Impact of the Scarcity and Serendipity Information on Online Impulse Buying Behavior with Moderating Effect of Hedonic Dimensions

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ABSTRACT

The phenomenon of impulse buying has become a focal point of interest for both academics and practitioners. This study aims to explore the role of situational factors such as scarcity and serendipity that affect online impulse buying behavior (OIBB) in Pakistan's social commerce (SC) environment. Additionally, the study assesses the moderating impact of the five Hedonic shopping value characteristics, namely adventure shopping, social shopping, value shopping, relaxation shopping, and idea shopping. Data were collected from 340 online buyers from different cities in Pakistan. The data was gathered through a questionnaire adapted from earlier studies. For data analysis, IBM SPSS and SmartPLS 4 software were used. The findings support the study's hypotheses that scarcity and serendipity information have a significant impact on online impulse buying behavior. The study further supports the idea of the moderating effect of Hedonic dimensions. The study's results are helpful for companies that want to understand the factors that preserve customers' online impulse buying behavior and motivate them to initiate the hedonic shopping aptitude. The study can be extended by combining quantitative and qualitative approaches and incorporating the negative effects of Hedonic dimensions to address the underlying causes of unsustainable consumption practices and environmental consciousness.

Keywords: Online Impulse Buying Behavior, Scarcity, Serendipity Information, Hedonic Dimensions.

1.1 INTRODUCTION

The use of websites and social media is a trend that has gained popularity worldwide. Social commerce has become a major topic in e-commerce, with online shoppers embracing it (Jung, 2014). The rapid expansion of internet technology has enabled a shift in e-commerce from a customer-centric to a product-centric model, facilitated by social media (Wigand et al., 2008). In 2015, social commerce sales reached $5 billion globally, and it is expected to grow significantly in the coming years (Anderson et al., 2011). Social commerce is a type of e-commerce that meets the demands and preferences of modern consumers by promoting online purchases of goods and services through social networks, social media, and consumer involvement. E-commerce is a critical component of online social networks and internet technologies. Online applications such as Facebook, Instagram, WhatsApp, TikTok, Wikis, and blogs integrate social media with e-commerce websites, enabling niche market consumers to purchase items or services by providing RSS feeds of regularly scheduled updates with community comments or collaborative connections. (Dr. Siraj Bashir, Farah Naseer, Hafsa Karim, Dr. Kinza Farooq, Zafarullah and Bibi Sultana,2021). Social media users benefit not only financially but also culturally and socially. Consumers aspire to act as co-creators in shaping their online purchasing and social encounters, allowing them greater sway over their socioeconomic realities. (Dr. Kinza Farooq, Dr. Siraj Bashir, Dr. Huma Zafar, Dr. Rukhsanda Zarar and Dr. Waseem Sadiq,2021). In the social commerce environment, the integration of business, community, and technology may lead to success and advantages for users across all clusters. Respect, quality, and fulfillment are the fundamental values that underpin relationships between users, and each user in the conceptual map receives rewards when these values are met (Linda, 2010).

The convenience of online shopping has resulted in consumers' preference for purchasing goods through digital channels. Online buying provides customers with an extensive array of options and access to comprehensive information. Furthermore, the online shopping experience is further incentivized by factors such as reduced social pressure and delivery efforts, which encourage impulse buying among consumers during their purchase decision-making process (Verhagen, 2011). The convenience of online shopping not only makes it preferable to offline shopping but also motivates impulse buying behavior (Dawson & Kim, 2009).

Sundström et al. (2019) and Zhang et al. (2020) found that impulse buying has emerged as a crucial contributor to retail sales in modern times. In the United States, impulse buying generates a whopping $17.78 billion annually, with consumers spending an average of $5400 such buying per year (Tran, 2019). However, the COVID-19 pandemic has led to an increase in impulse buying, with a rise of 18% in the average monthly spending of American consumers on such purchases (Dr. Siraj Bashir, Dr. Ghulam Murtaza, Sana Ullah, Mobeen Ahmed and Shakir Adam.(2021). Despite the pandemic's economic downturn, according to experts 20% of sales in the retail sector to impulsive buying (Repko, 2020). The study of Online Impulse Buying (OIB) has received significant research attention recently. Researchers agree that emotions are the key drivers of impulse buying behavior, and OIB is a result of hedonic motivations. Previous studies have also confirmed the association between impulse buying and hedonic motivation. People who enjoy

shopping are more likely to indulge in impulsive buying, and hedonic motivation significantly impacts OIB behavior. (Rehman et al., 2021; Verhagen, 2011; Yu & Bastin, 2010; Akram et al., 2017; Wolfinbarger & Gilly, 2001).

While previous studies have made significant contributions to the field of OIB, further research is required to determine the exact impact of multidimensional hedonic motivational variables in developing the OIB context. The current study aims to fill this gap by examining the increasing focus on hedonic and experiential consumption among modern consumers, who have a stronger desire to enjoy shopping than just to get the things they require (Sanaullah and Dr. Siraj Bashir,2019). This pattern stands out more in social commerce settings because customers are exposed to a wide range of impulse-buying triggers, such as scarcity messages (Song et al., 2015), and have simple access to search and payment options (Hansen & Olsen, 2007).

Online impulsive purchasing (OIB) has been the focus of numerous studies in recent years (Redine et al., 2022; Verhagen, 2011). Scholars have reached a consensus that emotions drive impulse buying behavior, and OIB is driven by hedonic motivations (Yu & Bastin, 2010; Akram et al., 2017). Previous studies have shown a strong correlation between impulse buying and hedonic motivation (Wolfinbarger & Gilly, 2001), suggesting that individuals who derive pleasure from shopping are more likely to indulge in impulsive buying. Hedonic motivation significantly impacts OIB behavior (Akram et al., 2017). This pattern stands out in social commerce environments because customers are exposed to a variety of impulse-buying triggers, such as scarcity messages (Song et al., 2015), and have easy access to search and payment options (Hansen & Olsen, 2007).

The study investigates the significant characteristics of the online shopping experience, focusing specifically on the phenomenon of unreasonable behavior in response to impulsive buying emotions. Impulse buying behavior (IBB) is often viewed negatively as an irrational behavior rather than a planned shopping experience. A well-planned buying enhances the buying experience and results in enjoyment and fulfillment, whereas impulsive shopping is seen as a burden (Beatty & Ferrell, 1998). Impulsive and well-planned shopping represent distinct reasons. It is crucial to look at the situational elements of scarcity (i.e., limited period or supply) and serendipity (i.e., unexpected and amazing encounters) to better comprehend the impulsive purchase process in online shopping.

When customers suddenly come across goods or services on a website, they may have an emotional reaction that could lead to impulsive behavior (Toms, 2000). Consumers may obtain relevant information that matches their preferences in this online buying environment. When product information obtained through planned search varies from that obtained through navigation, it may lead to impulsive buying (Sanaullah and Dr. Siraj Bashir,2019a). Scarcity messaging, the second situational aspect, informs customers that there is only a certain amount of time and goods available, which prompts impulsive behavior. For instance, online coupons that are valid only for a limited time may lead to impulsive behavior (Lynn, 1989).

Prior studies on impulse buying have mostly concentrated on utilitarian aspects, such as convenience while neglecting the role of hedonic features (Redine et al., 2022). However, recent studies have demonstrated that "social shopping, adventure shopping, value shopping, relaxation

shopping, and idea shopping" are all hedonic features that contribute to impulsive buying behavior. Despite this, there has been little investigation into situational factors that induce impulsive buying behavior, such as scarcity messages and serendipity (Akram et al., 2018). In Pakistan, customers who participate in social commerce communities are highly responsive to messages of scarcity and are more prone to make impulsive purchases. Consequently, the primary focus of the research is to comprehensively investigate how situational factors and hedonic shopping traits bolster online impulse purchasing in social commerce environments in Pakistan. This research has three key objectives:

1. “To examine the relationship between situational factors scarcity messages, and online impulse buying in social commerce environments in Pakistan.
2. To evaluate the relationship between situational factors serendipitous information, and online impulse buying in social commerce environments in Pakistan.
3. To investigate the role of hedonic shopping characteristics as a moderator in the relationship between situational factors (scarcity messages and serendipitous information) and online impulse buying in social commerce environments in Pakistan.”

This paper offers a comprehensive and inclusive framework to assess the impact of online impulse buying (OIB) on social commerce. The study framework consists of five distinctive sections. The introduction section offers a brief overview of the research problem and its significance. The literature review section discusses existing research on OIB, situational factors scarcity, serendipity, and hedonic shopping features. The following section outlines the hypotheses and theoretical model, as well as a thorough description of the data gathering and analysis procedures. The results of the study are presented in the fourth section, and academic and managerial implications, limitations of the study, and concluding remarks are summarized in the fifth section. This research proposes a comprehensive and innovative approach to examining the impact of OIB, making a significant contribution to the field of social commerce.

LITERATURE REVIEW

2.1 Online Impulse Buying

The emergence of online platforms and information technology (IT) has changed consumers from being careful and deliberate decision-makers to being impulsive buyers. With access to a wide range of products and services and a more convenient payment process, impulse buying behavior has become increasingly prevalent (Akram et al., 2017; Chen et al., 2016). Marketing scholars have characterized impulse buying behavior in various ways. For instance, Stern (1962) defined it as an unplanned and spontaneous purchase, Rook (1987) described it as a sudden, emotionally charged purchase, Beatty and Ferrell (1998) described it as an unplanned purchase, while Peck and Childers (2006) defined it as a spontaneous inclination to buy without reflection or forethought. Redine et al. (2022) and Zheng et al. (2019) understand impulse buying as an unplanned, hasty, and unintentional purchase prompted by exposure to a stimulus and a sudden, compelling urge to buy.

Traditionally, consumers have been seen as considerate and logical decision-makers who thoroughly consider items and services before making a purchase (Redine et al., 2022). However, recent research indicates that consumers' impulsive behavior may have been influenced by the growth of online channels and technological improvements (Akram et al., 2018; Chen et al., 2016).

Consumers are more likely to engage in impulsive buying due to the simplicity and convenience of online payment and purchasing alternatives, which has become a crucial subject of study for marketing researchers (Stern, 1962).

In-store promotions and advertising have been conventionally used by retailers and marketers to stimulate impulse buying (Yi & Jai, 2020; Grigsby et al., 2021). While customers consider moderate impulsive shopping to be socially acceptable as its recreational activity with minimal harm, excessive levels of this behavior can have negative impacts on shoppers, causing psychological and financial challenges (Chen et al., 2019; Redine et al., 2022). Zhang (2006) further suggests that a range of traits influences the context of online shopping, with impulsiveness playing a significant role in driving consumers' intention to make online purchases.

2.2 Scarcity

The classical economic principle of scarcity holds tremendous significance. Microeconomic theory clarifies that in a free market when all other factors remain constant, scarcity plays a vital role in creating a trade-off between the supply and demand of a particular item. According to Akram et al. (2018), the price of a commodity keeps rising due to its limited availability, which eventually balances with the anticipated demand as supply is regulated. This scarcity factor plays a crucial role in determining the market price of a product as it creates a sense of urgency among buyers to acquire the product before it runs out of stock.

It may be concluded that the economic concept of supply and demand is inextricably linked to the scarcity of a good, which affects the market's price dynamics. (Akram et al., 2018). However, while taking consumer preferences into account, caution must be used. Prices often rise in a market when scarcity is prevalent, not because the product becomes more desirable but rather because there is more competition for it. Similarly, the scarcity-induced price increase renders the product out of reach for many consumers, leading to a decrease in demand, not because the product is less desirable.

Several theoretical frameworks have been proposed to shed light on the impact of scarcity, such as commodity theory (Brock, 1968), naïve economic theory (Lynn, 1992), the theory of psychological reactance (Brehm & Brehm, 1981), and the theory of need for uniqueness (Abosag et al., 2020). These theories posit that scarcity imbues products and services with greater importance, and consumers exhibit a heightened preference for unique or scarce goods. As Lynn (1991) argues, this phenomenon is a requirement for economic behavior and a common feature of the everyday lifecycle.

Lynn (1989) added that messages of scarcity are crucial in motivating impulsive behavior. E-commerce merchants and sales agents often use attractive phrases like "limited edition" or "only five minutes left" to apply psychological pressure on their clients. The phenomenon of time pressure significantly affects consumers' buying behavior (Steenburg & Naderi, 2020). In the world of social commerce, signals of scarcity are quite efficient in grabbing customers' attention and persuading them to buy services and goods that might not be accessible for longer periods. These messages typically manifest as quantity and time limits (Rice & Keller, 2009). Consumers are more likely to click or touch objects when there are scarcity signals available, whether they are present on

the internet or in shopping applications. Therefore, this study assumes that a message of scarcity plays a significant role in online impulsive buying behavior among social commerce users.

2.3 Serendipity Information

Online information seeking can occur in two ways: through a search query or accidental encounter with information. While search engines enable users to find specific information using particular phrases or words, serendipitous discovery occurs when users unintentionally come across interesting information. The widespread use of smartphones and the convenience of online shopping have led to an increased focus on the importance of serendipitous information by websites, marketing scholars, and application developers (Siraj Bashir, Nasreen Aslam Shah, Hafsa Karim, Kinsa Farooq and Zohra Naseer Ahmed,2021).

Serendipitous information is a form of information linked to a customer's interests and discovered by chance (Toms, 2000). The web browsing experience is incomplete without serendipitous discovery (Mislove, 2016). Previous research has examined the hedonic (Akram, 2017; McCay-Peet & Toms, 2011) and utilitarian aspects (Kim et al., 2013) of serendipity. According to the literature, serendipity enhances the shopping experience (Kim et al., 2013), while recent studies have highlighted the satisfaction and happiness derived by consumers from the serendipitous discovery of new products (Zhang et al., 2012).

2.4 Shopping Value

In the world of consumerism, shopping is the pathway to purchasing. As consumers, we assign value to the act of shopping (Babin, 1994). The value of shopping can be perceived from two distinct perspectives, namely hedonic and utilitarian. On the one hand, it could be considered a mechanism for triggering affirmative feelings such as pleasure and gratification (Redine et al., 2022). On the other hand, it could be seen as a conduit for obtaining essential commodities required for daily living. Retailers can enhance their effectiveness by understanding the differences between hedonic and utilitarian shopping values and tailoring their marketing strategies accordingly (Babin, 1994). Not only do consumers seek products that provide functional benefits, but they also purchase items for the emotional value they hold, also known as hedonic consumption (Rehman et al., 2021).

The significance of hedonic motivation as a predictive factor for online impulse buying and shopping conduct cannot be overstated (Rehman et al., 2021; Akram, 2017). Rehman et al. (2021) claim that consumers indulge in impulse buying to satisfy their hedonic needs through hedonic consumption. Effective web retailers work to create a hedonistic atmosphere that encourages immediate purchases (Childers, 2001). Compared to unplanned shopping for leisure and relaxation, online impulse buying is considered a valuable shopping behavior (Redine et al., 2022; Hausman, 2000). The chief driving force behind hedonic shoppers is the sensation of satisfaction (To, 2007). For these shoppers, purchasing extends beyond acquiring goods and completing tasks (Babin, 1994; Sherry, 1990).

The literature on hedonic dimensions in online buying presents various approaches, each with different views on how to conceptualize and measure hedonic values. While some studies have treated it as a unidimensional construct (Sarkar, 2011), others have taken a multidimensional perspective (To, 2007; Arnold & Reynolds, 2003). In this paper, we adopt the latter methodology to

assess the hedonic shopping motivations of online shoppers. To explore these motivations, we draw on the theoretical frameworks proposed by Arnold and Reynolds (2003), Ozen and Engizek (2014), and To (2007). Specifically, we investigate the five dimensions of hedonic shopping: social, value, idea, relaxation, and adventure shopping. While there are numerous other constructs available, these five dimensions are particularly relevant and engaging in the context of an economy where online buying is rapidly growing (Ozen & Engizek, 2014).

2.5 Hypotheses Development

2.5.1 Scarcity and Online Impulse Buying Behavior

Scarcity refers to consumers' perception of the limited availability of a service, product, or benefit (Lynn, 1989). Past research has revealed that purchase limitations can serve as informative cues for consumers (Lynn, 1992; Aggarwal et al., 2011). Scarcity tactics are frequently employed by social commerce platforms to promote impulsive purchases, with the most prevalent signals being restricted quantity and limited duration (e.g., "Only 50 pieces left at this price" and "Sale for this week only").

In the realm of social commerce, time constraints may limit consumers' ability to explore alternative options, thereby enhancing the perceived value of a product through its scarcity. Customers are motivated to make purchases to satisfy their desire for respect through increased worth, and scarcity and rarity of a product further increase buyers' desire to purchase it (Brehm & Brehm, 1981). The limited supply of a product gives it a higher value in consumers' eyes. Scarcity has a significant impact on impulsive buying behavior in the online social commerce environment, where resources are limited, and competition is high. Thus, we propose the following hypothesis:

H1: "Scarcity has a significant positive association with online impulse buying behavior in Pakistani social commerce environment."

2.5.2 Serendipity and Online Impulse Buying Behavior

In the world of online shopping, consumers are often presented with an overwhelming amount of information, making it challenging to find what they are looking for. However, when consumers unexpectedly stumble upon serendipitous information, it can be an exciting and surprising experience that they find alluring. This type of information has a significant impact on their shopping experience as they perceive it to have shopping value. According to Foster and Ford (2003), serendipity involves discovering something unexpectedly valuable. In addition, Zhang et al. (2012) suggest that serendipity can also include an element of surprise or unusual experience. Because of the unexpected nature of serendipitous information, consumers are more likely to engage in impulsive purchasing than deliberate searching (Khan & Pavlou, 2018).

The online shopping experience comprises five distinct hedonic dimensions: adventure, social, value, relaxation, and idea shopping (Gawior et al., 2022). Considering these dimensions can act as moderators and significantly influence the relationship between serendipity, scarcity, and impulse buying behavior on online platforms. By exploring these dimensions, online retailers can optimize their strategies to enhance consumers' experience, leading to increased impulse buying behavior.

Social Shopping: The concept of social shopping (SS) has been supported by research indicating that shopping experiences provide a social outlet for consumers. They like interacting with others and spending time with their friends and family (Arnold & Reynolds, 2003). Dawon (1990) argues that social connection is the primary motivation for shopping as consumers seek recognition through social interactions while shopping. In recent years, online platforms have provided a new space for netizens to share their shopping experiences, leading to increased social connections (Wolfinbarger & Gilly, 2001; To, 2007). However, Ozen and Engizek (2014) suggest that some customers prefer online shopping as it allows them to avoid social interactions. While Sarkar (2011), and Akram et al. (2017) propose that utilitarian shopping motivations are more important for online shopping, earlier studies suggest that hedonic shopping motivations are more important for online purchases. Therefore, we propose that consumers who are motivated by hedonic needs are inclined to buy goods and services from online retailers than from offline stores. Based on these discussions, we present the following hypotheses:

H_3a: "Social shopping significantly moderates the association between Scarcity and Online Impulse Buying behavior in the Pakistani social commerce environment.

H_3b: Social shopping significantly moderates the association between Serendipity information and Online Impulse Buying behavior in the Pakistani social commerce environment."

Adventure Shopping: In marketing literature, adventure shopping (AS) and explore shopping are interchangeably used to describe a phenomenon in which customers encounter new and appealing products while browsing, enhancing their shopping experience (Westbrook & Black, 1985). While visual satisfaction is a driving force for product exploration, it is not the only factor contributing to consumers' sensory desire during the shopping process (Sherry, 1990). For some user computer usage itself can be a source of adventure and creating curiosity (Webster et al., 1993). This sense of curiosity fosters an adventure-seeking attitude that satisfies customers' exploratory instincts. Therefore, we propose the following hypotheses:

H_4a: "Adventure/explore shopping significantly moderates the association between scarcity and online impulse buying behavior in Pakistani social commerce environment.

H_4b: Adventure/explore shopping significantly moderates the association between serendipity information and online impulse buying behavior in Pakistani social commerce environment."

Value Shopping: Value shopping (VS) involves the pleasure that individuals derive from seeking out discounts, bargains, and sales (Babin et al., 1994; Westbrook & Black, 1985). Chandon (2000) has further highlighted that obtaining a better deal contributes to consumers' sense of cleverness, which in turn enhances their enjoyment. The pursuit of good deals can be seen as a means of attaining personal gratification. With the widespread use of e-commerce platforms, consumers are increasingly inclined to search for discounts and bargains online, which may impact their tendency towards impulsive buying (Redine et al., 2022; Akram, 2018). Building on previous research, we present the following hypotheses:

H_{5a}: "Value shopping significantly moderates the association between scarcity and online impulse buying behavior in Pakistani social commerce environment.

H_{5b}: Value shopping significantly moderates the association between serendipity information and online impulse buying behavior in Pakistani social commerce environment."

Relaxation Shopping: The concept of relaxation shopping is a crucial aspect of hedonic motivation, referring to shopping as a means to alleviate stress. Studies have shown that this behavior has a profound impact on customers' moods, leading to a positive alteration (Arnold & Reynolds, 2003). Many shoppers have reported that they engage in retail therapy to reduce stress levels or escape personal problems. For them, shopping is a means of relaxing, improving their mood, or satisfying their need for an escape from reality. Notably, relaxation shopping is positively linked to impulsive buying behavior (Yu & Bastin, 2010). Consistently, research by Ozen and Engizek (2014) has consistently demonstrated that the act of engaging in relaxation shopping has a significant impact on online impulse purchases. Considering this, we propose the following hypotheses.

H_{6a}: "Value shopping significantly moderates the association between scarcity and online impulse buying behavior in Pakistani social commerce environment.

H_{6b}: Value shopping significantly moderates the association between serendipity information and online impulse buying behavior in Pakistani social commerce environment."

Idea Shopping: In our study, we identified idea shopping as the final aspect of hedonic shopping motivations. This facet implies that shoppers engage in retail therapy to gain knowledge and insight into emerging trends and styles (Arnold & Reynolds, 2003). The online shopping experience has transformed this pursuit by providing buyers with an abundance of information on the latest products, brands, and fashion movements (To, 2007). Online shopping has become the platform for consumers who desire to stay up to date on product launches, new trends, and brands (Parsons, 2002). Formation access for consumers, by providing a plethora of choices right at their fingertips. Various options are available for businesses to promote their products online, such as keyword advertising, sponsorships, banner advertising, online product reviews, cost analysis, customer feedback comparisons, and promotional activities. This transformation has provided consumers with unprecedented ease and convenience in accessing product information, which is a significant factor in their purchasing decisions. As a result, impulse buying has become increasingly common in online transactions (Kim & Eastin, 2011 .Thus, we put forth the following hypotheses:

H_{7a}: "Idea shopping significantly moderates the association between scarcity and online impulse buying behavior in Pakistani social commerce environment.

H_{7b}: Idea shopping significantly moderates the association between serendipity information and online impulse buying behavior in Pakistani social commerce environment."

RESEARCH DESIGN AND METHODOLOGY

The current study employs a quantitative survey methodological design to examine the influence of scarcity and serendipity information on online impulse buying behavior, with the moderating effect of hedonic dimensions. As social media usage is ubiquitous, the study's population comprised all social media users in Pakistan, and the study employed a convenience

sampling method to ascertain a representative sample of 300 participants, comprising both male and female individuals. The key demographic target was university students and young professionals, as they are more inclined towards online shopping. Self-administered questionnaires adapted from previously validated scales were used to collect data. To ascertain the participants' opinions, they were requested to specify their level of agreement or disagreement with each statement on a 5-point Likert scale. The questionnaires were distributed via personal surveys, email, and social media. Descriptive and preliminary data analysis, such as standard deviation (SD), frequencies, and means, were performed using IBM SPSS. SmartPLS has been used for testing the Confirmatory Factor Analysis (CFA). CFA includes individual item reliability, internal consistency reliability, convergent validity, discriminant validity, and model testing. PLS-SEM is a suitable procedure for analyzing exploratory data, as indicated by Hair et al. (2021).

3.1 Composition of the Questionnaire

In this study, we utilized well-established measurement items from previous research to operationalize the principal construct in our model. As cited by Akram et al. (2018), our model comprised items that focused on online impulse buying (Verhagen & Van Dolen, 2011), serendipity (McCay-Peet & Toms, 2011), scarcity (Brock, 1968), and dimensions of hedonic shopping (Arnold & Reynolds, 2003; To et al., 2007). By adapting the dimensions of hedonic shopping, we developed our questionnaire to include a total of 31 items, grouped into various categories such as social shopping, value shopping, and relaxation shopping. Additionally, we aligned the contextual applicability of the five dimensions of hedonic shopping motivation with the framework of social commerce, based on the works of Arnold and Reynolds (2003) and To et al. (2007). Those adjustments aimed to provide a comprehensive understanding of consumer shopping behavior in social commerce environments.

RESULT OF THE STUDY

The result of study began by conducting a preliminary analysis using IBM-SPSS. Several statistical methods were employed to examine the data, starting with a frequency distribution of respondents' profiles. Careful attention was paid to coding and editing to ensure accuracy. Data screening was then conducted to address missing data, outliers, and normality assessment. Missing data were managed during the data collection phase, as the questionnaire having missing data > 15% are discarded and having missing data < 15% were replaced with a mean value. Z-scores were utilized to identify univariate outliers, and the Mahalanobis distance method was employed to detect multivariate outliers. The results showed there were no univariate and multivariate outliers that were subsequently needed to remove. Additionally, we employed skewness and kurtosis methods to evaluate the univariate and multivariate normality. The Skewness and Kurtosis test yielded results in the range of three and seven, which indicated no significant normality issues. Finally, we conducted a common method variance (CMV) test to verify the results of our analysis. During the data collection phase, missing data were handled by discarding questionnaires with missing data > 15%. A questionnaire having missing data < 15%, was replaced with the mean value. Z-scores were used to identify univariate outliers, and the Mahalanobis distance method was used to detect multivariate outliers. No significant outliers were found to delete. Skewness and kurtosis methods were applied to check the univariate and multivariate normality of the study data. Results have not shown any significant issues in normality. Finally, we test common method

variance/bias (CMV) using both Harman's single factor test in SPSS and the random number variable test in SmartPLS.

Following a comprehensive preliminary analysis and ensuring the assumptions of SEM, a two-step Structural Equation Modeling (SEM) technique has been employed. More specifically study utilized the Partial Least Square Structural Equation Modeling (PLS-SEM) approach to evaluate the validity, reliability, and path association of our study hypotheses. Our utilization of SEM was consistent with the work of Hair et al. (2019, 2021, 2022) and Tabachnick and Fidell (2013) who have asserted its ability to effectively test model relationships. SEM represents a robust statistical methodology for exploring and analyzing the interrelationships among variables. To assess the PLS-SEM theory, we employed a two-step process consisting of the measurement and structural model, also known as measurement theory and structural theory (Hair et al., 2019; Hair et al., 2021; Henseler et al., 2009).

4.1 Assessment of Measurement Model

To effectively evaluate the measurement model, researchers need to conduct an in-depth assessment of individual item reliability, internal consistency reliability, as well as convergence and discriminant validity examinations (Hair et al., 2021; Hair et al., 2019; Henseler et al., 2009). By scrutinizing these key aspects, researchers can ensure that their measurement model is valid and reliable.

Individual item reliability: Assessing individual item reliability is critical to ensure the accuracy and consistency of measures for each construct. As recommended by Hair et al. (2021), the outer loadings of each measure (item) must be evaluated to determine their reliability. Ideally, the loadings should be greater than 0.708, and it is generally recommended to hold on to items with loadings > 0.40 and < 0.70 unless doing so would compromise the validity of subsequent tests (Hair et al., 2021). In the present study, the outer loadings of each latent variable (refer to Table I) surpassed the threshold, indicating that the individual item reliability criterion was satisfactorily met.

Internal consistency reliability: In this study, we evaluate the internal consistency reliability of our measures using three tests: composite reliability (rhoc), Cronbach's alpha (CA), and rho_A. To determine the threshold for interpreting the composite reliability coefficient, we followed the guidelines suggested by Hair et al. (2021) and Bagozzi and Yi (1988), who recommend a score of 0.7 or higher. Our findings in Table 1 indicate that all composite reliability, Cronbach's alpha, and rho_A values meet the acceptable range criteria. Based on the presented findings, we can infer that our measures display sufficient internal consistency reliability (Bagozzi & Yi, 1988; Hair et al., 2021).

Convergent validity: To establish the convergent validity of the constructs, Fornell and Larcker (1981) suggest the use of the average variance extracted (AVE) test. According to Hair et al. (2019) and Chin (1998), achieving an AVE score of 0.50 or higher is crucial for obtaining valid outcomes. The data presented in Table I show that all constructs have surpassed this threshold, indicating satisfactory convergent validity (Chin, 1998).

Table I: Evaluation of the Measurement Model

Variables name	Item Label	Factor Loading	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Scarcity			0.934	0.934	0.953	0.836
	ST_01	0.920				
	ST_02	0.922				
	ST_03	0.873				
	ST_04	0.940				
Serendipity			0.924	0.928	0.947	0.816
	SR_01	0.857				
	SR_02	0.935				
	SR_03	0.898				
	SR_04	0.921				
Online Impulse Buying			0.928	0.929	0.949	0.822
	OIB_01	0.918				
	OIB_02	0.885				
	OIB_03	0.905				
	OIB_04	0.917				
	OIB_05	0.354	*Item deleted due to low loading			
Social Shopping			0.926	0.928	0.948	0.819
	SS_01	0.942				
	SS_02	0.906				
	SS_03	0.884				
	SS_04	0.886				
Idea Shopping			0.941	0.942	0.958	0.851
	IS_01	0.923				
	IS_02	0.952				
	IS_03	0.862				
	IS_04	0.949				
			0.954	0.965	0.970	0.915

Adventure Shopping						
	AS_01	0.958				
	AS_02	0.967				
	AS_03	0.945				
Value Shopping			0.890	0.891	0.931	0.819
	VS_01	0.899				
	VS_02	0.923				
	VS_03	0.893				
Relaxation Shopping			0.877	0.880	0.924	0.802
	RS_01	0.889				
	RS_02	0.893				
	RS_03	0.904				

Discriminant validity: To ascertain the discriminant validity of the measures implemented in our study, we have thoroughly followed the criteria established by Fornell and Larcker (1981) and the Heterotrait-Monotrait (HTMT) criterion. According to Fornell and Larcker's guidelines, the Average Variance Extracted (AVE) value should be equal to or greater than 0.5, and the square root of the AVE must be higher than the correlations among the latent variables to validate discriminant validity. Moreover, an HTMT value above .85 or .90 is considered acceptable. The study results, as presented in Tables II and III, demonstrate that the square root of the AVE surpasses the correlations among the latent variables, and the HTMT values satisfy the recommended criteria (> .90). Therefore, it has been concluded that all the measures implemented in our research demonstrate an acceptable level of discriminant validity.

Table II: Discriminate Validity (Fornell and Larcker Criteria)

	1	2	3	4	5	6	7	8
Adventure Shopping	**.957**							
Idea Shopping	.489	**.922**						
Online Impulse Buying	.408	.781	**.907**					
Relaxation Shopping	-.497	-.759	-.696	**.895**				
Scarcity	.406	.809	.790	-.745	**.914**			
Serendipity	.370	.644	.718	-.660	.539	**.903**		
Social Shopping	.361	.515	.666	-.629	.477	.604	**.905**	
Value Shopping	-.341	-.577	-.690	.691	-.548	-.772	-.751	**.905**

Note: 1=Adventure Shopping, 2=Idea Shopping, 3=Online Impulse Buying, 4=Relaxation Shopping, 5=Scarcity, 6=Serendipity, 7=Social Shopping, 8=Value Shopping

Table III: Discriminate Validity (Heterotrait-Monotrait Criteria)

	1	2	3	4	5	6	7	8
Adventure Shopping								
Idea Shopping	.512							
Online Impulse Buying	.428	.834						
Relaxation Shopping	.539	.836	.768					
Scarcity	.427	.862	.847	.820				
Serendipity	.389	.687	.774	.728	.575			
Social Shopping	.381	.550	.718	.696	.511	.656		
Value Shopping	.369	.628	.758	.783	.601	.852	.828	

Note: 1=Adventure Shopping, 2=Idea Shopping, 3=Online Impulse Buying, 4=Relaxation Shopping, 5=Scarcity, 6=Serendipity, 7=Social Shopping, 8=Value Shopping

4.2 Structural Model Assessment (Hypothesis Testing)

After establishing the construct's reliability and validity, the next step is to investigate the inner structural components of the model. As the PLS-SEM algorithm is not dependent on the variance-covariance matrix, it is important to evaluate the model's predictive ability. Recently, Hair et al. (2022) outlined several steps to evaluate the structural model, including verifying collinearity, evaluating the significance and size of paths, examining the determination coefficient (R2 and f2), and assessing out-of-sample predictive power using the PLSpredict method. Each of these tests is discussed in detail below.

Assessment of Collinearity Issue (VIF): The first step in the process of assessing the structural model involves evaluating collinearity issues. Upon examination, we observed that all Variance Inflation Factor (VIF) values are significantly lower than the standard threshold of 5 and the more conservative threshold of 3. Therefore, we can infer that collinearity is not a concern in the current study.

Assessment of Relevance and significance of structural model: To evaluate the statistical significance of the path coefficients in this study, we employed a standard bootstrapping technique with 5000 bootstrap samples and a sample size of 325, following the methodologies outlined in the works of Hair et al. (2022, 2021, 2019) and Henseler et al. (2009). Detailed estimates of the structural model are presented in Table IV and Figure I, with pertinent statistics concerning the moderating variable, which we obtained through our thorough analysis. Our examination produced these comprehensive findings.

The central hypothesis of this study is that scarcity and serendipity information are significantly and positively associated with online impulse buying behavior in the social commerce context of Pakistan. The findings, presented in Table IV and Figure I, show a statistically significant relationship between scarcity and impulse buying behavior ($\beta = .548$, SE = .028, t-value = 19.374, p-value < .001, CI LL = .493, CI UL = .603), thus confirming H1. Additionally, the results confirm a significant relationship between serendipity information and impulse buying

behavior (β = .233, SE = .027, t-value = 8.777, p-value < .001, CI LL = .183, CI UL = .288), providing support for H2. Overall, the outcomes of this study demonstrate that scarcity and serendipity information significantly drive online impulse buying behavior in the social commerce context of Pakistan.

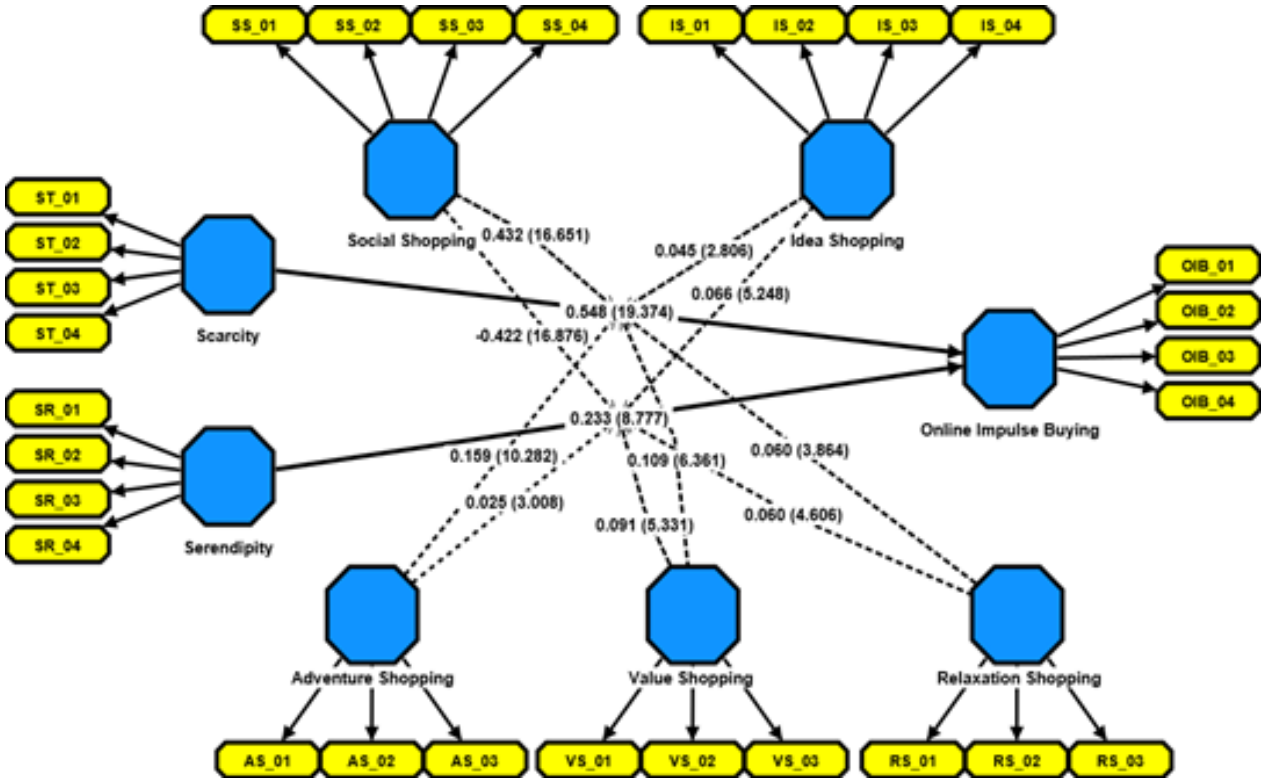
Furthermore, Table IV and Figure I show the moderation effect of hedonic dimensions on online impulse buying behavior. The study tested five moderating hypotheses between scarcity information and online impulse buying behavior and found that "social shopping, adventure shopping, value shopping, relaxation shopping, and idea shopping" significantly moderate the association between scarcity and online impulse buying behavior, supporting H3a, H4a, H5a, H6a, and H7a, respectively. Moreover, the study also tested five moderating hypotheses between serendipity information and online impulse buying behavior and found that "social shopping, adventure shopping, value shopping, relaxation shopping, and idea shopping" significantly moderate the association between serendipity information and online impulse buying behavior, providing support for H3b, H4b, H5b, H6b, and H7b, respectively. The results indicate that hedonic dimensions play a statistically significant role in shaping consumers' online impulse buying behavior and highlight the importance of considering different shopping motivations when analyzing the effects of scarcity and serendipity on online impulse buying behavior.

Table IV: Testing Hypothesis Using Path Coefficients

Hypo	Relationship	Std Beta	Std Error	T Value	P Value	CI LL	CI UL	Decision
H_1	Scarcity -> Online Impulse Buying	0.548	0.028	19.374	<.000	0.493	0.603	Supported
H_2	Serendipity -> Online Impulse Buying	0.233	0.027	8.777	<.000	0.183	0.288	Supported
H_{3a}	Social Shopping x Scarcity -> Online Impulse Buying	0.432	0.026	16.651	<.000	0.385	0.486	Supported
H_{3b}	Social Shopping x Serendipity -> Online Impulse Buying	-0.422	0.025	16.876	<.000	-0.476	-0.379	Supported
H_{4a}	Adventure Shopping x Scarcity -> Online Impulse Buying	0.159	0.015	10.282	<.000	0.129	0.190	Supported
H_{4b}	Adventure Shopping x Serendipity -> Online Impulse Buying	0.025	0.008	3.008	0.003	0.008	0.041	Supported
H_{5a}	Value Shopping x Scarcity -> Online Impulse Buying	0.109	0.017	6.361	<.000	0.080	0.148	Supported
H_{5b}	Value Shopping x Serendipity ->	0.091	0.017	5.331	<.000	0.05	0.121	Supported

	Online Impulse Buying					2		
H_{6a}	Relaxation Shopping x Scarcity -> Online Impulse Buying	0.060	0.016	3.864	<.000	0.030	0.091	Supported
H_{6b}	Relaxation Shopping x Serendipity -> Online Impulse Buying	0.060	0.013	4.606	<.000	0.039	0.091	Supported
H_{7a}	Idea Shopping x Scarcity -> Online Impulse Buying	0.045	0.016	2.806	0.005	0.013	0.076	Supported
H_{7b}	Idea Shopping x Serendipity -> Online Impulse Buying	0.066	0.013	5.248	<.000	0.044	0.094	Supported

Figure I: Study Model with Hypothesis Testing (Path Coefficients and t-value)



Assessment of model explanatory power: The evaluation of explanatory power is a crucial aspect of assessing PLS-SEM. Significant criteria to consider are R2 and f2 values. According to Elliott and Woodward (2007) and Hair et al. (2019, 2021, 2022), the percentage of variance in the dependent variable(s) that can be accounted for by one or more predictor variables is shown by the R2. An acceptable R2 value level is proposed by Falk and Miller (1992) to be 0.10, while Chin (1998) suggests that an R2 value of 0.60 or higher is substantial, 0.33 is moderate, and 0.19 is weak in PLS-SEM. In this study, the obtained R2 value was 0.745, indicating that the study variables explain 75% of the variance in OIBB. Therefore, according to Chin's (1998) suggestion, the obtained R2 value is substantial. Another crucial aspect that researchers can examine is the

assessment of the impact of omitting a specific independent variable on the dependent variable. This evaluation is known as f2, which estimates the degree of influence of an independent variable on a dependent variable (Hair et al., 2021). Cohen (1988) suggests that effect sizes can be classified as small, medium, or large based on the values of 0.02, 0.15, and 0.35, respectively. For moderating effect, f2 values of .005, .01, and .025 are considered small, medium, and large effect sizes, respectively (Kenny, 2016). The findings of this study reveal that all effect sizes exhibit a large effect size. This conclusion emphasizes the significant influence of the model hypotheses in the equation, which is likely to have notable practical implications.

Assessment of model predictive power: To evaluate the predictive relevance of our model, we opted to employ the blindfolding method (Hair et al., 2022; 2021). Shmueli and Koppius (2011) and Hair et al. (2022) claim that many scholars use the R2 metric to assess the predictive strength of models, but this approach is not fully comprehensive. Indeed, R2 only measures in-sample explanatory power and provides no insight into out-of-sample prediction power. For assessing out-of-sample prediction, we used PLSpredict (Hair et al., 2022; 2021). Our analysis shows that the predictive error, as measured by the root-mean-square error (RMSE), for the PLS path model is significantly lower than the naïve LM model benchmark for each of the four indicators of the dependent variable (see Table V). Therefore, we conclude that the model has high predictive power.

Table: XX

PLS-Predict Analysis

	Q^2predict	PLS-SEM RMSE	PLS-SEM MAE	LM RMSE	LM MAE	RMSE Difference	LM Difference
OIB_01	0.829	0.416	0.362	0.511	0.370	-0.095	-0.008
OIB_02	0.757	0.461	0.336	0.528	0.384	-0.067	-0.048
OIB_03	0.821	0.467	0.269	0.644	0.437	-0.177	-0.168
OIB_04	0.817	0.450	0.271	0.480	0.352	-0.030	-0.081

DISCUSSION AND CONCLUSIONS

This study sought to examine the influence of scarcity and serendipity on online impulse buying (OIB) within the context of Pakistan's social commerce environment. In addition, the study explored how five dimensions of hedonic motivations moderate this relationship. The findings revealed that scarcity and serendipity indeed have a significant impact on OIB, and social shopping, adventure shopping, value shopping, relaxation shopping, and idea shopping all played important moderating roles. The implications of these results are particularly relevant to the development of e-commerce and social commerce in Pakistan. The findings suggest that such platforms have the potential to shift towards more customer-centered and sustainability-oriented approaches. Specifically, social media has empowered consumers to make more informed and accurate buying decisions by providing access to socially available knowledge. As a result, retailers and manufacturers have become increasingly responsible and prioritized sustainable attributes in response to consumer demands. Notably, idea shopping has been linked with learning about new global trends and demonstrating newly acquired knowledge by choosing sustainable products, prompting manufacturers to adopt green manufacturing and green supply chain management.

Finally, the study also found that social, adventure, value, and relaxation shopping all positively influence OIB and have been linked to sustainable consumer buying behavior.

The theory presented in this study makes a significant contribution to the theoretical framework of unplanned and irrational consumption behaviors in the context of social commerce. The study identifies the significance of scarcity and serendipity in this context and demonstrates how various shopping types, such as social, adventure, value, relaxation, and impulse shopping, moderate these effects. The practical implications of this research are substantial, as it offers valuable insights for retailers and manufacturers seeking to comprehend the role of hedonic motivations in OIB and the impact of scarcity and serendipity on such behavior. To meet the growing demand for sustainable attributes among consumers, manufacturers and retailers need to adapt their practices accordingly. In summary, this research underscores the importance of understanding the factors that influence OIB in the Pakistani social commerce context and highlights the moderating effects of hedonic motivations. Doing so provides practical implications for retailers and manufacturers and contributes to the theoretical understanding of unplanned and irrational consumption behavior.

In this study, we explore the intricate relationship between hedonic shopping value and online impulse buying while recognizing its inherent limitations, which cannot be ignored despite our best efforts. Firstly, the study was conducted across a limited geographic range comprising five cities in Pakistan. To enhance the generalizability of the findings, it is suggested that future research expands to include a more diverse sample that encompasses smaller and larger cities. Secondly, the present study relied on a convenience sampling technique which, while practical, may limit the representativeness of the results concerning the wider population. Therefore, alternative sampling techniques could be utilized in future studies to ensure greater external validity. Thirdly, the incorporation of additional theories and factors in the research design would lead to a more comprehensive understanding of the underlying mechanisms that drive online impulse buying. Specifically, future research could incorporate behavior-based drivers, utilize mixed-methods research designs, and integrate moderating and mediating variables to further enrich the results. It is also recommended that future research be conducted across multiple countries to identify potential cross-cultural differences in the phenomena under investigation. Finally, the authors propose a novel research agenda that seeks to promote pro-environmental consumer behaviors and production. Such an agenda would build upon the foundational marketing knowledge by incorporating sustainability aspects and synthesizing various marketing dimensions.

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