Modeling Gamification, Virtual-try-on Technology, e-logistics service quality as predictors of online shopping: An empirical investigation

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Abstract

This research uses self-determination theory to examine gamification, virtual-try-on technology (VTO), and e-logistics service quality (e-LSQ) as predictors of customer satisfaction in an online context. The study further examines customer satisfaction as an influencing factor of repurchase intentions while positing Pay-on-delivery (POD) as a moderator of the relationship between customer satisfaction and repurchase intention. Data were gathered using a self-administered questionnaire from online shoppers—the sample comprised 634 respondents who had purchased products using VTO. The results confirmed VTO and e-LSQ as strong antecedents of customer

satisfaction, which further leads to repurchase intentions. Interestingly, gamification had no significant impact on customer satisfaction. Further, POD moderates the relationship between customer satisfaction and repurchase intentions. Using the SDT theoretical framework, this research is an initial endeavor in the online shopping context to empirically validate POD and VTO as significant contributors to online shopping satisfaction. The study thus establishes empirically-supported linkages between e-LSQ, VTO, and customer satisfaction.

Keywords: Gamification; virtual try-on; e-logistics service quality; customer satisfaction; pay-on-delivery; repurchase intention

1 Introduction

Ongoing technological developments and the massive penetration of online shopping have drifted marketers' focus towards retaining customers and inspiring them to repurchase. This drift is evident in both developing and developed nations. To gain a competitive advantage and retain existing customers, e-tailers use various interactive tools and policies, including shipping options, timely delivery, error-free orders, loyalty rewards and schemes (Pei et al., 2014), pay-on-delivery mode of payment, 3D virtual try-on (VTO), and liberal return policies (Pantano et al., 2017; Zhang et al., 2019; Oghazi et al., 2018). These innovative strategies influence consumers' behavior by positively inclining them towards online purchases, thereby affecting their overall decision-making process (Gupta and Ramachandran, 2021). Previous studies indicate that adequate emphasis on these strategies helps online retailers gain a competitive advantage (Oghazi et al., 2018; Zhang et al., 2019; Tandon et al., 2021). The following paragraphs delve deeper into several key innovative strategies and technologies pinpointed as increasingly critical success factors in extant research.

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Online shopping is a utilitarian activity but has a strong hedonic component, meaning that online purchases entail fun and spur flow (Feng et al., 2018). *Gamification* is "the process of adding game mechanics to processes, programs, and platforms that would not traditionally use

such concepts" (Swan, 2012, p.13). In the marketing domain, gamification has been introduced to several businesses at an accelerated pace. A consumer-related approach integrates game mechanisms to motivate and engage people (Bilgihan et al., 2016). This gamified approach, in turn, may inculcate trust among online shoppers and the passion needed to involve people for a long time. E-retailers worldwide have successfully incorporated gamification elements like puzzles, points, badges, and leader-boards, commonly referred to as "The PBL triad," to improve customer retention and make the shopping experience enjoyable (Feng et al., 2018; Raman, 2020). Therefore, this study attempts to validate gamification and other constructs such as VTO, e-LSQ, and POD to understand their relative significance.

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The absence of direct experience with a product makes an assessment of the quality complex and may negatively impact customer satisfaction (Kim, 2016; Zhang et al., 2019). Good fit, size, and matching with other products are critical in an online purchasing (Lin and Wang, 2016; Chen and Wang, 2010). Therefore, to deliver a genuine experience with the selected item, e-retailers dealing with lifestyle products have included *Virtual-try-on technology (VTO)* as an application of augmented reality. This technology comprises "website features that enable the creation and manipulation of product or environment images to simulate (or surpass) actual experience with the product or environment' (Fiore et al., 2005, p. 39). This trend has been observed by many e-tailers worldwide, especially in the eyewear or apparel industries (Zhang et al., 2017). However, few studies have validated VTO as a construct and signified its facilitating nature in online buying (Merle et al., 2012; Zhang *et al.*, 2019). This technology aims to reduce the risk of getting the wrong product sizes by addressing the "suit, fit and match" conundrum online. Despite being valuable and interactive, consumers may develop a negative attitude towards this technology if it is complicated to understand or has few accompanying risks (Merle et al., 2012). This novel technology is evolving as a promising line of investigation for researchers in e-retail. These technological interfaces and interactions require understanding, validation, and other

constructs in Indian settings so that the relative significance of each construct can be measured in the presence of other constructs.

Logistics is the leading facilitator of e-retail and helps e-retailers achieve competitive advantage. E-commerce logistics involve one-to-one, many-to-one, and one-to-many routing based on the accessibility of products and landing places. To attain customer satisfaction and inspire consumers to make repeat purchases, a significant focus on online retail logistics is required (Xing *et al.,* 2010). However, the absence of adequate logistics infrastructure poses delivery challenges and increases the likelihood of product damage and delayed delivery. Consequently, previous research has highlighted the crucial importance of *electronic logistics service quality (e-LSQ)* as a vital prerequisite for e-retailers (Rao et al., 2014; Jain et al., 2021). As a result, the Logistics Service Market revenue was reported to be around US$1,122.58 Bn in 2018 but is expected to achieve a figure of US$ 2,029.38 Bn by 2027 globally (IBEF, 2020). This increase in demand for logistics services is due to improved logistics infrastructure, growth of e-commerce, and trade activities, especially in emerging economies, including Asia and the Middle East. For example, in India, Logistics Service Providers (LSPs) (companies specializing in managing supply chains and performing activities such as order fulfillment and delivery of products, also known as 3PL) deliver more than 1.9 million shipments every day (KPMG, 2018). However, poor logistics infrastructure poses hurdles for LSPs in delivering products by increasing the delivery time (KPMG, 2018) and increasing the risk of damage to the product during shipment. Such options are of utmost significance in emerging economies (e.g., India), where the GDP per capita is comparatively lower and consumers need to make every money count. Therefore, it becomes a real challenge for e-retailers to guarantee satisfaction so that consumers head towards repurchase the products.

Finally, socioeconomic factors and customer demographics in many developing countries (e.g., Nigeria, Vietnam, Arab countries, China, Thailand, Bangladesh, India, and Pakistan) have

prompted e-retailers to formulate innovative policies such as *Pay-on-delivery mode of payment (POD)* (also known as Cash-on-delivery [COD]), which has become very popular while helping LSPs to focus on shipments and error-free product delivery (Chiejina and Olamide, 2014; International Finance Corporation, 2014; Tandon et al., 2021). As some consumers prefer, the POD mode of payment generates trust, leading to customer satisfaction and product repurchases (Jain et al., 2021). Online shoppers in urban and semi-urban areas (tier II and tier III) and the rural regions of developing countries usually prefer the POD mode of payment and pay after receiving the shipment because they are generally more loss-averse and cost-efficient (Zhang et al., 2019). This segment leads to 50-55% of e-retail shipments (KPMG, 2018). Even after demonetization and various other initiatives by the Indian Government, POD remains the preferred option among Indians (IBEF, 2020). POD addressed the issue of receiving a faulty product and solved the dilemma of using credit/debit cards during online purchases. However, research on the relationship between POD and repurchase intention remains embryonic and requires additional empirical examination of other constructs to comprehend its specific and explicit role in online shopping. For broader applicability in emerging economies, this study validates the moderating effect of POD payments on customer satisfaction and repurchase intention. These constructs have been independently investigated in the literature and are now integrated collectively into a holistic model. Second, this study extends self-determination theory (SDT) (Deci and Ryan, 1985) by incorporating new variables, including the under-explored POD mode of payment and the emerging concept of gamification not being covered concerning customer satisfaction towards e-commerce. Third, drawing on White (2015), this study deepens the knowledge of customer satisfaction using SDT theory. This study seeks to answer the following research question:

- To what extent does implementing e-logistics service quality, VTO, and gamification as critical predictors of e-tailing success enhance customer satisfaction in online shopping?

- To what extent does the POD mode of payment moderate the relationship between the critical predictors of e-tailing success and customer satisfaction and repurchase intentions?

2 Literature review and theory development

A literature review was conducted in the different phases. In the first phase, the theoretical framework of the self-determination theory is presented before a review of the literature on gamification, e-LSQ, and VTO. The role of POD as a moderator between customer satisfaction and repurchase intention was discussed in more detail before the second phase formulated the hypotheses.

2.1 Theoretical Background

2.1.1 Self-determination theory

Self-determination theory (SDT) (Deci and Ryan, 1985) is of utmost significance in marketing literature, as it focuses on the sources of motivation that influence consumer behavior. SDT focuses on how consumers regulate their psychological needs to satisfy themselves (Gagné and Deci, 2005). SDT emphasizes three psychological needs: competence, autonomy, and relatedness. These motivational needs lead to satisfaction and happiness. Deci and Ryan (1985, p.13670) figured out that these three needs are intrinsic motivators. Intrinsic motivation is "the natural inclination towards assimilation, mastery, spontaneous interest, and exploration, which are essential to cognitive and social development. It represents a principal source of enjoyment and vitality throughout life" (Deci and Ryan, 2000, p.70). In other words, intrinsic motivation increases when people experience fascination and delight in a phenomenon. This concept leads to cognitive and social development and in turn, generates enjoyment throughout life (Deci and Ryan, 2000). Extrinsic motivation can be defined as the performance of an activity to attain a separable outcome. A noteworthy characteristic of extrinsic motivation is "instrumentality," where an individual performs some activity for a specific reason (Deci and Ryan, 2000, p.71). External

mechanisms control this behavior. Individuals can be extrinsically motivated through prizes and rewards (Deci and Ryan, 2000), which helps them participate in events.

SDT has been utilized to comprehend the significance of *gamification* in attracting customers. Previous researchers (Reiners and Wood, 2015) have highlighted that obtaining points, badges, or other rewards bolsters people's motivation to participate in gamification activities. In addition, some researchers have suggested that these rewards may be converted into intrinsic motivators and improve engagement (Kim and Ahn, 2017).

VTO is an emerging area in e-commerce, and its adoption is on the rise worldwide (Merle et al., 2012; Zhang *et al.,* 2019), possibly acting as an extrinsic motive. Therefore, individuals perform activities that lead to their self-esteem and self-enhancement. Online retailers perform various activities, such as timely returns (Oghazi et al., 2018), VTO (Zhang et al., 2019), and POD mode of payment (Tandon et al., 2021) to appraise product quality and motivate online buyers to repurchase. To understand which extrinsic and intrinsic motivators reduce ambiguity and indistinctness about a product purchased online, this study integrates the SDT theory. Thus, online retailers rely on intrinsic and extrinsic motivating factors to satisfy online shoppers, which fosters repeat purchases. In online retail, motivators such as timely delivery, hassle-free returns, warranties, and assorted information about the product are critical success factors that online retailers promote on their websites to satisfy online shoppers and make them repeat buyers. Thus, we contend that e-LSQ, VTO, and POD may constitute the extrinsic motivating factors that e-retailers can emphasize. These may contribute to satisfying consumers, while gamification may be an intrinsic motivator, which is in line with previous studies (Martin, 2016; Kim et al., 2017). This study also enhances our understanding of how POD moderates the relationship between customer satisfaction and repurchase intention. Providing POD facilities by online retailers leads to positive perceptions, improves satisfaction, and encourages them to repurchase.

2.1.2 e-Logistics Service Quality

Existing research on service quality in the B2C context deals with the SERVQUAL model given by Parasuraman et al. (1985). However, Bienstock et al. (1997) argued that "SERVQUAL lays a strong emphasis on functional or process dimensions [which] may not adequately address the content validity of the (PDSQ) construct" (p. 34). In the B2C context, extant literature on service quality has focused on website quality (Parsuraman et al., 1985), reverse logistics (Pei et al., 2014; Oghazi *et al.*, 2018), and PDSQ (Xing et al., 2010). E-PDSQ dimensions such as liberal return policy, delivery speed, shipment tracking, and billing accuracy are indispensable for online purchases (Xing *et al.*, 2010). Bienstock et al. (1997) suggested that PDS must comprise three dimensions: availability of products, timely delivery, and service quality. The underpinnings of their research lead to further development of *e-LSQ* scales suitable for e-retailing. The literature supports the notion that timely delivery and reliable e-LSQ positively affect customer satisfaction (Rao et al., 2014). Therefore, items related to product availability, timely delivery, and product conditions on arrival were included in this study. Availability can be defined as the "capability to manage an inventory" (Xing et al., 2010). It indicates information about the accessibility of an item in stock and out of stock (Xing et al., 2010). Timeliness refers to whether products or services are delivered on time, which indicates the accuracy and quality of the item delivered (Xing et al., 2010). Rao et al. (2014) established an e-LSQ scale to understand the relationship between e-fulfillment quality and customer retention by analyzing data from bizrate.com. The authors confirmed that customer satisfaction with the e-LSQ is positively related to customer retention. Therefore, customer satisfaction and repurchase intention are the dependent variables for understanding customer expectations.

3 Hypotheses development (Gamification, VTO, e-logistics service quality)

3.1 Gamification

The principal elements of gamification that impact consumer behavior are rewards, challenges, social influence, assessment, and interactivity (Raman, 2020). These elements form the foundation of any gamification element (Deterding et al., 2011). Werbach and Hunter (2012) suggested various gamification applications like "avatars," “badges,” “content unlocking,” “gifting,” “leader boards,” “points,” etc. But, the most commonly used gamification features are “points,” “badges,” and “leader boards,” mutually termed “The PBL triad” (Feng et al., 2018; Raman, 2020). The PBL triad is considered apt to understand online shopping behavior, as it is a significant customer satisfaction enabler (Raman, 2020; Hassan and Hamari, 2019). By including PBL elements in online shopping websites, consumers indulge in repeat shopping activities, which provide them with the prospect of fetching rewards and collaborating with other consumers (Raman, 2020). Hwang and Choi (2020) argue that tangible and intangible rewards are significant predictors of consumer attitudes, leading to satisfaction and loyalty. Previous studies have emphasized that gamification rewards induce enjoyment (Choi et al., 2020; Feng et al., 2018). Furthermore, badges and leaderboards encourage social influence, and consumers feel a sense of recognition when they overcome a challenge or achieve a milestone (Xi and Hamari, 2019; Li, 2018; Kim and Ahn, 2017). By participating in various activities, consumers collect points and attain explicit targets on gamified e-shopping websites (Kim and Ahm, 2017; Webach and Hunter, 2012). These points spellbind consumers who are inclined to gather those points and are keen on redeeming them.

Likewise, badges also improve consumer inclination and facilitate their participation in gamified environments (Raman, 2020). Consumers fetch badges upon the completion of a particular activity. Meng et al. (2013) highlighted that badges represent expertise and help to gain status symbols. Similarly, leaderboards signify that consumers are arranged in order based on a particular standard. Consequently, consumers can compare their ranks with others, inspiring a spirit of competitiveness (Raman, 2020). This, in turn, may inculcate trust and satisfaction among

online shoppers and passion among online retailers to involve people for a long time (Deterding et al., 2011; Hamari, 2017). Therefore,

H1: *Gamification will have a positive impact on customer satisfaction in online shopping*

3.2 Virtual-try-on technology (VTO)

Online retailers feel the significance of VTO in retail to address the dilemma of "touch and feel" and improve upon consumers' acuity of the shopping experience (Kacen et al., 2013; Tandon et al., 2020). VTO reduces the ambiguity and apprehension of obtaining faulty products by enabling consumers to observe the products online, thereby providing them with a satisfactory experience (Zhang et al., 2019). Furthermore, VTO offers supplementary information to enable decision-making through interactive images, videos, etc., thus facilitating online shopping and improving their experiences (Tandon et al.,2021). These interactions with the good or service assist create a favourable opinion of the company and online merchant. Previous studies have highlighted the significant impact of VTO on purchase intentions (Zhang et al., 2019), attitudes (Almousa, 2020), and trust (Tandon et al., 2021). Furthermore, VTO technology augments the shopping experience because trying-on experiences can be shared with family and friends through social media. Therefore, this surplus information obtained from VTO technology helps consumers form a positive attitude towards online buying, which sequentially affects their intention to purchase online. In contrast, Almousa's (2020) research interpreted that some customers, such as Saudi Arabian females, observe privacy issues relating to VTO. Thus, it can be determined that VTO can improve customer satisfaction, although it sustains some limitations affecting privacy. Therefore:

H2: *VTO will positively impact customer satisfaction in online shopping*.

3.3 e-Logistics Service Quality (e-LSQ)

The e-LSQ is considered an imperative operation for online retailers. Bienstock et al. (1997) insisted on "availability of products," "timeliness of delivery," and "quality of delivery" as vital characteristics of physical distribution service quality (PDSQ) in the case of online retailers. Subsequently, a free and liberal return policy was incorporated into the e-PDSQ to evaluate the capability of an e-retailer to handle defective, broken, or damaged products (Xing et al., 2011; Lin et al., 2016). Online retailers must tailor their logistics services to meet the diverse requirements (Rao et al., 2011; Oghazi et al., 2018). Rao et al. (2011) studied 260 e-retailers and found that distribution quality and cost are significantly associated with customer purchase intention. Studies by Rokonuzzaman et al. (2020) further argue that the liberal return policies of e-retailers reduce - apprehensions about defective products. Therefore,

H3: *e-LSQ will positively impact customer satisfaction in online shopping.*

3.4 POD mode of payment

The POD mode of delivery is a significant policy for online retailers in developing countries where people are apprehensive about digital payment. Low confidence in online payments and the inability to pay through debit card/credit cards, most shoppers in developing countries prefer POD and spend money only after receiving shipment (Chiejina and Olamide, 2014; International Finance Corporation, 2014; Halaweh, 2019; Zhang et al., 2020; Yu et al., 2020; Tandon et al., 2021). Omar et al. (2011) suggested that POD preference is one of the major differences between developing and developed nations. Hussain et al. (2007) suggested that the natives of developing countries prefer POD over credit cards, as they create trust and build positivity. The POD mode of payment is also preferred in countries such as Nigeria (Chiejina and Olamide, 2014), Bangladesh (Rahman et al., 2018), Poland (Polasik and Fiszede, 2009), China (Ho and Awan 2019), Egypt (Hamed and El-deep, 2020), and Pakistan (Anjum and Chai, 2020). POD reduces skepticism about online purchases and builds confidence in repeat purchases (Tandon et al., 2021).

However, the POD construct remains understudied in the literature, especially in relation to other constructs, such as consumer satisfaction, from an integrated perspective. However, due to the intricated operations of online retail with respect to logistics, lack of touch and feel factor, and accuracy of product, POD mode of payment plays a key role in strengthening the relationship between customer satisfaction and repurchase intention (Franco & Bulomine, 2016). shoppers prefer POD mode of payment as it provides them with some assurance that they are giving the money after receiving the product. POD acts as a buffer and mitigates the delayed deliveries thereby enhancing a pleasant shopping experience. It enhances self-confidence, lessens risk of receiving faulty products by ensuring that the quality is better than expected. Online retailers can thus by offering adequate security and convenience of POD, may foster a positive shopping experience, increase customer satisfaction, and ultimately drive repurchase intention thereby attaining competitive advantage. , we may conclude that POD mode of payment increases customer satisfaction by mitigating the risk of faulty products and in-turn leads to increase in recurrent purchases. In fact, most of the studies analyzed POD as a single stand-alone construct (Hamed and El-deep, 2020; Tandon et al; 2021; Halaweh, 2019), while none regarded it as a moderator that strengthens the link between customer satisfaction and repurchase intention a gap which this research tries to build upon. For example, before the inclusion of the POD mode of payment, Indians showed distrust towards online shopping, but after the POD introduction, they became more enthusiastic about it (Tandon et al., 2021). This behavioral change indicates that POD may moderate the link between customer satisfaction and online repurchase intentions. Based on the gap in the existing literature and understanding the moderating impact of POD, we propose:

> ***H4:*** *POD mode of payment moderates the relationship between customer satisfaction and repurchase intention.*

3.4 Customer satisfaction and repurchase intention

Customer satisfaction is a well-established construct in e-shopping and has mainly been studied in marketing and technology adoption domains. Zhang et al. (2020) determined that purchase/repurchase intentions or actual purchases are vital behavioral dimensions in technology adoption research. As discussed previously, in a developing nation such as India, where e-shopping is characterized by sluggish development, it is extremely important to develop a customer base and satisfy them to opt for repeat purchases. Therefore, this study focuses on repurchase intention as the dependent variable. Previous studies have highlighted that online purchases depend on customer satisfaction (Rao et al., 2014; Zhang et al., 2020). Thus, the proposed framework specifies that VTO, gamification, and e-LSQ influence customer satisfaction, which leads to repurchase intention. Hence,

H5: *Customer satisfaction in online shopping is positively associated with repurchase intention.*

4 Methodology

4.2 Measurement Development

The scale items of the identified constructs were operationalized using measurement scales from previously reported studies. Gamification items were assessed using survey items from García-Jurado et al. (2019). The items of the POD mode of payment were taken from a previous study (Tandon et al., 2021). Items for intention to purchase and customer satisfaction were used in Prasad's previous studies (2020) and Zhang *et al.* (2019). The items of the VTO technology were adopted from Zhang *et al.* (2019). The e-LSQ scale was estimated using items from the study by Jain et al. (2020). These scale items were modified to fit the context of online shopping. We measured items using 5-point Likert scale (Appendix 1).

4.2 Data collection procedures

To substantiate the face validity of the scale items, an item screening test was carried out with a panel of six industry professionals (ideally senior managers), academics from a public institution, and Ph.D. candidates. The scales were adjusted in accordance with the minor language, applicability, and alternative suggestions made by this panel. A web-based survey and on-the-ground observations were used to get the data. Due to the simplicity of data collecting and the preservation of respondent anonymity, a web-based survey was undertaken. This process aids in lowering (Andrews et al., 2003). Additionally, an online survey directly saves responses from respondents into a data file, minimizing transcription errors (Zhang et al., 2019).

Several visits and revisits were undertaken to approach the respondents and obtain a representative sample. A mixed-method sampling technique was employed, as the respondents were unknown and difficult to locate (Onwuegbuzie and Collins 2007). Only respondents who had purchasing experience using virtual-try-on technology were considered in this study. Therefore, sampling techniques such as convenience, purposive (also known as judgment), and snowball sampling were used. Based on convenience sampling, websites of various online retailers, such as Myntra.com, Lenskart.com, Voonic.com, Caratlane.in, Biba.in, Nykaa.in, and numerous others were visited, and respondents who had written reviews about the products or purchased through VTO were approached to participate in the survey. Subsequently, respondents were contacted using the purposive sampling method through various websites such as Facebook, Instagram, and YouTube for the online survey. A detailed message was sent to individuals requesting their participation in the survey. Finally, we invited respondents using the snowball sampling method from various social groups/networks, and the questionnaire link was forwarded. According to De Leeuw *et al.* (2008), using the mixed-methods sampling technique reduces the bias caused by the single method, saves time, and improves the survey response rate. The respondents were assured about the concealment of their replies and the preservation of their anonymity to address social desirability bias and persuade them to reply as honestly as possible

(Podsakoff *et al*., 2003). After scrutiny of the responses, 634 were considered for further analysis. Few (around 20) respondents had left the gender and age box empty or wrote unknown entries and were thus not considered in this study.

4.3 Preliminary Data Quality Checks

Several preliminary data quality checks were carried out before proceeding for the actual data analysis. At the first instance, non-response bias was addressed by comparing the early and late respondents. The mean differences between the key constructs were tabulated across early (n=407) and late (n=227) respondents. No significant differences were found between the two groups, indicating the absence of nonresponse bias. Thus, the final sample of 634 participants was considered representative of the entire nation. However, since an online survey was conducted to collect data, a common method bias could emerge owing to the high correlation among constructs. Common method bias was minimized by running principal component factor analysis. The results indicated 30.46% of variance explained by single factor, which is below the recommended value of 50%, and thus suggested the absence of common method bias (Podsakoff et al., 2003). Finally, the normality of the data was checked through the values of skewness and kurtosis. Results of the descriptive analysis show that all the items have skewness and kurtosis values within the prescribed range of ±2 which suggests that there is no issue of non-normality in the study (Garson, 2012).

Table 1: Normality Check

Construct	Skewness	Kurtosis
Gamification	0.923	-0.725
e-Logistics Service Quality	-0.755	1.001
Virtual-try-on technology	-1.084	-1 460
Customer Satisfaction	-1.128	1.952
Repurchase Intention	-0.514	0.388

POD mode of payment	-0.874	1.582

4.3 Demographic Profile and Respondent Characteristics

Table 2 presents respondents' characteristics and shows a fair inclusion of respondents across genders, with 56.78% males and 43.22% females; 69% of people still prefer the POD payment. Therefore, POD was empirically validated as a moderator in this study.

Table 2: Frequency Distribution for Respondents' Demographics

Demographic Characteristic N=634	**Response**	**Percentage**
Gender		
Male	360	56.78
Female	274	43.22
Education Qualification		
Undergraduates	204	32.08
Graduates	274	43.22
Postgraduates	156	24.7
Age		
18-30	222	35.05
31-45	204	32.20
Above 45	208	32.75
Nature of customers		
Student	141	22.24
Self-employed	207	32.65
Service	286	45.11
Hours spend on online shopping in a month		
10 hours	173	27.29
11-15 hours	296	46.69
More than 15 hours	165	26.02
Number of products purchased in last six months by using VTO		
Less than 5	129	20.35
6-10	352	55.52
More than 10	153	24.13
Number of years of online shopping		
Less than 3 years	156	24.61
4-6 years	353	55.68
More than 6 years	125	19.72
Preferred mode of payment		
Pay-on-delivery	454	71.61
Credit card	64	10.09
Debit card	116	18.30

5 Data Analysis and Findings

5.1 Structural Equation Modelling Analysis

Structural Equation Modelling (SEM) using AMOS 24 was used to analyze the data. SEM was favored over other techniques because it combines many standard methods, such as correlation, multiple regression, and factor analysis, into a single software (Lowry and Gaskin, 2014).

5.1.1 Confirmatory Factor Analysis

Next, to ensure the quality, reliability, and validity criteria before proceeding to the structural model assessment, confirmatory factor analysis (CFA) was conducted to ensure a fit between the observed data and a theoretically grounded model that signifies hypothesized causal relationships between latent and observed indicator variables (Hancock and Mueller, 2001, p. 5240).

The results indicated that standardized loadings were above the recommended threshold value of 0.60 for established items (Kline, 2005). The reliability and validity of the constructs and their related scale items are presented in Table 3. The composite reliabilities (CRs) of the constructs were above the acceptable value of 0.7, indicating good internal consistency of the factors. The average variance extracted (AVE) value was greater than 0.5, confirming convergent validity (Hair et al., 2010). To ensure the discriminant validity of the scale items, the values of the square root of AVE were more than the inter-item correlations (Table 4), as suggested by Hair et al. (2010).

Table 3: Measurement Model

Latent Constructs	Items	Std. Loadings	Std. error	Critical ratio	Average Variance Extracted	Composite Reliability
Repurchase intention	RP1	0.748			0.614	0.826
Mean=3.62	RP2	0.857	0.063	18.647		
Std. Dev=0.909	RP3	0.740	0.057	17.304		
Customer satisfaction	CS1	0.651			0.548	0.783
Mean=4.21	CS2	0.784	0.072	15.787		
Std. Dev= 0.68	CS3	0.778	0.075	15.719		
Virtual-try-on technology	VT1	0.634			0.572	0.841
Mean=3.59	VT2	0.727	0.071	14.742		
Std. Dev=0.909	VT3	0.807	0.080	15.795		
	VT4	0.840	0.079	16.098		
Gamification	GM1	0.675			0.522	0.884
Mean=2.87	GM2	0.711	0.070	15.675		
Std. Dev=0.95	GM3	0.756	0.071	16.396		

	GM4	0.773	0.070	16.730		
	GM5	0.781	0.071	16.964		
	GM6	0.683	0.074	15.147		
	GM7	0.667	0.076	14.831		
e-Logistics Service Quality	e-LSQ1	0.710			0.501	0.899
Mean=4.33	e-LSQ2	0.674	0.067	15.231		
Std. dev=0.95	e-LSQ3	0.607	0.071	13.868		
	e-LSQ4	0.623	0.072	14.200		
	e-LSQ5	0.723	0.068	16.168		
	e-LSQ6	0.688	0.074	15.459		
	e-LSQ7	0.692	0.082	15.574		
	e-LSQ8	0.821	0.068	18.023		
	e-LSQ9	0.797	0.068	17.577		
Pay-on-delivery mode of payment	POD1	0.695			0.524	0.844
Mean=4.27	POD2	0.850	0.066	18.317		
Std. Dev=0.57	POD3	0.741	0.067	16.549		
	POD4	0.580	0.058	13.220		
	POD5	0.727	0.079	14.979		

5.1.2 Structural Model

The hypothesized model was estimated for all constructs to obtain satisfactory results from the measurement model (Table 5 and Figure 1). The e-LSQ gained strong support (β = 0.643, p < 0.001) and emerged as the strongest predictor of customer satisfaction in online shopping, thereby validating H3, which states that e-LSQ is positively related to customer satisfaction. The e-LSQ was followed by VTO (β = 0.331, p < 0.001), thereby lending support to H2. This finding reveals a significant effect of VTO on customer satisfaction. Conversely, gamification was an insignificant predictor of customer satisfaction (β = 0.047; p = 0.332), thereby invalidating H1, which specifies a significant impact of gamification on customer satisfaction. Finally, H4, which indicates that customer satisfaction leads to repurchase intention, gained substantial support (β = 0.600; p < 0.001). All the fit indices indicated an acceptable fit (Table 6). Thus, the hypothesized model logically presented the structures underlying the observed data.

Table 4: Correlation Matrix

	GAM	E-LSQ	VTO	CS	RP	POD
GAM	***0.722***					
e-LSQ	-.288**	***0.707***				
VTO	-.117**	.302**	***0.756***			
CS	-.223**	.425**	.150**	***0.74***		
RP	-.120**	.238**	.143**	.499**	***0.783***	
POD	-.255**	.612**	.319**	.346**	.252**	***0.723***

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Note: Diagonal values in bold represent the square root of the average variance extracted (AVE), while off-diagonal values represent the raw inter-construct correlations.
GAM=Gamification, POD: POD mode of payment, VTO: Virtual try-on-technology, REP: Repurchase Intention, CS: Customer Satisfaction, e-LSQ- e-Logistics Service Quality

Table 5: Structural Model

			Std. Estimate	SE.	CR.	P	Results
e-Logistics Service Quality	→	Customer Satisfaction	0.643	0.115	7.177	0.001	Accept
Gamification	→	Customer Satisfaction	0.047	0.047	0.954	0.340	Reject
Virtual try-on-technology	→	Customer Satisfaction	0.331	0.107	3.67	0.001	Accept
Customer Satisfaction	→	Repurchase Intention	0.628	0.103	7.759	0.001	Accept

Goodness of fit statistics CMIN/df=2.658, GFI=0.958, NFI=0.976, AGFI=0.921, RFI=0.978, TLI=0.984, CFI=0.966, RMSEA= 0.045, *** significant at 0.001 probability level, **significant at 0.01 probability level

Table 6: Path analysis after moderation

			Std. Estimates	**SE.**	**CR.**	**P**
Direct effects						
POD mode of payment	→	Repurchase Intention	0.406	0.044	9.411	0.000***
Customer Satisfaction	→	Repurchase Intention	0.479	0.037	12.848	0.000***
Interaction effects						
Customer satisfaction * POD	→	Repurchase Intention	0.050	0.026	1.380	0.016**

5.2 Moderating effect of POD mode of payment

Moderation analysis was performed to test the hypothesis that POD moderates the relationship between customer satisfaction and repurchase intention (AMOS 24.0). To test for this moderating effect, we followed Chin *et al.'s* (2003) method, which comprises estimating two models: (1) one without interaction effects and (2) one with interaction effects. The first model is limited to the estimation of the direct effects of the independent variable (i.e., customer satisfaction) and moderator (i.e., POD) on the dependent variable (i.e., repurchase intentions). The results also confirm the significant impact of POD on repurchase intentions (β = 0.426, p < 0.001), and the impact of customer satisfaction is replicated and confirmed to be significant (β = 0.628, p < 0.001). In the second model, the estimation of the direct paths was complemented by the assessment of the interaction term between customer satisfaction and POD. First, all the direct paths were statistically significant. Figure 2 indicates that the paths exhibited a significant p-value of less than 0.001 and that the overall model accounted for 26 percent of the total variance. Therefore, as shown in Figure 2 and Table 6, H5 is supported (Std estimates= 0.05, p< 0.01). The path coefficient between customer satisfaction and repurchase intention was (0.479). This coefficient is lower than the main effect between customer satisfaction and repurchase intentions found in the first model, in which POD was not analyzed as a moderator. These results suggest that the interaction between POD and customer satisfaction has an additional effect on the total effect between customer satisfaction and repurchase intentions. Therefore, POD acts as a moderator between customer satisfaction and repurchase intention, although the interaction effect is weak compared to the main effect (Table 5). In other words, customer satisfaction predicts repurchase intentions, but this effect is reduced with the availability of POD in online purchasing.

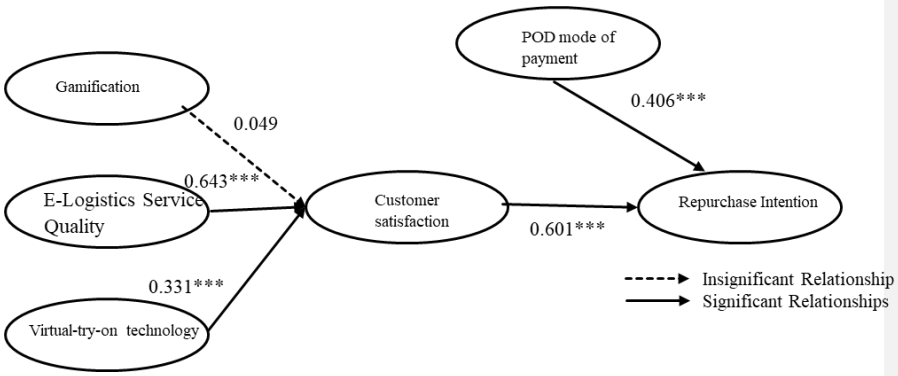

Figure 1. Path analysis without moderation

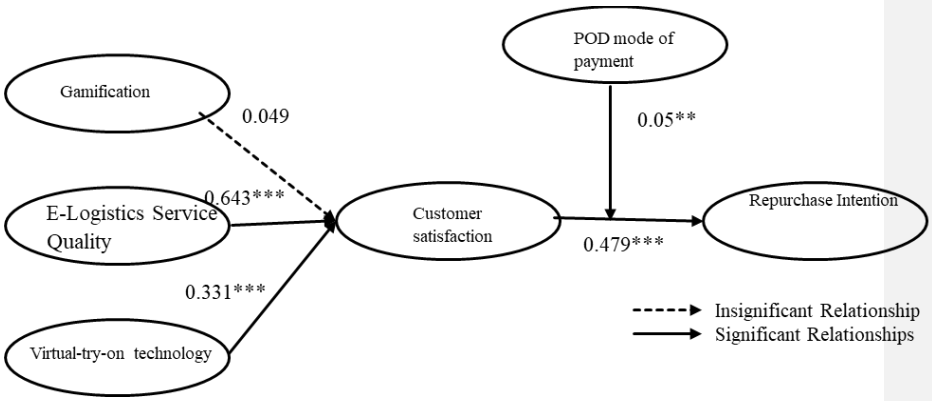

Figure 2. Path analysis with moderation

6 Discussion

This research proposes that gamification, e-LSQ, and VTO significantly impact customer satisfaction, thus inducing repurchase intention. Furthermore, the POD mode of payment was validated as a moderator between customer satisfaction and repurchase intention.

In line with the first research question, e-LSQ and VTO had a significant positive relationship with customer satisfaction. e-LSQ had high loadings, reflecting that liberal return

policies, timely delivery, and error-free products instilled confidence in online purchases and led to customer satisfaction. This finding is in agreement with other related studies indicating a positive relationship between e-LSQ and customer satisfaction (Xing et al., 2011; Lin et al., 2016; Rao et al., 2011; Rokonuzzaman et al., 2020). The e-LSQ was followed by VTO, which also emerged as significant, indicating a positive impact on customer satisfaction. Again, this finding aligns with other correlated studies that emphasize the positive association of VTO and gamification with customer satisfaction (Tandon et al., 2021; Zhang et al., 2019). Both e-LSQ and VTO had high loadings, suggesting that e-retailers should incorporate and display e-LSQ policies and VTO on their websites and certify timely and hassle-free shipment delivery to maximum area postal codes in developing countries, such as India. Furthermore, a dedicated focus on reverse logistics and hassle-free returns may generate confidence and overcome apprehensions among Indians regarding online shopping.

Surprisingly, despite positive results from previous research, gamification had an insignificant impact on customer satisfaction. This finding is contrary to previous investigations(Jones et al., 2014; Feng et al., 2018). There may be several reasons for this. Firstly, adding excessive rewards might confuse online buyers leading to frustration. Adding multiple challenges and badges rather than streamlining the online shopping makes consumers perplexed. Further, gamification often raises expectations about rewards, however, online shoppers may feel let down if their expectations are not satisfied. For example, if a loyalty programme promises special benefits but delivers only nominal savings, shoppers may feel upset and abandon shopping from the site. This indicates that utmost care needs to be taken while designing gamification. Businesses must judiciously stabilize the shopping experience with gamification elements to ensure that customers feel empowered rather than overwhelmed and dazed. Further, discussing blended outcomes will probably not be the opposite since this investigation centers on online shopping in a developing country like India. This suggests that gamification might be a novel

activity in a country, and even though individuals know about this innovation, they have not utilized it much time due to its complex operations. However, as expected, customer satisfaction had a significantly positive effect on repurchase intention.

Additionally, the results indicate that POD has a weak moderating effect on the relationship between customer satisfaction and repurchase intention. POD has been tested as a construct in several previous studies (Tandon et al., 2021; Hussain et al., 2019; Chiejena and Olamide, 2014). First, few studies have validated the POD mode of payment as a construct. Additionally, the moderating role of POD has not been validated in past research; thus, there is a dearth of literature support, and this is a novel finding of this study. The findings indicate that attitudinal appraisals (satisfaction) ensure continuance behavior. However, the consumption experience with actual shopping and paying after receiving the product (POD) also plays a significant role in the continuance of the behavior. This finding offers additional insights into the relationship between customer satisfaction, repurchase intention, and POD.

7 Implications of the Study

7.1. Theoretical implications

This study makes several contributions to both academics and practitioners. First, it establishes a theoretical link between e-LSQ, VTO, and customer satisfaction. The study also analyzes the impact of gamification on customer satisfaction and POD as a moderator between customer satisfaction and repurchase intention. Finally, this research enriches our understanding of the intrinsic and extrinsic motivators influencing online shopping by extending SDT theory.

This research empirically validates e-LSQ, gamification, and VTO in a single study, thereby underpinning each motivator's significance in the presence of others. In this study, the e-LSQ emerged as the most substantial factor leading to customer satisfaction. Therefore, adequate importance is given to the proper dispatch of the product to delivery so that damage to the product may be minimized. Furthermore, this study confirms the importance of hassle-free returns in

determining customer expectations and improving the overall shopping experience (Bonifield *et al.*, 2010; Li *et al.*, 2013).

Another significant contribution of this study is the analysis of VTO, which provides a holistic view of how this technology leads to customer satisfaction. Focusing on VTO and using this option can inculcate a positive attitude among consumers, thereby increasing their purchase intention. Simultaneously, in line with previous research, VTO add-ons should be deployed while assuring consumers of their security (Zhang et al., 2019). This is especially important since some cultural or religious hindrances might prevent consumers from using the add-on. For example, in some cultures and religious traditions, women (or even men) may feel uncomfortable using a program that records pictures or videos of their body parts. Therefore, clear policies about privacy, access to, and protection of personal data might be of utmost need in such contexts.

Surprisingly, despite the critical aspect of gamification for user motivation and engagement (Bilgihan et al., 2016), consumer retention, and the overall shopping experience (Feng et al., 2018; Raman, 2020), the construct does not seem to impact customer satisfaction. In contrast to this hedonically related factor, other utilitarian drivers, such as e-LSQ and VTO, seem more impactful in this regard.

As expected, satisfaction impacts repurchase intentions, but this study contributes further to the literature by revealing the moderating role of POD between customer satisfaction and repurchase intention. These results are significant for developing economies, although developed economies might learn lessons from them too. Although customer satisfaction remains an essential predictor of repurchase intention alone, it may not be sufficient to explain it. An adequate focus on e-LSQ and POD by e-retailers and their LSPs will help retain customers. This is indeed a unique contribution of this research to academia and e-retailers.

7.2. Managerial implications

Given the comparative importance of e-LSQ on customer satisfaction, e-retailers should not only properly dispatch products with minimum product damage but also monitor the inadequate and unprofessional service of LSPs. Design strategies for timely delivery of quality products are also recommended. For example, the chances of damage or delivery of product quality can be minimized by providing instructions to vendors to transport the products to fulfillment centers for final packaging after adequate scrutiny. Another strategy for reducing returns is to handle discrepancies between product descriptions and actual offerings. Managers should improve or implement effective reverse logistics processes to ensure a high e-LSQ. This may increase customer satisfaction and pave the way for repurchase intention.

As the second most influential factor in customer satisfaction, e-tailers should consider adding VTO functionalities. Since this technology is still relatively new in many developing countries and some developed ones, online retailers need to incorporate it into their websites, especially those selling apparel, and formulate clear privacy and data protection policies. Going a step ahead, online retailers can also encourage younger customers to share their try-on presentations with peers through social media.

Finally, in the context of developing countries, POD directly affects repurchase intentions while minimizing the importance of customer satisfaction in increasing these intentions. Therefore, e-retailers need to extend POD to most postal codes. It should be stressed that POD may decrease the recourse to reverse logistics by handling delivery issues when delivery occurs, explaining the comparatively lower importance of customer satisfaction as an outcome of the e-LSQ, which comprises reverse logistics. Nonetheless, online retailers may use third-party logistics (3PL) providers to implement a reverse logistics system, as consumers might desire to return the product on POD. This can be done through a three-tier procedure entailing framing a substantial and impartial return policy, understanding the costs involved with product returns, and engaging a third party dealing exclusively with returns (Pei et al., 2014; Oghazi et al., 2018).

Since this study aimed to comprehensively explore the impact of multiple predictors of customer satisfaction and repurchase intentions, online retailers can formulate operative marketing strategies articulating cohesively by order of importance: e-LSQ (with a special reverse logistics applet), POD, and VTO technology.

8. Limitations of the research and directions for future research

While contributing to existing marketing theory and literature, this study has a few limitations recognized by researchers as future research directions. An essential limitation of this study was the lack of generalizability of the findings. Since the data were collected from North Indian States, the results may be more applicable to India's northern states. This research may be extended to Eastern, Western, and Southern parts of India as the exposure to technology and the logistical infrastructures are different in those areas. To test the validity of these findings, this study may be extended to other developing countries. Further, future researchers may also consider the role of control variables which this study didn't consider. However, the study of POD might also be investigated in developed economies, where POD could be compared to credit card payments on satisfaction, intentions, and actual shopping behavior. Second, variables such as personal innovativeness, perceived risk, website quality, and government policy can be included as independent variables and customer loyalty as the dependent variable. Simultaneously, age, gender, and culture can be used as moderators. The study also leaves room to validate these variables for mobile shopping.

Finally, systematic literature reviews, bibliometrics, and network analysis could further conclude the developing body of knowledge regarding SM usage, VTO, and POD in online shopping decision-making processes. This study uses SDT theory to understand the constructs. Future research could use other theories as a theoretical background, such as Use and Gratification, Signaling theory, and UTAUT2 by eminent researchers.

Journal Specific Statements

Declarations of interest: none

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data Availability Statement: The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest Statement: Authors declare that there is no conflict of interest with any competing authority

Consent to participate: Informed consent was obtained from all individual participants included in the study

Ethical Approval

This is a descriptive study and measures the perception of the online shoppers. The University Research Ethics Committee has confirmed that no ethical approval is required.

Appendix 1

	Gamification
GAM1	Points1 The way points/votes are received when commenting on products is understandable
GAM2	Points2 The points/votes system correctly reflects my efforts to comment on products
GAM3	Badges1 The badges that can be obtained from online websites reflect the good work done as a reviewer
GAM4	Badges2 The badges that can be obtained are perfectly defined
GAM5	Leaderboards1 The ranking of top reviewers is well designed
GAM6	Leaderboards2 The ranking of top reviewers reflects my status when I comment
GAM7	Leaderboards3 The reputation that I have as a reviewer can be easily checked
	e-Logistics Service Quality
e-SQ1	Shipping options provided help me to purchase the product online.
e-SQ2	Information about item availability help me to purchase the product online.
e-SQ3	Order tracking help me to purchase the product online.
e-SQ4	On-time delivery help me to purchase the product online.
e-SQ5	Shipping charges provided help me to purchase the product online.
e-SQ6	Charges presented clearly motivate me to buy online
e-SQ7	Error free delivery motivates me to purchase online
e-SQ8	Free return policy mentioned on the website motivates me to purchase online
e-SQ9	Online retailers fullfil my expectations by providing product not available in nearby shops.
e-SQ10	Quick return policy motivates me to shop online
	Virtual-try-on technology
VTO1	This tool helped me to learn more about the product.
VTO2	With the help of this tool I can choose better products for myself.
VTO3	This tool provides timely information about new items
VTO4	This tool supplies relevant information.
VTO5	This tool provides accurate information.
	Customer Satisfaction
CS1	I am satisfied with my purchase.
CS2	I am satisfied with POD mode of payment
CS3	I am satisfied with quality of product received through online purchase
	Repurchase Intention
RP1	I would like to re-buy products from online retailers continuously
RP2	It is likely that I will continue purchasing online
RP3	I expect to repurchase from online retailers in near future.
	POD mode of payment
POD1	I think POD is a reliable mode of payment (Tandon et al., 2021)
POD2	I prefer to buy from online retailers offering POD mode of payment
POD3	I prefer to pay through POD
POD4	POD mode of payment facilitates easy returns of defective products
POD5	POD gives me confidence for future purchase

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