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**Dr. Bandar Khalaf Alharthey**  
Associate Professor,  
Department of Marketing,  
Business Administration  
College, Taif University, Saudi  
Arabia

## Unveiling the influence of live streaming commerce on impulse buying behavior through customer engagement in digital marketing

**Dr. Bandar Khalaf Alharthey**

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### Abstract

The objective of this study is to measure the mediating effect of customer engagement as well as the impact of the real-time interaction, perceived proximity, and perceived authenticity on impulse buying. To achieve objective of study a survey method was used and data were collected in one point in time. Measurement scales for the research were adopted from the previous study and data were collected through online survey. Further, to analyze the result Structural Equation Modeling technique was applied by using the Smart PLS3. Hypotheses were measured by applying the bootstrapping technique and results show that all hypotheses were accepted. Results indicate that customer engagement significantly mediates the relationship between live streaming commerce and impulse buying. Further, the attributes of live streaming commerce show that real time-interaction, perceived proximity and perceived authenticity are significant predictor of impulse buying. Consumers feel more engaged through live streaming leading to higher purchases. This study highlights the importance of live streaming commerce in Saudi markets and provide actionable insights especially to firms seeking to capitalize on the growing opportunities in the Saudi e-commerce.

**Keywords:** Live streaming commerce, real-time interaction, perceived proximity, perceived authenticity, customer engagement, impulse buying

### Introduction

The widespread appearance of live streaming commerce has totally redefined the e-commerce division on the global level lately. This novel method applies technology of real-time video streaming to draw in the consumer into the shop, delivering a 3D experience of the product, and allowing the shopper to interact in the shopping process. E-commerce live streaming as a synthesis of entertainment, social interaction, and retailing delivering consumers with personalized and genuine shopping experiences (Mao *et al.*, 2022; Sun *et al.*, 2019) <sup>[25, 31]</sup>. This, in turn, resulted in much investigation, being highly interesting for both practitioners and researchers due to the fact that it has huge impact on consumers' behaviors - above all, in terms of impulse buying. E-commerce domain is a space where impulsive buying specifically, acts as a prominent and significant consumer behavior. This includes the unplanned and spontaneous purchases that result from sudden urges. This could be as a result of situational factors or emotional triggers (Chan *et al.*, 2017) <sup>[8]</sup>. This growth in live streaming commerce has led to the emergence of new platforms for the impulse buying behavior. Such a scenario brings on live interactions between potential customers and products, hosts, and viewers, increasing the attractiveness of impulse purchases (Xue *et al.*, 2020) <sup>[37]</sup>.

The influence of live streaming commerce on impulsive buying has been debated extensively; however, further efforts to grasp the main components of this link should be a priority. Another way it can do this is by customer engagement that includes cognitive, emotional, behavioral, and social aspects of consumer interactions with brands (Brodie *et al.*, 2011) <sup>[5]</sup>. Customer engagement keeps the key position in the Live Streaming Commerce context, which highly influences consumer attitudes, experiences, and buying decisions.

With this background in mind, this research study aims to examine the relationship between real-time interaction and perceived proximity, perceived authenticity and the mediating variable of customer engagement as factors that can bring about impulse buying behavior. Bidirectional interaction in real-time is produced by two different parties, which is called live

**Corresponding Author:**  
**Dr. Bandar Khalaf Alharthey**  
Associate Professor,  
Department of Marketing,  
Business Administration  
College, Taif University, Saudi  
Arabia

streamers and viewers, facilitated by modern technologies in an immediate and personalized way (Kang *et al.*, 2021) <sup>[18]</sup>. Proximity as perceived entails the cognitive and affective closeness of the consumer to the sales person in the online environment and has a bearing on trust and affinity of the online consumer-seller relationship (Wilson *et al.*, 2008) <sup>[34]</sup>. Consumer perception of authenticity, the Genuity and trustworthiness of content and engagements in the live commerce, is an important determinant of consumer perceptions and intent to buy (Rosenblum *et al.*, 2020) <sup>[29]</sup>.

This study is, therefore, very vital in the wake of the recent transformations of the e-commerce arena in Saudi Arabia. The Saudi nation offers a very attractive prospective for researching shopping habits on the Internet. The infrastructure is getting more digital, smartphone coverage is increasing, and the authorities are taking steps to raise trust levels of consumers in e-commerce (International Trade Administration, 2024) <sup>[17]</sup>. While the presence of the U.S. companies in Saudi Arabia has huge potential, companies intending to operate within the market still need to deal with certain peculiarities, including people's preference for cash payments and cyber security. (International Trade Administration, 2024) <sup>[17]</sup>. Through salient the entanglement of real-time engagement, perceived closeness, perceived genuineness, customer participation, and impulsive purchasing in the cultural informational context of live streaming commerce, our study delivers data for marketers, policy makers, and businesses involved in e-commerce in Saudi Arabia. the outcome will contribute to improved knowledge on the consumer behavior in the digital era which will help to create more effective engagement and substitute impulse bring forth in the live streaming commerce.

This study, on the other hand, aims at closing a gap that has remained in the existing literature by highlighting the complex dynamics of live streaming commerce, engagement, and impulse buying in the unique context of the Saudi Arabia e-commerce market. This study will unveil the mediating effect of customer engagement as well as the impact of the real-time interaction, perceived proximity, and perceived authenticity on impulse buying, thus, providing actionable insights especially to firms seeking to capitalize on the growing opportunities in the Saudi e-commerce landscape (Lu *et al.*, 2021; Sun *et al.*, 2019; Kang *et al.*, 2021; Wilson *et al.*, 2008; Rosenblum *et al.*, 2020) <sup>[18, 28, 29, 31, 34]</sup>. Additionally, the data obtained here are anticipated to provide theoretical guidance for consumer behavior research and facilitate target marketing methods that are suited to the local specificities of the Saudi consumers (Mao *et al.*, 2022; Xue *et al.*, 2020; Chan *et al.*, 2017; Brodie *et al.*, 2011) <sup>[5, 8, 25, 37]</sup>.

## Literature Review

### Live Streaming

Live streaming e-commerce has emerged as a game changer in the modern retail landscape, transforming how customers connect with companies and make purchasing decisions. Live streaming technology, which originated in the entertainment and gaming sectors, has spread to a variety of industries, including retail, where it is a potent tool for product marketing and sales (Mao *et al.*, 2022) <sup>[25]</sup>. The incorporation of live streaming into e-commerce platforms has created new opportunities for marketers to engage with consumers in real time, providing immersive product

experiences and personalized interactions (Zheng *et al.*, 2022) <sup>[44]</sup>. This merger of entertainment and commerce has created a new type of reattainment, blurring the distinction between traditional shopping and entertainment consumption (Lu *et al.*, 2021) <sup>[18]</sup>. Live streaming e-commerce is important because it may create real and interesting purchasing experiences, which increase customer loyalty and confidence (Sun *et al.*, 2019) <sup>[31]</sup>. Live streaming allows hosts to show off products in real time, answering questions from viewers and dynamically showcasing features, in contrast to static product photos or text descriptions (Kang *et al.*, 2021) <sup>[18]</sup>. In addition to increasing customer engagement, this degree of interaction offers insightful data on consumer preferences and behavior that can be used to guide future marketing initiatives (Wongkitrungrueng *et al.*, 2020) <sup>[36]</sup>.

Moreover, live streaming e-commerce has made small and medium-sized enterprises competitive on a worldwide level, democratizing the retail scene (Cai, *et al.*, 2018) <sup>[6]</sup>. According to Xue *et al.* (2020) <sup>[37]</sup>, firms can promote their products cost-effectively and reach a varied audience by utilizing platforms such as social media and e-commerce websites. The market for live streaming e-commerce has expanded due to the democratization of shopping, drawing in both well-known companies and budding entrepreneurs (Huo *et al.*, 2023) <sup>[16]</sup>.

### Customer Engagement

Cognitive, emotional, behavioral, and social aspects are all included in customer engagement, which reflects the complexity and range of consumer-brand relationships. According to Brodie *et al.* (2011) <sup>[5]</sup>, Hollebeek (2011) <sup>[5, 12]</sup>, Vivek *et al.* (2014) <sup>[32]</sup>, Brodie *et al.* (2013) <sup>[4]</sup>, Behnam *et al.* (2021) <sup>[1]</sup> and other sources, it entails the active processing of brand information (cognitive engagement), elicitation of positive emotions (emotional engagement), participation in actions and interactions (behavioral engagement), and involvement in social interactions and connections (social engagement). Customer involvement is essential for establishing rapport, developing trust, and influencing purchasing decisions in the live streaming commerce setting. These factors all contribute to the success and expansion of brands (Dessart *et al.*, 2016) <sup>[9]</sup>. Consumer behavior in the context of live streaming commerce is greatly influenced by a variety of cognitive, emotional, behavioral, and social factors, all of which are integral parts of the complex concept of customer engagement (Brodie *et al.*, 2011; Hollebeek, 2011) <sup>[5, 12]</sup>. Cognitive engagement is the deliberate processing of brand material and information, such as advantages and features of products, as they are presented in live streaming. According to Hollebeek *et al.* (2019) <sup>[13, 14]</sup>, viewers actively assess and absorb this information, which shapes their opinions and intents to buy.

### Impulse Buying

Impulse buying behaviour is defined as impulsive and unexpected purchases induced by internal or external cues when shopping (Rani & Rex, 2023) <sup>[28]</sup>. It includes consumer actions motivated by personal values, hedonistic lifestyles, and cultural variables (Kristiyono & Gozali, 2022) <sup>[19]</sup>, as well as cognitive incentives such experience consumption. Convenience, channel integration, and consumer characteristics such as extroversion and neuroticism all play a role in impulse purchase. These

purchases are frequently made in the moment, influenced by personal preferences, time availability, and advertising impulses. Consumer empowerment, trust, satisfaction, perceived value, and personal characteristics like self-control and emotional temperament all influence impulse purchase behaviour (Boutsouki, 2019; Wang *et al.*, 2022) <sup>[3, 33]</sup>.

## Hypotheses Development

### Impact of live streaming commerce on customer engagement

The subjective reactions and emotional investment that live streaming content elicits are referred to as emotional engagement. Positive feelings like delight, excitement, or anticipation are evoked by engaging live streams, which strengthens the bond between customers and companies (Vivek *et al.*, 2014) <sup>[32]</sup>. Consumers' reactions to live streaming content are included in the category of behavioral engagement. This includes following through on purchases that were prompted by the live stream experience, as well as actively engaging in discussions, likes, shares, and other online interactions (Brodie *et al.*, 2013) <sup>[4]</sup>. Social engagement refers to the relationships and social exchanges that are made possible by live streaming services. In addition to interacting with the information, viewers also interact with one another, exchanging insights, advice, and experiences in real time. Consumer involvement is further enhanced by these social connections, which foster a sense of community and belonging (Behnam *et al.*, 2021) <sup>[1]</sup>. According to Dessart *et al.* (2016) <sup>[9]</sup>, customer participation plays a crucial role in live streaming commerce by establishing brand relationships, promoting trust, and encouraging purchase decisions. In the ever-changing world of live streaming commerce, brands can build devoted and passionate client bases by developing immersive and engaging experiences that connect with customers on cognitive, emotional, behavioral, and social levels. This will ultimately lead to an increase in sales and revenue growth.

Based on the available literature, it is hypothesized that real-time interaction (H1a), perceived proximity (H1b), and perceived authenticity (H1c) all have a beneficial impact on customer engagement. This paradigm proposes that in the context of live streaming commerce, these characteristics collectively influence consumer engagement levels, ultimately determining their interactions and experiences with the business.

**H<sub>1</sub>:** Live streaming commerce attributes.

1. Real-time interaction.
2. Perceived proximity.
3. Perceived authenticity have significant impact on customer engagement.

### Impact of live streaming commerce on impulse buying behavior

With live streaming commerce providing customers with real-time encounters with items and influencers that can spark impulsive purchases, it has become a potent stimulant for consumer behavior. Live streaming channels, in contrast to conventional e-commerce platforms, offer dynamic and captivating material that stimulates viewers' sense of urgency and excitement, resulting in impulsive purchasing decisions (Xue *et al.*, 2020) <sup>[37]</sup>. Because live broadcasting is interactive, presenters can answer viewer queries, highlight

products in detail, and incite FOMO (fear of missing out), which encourages impulsive purchases (Wongkitrungrueng *et al.*, 2020) <sup>[36]</sup>. In live streaming commerce, impulsive purchases are caused by a number of causes. Social impact and peer pressure play a crucial role, since viewers can be swayed by other participants' purchases or influencers' suggestions (Ming *et al.*, 2021). Furthermore, the combination of live streaming's visual and aural stimulation with compelling sales tactics and time-limited offers might elicit emotional reactions and compulsive buying impulses (Sun *et al.*, 2019) <sup>[31]</sup>.

Moreover, one of the most important factors in promoting impulsive purchasing behavior is the perceived authenticity of live streaming content. According to Rosenblum *et al.* (2020) <sup>[29]</sup>, authenticity increases customer confidence and trustworthiness, increasing the likelihood that viewers will make impulsive purchases based on the hosts' recommendations and demonstrations. Genuine and trustworthy hosts have a greater chance of influencing viewers' decisions to buy, which increases the likelihood of impulsive purchases (Wongkitrungrueng & Assarut, 2020) <sup>[36]</sup>. Furthermore, the interactive quality of live streaming commerce makes it easier for hosts and viewers to communicate in real time, fostering a feeling of immediacy and intimacy that may encourage impulsive purchases (Kang *et al.*, 2021) <sup>[18]</sup>. Live streaming gives viewers a sense of engagement and involvement, which increases emotional arousal and encourages impulsive purchasing (Yin, 2020) <sup>[40]</sup>.

Real-time interaction, which includes dynamic communication channels and interactive experiences, is projected to have a substantial impact on impulse purchases. According to research, live streaming platforms provide realistic and authentic shopping experiences by allowing consumers to interact with products in real time, which can lead to impulsive purchases (Wongkitrungrueng *et al.*, 2020) <sup>[36]</sup>. Consumers may feel tempted to make spontaneous purchases due to the dynamic and participatory character of real-time interactions.

Similarly, perceived proximity, which measures the seller's closeness and accessibility, is expected to have a beneficial impact on impulse purchase behavior. According to research, when consumers perceive a sense of proximity to the seller, they are more likely to trust the brand and feel emotionally linked, which can lead to impulsive purchases (Zhao *et al.*, 2020) <sup>[43]</sup>. The perception of closeness and accessibility creates trust and rapport, leading consumers to make impulsive purchases. Furthermore, perceived authenticity, defined as genuineness and credibility, is likely to have a favorable impact on impulse buying behavior. Authentic encounters increase trust and emotional resonance in consumers, leading to spontaneous purchasing decisions (Rosenblum *et al.*, 2020) <sup>[29]</sup>. When consumers believe items or services are genuine, they are more likely to make impulsive purchases motivated by emotional connections and trust in the brand.

Overall, the theoretical framework implies that real-time contact, perceived proximity, and perceived authenticity are important factors in determining impulse purchase behavior in online retail contexts. So.

**H<sub>2</sub>:** Live streaming commerce attributes.

1. Real-time interaction.
2. Perceived proximity.

3. Perceived authenticity have significant impact on impulse buying.

### Impact of customer engagement on impulse buying

Customer engagement, which includes cognitive, emotional, behavioral, and social components, is critical in affecting consumer behavior, particularly when it comes to impulse buying. Engaged consumers have stronger emotional connections to companies and are more inclined to devote time, effort, and resources in interactions with them (Vivek *et al.*, 2014; Hollebeek *et al.*, 2019) <sup>[13, 14, 32]</sup>. This emotional commitment and active participation increase the risk of making impulsive purchases.

According to research, engaged customers are more responsive to marketing cues and more likely to make spontaneous purchases (Dessart *et al.*, 2016) <sup>[9]</sup>. Their emotional involvement and sense of connection with the brand result in increased purchase intentions and a propensity to act on impulsive desires (Hollebeek *et al.*, 2019) <sup>[13, 14]</sup>. Furthermore, engaged consumers exhibit good feelings during brand interactions, which stimulates impulse purchasing behavior (Vivek *et al.*, 2014) <sup>[32]</sup>. Overall, the theoretical framework argues that customer engagement improves impulse buying behavior by creating emotional ties, raising purchase intentions, and predisposing consumers to make spontaneous purchases.

### H<sub>3</sub>: Customer Engagement have significant impact on Impulse buying

#### Mediating Role of Customer Engagement

Live streaming channels, in contrast to conventional e-commerce platforms, offer dynamic and captivating material that stimulates viewers' sense of urgency and excitement, resulting in impulsive purchasing decisions (Xue *et al.*, 2020) <sup>[37]</sup>. Real-time interaction, which includes dynamic communication channels and personalised experiences, improves customer engagement by facilitating interactive exchanges between buyers and sellers (Kang *et al.*, 2021;

Xue *et al.*, 2020) <sup>[37]</sup>. Engaged consumers have a stronger emotional connection to the brand and its goods, which leads to increased purchase intentions and impulsive buying (Dessart *et al.*, 2016; Hollebeek *et al.*, 2019) <sup>[9, 13, 14]</sup>. Moreover, one of the most important factors in promoting impulsive purchasing behavior is the perceived authenticity of live streaming content. According to Rosenblum *et al.* (2020) <sup>[29]</sup>, authenticity increases customer confidence and trustworthiness, increasing the likelihood that viewers will make impulsive purchases based on the hosts' recommendations and demonstrations. Furthermore, emphasising perceived authenticity can boost credibility and emotional resonance, resulting in greater consumer loyalty and long-term connections (Sun *et al.*, 2019; Kang *et al.*, 2021; Rosenblum *et al.*, 2020) <sup>[18, 29, 31]</sup>.

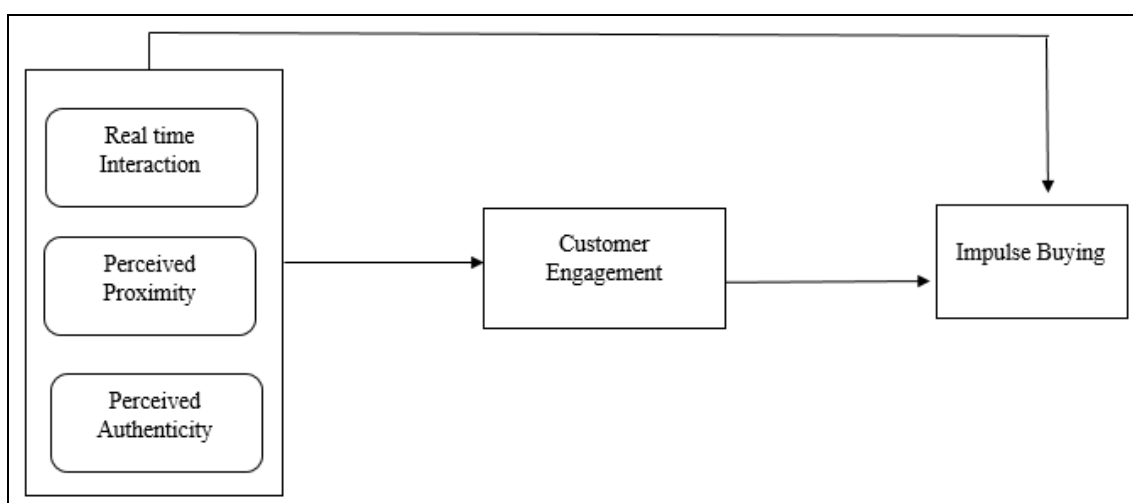
Customer engagement serves as a bridge between real-time interaction and impulse purchasing behaviour. Engaged consumers, inspired by the immersive experiences enabled by real-time engagement, are more likely to make impulsive purchases because they feel emotionally attached to the company and its goods (Sun *et al.*, 2019; Kang *et al.*, 2021) <sup>[18, 31]</sup>. This increased emotional connection magnifies the influence of real-time interaction on impulse purchasing behaviour, demonstrating the mediating function of consumer engagement in this relationship.

By explaining this mediation mechanism, the theoretical framework sheds light on the underlying processes that drive impulsive purchase in live streaming commerce scenarios.

**H<sub>4</sub>:** Customer Engagement mediates the relationship between live streaming commerce attributes (real-time interaction, perceived proximity, perceived authenticity) and impulse buying.

#### Model

Figure 1 explains the theoretical framework for the study.



**Fig 1:** Theoretical framework

### Methodology

The aim of the research was to determine the relationship between the factors. Since surveys are among the most widely used and efficient methods of doing research, the online survey technique was employed in this study to investigate the correlations between the variables (Lefever,

Dal, & Matthiasdottir, 2007) <sup>[26]</sup>. The investigation was guided by the natural environment. The researcher did not intervene in any way. Information about the respondents was kept private in accordance with study ethics standards. Information was gathered from Kingdom of Saudi Arabia (KSA) online purchasers. In KSA, e-commerce is expanding

at a steady pace. By 2024, 33.6 million Saudis are expected to engage in e-commerce, or buying and selling, over the internet—a 42 percent rise from 2019. Information will be gathered from internet purchasers in major cities of KSA.

For this study, a deductive research approach (generic to specific) was employed, which permits the application of data from a sizable sample to a particular problem. The study was cross-sectional in character, quantitative in nature, and correlational at a particular point in time in an uncontrived environment. Convenience sampling, a non-probability sampling technique, was employed in this investigation. Because the unit of selection in this sort of sampling is chosen primarily on convenience, not every member of the population has an equal probability of being chosen. Convenience sampling was employed in this study to get information from the participants. A systematic questionnaire was employed as a method of study. The survey was modified based on several sources.

51 items that were adopted from other research were used to test each variable on a 5-point Likert scale. The questionnaire was divided into two sections, designated as "A" and "B." Part "A" was created to gather participant demographic data. Section "B" dealt with measuring the variables; the questionnaire was written in an easy-to-understand manner for the participants. The language spoken for conversation was English. The measurement tools were clearly specified and have been employed in earlier research. A five-item scale was used to assess real-time interaction; a four-item scale was used to evaluate perceived proximity; and a three-item scale, which was modified from an earlier study (Qin *et al.*, 2022) [34].

The online survey approach was chosen since it is economical and requires less time to manage the data gathering instrument. The questionnaire was created in Google Doc and distributed over social media (WhatsApp, Messenger, and Facebook). There was a 56% response rate. The common method variance test was used on respondents who were a single source for the constructs. The Herman single factor test was used to gauge bias. The variation from the conventional technique is less than 50%. This implies that bias in research is not an issue. The study was quantitative in nature and used a correlational approach. SmartPLS3 and SPSS (statistical package for social sciences 21) were employed in the studies. Bootstrapping was used to mediate a regression test to validate the model. It provides a basic explanation of mediation's indirect effect. Small sample sizes of non-parametric data can be used for the bootstrapping technique.

### Data Analysis

Primary data were obtained through online self-completion questionnaire from the online buyers. Partial least squares structural equation modeling (PLS-SEM) was used to perform the analysis with the help of SmartPLS3. In order to provide empirical evidences of the hypothesized proposed model, the following analytical approaches are the main analyses that were conducted; (e.g., structural equation modeling, evaluation of the measurement model, reliability,

validity, evaluation of the model, test of mediation, and test of moderation). Structural equation modeling has become a popular and significant statistical tool being used by social and behavioral scientists for analyzing multivariate statistical data and also known as second generation analysis techniques (Hair Jr *et al.*, 2014) [13]. SEM is a set of statistical related techniques which enables researchers to examine the collection of relationships between one or more exogenous variables and the fit indices of the data to the hypothesized proposed model. SEM technically explain the hypothesized pattern of direct and indirect linear relationships between a set of indicator variables and unobserved/latent variables (Schermelel Engel *et al.*, 2003) [39]. SEM play a significant role in analyzing latent relationships and at the same time helps in the evaluation of variance-based modeling and covariance-based modeling (CB-SEM), partial least square (PLS), and assessment of confirmatory factor (Hair *et al.*, 2012) [21]. Subsequently, the aim of SEM is to examine the fitness of the theoretical relationships and causal effect of the hypothesized model.

There are several advantages using SEM techniques when compared with regression (i.e., first generation analysis technique) (Ringle, 2014) [36]. Firstly, SEM enables researcher to better understand the complex model relationships and to assess the relative contribution of each manifest/indicator variable to its associated unobserved/latent variable (Hair Jr *et al.*, 2014) [13]. Secondly, it provides a greater comprehensive analysis of the model by incorporating both indicator variables and latent variables, instead of using a single indicator derivative (Ringle, 2014) [36]. Lastly, SEM allows researcher to systematically treat multi-collinearity problem so that SEM biasness due to measurement error would be prevented (Kline, 1998) [23]. Therefore, this study used SEM assessment of measurement model (e.g., CFA) and assessment of structural model (i.e., examining the relationships among variables under study) (Schermelel-Engel *et al.*, 2003) [39].

Evaluation of the Measurement Model Confirmatory factor analysis (CFA) was employed in SmartPLS3 in order to authenticate the reliability (Inter consistency reliability) and validity (Convergent and discriminant) of the hypothesized model (Ringle, 2014) [36]. CFA is considered to be more appropriate and flexible technique for defining the goodness of fit or fit indices of the model (Joe *et al.*, 2020). The measurement model explains how well the indicators adequately represent or measure the constructs. A measurement model authenticates the adequacy of the indicators towards a latent variable (Leguina, 2015) [27].

### Demographic Analysis

The demographics analysis was confined to gender, age, and shopping frequency of the respondents. Respondents' gender, age, shopping frequency and frequencies are calculated using SPSS. The total of 410 respondents took part in this research from the online consumers in KSA. The details are deliberated below in the Table 1.

**Table 1:** Demographic Characteristics of Respondents

Demographic	Characteristic	Frequency	Relative Frequency (%)
Gender	Male	150	73.2
	Female	55	26.8
Age	Below 20 Years	11	5.4%
	21-25 Years	126	61.5%
	26-30 Years	37	18%
	31-35 Years	19	9.3%
	36-40 Years	11	5.4%
	41-45 Years	11	5.4%
	Above 45 Years	1	0.5%
Qualification	Intermediate / A Levels or Equivalent	6	2.9%
	Bachelor's Degree	107	52.2%
	Masters / M. Phil Degree	72	35.1%
	Post Graduate / PHD Degree	19	9.3%
	Associate Degree	1	0.5%
Shop Online	Once in a week	23	11.2%
	Once in a month	52	25.4%
	Once in two weeks	47	22.9%
	Once in more than two weeks	40	19.5%
	Once in two months	22	10.7%
	Two or three times a week	21	10.2%
Online Purchase of Products	Cosmetics / Skin Care Products	54	26.3%
	Food Items	44	21.5%
	Clothes	100	48.8%
	Others	36	29.7%

**Measurement Model Results**

The posited hypotheses were inspected through “PLS Smart 3.0” software which functions through “Partial Least Squares Modeling” technique. This is a highly recommended technique to examine the multiplex relationships with a small sample size. PLS essentially executes the developed path model and then tests the reliability of the measures first by running an algorithm. Hence, it instigates the relationships among the variables of the research model after examining the reliability of constructs. This is one of the distinguishing factors which make it both reliable and easy to use.

**Reliability**

Reliability measures the internal consistency of a study instruments. Reliability of the constructs of this study was measured through Cronbach’s alpha). The threshold value for Cronbach’s alpha) should be (>0.70) (Hair Jr *et al.*, 2014) [13]. Reliability and Validity analysis were performed

on the variables as exhibited in Table 1. The following table suggests that “Factor Loadings” of all the items are greater than that of 0.7 which suggests that convergent validity exists between the variables. Hence, we can deduct from the results that the measures of the constructs are in fact related. The values of “Cronbach’s Alpha” suggest that the constructs are proved to be reliable as all of the values are greater than that of 0.7. Thus, it can now be elucidated that the measures accurately define the latent variables i.e. “internal consistency of the scale” and “competency for confirmatory purposes”. The values of “Average Variance Extracted” are all greater than that of 0.5, the benchmark value which suggest the convergence validity of constructs. Moreover, the values of “Composite Reliability” (CR) suggest that results are reliable as the values obtained from the results are all greater than that of 0.7. Hence, we are able to explain the reliability of scales. All results are given below in Table 2 which shows that all constructs are reliable and convergent validity is established.

**Table 2:** Construct Reliability & Validity

Constructs	Cronbach’ s Alpha	AVE	CR
Real Time Interaction	0.792	0.705	0.877
Received Proximity	0.830	0.652	0.877
Perceived Authenticity	0.846	0.686	0.897
Customer Engagement	0.709	0.774	0.873
Impulse Buying	0.868	0.791	0.919

The instruments used for the present study i.e. convergent and discriminant were validated through CFA. Convergent validity is the degree to which measure’s perfect correlation obtained by different measures are truthfully represent the same construct. In this present study, average variance extracted (AVE) was used to determine the convergent validity. The recommended cutoff values for AVE should be above than 0.5 (Fornell, C., & Larcker, 1981) [11]. Discriminant validity explains that a construct is actually different from the rest of the constructs of the model.

Therefore, to establish discriminant validity “Heterotrait-Monotrait” and “Variance Inflation Factor” were used (Hair *et al.*, 2012) [14]. Presents the results acquired with reference to “Fornell-Larcker criterion.” The results indicate the discriminant validity of the constructs as the “root square of the AVE values for each of the latent variables must be greater than the correlation coefficient between the latent variable and all the other variables” Table 3 displays that discriminant validity is established.

**Table 3:** Discriminant Validity

Constructs	RTI	PP	PA	CE	IB
RTI	0.828				
PP	0.742	0.890			
PA	0.715	0.798	0.880		
CE	0.735	0.681	0.619	0.930	
IB	0.539	0.496	0.528	0.637	0.857

### Structural Model Results

Evaluation of the Structural Model Having successfully examined the measurement model, the next step is to assess the relationships among the variables and the fit of the data to the hypothesized proposed model (Hair Jr *et al.*, 2014) [13]. The purpose is to provide empirical evidence related to the hypothesized study model (Ringle, 2014) [36]. The evaluation of the structural model examines the fit between the latent constructs within the model. In this regard, the structural model's interrelationships have been predicted using PLS-SEM algorithm. After the measurement model, the structural models have been evaluated in SmartPLS3. So also, collinearity, t-values, and p-values were assessed in structural models by bootstrapping with 359 cases and 5000 re-sample was employed to determine the path model significance and to test the hypothesized relationships among the study variables (Hair Jr *et al.*, 2014) [13]. Overall, the coefficient of determination (R<sup>2</sup>), and path coefficient ( $\beta$ ) have been assessed.

Hypotheses testing were executed through a "bootstrap procedure" using 300 subsamples as it must be greater than that of the sample size. Above figure illustrates the results obtained from "SEM-PLS algorithm" and the association of the latent variables with each other. The figure suggests that a total of thirteen hypotheses were propounded, out of which eleven have been proved true while two of them have been rejected. The first hypothesis (H<sub>1</sub>) proposed that there exists a significant and positive relationship between live streaming commerce (a) real time interactivity and customer engagement (B=0.356, t=4.993, p=0.000), Perceived proximity and customer engagement (b=0.681, t=12.319, p=0.000), perceived Authenticity and customer engagement (b=0.496, t=7.600, p=0.000). Second hypothesis (H<sub>2</sub>) states proposed that there exists a significant and positive relationship between live streaming commerce (a) real time interactivity and impulse buying (b=0.516, p=0.060, t=8.558), Perceived proximity and impulse (b=0.551, t=7.158, p=0.000), perceived authenticity and impulse buying (B=0.3750, t=5.521, p=0.000). Third hypothesis (H<sub>3</sub>) posited that social customer engagement have significant impact on impulse buying (b= 0.375, t=5.521, p=0.000) leading to acceptance of H<sub>3</sub>. Hypothesis (H<sub>4</sub>) states that customer engagement mediates the relationship between different dimensions of live streaming commerce and impulse buying. H<sub>4</sub> (a) suggests that customer engagement mediates the relationship between real time interaction and impulse buying H<sub>4</sub> (b) states that customer engagement mediates the relationship between perceived proximity and impulse buying (b=0.34, t=4.768, p=0.000), (b=0.348, t=4.833, p=0.000). Moreover, customer engagement also mediates the relationship between perceived authenticity and impulse buying (b=0.318, t=4.453, p=0.000). All hypotheses were significant at 99% level of confidence interval.

### Discussion and Conclusion

The objective of this study is to measure the impact of Live streaming commerce on impulse buying through customer engagement. Different attributes of live streaming commerce (i.e. real time interaction, perceived proximity, perceived authenticity) develops customer engagement which ultimately leads to impulse buying. To achieve the objective of this study data were collected from online buyers of Kingdom of Saudi Arabia (KSA). SEM technique was applied to achieve the desirable results.

The results of study show that different attributes of live streaming commerce have significant positive impact on customer engagement indicating that real-time interaction, perceived proximity and perceived authenticity are significant predictor of customer engagement. In live streaming consumer can interact with seller and they respond to their queries in real time which leads to engage customer. These results are also align with previous studies (Cao *et al.*, 2022) [7, 38]. Moreover, other attributes perceived proximity and authenticity also have significant impact on customer engagement and these results are also in line with prior research (Luo *et al.*, 2024) [30].

Moreover, attributes of live streaming commerce, (i.e., real time interaction, perceived proximity, and perceived authenticity) significantly influence the impulse buying. Lee and Chen (2021) [20] also discussed in their study that live streaming increase the impulsive behaviour of customers and they are more likely to engage in buying behaviour. Further, customer engagement also have significant impact on impulse buying. Prior researcher have also witnessed these results (Luo *et al.*, 2024) [30].

Finally, this study have also measured the mediating role of customer engagement among the relationship of different attributes of live streaming commerce (i.e., real time interaction, perceived proximity and perceived authenticity) and impulse buying. The study results indicates that attributes of LSC increase the impulse buying through customer engagement. It shows that LSC with real communication environment, and with real content and interaction increase the engagement and motive the consumers to buy impulsively.

Moreover, our findings show that engagement is a powerful predictor of customer behavior, which is in line with the claim that engagement shapes consumer behavior (Hollebeek *et al.*, 2019; Devino & Engriani, 2023) [10, 13, 14]. Circumstantial evidence from previous studies suggests that involvement is especially crucial for fostering connections between consumers, brands, and other consumers, especially in LSC environments (Yang *et al.*, 2022; Yi *et al.*, 2023) [38, 39]. This research suggests that merchants should engage with their target consumers in collaborative, bilateral (or multilateral) interactions rather than typical one-way communication (e.g., by being very responsive to their inquiries). Next, the mediating effect that engagement had relation between impulse purchasing tendency and important LSC attributes such as, Real time interaction, perceived proximity, perceived authenticity. The results demonstrate that engagement mediate most of these relationships. Resonant contagion influences social behavior and creates emotional bonds, although it may not always imply hasty purchases. The association between impulsive purchase and resonance contagion may be influenced by additional variables, including situational and individual factors (Zeng *et al.*, 2022) [41]. Accordingly, engagement is

essential for streamlining the decision-making and purchasing processes of consumers. Thus, our research suggests that in order to enhance customers' interaction and provide unique LSC-based insight, consumers' dual-route information process should be cultivated. Similarly, it was discovered that clients' compulsive purchase behavior was driven by engagement.

Moreover, findings demonstrate that the streamer's ability to effectively interact with their audience is the primary determinant of impulse purchase tendency. Consequently, it is advised that streamers should keep an eye on their feelings, since it is anticipated that they will have a direct impact on consumers' purchasing decisions. Additionally, in order to increase consumer involvement (e.g., by like or sharing promotional or product links), streamers might remind viewers to collect limited coupons or check out product links. In order to augment the level of social interaction with their audience, streamers could consider motivating live-streamers to share their opinions and sentiments through the bullet-screen by asking them to send emojis (like a thumbs up) or to show their approval, as well as by following the posts made by users.

### Implications

In order to understand consumers' participation in tents in LSC from a social support viewpoint, a theoretical model was created and validated. The findings demonstrate how real-time engagement, perceived proximity, and perceived authenticity of LSC are all viewed. First, by providing fresh perspectives on the influence of perceived LSC qualities on customer engagement, this study expands the body of knowledge regarding the possible antecedents of customer engagement. A number of research on LSC have examined the impacts of relational connections (Hu & Chaudhry, 2020) <sup>[15]</sup>, perceived value (Wongkitrungrueng & Assarut, 2018) <sup>[35]</sup>, and customer trust (Guo *et al.*, 2021) <sup>[11, 18]</sup> on customer participation in LSC. This study assess the beneficial impacts of perceived LSC traits on consumer engagement, identifying real-time contact, perceived proximity and perceived authenticity as the three main LSC attributes. This study is in line with other research on social commerce (Berry *et al.*, 2006; Zhang *et al.*, 2014) <sup>[2, 42]</sup>, which considered technological cues to be motivating variables that influence assessment. The study's findings also support earlier research (Luo *et al.*, 2016) <sup>[22]</sup> that found interaction to be a significant factor in raising customer engagement, as opposed to a different study's finding (Kang *et al.*, 2021) <sup>[18]</sup> that found an inverted U-shaped dynamic between interactivity and customer engagement in LSC. Furthermore, this study carried out a thorough empirical investigation of the effects of authenticity and closeness on customer engagement, in contrast to previous studies that just highlighted the significance of these factors in LSC.

Moreover, online retailers can use LSC as a crucial digital marketing tactic. Given the unique correlation between customer engagement and real-time contact, LSC need to facilitate prompt communication between consumers. In order to increase consumers' propensity to connect, online retailers should also choose live streamers that have excellent communication and sales abilities. This will create an active purchasing environment for customers. Furthermore, in light of the benefits that perceived closeness has for consumer engagement and social support, textual information and real-time feedback have to be displayed on

live video displays in order to boost the sense of proximity. In order to capitalize on the close proximity of LSC, online retailers and streamers ought to urge their clients to engage in interactive activities as information providers by forwarding them bullet screens.

Furthermore, examining the idea of authenticity may offer streamers and online sellers important information about how to enhance their customers' perceptions of their authenticity through the use of a welcoming LSC layout, the introduction of team-related details, and the display of behind-the-scenes content in upcoming marketing campaigns.

### Limitations and Future Directions

A number of the current study's shortcomings necessitate further investigation. First, since the link between LSC qualities and impulse buying is through customer engagement is the main subject of this study. Product type may have an impact on customers' perceived qualities and intentions for customer involvement (search vs. experience). To confirm the results in a real-world setting, future studies should investigate the moderating influence of product type in more detail. Secondly, this study looks at how customer engagement is affected by perceived LSC qualities from a social support standpoint. Other mediating factors are not examined in the theoretical model due to the limitations of this investigation.

In present study, survey method is used, future research can consider other data collection techniques. To generalize the results study should be conducted in other geographical areas.

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