compared to those who do not, as such usage helps them stay focused on shopping goals.

Conceptual Framework and Hypotheses

Model of Impulse Buying Proposed in This Study

The growing use of mobile devices, along with their increasing application for activities unrelated to tasks, offers a chance to reevaluate existing studies on impulse-buying behaviour. This research seeks to

introduce a novel model of impulse buying that can assist both industry professionals and academics in gaining a more profound insight into consumer behaviour in today's retail environment, where people frequently use their mobile phones for activities unrelated to shopping. In alignment with prior studies, our model characterizes the tendency to experience pleasure from shopping (shopping enjoyment) as a distinct personal attribute (Aiolfi et al., 2022), and the impact of positive and negative affect (Punj, 2022), the influence of external situational factors like available funds, time constraints, price reductions, and the ambiance of the store (Redine et al., 2023) and the urge to purchase impulsively (Redine et al., 2023) act as **intermediaries** in the influence of the other variables (i.e., positive and negative affect, price discount, store atmosphere) on impulse-buying behavior. Furthermore, the propensity for pre-purchase planning is integrated into the personal traits already explored in the existing literature (Punj, 2022). In order to fill the gap in the current research, this study concentrates solely on the mobile usage habits of individuals who utilise their mobile devices exclusively for tasks unrelated to shopping. This section presents the conceptual framework underlying the revised model of impulse buying behaviour (as illustrated in Figure I).

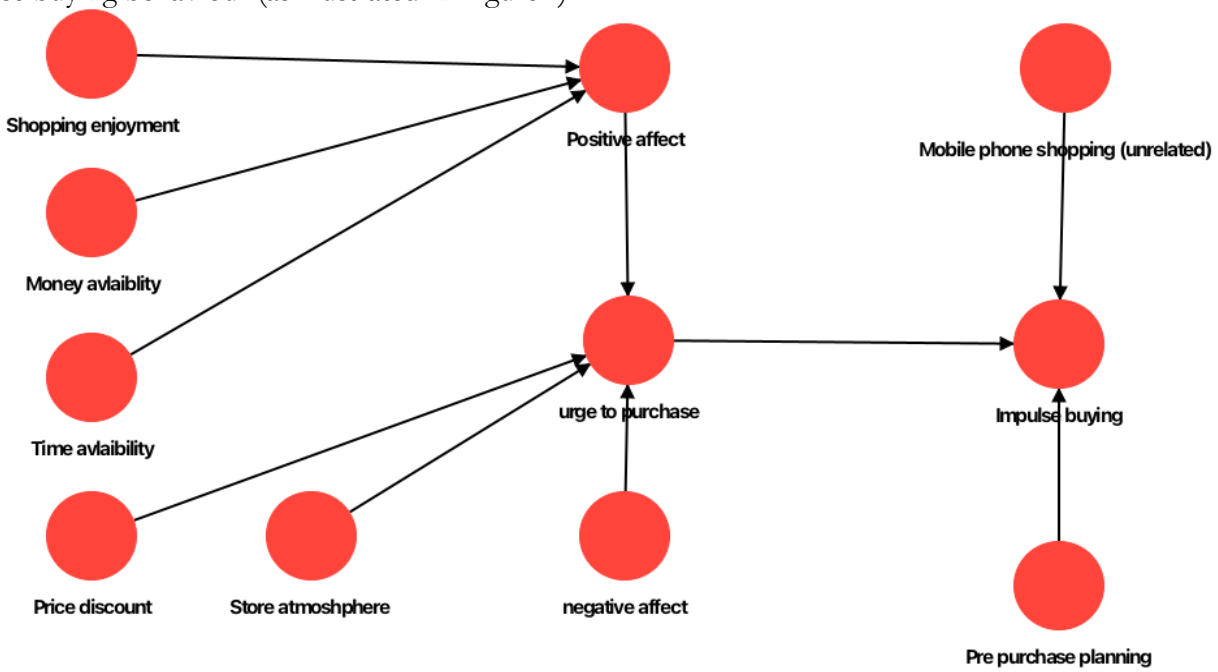

Figure I: Conceptual framework of this study

Shopping Enjoyment and Positive Affect

The enjoyment of shopping involves seeking pleasure, thrill, and emotional fulfilment through the act of shopping (Aiolfi et al., 2022). Positive affect refers to emotions such as happiness, enthusiasm, and contentment. The literature suggests that individuals who perceive shopping as a pleasurable activity derive satisfaction from it, thereby increasing the likelihood of obtaining psychological benefits from the experience (Punj, 2022). Consequently, enjoyable shopping experiences in the grocery retail sector contribute to positive affect, as evidenced by prior studies (Punj, 2022). Based on these insights, the following hypothesis is proposed.

H1: Individuals who find greater enjoyment in shopping are more inclined to experience positive affect.

Price Discount and Urge to Purchase

Büyükdağ et al. (2020) clarified that a price discount represents a reduction in cost during the payment process. Companies typically offer these discounts for a limited duration to enhance their product sales. Discounts are usually shown as a percentage decrease from the regular price. This discount serves as an extra

motivation for customers to make a purchase; in its absence, they might disregard the available products (Jia et al., 2024).

H2: Price discounts lead to a higher urge to purchase.

Impulse buying and Pre-purchase planning

Wilson et al. (2024) describe pre-purchase planning as the process in which consumers set particular buying objectives and take introductory steps before going grocery shopping. Consistent with earlier studies, shoppers invest time and effort in preparing for their shopping trips by comparing prices and organising their purchases (Davydenko & Peetz, 2020). Earlier studies have shown a direct link between how much preparation is done for grocery shopping and how consumers behave in stores, particularly regarding impulse buying. Specifically, the better prepared consumers are before entering a store, the more they plan their purchases, which decreases the chances of impulsive buying (Bellini & Aiolfi, 2020). Therefore, the following hypothesis is proposed:

H3: Pre-purchase planning reduces the quantity of impulse buying.

Store Atmosphere and Urge to Purchase

The atmosphere within a store is intentionally designed to trigger specific emotional responses in customers, thereby increasing the probability of purchase (Akram et al., 2016). The store's ambience is crucial in influencing impulse buying by creating an environment that evokes emotional reactions from consumers. Factors such as store layout, lighting, and music contribute to a more pleasant shopping experience, encouraging customers to linger longer and make unplanned purchases. Research shows that a positive atmosphere, marked by appealing displays and pleasant environmental factors, promotes spontaneous buying behaviour. Consequently, the hypotheses are as follows:

H4: Store atmosphere (display, lighting, scent) positively influences the urge to buy.

Money Availability and Positive Affects

Redine et al. (2023) observed that consumers with greater financial flexibility tend to derive more enjoyment from shopping and are more likely to engage in exploratory and pleasure-oriented shopping activities, thereby enhancing their emotional satisfaction. Similarly, Dias et al. (2022) found that ample financial resources mitigate stress during purchasing decisions and improve the overall shopping experience. Aknin et al. (2020) emphasized that individuals with sufficient financial means experience less internal conflict while shopping, which fosters positive emotional states. Furthermore, research by Sun et al. (2019) indicated that the perception of having adequate financial resources enhances a shopper's confidence and enjoyment, directly influencing their positive emotions. Based on the outcomes of these studies, it can be determined that financial availability is essential in fostering positive emotional experiences, which led to proposal of the hypothesis:

H5: More money availability leads to a higher level of positive affect.

More Time and Positive Affect

Redine et al., (2023) found that consumers experience more enjoyment and pleasure from shopping when they are not rushed and have sufficient time to explore. Similarly, Dias et al. (2022) emphasized that having enough time decreases stress and enhances emotional satisfaction, especially during unplanned or leisurely shopping experiences. Sun et al. (2023) observed that positive emotions are more likely to arise when individuals are free from time constraints, allowing them to fully engage in the shopping experience. Additionally, Wang et al. (2023) showed that the availability of time acts as a situational factor that encourages emotional and impulsive behaviours, resulting in positive feelings. Based on this study, having more time while

shopping enables consumers to feel relaxed, happy, and more emotionally engaged, which led to the proposal of the hypothesis:

H6: More time for shopping leads to higher levels of positive affect.

Urge to Purchase and Positive Affect

Redine et al. (2023) found that consumers experiencing positive emotions such as joy, excitement, or interest while shopping are more inclined to engage in impulsive purchases and exhibit an increased desire to buy. Similarly, Dias et al. (2022) emphasized that emotional arousal, particularly positive emotional arousal, plays a critical role in facilitating unplanned buying. Chaudhary et al. (2025) further corroborated this by asserting that positive emotional states act as internal cues that initiate spontaneous purchase behaviour. Additionally, Tandon et al. (2024) demonstrated that positive affect directly intensifies the urge to purchase, even when the purchase was not originally intended. Upon reviewing these studies that positive affect serves as a potent emotional catalyst that enhances the urge to purchase, which led to the proposal of the hypothesis:
H7: The stronger the positive affect, the more intense the urge to buy.

Urge to Purchase and Negative Affect

When consumers experience negative emotions such as stress, anxiety, sadness, or frustration during shopping, their propensity for impulsive purchasing tends to decrease. These adverse emotional states can disrupt the shopping process and reduce the likelihood of impulse buying. This phenomenon is supported by various researchers. Nyrhinen et al. (2024) emphasized that while impulsive buying is linked to emotions, negative feelings can induce emotional conflict that restrains spontaneous impulses. Similarly, Melati et al. (2024) discovered that negative emotions, including irritation or guilt, can diminish the urge to purchase. Dias et al. (2022) observed that consumers experiencing negative emotions are less inclined to explore products or enjoy the shopping environment, leading to fewer unplanned purchases. Therefore, the following hypothesis is proposed:

H8: As negative emotions increase, the urge to make a purchase decreases.

Impulse Buying and Urge to Purchase

The urge to make a purchase is often described as a sudden, intense, and overwhelming desire to buy something, which acts as a primary trigger for impulsive buying behaviour (Ngo et al., 2024). Previous studies provide significant evidence to support this connection. Melati et al. (2024) observed that when consumers experience a strong urge to buy, they frequently engage in immediate and unplanned purchasing, bypassing rational decision-making processes (Lee et al., 2025). Nyrhinen et al. (2024) also pointed out that the urge to buy is an emotional and impulsive reaction, often resulting in spontaneous purchases, especially among highly impulsive individuals. Similarly, Redine et al. (2023) identified the urge to buy as an intermediary between emotional states and impulse purchases, confirming its role as a direct catalyst. Additionally, Melati et al. (2024) stressed that the intensity of the urge to buy is crucial in distinguishing between regular and impulsive buying. Therefore, the hypothesis is as follows:

H9: A higher urge to purchase leads to higher impulse buying behaviour.

Mobile Phone and Impulse Buying.

An extensive analysis of recent studies revealed that mobile phone use in retail settings significantly influences consumer impulse-buying tendencies. Engaging in non-shopping-related mobile activities, such as texting, scrolling through social media, or watching unrelated digital content while shopping, has been shown to reduce consumer focus and increase cognitive distraction. This mental diversion hampers consumers' ability

to regulate their purchasing behaviour, leading to an increase in impulse buying (Aiolfi et al., 2022). Such distractions create an environment in which consumers are less focused on their original shopping goals and more susceptible to unplanned purchases. Conversely, mobile phone activities related to shopping, such as using price comparison tools, reading product reviews, or searching for coupons, support goal-oriented behaviour and improve self-control. These actions help consumers remain focused and informed, thereby reducing their urge to make spontaneous purchases (Punj, 2022; M. R. Sciandra et al., 2019). Based on these insights, the following hypotheses are proposed:

H10: Non-shopping-related mobile phone use during in-store shopping increases distraction and leads to higher levels of impulse buying.

Methodology

Sample

Data were collected at a grocery store in India, with authorisation obtained from a leading Indian grocery retailer to facilitate our survey. This study employed a single-stage mall intercept survey methodology, a technique well-documented in the literature (Punj, 2022; M. R. Sciandra et al., 2019). The survey was administered within the store, and 326 shoppers were interviewed. Table I summarises the demographic characteristics of the sample population.

Table I: Demographic characteristics

Characteristics	**(%)**
Gender	
Male	46.04
Female	53.96
Age	
18-25	20.85
26-35	24.23
36-45	28.53
45+	26.38

Procedure

A mall-intercept survey was conducted at the exit of a prominent Indian grocery store, engaging shoppers immediately after they had completed their purchases. Initially, each participant was asked about their use of mobile phones during their shopping experience. Participants who affirmed using their phones were subsequently requested to complete a structured questionnaire via Google Forms. In total, 326 shoppers were approached for this study. Of these, 48 shoppers reported not using their mobile phones during their shopping trip, while the remaining 278 indicated that they had used their phones during their in-store visit. Consistent with previous research (Bellini & Aiolfi, 2020), mobile phone usage during shopping was categorized into two types: shopping-related and shopping-unrelated activities. Shopping-related mobile phone usage included actions such as comparing product prices, reading reviews, checking price history (past versus present), comparing prices with online platforms, assessing the price-to-quantity ratio, contacting someone for purchase advice, making payments via UPI, and checking promotional offers or discounts. Shopping-unrelated usage encompassed non-shopping activities such as making or receiving calls, texting, browsing social media, listening to music, or playing games.

TABLE II presents the proportion of respondents who utilized their mobile phones during the specified shopping trip (85.3%, 278 respondents) and those who did not (14.7%,48 respondents).

Table II: In-Store Mobile Phone Usage Patterns

Use of Mobile in store	Percentage
yes	85.3
no	14.7
shopping-related use	38.5
Shopping-unrelated use	61.5

Additionally, Table II delineates the percentage of respondents who engaged in mobile device usage for in-store shopping-related activities (38.5%,107 respondents) versus those who used their devices for activities unrelated to shopping (61.5%,171 respondents). Our research specifically focused on unrelated mobile phone use within stores. Table III specifies the various kinds of in-store mobile utilisation unrelated to shopping, as reported by respondents, along with their corresponding percentages.

Table III: Type of shopping-unrelated mobile usage inside the store

Type of shopping-unrelated mobile usage inside the store	Percentage
Answering or making calls	35.67
texting	33.33
Browsing social media	18.71
listening to music	11.11
playing games	1.17

In alignment with the objectives of our research, it was imperative to quantify the number of products purchased impulsively. Consistent with prior studies (Bellini & Aiolfi, 2020), the frequency of impulse buying was assessed by determining the proportion of items bought impulsively compared to the overall number of items purchased during a specific shopping experience. Consequently, shoppers were requested to present their receipts and collaborate with the researcher to identify any products acquired impulsively—specifically, those not premeditated (referred to as "pure impulse") or those prompted by the retailer during the shopping experience (referred to as "reminded"). As recommended by Bellini and Aiolfi (2020), the determination of impulse purchases was conducted through a dual-verification process: the interviewer and the shopper compared the planned purchases (as listed in the shopping list) with the actual purchases made during the specific shopping trip by cross-referencing the list and the basket. Finally, shoppers responded to inquiries regarding their preparatory activities prior to entering the store, their perception of shopping as an enjoyable activity (Shopping Enjoyment;(Mashilo et al., 2025), the influence of price discounts on their mood (Price Discount; (Pallikkara et al., 2021), the pre-purchase planning undertaken before this particular shopping trip (Pre-Purchase Planning; Iyer et al., 2020), the effect of store atmosphere on the shopping experience (Store Atmosphere; (Krasonikolakis & Vrontis, 2022) , their monetary budget and time availability for this trip (Money Availability; Time Availability; (Dias et al., 2022), the level of positive feelings experienced during shopping (Positive Affect and Negative Affect); (Nyrhinen et al., 2024) , the urges to make unplanned purchases encountered during the specific shopping trip (Urge to Purchase; (Melati et al., 2024), the use of mobile phones during shopping (Mobile Phone Use unrelated to Shopping; (Bellini & Aiolfi, 2020), and the frequency of engaging in impulse buying (Impulse Buying; (Redine et al., 2023).

Measure

In this research, all constructs were assessed using multi-item scales derived from recognized sources, with slight adjustments to fit the Indian grocery retail setting. The survey employed a 5-point Likert scale, where participants could respond from 1 (Strongly Disagree) to 5 (Strongly Agree). To ensure the scales' content validity, they underwent expert review and a pilot test with 30 participants. Minor wording changes were made to improve clarity and contextual relevance.

Finding and Discussion

Measurement Model

This research utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) with the help of SmartPLS to investigate the influence of mobile phone interactions, along with psychological, situational, and store-related factors, on impulse buying behavior in Indian grocery chains. Because the model includes both reflective and formative constructs, the analysis followed a two-step approach: (1) evaluation of the measurement model, and (2) analysis of the structural model.

To assess the reliability of indicators, the outer loadings of each item were examined. As shown in Table IV, the majority of indicators exhibited loadings exceeding the suggested threshold of 0.70. However, one indicator, IB4, was excluded because its loadings were below 0.60, in order to enhance construct reliability. The remaining indicators demonstrated satisfactory reliability (Hair Jr et al., 2020, 2021). Overall, the retained indicators exhibit adequate reliability and are appropriate for use in further measurement model evaluation.

Table IV: Outer Loadings of Reflective Indicators

Construct	Indicator	Outer Loading
Impulse Buying	IB1	0.744
	IB2	0.791
	IB3	0.75
	IB5	0.727
Money Availability	MA1	0.693
	MA2	0.822
	M3	0.825
Negative Affect	NA1	0.665
	NA2	0.801
	NA3	0.85
Pre-Purchase Planning (PPP)	PPP2	0.774
	PPP3	0.938
Positive Affect	PA1	0.856
	PA2	0.825
	PA3	0.771
Price Discount	PD1	0.824
	PD2	0.784
	PD3	0.924
Shopping Enjoyment	SE2	0.903
	SE3	0.863
	SE1	0.76
Time Availability	TA1	0.81
	TA2	0.869
	TA3	0.903
Urge to Purchase	UTP1	0.788
	UTP2	0.774
	UTP3	0.846

Cronbach's Alpha (CA), Composite Reliability (CR), and rho_A were used to test internal consistency. Table V shows reliability and convergent validity

Table V: Reliability and Convergent Validity (CA, CR, AVE)

Construct	Cronbach's Alpha	Composite Reliability (CR)	AVE
Money Availability	0.687	0.825	0.612
Negative Affect	0.682	0.818	0.602
Pre-Purchase Planning (PPP)	0.674	0.85	0.74
Positive Affect	0.752	0.858	0.669
Price Discount	0.806	0.882	0.715
Shopping Enjoyment	0.801	0.881	0.713
Time Availability	0.827	0.896	0.742
Urge to Purchase	0.725	0.845	0.645
Impulse Buying	0.747	0.84	0.568

Table V shows that all constructs have composite reliability values exceeding the suggested minimum of 0.70, indicating robust internal consistency. While the Cronbach's alpha values for Money Availability, Negative Affect, and Pre-Purchase Planning are slightly under 0.70, their reliability is supported by acceptable composite reliability and AVE values (Sarstedt et al., 2022).Moreover, all AVEs exceed 0.50, indicating that the constructs exhibit sufficient convergent validity.

Convergent validity was assessed using the Average Variance Extracted (AVE). All constructs had AVE values greater than 0.50, which means that more than half of the variance in the indicators was explained by their respective constructs (Cheung et al., 2024). The HTMT ratio was used to assess discriminant validity. All HTMT values were below the threshold of 0.90, and most were below 0.85, as shown in Table VI, showing that the reflective constructs were empirically distinct (Hair Jr et al., 2021).

Table VI: HTMT Matrix

	MA	NA	PPP	PA	PD	SE	TA	UTP	IB
Money Availability	—	0.249	0.085	0.49	0.462	0.294	0.816	0.555	0.393
Negative Affect		—	0.301	0.088	0.091	0.104	0.13	0.288	0.346
Pre-Purchase Planning			—	0.123	0.186	0.252	0.137	0.131	0.16
Positive Affect				—	0.439	0.659	0.711	0.517	0.567
Price Discount					—	0.476	0.401	0.408	0.228
Shopping Enjoyment						—	0.418	0.432	0.324
Time Availability							—	0.381	0.26
Urge to Purchase								—	0.77
Impulse Buying									—

As indicated in Table VI, all HTMT values fall below the recommended threshold of 0.90, with most values even lower than the more stringent criterion of 0.85. This indicates that the reflective constructs are empirically distinct and do not suffer from discriminant validity issues. Therefore, the measurement model's discriminant validity is adequately established. Based on the results of the indicator loadings, internal consistency, AVE, and HTMT, the reflective measurement model confirmed strong reliability and validity. Therefore, these constructs were appropriate for use in the structural models (Hair Jr et al., 2021).

Formative Construct

Two constructs in the model—Mobile Phone Use (Unrelated) and Store Atmosphere—were specified as formative based on their conceptual definitions and the nature of causal indicator relationships, as supported

by previous studies (Hair Jr et al., 2021). To assess the quality of formative measurement, three key criteria were considered: multicollinearity, significance of outer weights, and contribution through outer loading. All indicators reported Variance Inflation Factor (VIF) values well below the threshold of 3.3, indicating no multicollinearity concerns (Hair Jr et al., 2020).

Using the sample of 326 post-purchase respondents, bootstrapping with 5,000 resamples and bias-corrected accelerated (BCa) confidence intervals was employed to test the statistical significance of outer weights. For Mobile Phone Use (Unrelated), only indicator MUSUR3 had a significant outer weight ($p < 0.05$, CI = [0.229, 0.971]). Although MUSUR1 and MUSUR2 were statistically non-significant, they demonstrated strong outer loadings of 0.725 and 0.670, respectively. Based on their theoretical relevance and empirical support, these indicators were retained (Hair Jr et al., 2021).

Similarly, for Store Atmosphere, indicators SA1 and SA3 exhibited significant outer weights and high loadings (0.924 and 0.806, respectively). While SA2 had a non-significant outer weight and its confidence interval included zero, it was retained due to a sufficient loading (0.548) and its conceptual importance in capturing ambient store cues, as discussed above. Following the best practices in formative measurement, all indicators were retained by considering both statistical outcomes and theoretical justification, as shown in Table VII, as recommended in a previous study. (Magno et al., 2024). Indicator removal was avoided solely on statistical grounds to preserve the content validity and construct comprehensiveness.

TABLE VII: Shows which formative indicators were retained.

Construct	Indicator	Outer Weight	95%	p-value	Outer Loading	VIF	Retain
Mobile Phone Use (Unrelated)	MUSUR1	0.491	–0.146 to 0.979	0.093	0.725	1.644	Yes
	MUSUR2	0.145	–0.499 to 0.845	0.676	0.67	1.755	Yes
	MUSUR3	0.667	0.229 to 0.971	0.001	0.82	1.119	Yes
Store Atmosphere	SA1	0.644	0.198 to 0.974	0.001	0.924	1.549	Yes
	SA2	0.146	–0.200 to 0.503	0.408	0.548	1.232	Yes
	SA3	0.404	–0.001 to 0.771	0.037	0.806	1.462	Yes

Although some indicators have outer weights that are not statistically significant, their outer loadings are adequate and hold theoretical importance, justifying their inclusion. In conclusion, the formative measurement model is of acceptable quality and suitable for further analysis of the structural model.

Structural Model Evaluation

Following the validation of the measurement model, the structural model was assessed to examine the hypothesized relationships among the constructs. This evaluation included testing for collinearity, assessing path coefficients and their significance, examining effect sizes (f^2), determining explained variance (R^2), and evaluating the model's predictive relevance (Q^2 Predict), in line with the recommendations of Sarstedt et al. (2022).

To ensure the absence of multicollinearity among the predictor constructs, the Variance Inflation Factor (VIF) was assessed. All Outer VIF values were below the recommended threshold of 3.3, indicating no significant collinearity issues (Hair Jr et al., 2021).

Table VIII shows that the maximum VIF was 2.206, which is comfortably within the acceptable range. These findings verify that collinearity does not distort the estimation of the structural path coefficients.

4.5.2 Path Coefficients and Hypothesis Testing.

Table VIII: Outer (Indicator-level) VIF Values

Indicators	VIF
IB1	1.384
IB2	1.581
IB3	1.646
IB5	1.457
MA1	1.279
MA2	1.348
MA3	1.413
MUSUR1	1.644
MUSUR2	1.755
MUSUR3	1.119
NA1	1.296
NA2	1.641
NA3	1.358
PA1	1.763
PA2	1.678
PA3	1.329
PD1	1.742
PD2	1.638
PD3	2.027
PPP2	1.348
PPP3	1.348
SA1	1.549
SA2	1.232
SA3	1.462
SE2	2.020
SE3	1.779
TA1	1.684
TA2	1.971
TA3	2.206
UTP1	1.366
UTP2	1.416
UTP3	1.563
SE1	1.567

The significance of the structural path coefficients was evaluated using bootstrapping with 5,000 resamples. Path coefficients, t-values, and p-values were examined to test the proposed hypotheses.

Table IX: Path Coefficients and Hypothesis Results

Path Relationship	**β (O)**	**t-value**	**p-value**	**Supported/not-supported**
Mobile Phone Use (Unrelated) → Impulse Buying	0.168	2.558	0.011	Supported
Money Availability → Positive Affect	0.002	0.026	0.979	Not Supported
Negative Affect → Urge to Purchase	0.166	2.403	0.016	Not Supported
Positive Affect → Urge to Purchase	0.25	3.251	0.001	Supported
Pre-Purchase Planning → Impulse Buying	-0.188	2.476	0.013	Supported
Price Discount → Urge to Purchase	0.169	2.331	0.02	Supported
Shopping Enjoyment → Positive Affect	0.384	4.901	0.00	Supported
Store Atmosphere → Urge to Purchase	0.273	3.508	0.00	Supported
Time Availability → Positive Affect	0.438	4.947	0.00	Supported
Urge to Purchase → Impulse Buying	0.528	9.121	0.00	Supported

As shown in Table IX, nine of the ten hypothesized relationships are statistically significant, supporting the proposed structural model. Urge to Purchase has the strongest effect on Impulse Buying, while the relationship between Money Availability and Positive Affect is not supported.

The coefficient of determination (R^2) indicates the proportion of variance explained by each endogenous construct. According to Guenther et al. (2023), R^2 values of 0.19, 0.33, and 0.67 represent weak, moderate, and substantial levels of explanatory power, respectively.

Table X: R^2 Values

Endogenous Variable	R^2	R^2 Adjusted	Interpretation
Positive Affect	0.452	0.442	Moderate
Urge to Purchase	0.302	0.285	Moderate
Impulse Buying	0.381	0.37	Moderate

As shown in Table X, the R^2 values for Positive Affect (0.452), Urge to Purchase (0.302), and Impulse Buying (0.381) fall within the moderate range. These results indicate that the model explains a meaningful proportion of variance in all endogenous constructs.

The effect size (f^2) assesses the individual impact of exogenous variables on endogenous variables. According to (Guenther et al., 2023), values of 0.02, 0.15, and 0.35 correspond to **small**, **medium**, and **large** effect sizes, respectively.

Table XI: f^2 Effect Sizes

Path Relationship	f^2	Effect Size
Mobile Phone Use (Unrelated) → IB	0.039	Small
Pre-Purchase Planning → IB	0.055	Small
Urge to Purchase → IB	0.393	Large
Store Atmosphere → Urge to Purchase	0.092	Small
Positive Affect → Urge to Purchase	0.075	Small
Negative Affect → Urge to Purchase	0.038	Small
Price Discount → Urge to Purchase	0.035	Small
Shopping Enjoyment → Positive Affect	0.241	Medium
Time Availability → Positive Affect	0.201	Medium
Money Availability → Positive Affect	0.000	None

As shown in Table XI, the Urge to Purchase significantly influences Impulse Buying, whereas Shopping Enjoyment and Time Availability have moderate impacts on Positive Affect. Most other associations demonstrate minimal or negligible effect sizes, with Money Availability having no impact on Positive Affect.

Predictive relevance was evaluated using Q^2 Predict, a blindfolding-based technique that determines whether a model has predictive capabilities. According to , Sarstedt et al. (2022), Q^2 values greater than 0 indicate acceptable predictive relevance.

Table XII: Q^2 Predict Values

Construct	Q^2 Predict	Interpretation
Positive Affect	0.418	Strong
Urge to Purchase	0.224	Moderate
Impulse Buying	0.172	Moderate

As shown in Table XII, all endogenous constructs possess Q^2 Predict values greater than zero, signifying sufficient predictive relevance. Positive Affect exhibits strong predictive strength, whereas Urge to Purchase and Impulse Buying display moderate predictive abilities.

4.5.6 Conclusion of Structural Model

The structural model demonstrated strong empirical support for most of the hypothesised relationships. All R^2 values indicated moderate explanatory power, while path analysis confirmed that psychological (e.g., emotional states), situational (e.g., time availability), and store-related (e.g., store atmosphere) factors significantly influenced impulse buying behaviour. Notably, non-shopping mobile phone use also had a significant positive effect on impulse buying, highlighting its relevance in contemporary digital shopping environments. The model showed sufficient effect sizes and strong predictive performance, particularly for Positive Affect and Urge to Purchase. As shown in Figure 2.

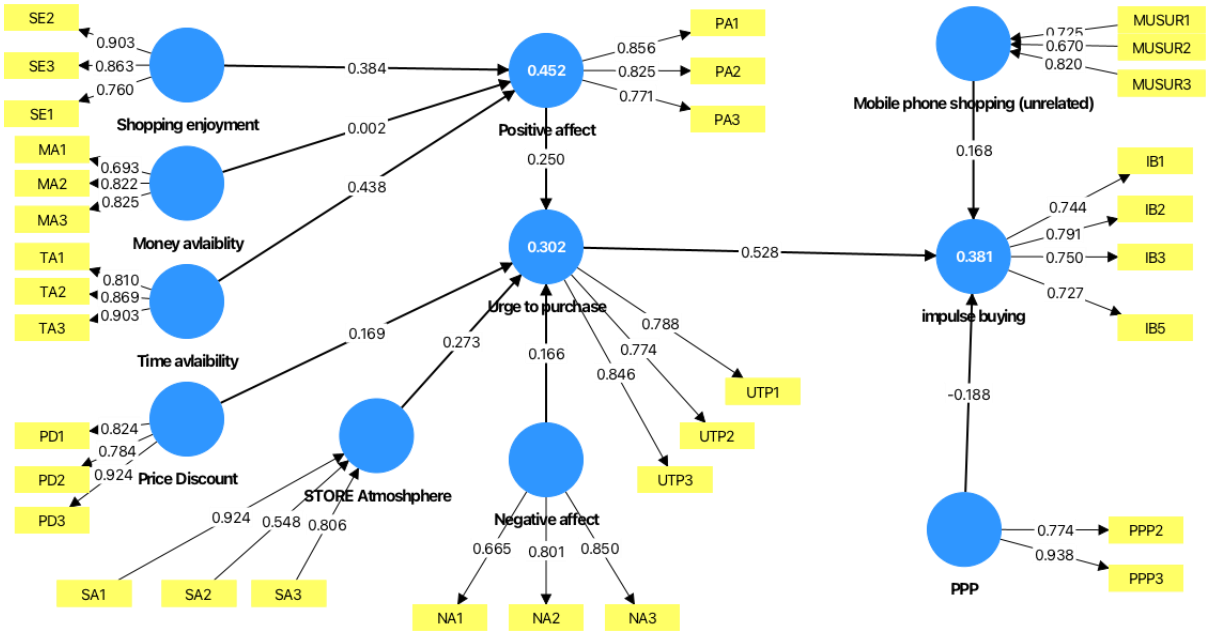

Figure 2: Illustrates the results of the structural model and measurement model using PLS-SEM

5. Conclusion and Implementation

This study investigated how non-shopping-related mobile phone use, emotional states, and situational or environmental factors influence impulse buying in Indian grocery stores by utilising a modified stimulus-organism-response (S-O-R) framework in conjunction with Partial Least Squares Structural Equation Modelling (PLS-SEM). The results show that using mobile phones in stores for unrelated tasks—such as chatting, watching videos, or browsing social media—can significantly increase the likelihood of impulse buying. This supports the idea that mobile phone distractions reduce consumers' self-control, making them more vulnerable to unplanned purchases. Among all the factors, the urge to purchase was found to be the strongest direct driver of impulse buying. This urge was shaped by both positive and negative emotions, showing that emotional experiences—whether pleasant or unpleasant—can lead to spontaneous purchases. Contrary to hypothesis H8, results show negative affect positively influences purchase urge ($\beta = 0.166$, $p = 0.016$). This suggests consumers experiencing negative emotions during grocery shopping may engage in compensatory purchases to improve their emotional state. This finding indicates negative emotions can stimulate impulsive buying within the S-O-R framework. Store-related factors like atmosphere, enjoyment, discounts, and time availability influenced emotional responses and buying behavior.

Contrary to expectations, the relationship between Money Availability and Positive Affect (H5) was unsupported. The path coefficient was negligible ($\beta = 0.002$), indicating financial resources alone don't significantly generate positive emotions in grocery shopping. Emotional responses in retail are more driven by

situational stimuli—such as store atmosphere or promotions—than by perceived financial capacity. In routine grocery purchases, money availability may facilitate rather than trigger emotions. This finding refines the S-O-R framework, suggesting internal resources don't directly influence affective states but operate through different mechanisms. Examining the results through the perspective of the four distinct types of impulse buying identified in the literature offers further understanding. The significant influence of the urge to purchase is mainly indicative of pure impulse buying and suggestion impulse buying, where spontaneous emotional impulses and in-store stimuli result in immediate, unplanned purchases. The impact of mobile phone distractions and in-store cues corresponds with reminder impulse buying, as digital interactions might trigger consumers to remember needs or desires they hadn't initially planned for. Additionally, the interplay between pre-purchase planning and situational triggers supports planned impulse buying, where consumers are prepared to buy extra items if favorable conditions present themselves.

The model demonstrated moderate explanatory power ($R^2 = 0.381$ for impulse buying) and good predictive relevance ($Q^2 = 0.172$), indicating that the relationships were statistically strong and practically meaningful. Theoretically, this study contributes to the consumer behavior literature by updating the traditional S-O-R model to include modern digital distractions as stimuli and by confirming that both types of affect—positive and negative—can influence buying decisions. From a managerial perspective, the findings suggest that grocery retailers can enhance impulse buying by designing engaging in-store environments and using digital tools, such as mobile notifications or QR-based offers, to capture shoppers' attention. However, this also raises important ethical considerations, as marketers must ensure that their strategies support responsible consumption and do not exploit psychological vulnerabilities. In addition to practical implementation insights, the findings also carry ethical and responsibility-related implications in the context of mobile phone interactions within Indian grocery retail settings. While emotionally and situationally driven impulse-stimulating strategies enabled through mobile technologies may enhance short-term performance, their application should remain balanced to avoid encouraging excessive or unreflective consumption. Retail managers are encouraged to adopt responsible mobile marketing practices that respect consumer autonomy and prioritize long-term consumer well-being, particularly in digitally mediated grocery shopping environments.

While strategically crafted mobile interactions and in-store cues can boost impulse buying, retailers have a duty to avoid exploiting cognitive biases or emotional vulnerabilities. Ethical practices may involve setting limits on aggressive notifications, ensuring transparency in promotions, and fostering consumer awareness of spending decisions. Balancing sales goals with consumer well-being is essential for maintaining long-term trust and sustainable customer relationships.

Limitations and Future Research Directions

While this study offers significant insights, it is important to acknowledge several limitations that should be considered when interpreting the findings and planning future research. First, the study focuses solely on Indian grocery retail chains; thus, the findings may have limited relevance to different cultural, economic, or retail environments. Future research should examine the model across various nations and industries, such as fashion and electronics, and rural–urban settings to assess its broader applicability. Second, the cross-sectional nature of the research and its reliance on self-reported data limit the ability to draw causal inferences. Future studies should adopt longitudinal methods or real-time behavioral tracking (e.g., mobile analytics or in-store observations) to capture dynamic consumer responses. Third, while this study examined non-shopping-related mobile phone use, it did not explore task-oriented usage, which may have contrasting effects on impulse buying. Future studies should investigate the dual influence of shopping-related and unrelated mobile interactions. Fourth, constructs such as pre-purchase planning and negative affect showed relatively weaker measurement performance, indicating the need for scale refinement or additional indicators in future models to improve measurement performance. Finally, the model does not include potential mediators or moderators, such as self-control, shopping goals, personality traits, or demographic factors, which could explain individual differences

in susceptibility to mobile-induced impulsivity. Incorporating these variables in future studies would enhance the explanatory and predictive power of the model.

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Data availability statement: Data available on request The data that support the findings of this study are available from theFrom the corresponding author, Himanshu Verma, upon reasonable request.

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