Impact of AR-Enabled Product Visualization on Impulse Buying Behaviour

Priyanka Anand[1], Jatin Anand[2]
Assistant Professor
Department of Commerce
St. Aloysius' College (Autonomous), Jabalpur
Corresponding Author Email: *jatinanandsac22@gmail.com*

ABSTRACT

The growing adoption of Augmented Reality (AR) in digital retail has reshaped online shopping experiences, influencing how consumers evaluate and purchase products. This study investigates the impact of AR-enabled product visualization on impulse buying behavior through a comprehensive secondary data analysis of existing empirical studies, industry reports, and scholarly literature. By synthesizing prior research grounded in the Stimulus–Organism–Response (S-O-R) framework, the paper examines how immersive visualization, interactivity, and perceived realism influence consumers' cognitive and emotional responses. The analysis reveals that AR technology enhances product vividness, reduces perceived risk, and fosters a sense of virtual ownership, which collectively stimulate spontaneous purchase decisions. Furthermore, emotional engagement and perceived enjoyment consistently emerge as mediating factors between AR experiences and impulse buying tendencies. The findings highlight AR's strategic role in increasing consumer engagement and conversion rates in competitive e-commerce environments. By consolidating fragmented insights from prior studies, this research provides a structured understanding of AR's influence on unplanned purchasing behavior and offers practical implications for retailers seeking to leverage immersive technologies to drive consumer impulsivity in digital marketplaces.

KEYWORDS: *Augmented Reality, Impulse buying behaviour, E-Commerce, Product Visualization, Consumer Behaviour, S-O-R Model*

INTRODUCTION

The retail industry and consumer behavior have changed dramatically as a result of the quick development of digital technologies. Among these developments, augmented reality (AR) has become a potent technology that improves online shopping by enabling customers to see things in their actual surroundings. AR-enabled product visualization provides dynamic, immersive, and realistic simulations that bridge the gap between in-person and virtual buying, in contrast to standard e-commerce interfaces that rely on static photos and textual descriptions. In today's cutthroat digital marketplace, where consumer involvement and experience are critical factors affecting purchase decisions, this technological development is especially pertinent.

By creating a conceptual model based on accepted theories and current research, our work seeks to close this gap. The report offers a greater understanding of the psychological mechanisms through which AR influences consumer behavior by combining previous research.

a) Augmented Reality in E-Commerce

In the context of e-commerce, augmented reality (AR) is the application of interactive digital technology that superimposes virtual elements—such 3D product models, animations, or information—onto a user's physical surroundings via gadgets like computers, tablets, or smartphones. By enabling customers to see things in their real-world environments before making a purchase, augmented reality (AR) improves the conventional shopping interface in online retailing.

AR systems offer immersive and engaging experiences, in contrast to traditional e-commerce platforms that mostly rely on static photos and written descriptions. Customers can evaluate aspects like look, fit, color, and spatial compatibility by rotating, resizing, and positioning virtual objects in real time. Customers can, for instance, digitally try on items, virtually arrange furniture in their living area, or see how cosmetics might seem on their faces.When AR is included with e-commerce, it lessens the uncertainty that comes with online shopping because it is impossible to physically inspect things. AR enhances decision-making quality, boosts consumer confidence, and may reduce product return rates by providing a virtual "try-before-you-buy" experience. AR's captivating qualities can also improve brand interaction and client happiness. All things considered, augmented reality bridges the gap between physical and

digital retail environments by turning online purchasing from a simply informational process into an immersive one.

b) Impulse Buying Behavior

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Impulse buying has been widely discussed in consumer behavior literature, with scholars emphasizing its spontaneous and unplanned nature. Beatty and Ferrell (1998) describe impulse buying as an immediate purchase made without prior intention to buy a particular product or satisfy a predetermined need. They argue that such purchases are triggered by a sudden urge experienced in-store and involve minimal cognitive evaluation. However, they clarify that purchases made as replacements for out-of-stock items or those prompted simply by product reminders do not fall under impulse buying.

Similarly, Bayley and Nancarrow (1998) characterize impulse buying as a rapid and emotionally driven decision-making process in which consumers experience a compelling urge that limits thoughtful comparison of alternatives. Their definition highlights the hedonic dimension of impulse buying, suggesting that such behavior is associated with pleasure, excitement, and emotional gratification. This contrasts with utilitarian purchasing, where decisions are primarily guided by functionality, efficiency, and economic value.

Expanding on this perspective, Block and Morwitz (1999) define impulse purchases as decisions made with little or no prior deliberation, typically resulting from a strong and sudden desire to buy. In a similar vein, Kacen and Lee (2002) observe that impulsive buying tends to be more emotionally intense and difficult to resist than planned purchasing, while involving significantly less rational evaluation.

Earlier work by Engel and Blackwell (1982) also supports this view, describing impulse buying as a purchase made without conscious recognition of need or intention before entering the retail environment. This perspective emphasizes the absence of pre-shopping planning as a key characteristic of impulsive behavior.

Overall, the literature suggests that impulse buying is a spontaneous, emotionally driven purchase decision made within the shopping environment, characterized by sudden desire, limited cognitive processing, and hedonic motivation. Importantly, it excludes reminder-based or replacement purchases, as these involve prior need recognition rather than purely spontaneous urges.

c) AR Visualization and Consumer Psychology

Visualization of augmented reality (AR) has a profound impact on consumer psychology by altering how people view, assess, and react emotionally to things in virtual spaces. Customers can use augmented reality (AR) to project virtual products into their actual environment, giving them a sense of realism and personal relevance that is not possible with standard digital photos. From a psychological standpoint, augmented reality (AR) improves mental imagery, enabling customers to more vividly envision owning and using a product. Customers are more likely to consider a product as useful and compatible when they can see how it will fit into their personal space or on their body. This procedure lessens the uncertainty frequently connected to online purchases and increases cognitive involvement. Emotional reactions are also impacted by AR imagery. Hedonic shopping motivation is linked to excitement, enjoyment, and curiosity, all of which can be evoked by immersive and interactive experiences. Purchase intention and general contentment with the shopping experience might both rise as a result of these pleasant feelings. The growth of a sense of ownership, often known as the endowment effect, is another significant psychological impact. Customers may develop a deeper psychological attachment to a product when they digitally engage with it or personalize it in their own setting, increasing the likelihood that they will finish the purchase.

Additionally, by improving product comprehension, AR lowers perceived risk and boosts customer confidence in the online merchant. AR visualization changes consumer attitudes, decision-making, and purchasing behavior by bridging the gap between digital and real retail experiences. All things considered, AR visualization affects both the affective (feeling) and cognitive (thinking) aspects of consumer psychology, increasing the persuasiveness, immersion, and decision-making of online purchase.

THEORETICAL LINK: STIMULUS–ORGANISM–RESPONSE (S-O-R) FRAMEWORK

The Stimulus–Organism–Response (S–O–R) paradigm, which was first put forth in environmental psychology, provides a fundamental framework for analyzing how internal psychological states and external environmental stimuli influence an individual's behavior. The S-O-R model is especially pertinent in this study to comprehend how augmented reality features integrated into e-commerce platforms function as stimuli that influence customer reactions.

a) Stimulus (S): AR Features

Technological features including interaction, vividness, and novelty serve as important stimulants in AR-enabled purchasing settings. The degree to which users can interact and manipulate virtual product representations in real time is referred to as interactivity. Vividness refers to the depth, visual clarity, and sensual appeal of the augmented reality experience, as well as its richness and realism. Novelty is a reflection of AR technology's originality and inventiveness, which can draw in customers and pique their interest. The whole sensory and experiential quality of online buying is improved by these elements taken together.

b) Organism (O): Emotional and Cognitive States

The internal mechanisms brought on by AR stimuli are represented by the organism component. These comprise cognitive assessments like perceived utility as well as emotional reactions like enjoyment and excitement. While arousal denotes increased emotional activation or excitement, enjoyment is the inherent pleasure obtained from interacting with AR interfaces. According to research on technological acceptance, perceived utility refers to how much customers think augmented reality improves their ability to purchase and make decisions. These psychological states have a significant impact on how people behave.

c) Response (R): Impulse Buying Behaviour

The ensuing customer behavior, especially impulsive purchases, is referred to as the response component. Impulse buying is defined as making impulsive, unexpected purchases without giving them any thought. AR's immersive and captivating qualities might heighten emotional reactions and lower cognitive barriers, which raises the possibility of impulsive purchases.

Overall, the S–O–R model provides a structured mechanism to explain how AR-enabled stimuli translate into behavioural responses through psychological mediators.

TECHNOLOGY ACCEPTANCE MODEL (TAM)

The adoption of new technologies by users is often explained using the Technology Acceptance Model (TAM). TAM aids in comprehending how customers view and engage with AR tools in the context of e-commerce, which eventually affects their purchasing decisions.

a) Perceived Usefulness

The degree to which a customer feels that employing augmented reality technology improves their buying experience is known as perceived usefulness. This could include better product comprehension, enhanced visualization, and more assurance while making purchases in AR-enabled settings. Customers are more inclined to interact with AR and rely on it when making decisions if they believe it to be beneficial.

b) Perceived Ease of Use

The degree to which customers find augmented reality technology easy to use is correlated with perceived ease of use. Increased usability is a result of intuitive controls, user-friendly interfaces, and smooth connection with e-commerce systems. Customers are more likely to adopt AR tools and spend more time interacting with things when they believe they are simple to use.

Customers' sentiments about augmented reality technology and their intention to utilize it are influenced by both perceived utility and perceived ease of use. Increased AR use and interaction might heighten emotional experiences, which could then result in impulsive purchasing. By elucidating the cognitive acceptance of AR as a prelude to emotional and behavioral responses, TAM thereby enhances the S–O–R framework.

c) Flow Theory

The psychological state of intense involvement and immersion that people experience when they are totally engrossed in an activity is explained by flow theory. Flow has a big influence on how customers behave in AR-enabled retail spaces.

With its interactive and immersive features, augmented reality technology has the potential to produce a flow experience by drawing people in and keeping them interested. People who are in a state of flow prefer to focus solely on the task at hand, losing awareness of time and other distractions. The total shopping experience is improved and emotional pleasure rises as a result of this increased level of participation.

Crucially, flow experiences can impair cognitive control and self-regulation. Customers' capacity to critically assess purchasing decisions may decline as they get more engrossed in AR encounters. This may cause individuals to lose self-control and become more prone to impulsive behavior.

Additionally, hedonic motivation—a major factor in impulse buying—is strengthened by the amusing and pleasurable aspects of AR-driven flow experiences. When consumers like shopping and are emotionally invested, they are more likely to make impulsive purchases.

INTEGRATION OF THEORIES

A comprehensive framework for comprehending how AR affects impulsive purchasing behavior is provided by the integration of S-O-R, TAM, and Flow Theory. The stimulus-response mechanism is explained by the S–O–R paradigm, technology acceptance is taken into account by TAM, and the immersive and experiencing elements of AR are captured by Flow Theory. When taken as a whole, these theories show that AR has a significant impact on emotional and experiential aspects in addition to cognitive assessments, which eventually leads to impulsive buying behavior.

PROPOSED MODEL

The suggested conceptual model shows how product visualization facilitated by augmented reality (AR) affects impulsive purchasing behavior in online retail settings. The approach is based on the combination of Flow Theory, the Technology Acceptance approach (TAM), and the Stimulus–Organism–Response (S–O–R) framework. According to this theory, certain AR characteristics serve as external cues that mold users' interior psychological reactions, which in turn influence behavioral results like impulsive purchases.

At a broader level, the model can be represented as:

a) AR Features → Psychological Responses → Impulse Buying Behaviour

This structure emphasizes that the impact of AR is not direct alone but is largely mediated by emotional and cognitive processes.

b) AR Interactivity → Enjoyment → Impulse Buying

One of the key features of augmented reality technology is interactivity, which enables consumers to actively interact with virtual product representations. Real-time product rotation, zooming, and manipulation give users a sense of control and involvement. The intrinsic pleasure of buying is increased by this interactive interaction.

As an emotive response, enjoyment is a key factor in influencing consumer behavior. Customers are more likely to prolong their browsing sessions and feel emotionally invested in the purchasing process when they like interacting with augmented reality interfaces. This increased involvement raises the possibility of impulsive purchases and decreases logical thought.

Thus, enjoyment acts as a mediating variable that translates AR interactivity into impulse buying behaviour. The more interactive and engaging the AR experience, the greater the level of enjoyment, which in turn stimulates impulsive purchasing tendencies.

c) AR Vividness → Emotional Arousal → Impulse Buying

The richness, realism, and sensual appeal of AR-generated material are referred to as vividness. Customers can view products more realistically when they have high levels of vividness, which frequently mimic tactile interaction. This contains realistic depictions in authentic settings, precise scale, and intricate textures.

Emotional arousal, which is marked by increased excitement, stimulation, and sensory activation, is triggered by such dramatic experiences. Because emotional arousal can overwhelm cognitive control systems and result in quick decision-making, it is a key factor in impulse purchase.

Vibrant product imagery heightens emotional reactions in AR-enabled surroundings, increasing consumers' propensity for impulsive behavior. Thus, one important mediator

between AR vividness and impulsive purchasing behavior is emotional arousal.

d) AR Personalization → Satisfaction → Impulse Buying

In augmented reality, personalization refers to the technology's capacity to customize product experiences to specific customer preferences, requirements, and situations. AR apps might, for instance, let users see things in their real surroundings, change features to suit their preferences, or get personalized suggestions.

By fostering a feeling of connection and relevance with the product, this tailored contact raises customer happiness. Customers' emotional attachment to and trust in their decisions are strengthened by satisfaction, which is a positive evaluative response. When customers are happy with their augmented reality experience, they are more likely to decide to buy right away without doing much research or comparison shopping. Impulsive purchases are more likely as a result of this inclination.

Thus, satisfaction mediates the relationship between AR personalization and impulse buying behaviour, highlighting the importance of customized experiences in digital retail.

e) Perceived Usefulness (TAM) → Purchase Intention

Based on the Technology Acceptance Model, perceived usefulness measures how much customers think augmented reality improves their ability to shop. Usefulness in the context of AR-enabled product visualization could include better decision-making, less ambiguity, and enhanced product comprehension.

Customers are more likely to form a strong buy intention when they believe augmented reality to be beneficial. Even though purchase intention is usually linked to planned behavior, it can also influence impulsive purchases in immersive settings, particularly when paired with emotional triggers.

Thus, perceived utility serves two purposes: it promotes the adoption of technology and fortifies the cognitive foundation for purchase, which may obliquely encourage impulsive purchasing when emotional engagement is high.

f) Flow Experience → Reduced Cognitive Control → Impulse Buying

The term "flow experience" describes a state of intense engagement and immersion in an activity where people lose all sense of time and outside distractions. Because AR environments are immersive and engaging, they are quite good at creating flow states. Customers have less self-control and cognitive control while they are in flow. They become more prone to impulsive behavior as their attention moves from logical assessment to experiencing satisfaction.

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One of the main ways that flow causes impulsive purchases is through decreased cognitive control. Customers are less likely to critically evaluate their purchases as they become absorbed in augmented reality interactions, which leads to impulsive and unexpected purchases.

LITERATURE REVIEW

Muruganantham, G., & Bhakat, R. S. (2013). Impulse buying has been widely examined in consumer behavior research, with foundational studies by Clover (1950), Stern (1962), and Rook (1987) establishing its psychological and behavioral dimensions. Later research expanded the concept by identifying key drivers such as hedonic motivation, emotional responses, and retail environment stimuli (Peck & Childers, 2006; Chang et al., 2011). With the evolution of digital retailing, impulse buying has increasingly shifted to online platforms, where technological factors play a crucial role. In recent years, augmented reality (AR) has emerged as a transformative tool in e-commerce, enhancing interactivity, product visualization, and user engagement. Studies suggest that AR-driven experiences can stimulate consumers' emotions and perceived enjoyment, thereby increasing the likelihood of impulsive purchases.

This evolving literature highlights the need to integrate technological dimensions like AR into traditional impulse buying frameworks, providing a basis for the present study. **Trivedi et al. (2022)** examined the impact of augmented reality (AR) in mobile applications on consumers' online impulse purchase intention, particularly in the cosmetics segment. The study found that users' motivation to engage with AR and the perceived quality of augmentation significantly enhance perceived value, which in turn drives impulsive buying behavior. Perceived value was also identified as a key mediating factor, while product involvement moderated its relationship with impulse purchase intention. Based on data from millennial women, the findings suggest that AR-enabled mobile experiences can effectively stimulate online impulse purchases.

Ahluwalia, G. K., Anute, N., Kalekar, R. S., Umbarkar, S. K., & Madhani. examined the role of augmented reality (AR) in shaping online shopping behavior through a quantitative study of 289 respondents. The findings reveal that AR significantly enhances the online shopping experience by improving product visualization, increasing interactivity, and boosting consumer confidence in purchase decisions. However, the study also highlights certain challenges faced by users in adopting AR technology. Overall, the research emphasizes AR's potential to transform digital shopping while suggesting the need for better design and usability to maximize its effectiveness.

Tirmizi et al.(2009) investigated the influence of factors such as shopping lifestyle, fashion involvement, and decision-making stages on impulse buying behavior among consumers. Based on data collected from higher-income respondents in Rawalpindi and Islamabad, the study found an overall weak relationship between these variables and impulse buying. However, the pre-decision stage of consumer behavior showed a strong influence on impulsive purchases. The findings also indicate that, contrary to common assumptions, young consumers in higher-income groups do not necessarily exhibit strong impulse buying tendencies.

Parmar and Ahmed (2013) examined the factors influencing impulse buying behavior for FMCG products in Larkana, Pakistan. The study identified key determinants such as promotional strategies, store environment, visual merchandising, income level, and credit card usage. Findings indicate that discounts, free offers, and attractive store displays significantly encourage impulsive purchases. Additionally, income level and well-designed retail environments were found to have a strong impact, highlighting the importance of visual appeal and promotional tactics in driving impulse buying behavior.

Chinthamu and Balaram (2025) explored the transformative role of augmented reality (AR) in retail through a quantitative and case-based approach. The study highlights that AR enhances user experience, customer engagement, and purchasing behavior by enabling interactive product visualization. It also identifies challenges such as technological limitations, privacy concerns, and adoption barriers. The findings emphasize that AR, when integrated with technologies like AI and data analytics, can improve consumer trust, personalization, and long-term retention. Overall, the study positions AR as a disruptive innovation shaping the future of retail and digital shopping experiences.

DISCUSSION

This study offers a conceptual explanation of how product visualization facilitated by augmented reality (AR) affects impulsive purchasing behavior in online retail environments. Through the integration of the Technology Acceptance Model (TAM), Flow Theory, and Stimulus–Organism–Response (S–O–R) model, the results demonstrate how psychological processes and technological aspects work together to influence customer choices. According to the investigation, significant stimuli that improve customers' emotional and cognitive reactions include AR qualities like interactivity, vividness, and personalization. While vividness raises emotional arousal through realistic and immersive product representations, interaction boosts user engagement and satisfaction. By producing experiences that are pertinent and unique, personalization increases happiness even more. The S-O-R framework is supported by these internal reactions, which considerably raise the probability of impulsive purchases.

Since immersive AR settings can impair cognitive control and promote impulsive decision-making, flow experience also becomes a crucial component. Deeply involved customers are less inclined to make logical decisions, which can result in impulsive purchases. Furthermore, how well AR features transfer into behavioral consequences is influenced by perceived utility and usability. AR technology has a greater effect on emotional involvement and impulsive purchases when it is seen as practical and easy to use. Overall, the study shows how augmented reality (AR) turns online buying into an immersive experience motivated by hedonic value and emotional involvement. This change demonstrates the increasing significance of immersive technologies in influencing both planned and impulsive purchasing behavior.

IMPLICATIONS

a) Theoretical Implications

This study adds significantly to the amount of knowledge already available on customer behavior and digital retail technologies. First, it contextualizes the Stimulus–Organism–Response (S–O–R) model within AR-enabled e-commerce scenarios, expanding its usefulness. This study shows the applicability of the S-O-R framework in comprehending behavior in immersive and interactive technology environments, even if it has been widely utilized to explain consumer behaviors in physical and online settings.

Second, the study offers a multifaceted viewpoint by including Flow Theory and the Technology Acceptance Model (TAM) into AR research. By using TAM, the study emphasizes how customer interaction with AR technologies is influenced by perceived utility and usability. Simultaneously, Flow Theory sheds light on the immersive and experiencing elements of AR, especially how intense engagement affects impulsive behavior. By bridging the gap between technological adoption and behavioral outcomes, this integration fortifies the theoretical underpinnings.

Lastly, the study suggests a cohesive conceptual framework that connects psychological reactions, impulsive purchasing behavior, and AR characteristics. The paradigm provides an organized foundation for future empirical study by identifying important mediating and moderating variables like enjoyment, emotional arousal, satisfaction, and cognitive control. By combining previously disparate findings into a cohesive model, it also adds to the body of literature.

b) **Managerial Implications**

For practitioners, especially e-commerce companies looking to improve user engagement and boost revenue, the study's conclusions provide insightful information. Businesses should strategically engage in augmented reality (AR) technologies to provide immersive and engaging retail experiences, according to one important conclusion. AR-enabled product visualization can boost purchase likelihood, lower uncertainty, and greatly increase customer engagement.

Additionally, businesses should concentrate on improving important AR aspects like personalization and interactivity. Personalized experiences can enhance satisfaction and relevance, while interactive features that let customers alter and explore products can boost engagement and enjoyment. When taken as a whole, these elements can have a big impact on consumer behavior.

AR can also be strategically employed to boost conversion rates and encourage impulsive purchases. Businesses can promote impulsive purchases by designing captivating and emotionally appealing retail spaces. However, as these aspects affect technological uptake and overall efficacy, it is equally crucial to make sure AR apps are easy to use and seen as

beneficial.

According to the study's findings, augmented reality (AR) is a strategic tool that may transform customer experiences and give businesses a competitive edge in the online market.

CONCLUSION

Product visualization made possible by augmented reality (AR) has become a significant innovation in the rapidly changing online retail industry. AR greatly improves how customers interact with items in digital settings by providing immersive, engaging, and customized experiences. The results of this study show that augmented reality (AR) not only enhances product comprehension and lowers perceived risk but also generates emotional excitement and enjoyment, which are important factors that influence impulsive purchasing behavior. Customers create a better perceived value through improved visualization and real-time interaction, which encourages more impulsive and unexpected purchases.

Additionally, this study emphasizes how crucial psychological elements like hedonic motivation, engagement, and perceived enjoyment are in determining how customers react to AR-enabled platforms. AR's ability to provide individualized shopping experiences and create enduring customer relationships is further strengthened by its integration with cutting-edge technologies like artificial intelligence and data analytics. To effectively reap its benefits, however, issues including technological obstacles, privacy concerns, and user adaptation must be resolved.

Overall, by offering a thorough knowledge of how AR influences online impulse buying behavior, this study adds to the expanding corpus of information. Additionally, it provides e-commerce companies with useful information on how to strategically incorporate augmented reality features to improve customer experience, boost conversion rates, and obtain a competitive edge in the online market.

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