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Analyzing the complexities of chatbots, virtual try-on and digital payment mode on customer satisfaction: an empirical study of online shoppers

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Abstract

Purpose – The present study incorporates the extended unified theory of acceptance and use of technology (UTAUT2) with chatbots (CBs) and virtual try-on (VTO) as new variables, in accordance with global developments that have resulted in online purchasing becoming an emerging trend among consumers in the digital era.

Design/methodology/approach – The research used a survey instrument utilizing snowball sampling, gathering data from 600 consumers in northern India. PLS-SEM was employed to empirically validate the conceptual model and test the study hypothesis. A conceptual model was constructed utilizing both existing and new variables.

Findings – The research demonstrated that performance expectancy (PE), habit (H) and price value (PV) have a significant positive relation with customer satisfaction (CS), which subsequently fosters continued intention (CI). Conversely, effort expectancy (EE) did not seem to significantly influence consumer satisfaction. The results demonstrate that CBs, VTO and digital payment mode (DPM) exert a favorable and significant effect on consumer satisfaction. Furthermore, customer satisfaction exerts a substantial and favorable impact on the intentions to continue.

Originality/value – This study enhances the literature by amalgamating VTO and CBs with UTAUT2 to develop a comprehensive model for analyzing online shopping adoption. Online retailers should concentrate on these critical variables that substantially impact customer satisfaction to develop strategies for recruiting new clients.

Keywords Online shopping, Digital payment mode, Virtual try-on, Chatbots,
Unified theory of use and technology 2 (UTUAT 2)

Paper type Research article

1. Introduction

The accelerated advancement of technology has generated opportunities for both consumers and sellers. Chatbots (CBs) and virtual try-on (VTO) are the technologies that have transformed the e-commerce scenario. Earlier studies on VTO that have primarily focused on their impact on purchase intention (Beck and Crié, 2018; Javornik *et al*., 2016), however, the current study employs CBs in conjunction with VTO to investigate their impact on customer satisfaction of online shoppers. Digital payment mode (DPM) is an additional critical construct that has been added in the study. DPM is essential in the technologically advanced environment and facilitates e-commerce. Tandon and Kiran (2018) incorporated pay-on-delivery in their first study. As POD has given way to DPM, the current study has considered DPM as a construct.

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Relying on Venkatesh *et al.*'s (2012) UTUAT2 model, this study has added CBs; VTO and DPM as new constructs to provide an integrated model. The dependent variable is customer satisfaction. The study moves ahead and links customer satisfaction with continued intention. Thus, this research will offer retailers valuable insights to have a complete view and focus on significant drivers. Accordingly, the study sets out to examine several key relationships. First, it investigates the impact of performance expectancy (PE), habit (H), price value (PV), effort expectancy (EE) and social influence (SI) on customer satisfaction. Second, it evaluates how emerging technologies – specifically virtual try-on (VTO) and chatbots (CBs) – influence customer satisfaction among online shoppers. Third, the research assesses the role of digital payment mode (DPM) in shaping customer satisfaction. Finally, the study analyzes how customer satisfaction translates into continued intention (CI) to engage in online shopping.

Earlier researchers have been investigating the influence of technology adoption, payment method (Tandon and Kiran, 2018), and repurchase intention on online shopping (Venkatesh *et al*., 2012). The enduring presence of cultural differences, sluggish adoption and penetration of internet services, and a preference for in-person purchasing have impacted online shopping. Researchers have widely employed diverse theoretical models to comprehend the behavior of online consumers regarding the acceptance and utilization of digital platforms. Porter and Donthu (2006) and Wixom and Todd (2005) contend that the technology acceptance model (TAM) requires augmentation through the integration of additional components to improve comprehension of online shopping purchase intention. To address the shortcomings of the TAM, the theory of planned behavior (TPB) was incorporated in earlier studies (Delafrooz *et al*., 2011; Meskaran, 2015). This was accomplished by incorporating additional components into the perceived behavior control (PBC). Venkatesh *et al*. (2003) advanced their research on online purchasing by developing the unified theory of acceptance and use of technology (UTAUT) paradigm. This model has the following elements: user behavior (UB), performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC) and behavioral intention (BI). Venkatesh *et al*. (2012) incorporated three further components in their UTAUT2 study: hedonic motivation (HM), price value (PV) and habit (H). This presented an opportunity to implement chatbots and virtual try-on technology and evaluate their effects on online commerce. Research conducted by Muthumani *et al*. (2017) posits that the degree of engagement in online purchasing is influenced by convenient payment methods, such as cash on delivery, return and exchange options. Tandon and Kiran (2018) introduced pay on delivery (POD). However, this study includes DPM due to its growing importance. However, virtual try-on (VTO), chatbots (CBs) and digital payment mechanisms (DPMs) need more detailed analysis. This study examines the impact of UTUAT2 drivers, along with new constructs (VTO; CBs and DPM), on customer satisfaction and further on continued intention.

2. Theoretical underpinning and background literature

2.1 Consumer behavior and online shopping

Early research on online shopping depicts results based on the frameworks and constructs considered. Palau-Saumell *et al.* (2019) used UTAUT-2 to study restaurant search and reservation mobile app adoption. Researchers added perceived credibility and redesigned price value and social influence to online shopping adoption. Li *et al*. (2018) studied used performance expectancy (PE), social influence (SI), facilitating conditions (FCs) and experience expectations to examine charity crowdfunding donors' intentions. Although there is a wide range of literature on online shopping, limited literature is available examining online shopping in the context of demonetization and the shift toward online shopping. Mehta *et al*. (2016) asserted that despite the emergence of digital currency, cash still predominates in many economies, including India. Rani (2016) criticized demonetization, considering it an adverse situation; however, she mentioned that it helped consumers shift toward a cashless economy, e.g. Paytm and internet banking. Kalyani (2016) also corroborated the transition to digital mode after demonetization in India. Though the government of India has encouraged the use of

digital options for payments (Economic Survey, 2017); the real challenge is technology adoption among all age groups (Antoniou and Ansoff, 2004). Youth is leveraged for the promotion of digital literacy (Mahajan and Singla, 2017). Demonetization by the Indian government in 2016 and further reforms in Internet banking services are positive steps toward advancing online consumerism. This was further supported by Banerjee and Sayyed (2017), who also advocated that the Indian economy is moving strongly toward being a cashless economy and demonetization has triggered this move toward digital payments. We all know that new technologies are often embedded in products and services, and online shopping is expanding in India. Nagesh *et al*. (2024) assess the risk factors related to buying through social media platforms by employing a quantitative approach and also develop an instrument to assess the digital buyers risk factor score (DBRFS) in times of uncertainity. The results highlight that risk-taking by the male and female is at par. One vital challenge faced in online shopping is whether India is ready to switch to digital payment mode, as it is still considered to be a cash-driven economy. In the current research, the UTAUT2 framework was extended by taking the digital payment mode as a new construct.

2.2 Chatbots and virtual try-on technology

Smink *et al*. (2019) examine the effect of virtual try-on technology (VTO) on brand responses and personal data disclosure. Results highlight that augmented reality enhances personal informativeness and personal enjoyment while engaging in online shopping. Ashfaq *et al*. (2020) examines the effect of various predictors along with chatbots on the satisfaction level of users. The results reveal that in the future chatbots would play a vital role in satisfying digital users. Kasilingam (2020) has examined the impact of attitude toward chatbots on consumer's intention during mobile shopping. Further, Tandon (2023) uncovers the relationship between VTO, return policies, pay on delivery (POD) payment mode and repurchase intention taking trust as a mediator. Results indicate that VTO does not show a significant effect on trust. De Cicco *et al*. (2020) explores the influence of visual cues and interaction styles on social presence and whether it leads to increased perceived enjoyment and trust among consumers. Findings suggest that a socially oriented interaction style increases users' perception of social presence.

In another study by De Cicco *et al*. (2021), an experiential test has been conducted to study the influence of a social-versus task-oriented interaction style chatbot on social presence and trust, perceived enjoyment and behavioral intention, taking the case study of the online food industry. Results depict that the interaction with the chatbot increased users' perception of social presence and perceived enjoyment, while it did not have any direct and significant effect on trust and intention to use. Thus, there are mixed results, while studies do indicate the importance of chatbots and VTO, however, there is still a need to examine this deeply.

3. Conceptual framework and hypothesis development

Technology acceptance has long lured researchers across the globe to develop new models that can be used to explain e-shopping. UTAUT 2 initially was used for mobile technology, but Venkatesh *et al*. (2012) inspired researchers in developing and developed counties to test and validate the model. The original UTAUT 2 model may be reconsidered in light of two new constructs, CBs and VTO and also, DPM to gauge the CS of online shoppers. The present research, therefore, considered UTUAT2 in an Indian setting for analyzing CS in the context of online shopping. A brief summary of prior UTAUT/UTAUT2 literature is presented in Table 1 in the supplementary sheet.

The researcher critically reviewed the UTAUT2 and proposed a revised theoretical model that was tested using a combination of exploratory factor analysis and structural equation modeling (PLS-SEM). Customer satisfaction is a dependent variable, while CBs, DPM and VTO have been taken as new online shopping drivers. Customer satisfaction is the dependent

variable that leads to continued intention. Independent variables are performance expectancy, effort expectancy, price value, habit and social influence. All these variables are part of UTAUT2. Other drivers of online shopping that have been considered are digital payment mode, chatbots and virtual-try-on technology.

Performance expectancy (PE) relates to using the system to accomplish advantages in job performance (Venkatesh *et al*., 2003). Perceived usefulness in TAM (Davis, 1989) refers to the conduciveness of users to purchase. Performance expectancy has been cited and empirically examined by Tandon and Kiran (2018) and is an important predictor of online shopping. Behavioral intention is significantly and positively influenced by performance expectancy in online hotel bookings (Chang *et al*., 2019). Additionally, PE significantly affects the use of technology in various fields, as highlighted in various previous studies (Palau-Saumell *et al.*, 2019). UTAUT was tested for Chinese consumers by Li *et al*. (2018), and the results confirmed that donor's intention to donate to various projects are significantly affected by PE. Contrary to this, Sareen and Jain (2014) found no significant relationship between performance expectancy and behavioral intention.

H1a. Performance expectancy has a direct positive impact on customer satisfaction.

Effort expectancy is defined as the degree of ease associated with the use of the system (Venkatesh *et al*., 2003). Effort expectancy has emerged as the strongest predictor influencing online shopping, as highlighted in previous studies (Yaprakli *et al*., 2013; Sareen and Jain, 2014). Also, EE significantly affects the use of technology in various fields, as highlighted in previous studies (Palau-Saumell *et al.*, 2019). UTAUT was tested for Chinese consumers by Li *et al*. (2018), and the results confirmed that a donor's intention to donate to various projects is significantly induced by EE. But in the studies of Lian and Yen (2014), Baptista and Oliveira (2015), Chiu *et al*. (2009) and Zhang *et al*. (2019), effort expectancy emerged as an insignificant variable.

Price value (PV) refers to stipulating value for money and product availability at rational prices (Venkatesh *et al*., 2012). The cost and pricing structure may have a significant impact on consumers' technology use (Venkatesh *et al*., 2012). Behavioral intention is significantly and positively influenced by price value in online hotel bookings (Chang *et al*., 2019). When UTAUT2 was tested for Spanish consumers, Palau-Saumell *et al.* (2019) found that price saving orientation is significantly related to use while using mobile applications for restaurant searches and reservations. Yang *et al*. (2013) found a positive impact of price value on e-learning, but the study of Albugami and Bellaaj (2014) reported no significant impact of price value on mobile payment in China. A habit is the extent to which a person tends to perform a behavior automatically because of learning (Venkatesh *et al*., 2012). Behavioral intention is significantly and positively influenced by habit in online hotel bookings (Chang *et al*., 2019). When UTAUT2 was tested for Spanish consumers, Palau-Saumell *et al.* (2019) found that habit is significantly related to use while using mobile applications for restaurant searches and reservations.

Social influence (SI) is defined as "The degree to which an individual perceives that others belief in the use the new system" (Venkatesh *et al*., 2003). SI was interpreted as whether reviews of verified customers help customers in locating the right product. Earlier literature (Chang *et al*., 2019) highlights a direct relationship between social influence and behavioral intention. Additionally, SI significantly affects the use of technology in various fields, as highlighted in various previous studies (Palau-Saumell *et al*., 2019).

The proposed hypotheses for the current study are:

H1b. Habit has a direct positive impact on customer satisfaction.

H1c. Effort Expectancy has a direct positive impact on customer satisfaction.

H1d. Price value has a direct positive impact on customer satisfaction.

H1e. Social Influence has a direct positive impact on customer satisfaction.

3.1 Chatbots

We have many assistants today, like Siri and Alexa. Chatbots are very common today. They find their application in many fields like education and investment; whether we open Grow, an investment app, or IELTS booking, we have chatbots to assist us. They are available 24*7. There is empirical validation through researchers that the intention to purchase can be stimulated through collaborative and interactive systems and devices (Danckwerts *et al*., 2019; Mathwick *et al*., 2001). Chung *et al*. (2020) also supported that chatbots' assistance enhances customer satisfaction. Still, there is a greater need to understand the role of chatbots and their impact on online shopping and to examine whether chatbot conversation supports new levels of customer interaction and stimulates behavioral intention (Sampson and Chase, 2020).

H2. Chatbots significantly influence customer satisfaction of online shoppers.

3.2 Virtual-try-on technology

We all remember an advertisement by Lenskart where you could try different glasses virtually and order online. E-retailers introduced virtual-try-on technology to assist online shoppers to try out different combinations of dresses, cosmetics, glasses, etc. (Kim, 2016; Lin and Wang, 2016; Zhang *et al*., 2019). Such technology for online clothing retailing is considered to be laying new trends in online shopping. VTO technology, as highlighted by Beck and Crié (2018), has been positively associated with customer's buying behavior. Yen *et al*. (2017) also confirmed a positive relation among perceived usefulness, perceived ease of use and intention toward virtual fitting room. So there is a lot of scope for retailers in this field. Our research intends to deepen the understanding of the role of VTO for online consumers' satisfaction. Baytar *et al*. (2016) have supported its use for information related to apparel attributes (e.g. size and color). This approach focuses on usefulness and ease of use (Hirst and Omar, 2007). The hedonic value is expressed through making shopping an enjoyable experience (Merle *et al*., 2012; Pachoulakis and Kapetanakis, 2012). Zhang *et al*. (2019) propose that online consumers' usage experiences with attitude toward VTO technology have a positive influence on online shoppers' buying intention. The associated hypothesis is:

H3. Virtual try-on technology significantly influences customer satisfaction of online shoppers.

3.3 Digital payment mode

The UTAUT 2 model fascinated a lot of researchers. Tandon and Kiran (2018) validated the role of cash-on-delivery (COD) mode of payment as a construct and ease of ordering as a new dimension to UTAUT2. As technology improved, COD as a mode of payment, which was very popular in developing countries like India, was being replaced by other digital modes of payment. Further research by Irimia-Diéguez *et al*. (2023) examines the critical factors in the adoption by customers, a peer-to-peer (P2P) mobile payment system widely used in Spain. This study proposes a theoretical framework based on the stimulus–organism–response (S-O-R) model and tries to understand the moderating effect of perceived risk and the mediating effect of perceived trust. The results show that perceived usefulness is the most important predictor of intention to use. Digital payment mode (DPM) as an e-commerce payment system facilitates the use of e-payment for online transactions. DPM has been validated as a new construct of online shopping influencing behavioral intention (Gupta *et al*., 2022). This highlights the passion for using new payment modes. In view of this, the following hypothesis has been proposed.

H4. DPM (Digital payment mode) significantly influences customer satisfaction of online shoppers.

3.4 Customer satisfaction and continued intention

Venkatesh *et al.* (2003) in the unified theory of acceptance and use of technology (UTAUT) used theory of reasoned action (TRA), the technology acceptance model (TAM), the motivational model, the theory of planned behavior (TPB), a combined TBP/TAM, the model of PC utilization, innovation diffusion theory (IDT) and social cognitive theory (SCT). Performance expectancy similar to perceived usefulness in TAM; effort expectancy covering perceived ease of use in TAM; social influence analogous with subjective norm in TAM 2; facilitating covering perceived behavioral control of TAM-TPB. Numerous researchers applied UTAUT in new contexts and in new cultural settings like China (Lian and Yen, 2014), Iran (Yaprakli *et al*., 2013), and India (Sareen and Jain, 2014). The use of technology for hedonic purpose was still not clearly imminent in the earlier UTUAT model. Thus, UTAUT 2 (Venkatesh *et al*., 2012) incorporated hedonic motivation (HM), price value (PV) and habit (HAB). These additions helped in enhancing variance explained in behavioral intention (56–74%) and technology use (40–52%). Ajzen (1991) highlighted that the stronger the intention of doing a certain task, the more likely the task will be performed. Moreover, intention to perform the task is the immediate antecedent of the actual consumer behavior. Customer satisfaction is of utmost significance to any retail organization, as it results in customer retention (Chung and Shin, 2010; Chen *et al*., 2012). Therefore, by focusing on this aspect, sales could be increased in the form of repetitive purchases (Khalifa and Liu, 2007; Yiu *et al*., 2007). If a consumer forms a positive attitude toward a product, then definitely he would repurchase that product in the form of continued intention (Pavlou and Fygenson, 2006; Tsai and Huang, 2007; Wang and Head, 2007). This positive attitude is actually customer satisfaction. Most of the studies in developed countries have focused on behavioral intention, but in developing countries like India, taking intention as a dependent variable is a little skeptical; therefore, we have taken customer satisfaction as the dependent variable.

H5. Customer satisfaction has a significant positive effect on continued intention.

Thus, in this study, we are using customer satisfaction as a dependent variable, but the study wants to examine the influence of CBs and VTO along with the initial drivers of UTAUT2 on continued intention, as these are the recent developments, and still limited research has been undertaken in this area. The proposed model is shown in Figure 1.

4. Data and method

4.1 Data

Data were collected from 600 respondents through a survey, using snowball sampling, with the link shared through email. Furthermore, the use of snowball sampling introduces inherent sampling bias, limiting the generalization of the findings to a broader population. While effective in reaching digitally active respondents, this non-probability sampling method may overrepresent certain user groups and under represent others. Future studies should adopt probability-based sampling techniques to enhance the external validity of the results. The population of this research comprised North Indian Internet-savvy online consumers. In Northern India, three states were covered, i.e. Punjab, Haryana and Himachal. This sample structure was intentionally designed to reflect active online shoppers in semi-urban and urban regions, where digital access and technology adoption are growing rapidly. By targeting this demographic, the study captures the behavioral patterns of a segment that is highly relevant for understanding emerging e-commerce trends in India.

First, a pilot study was done by sending it to 50 online shoppers for checking the face validity of the questionnaire. Data were also collected from 50 academicians to check the content validity. Based on the review, some of the items were deleted and some were reframed. Further, those items were retained with reliability greater than 0.7. Initially, a questionnaire was sent to 800 people, and they were asked to circulate it further to online shoppers in their peer group. The data were collected over a three-month period between November 2023 and

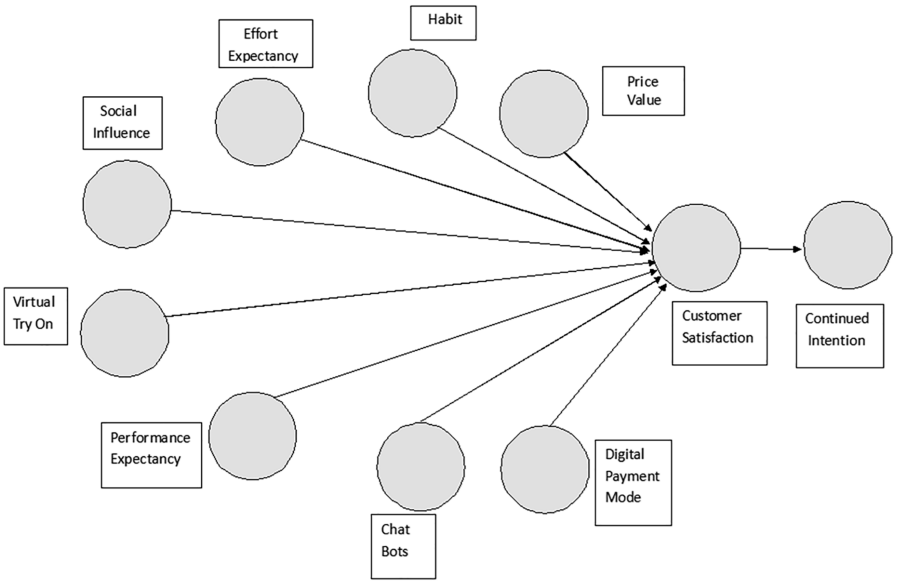

Figure 1. Conceptual framework. Source: The authors with PLS-SEM

January 2024. This time frame ensured coverage of diverse online shopping behaviors, including the seasonal shopping spike during year-end sales. Appendix Table 2 shows questionnaire scale items and their sources.

Data were collected in two waves; the first phase was where responses were slow. In the second phase, the respondents were also contacted through social media (Facebook and Linked In) (Singh and Srivastava, 2018). When the instrument causes response variations rather than the respondents' predispositions, common method bias (CMB) occurs. The result may be inflated variation. Harman's single factor score recommends loading all latent variables into one factor. We used this, and the total variance for a single factor was 39.72%, indicating that CMB did not affect the data (Podsakoff *et al*., 2012).

Multi-collinearity and CMB prevalence are indicated by VIF >3.3. We also checked if all full collinearity test VIFs were less than 3, indicating the absence of multicollinearity. Non-response bias was checked by comparing the sample distribution of responses from the two waves. The key variable mean differences between early (n = 364) and late (n = 236) respondents were tested. The results showed no non-response bias between groups.

4.2 Measures

The researcher critically reviewed the UTAUT2 and proposed a revised theoretical model that was tested using a combination of exploratory factor analysis and structural equation modeling, (PLS-SEM). The drivers of online shopping considered in the current model are performance expectancy, effort expectancy, habit, digital payment mode, social influence and price value. Catching up e-commerce pace may be difficult, but additional literature and new models may assist in better understanding, the factors that influence behavioral intentions of online shoppers. Though UTAUT2 through its wide applicability in diverse fields, has helped us to explore the factors that influence behavioral intention, but to date, we have not been able to trace research validating critical drivers influencing consumers' decisions while interacting with new technology (Chu *et al*., 2022). Digital payment mode, chatbots and virtual try-on

technology are distinct domains of business research signifying the era of digital transformation. The field of digital payment mode and technology adoption is novel and complex, so most of the research has employed mature theories like UTAUT2 (Bălan, 2023).

4.3 Method

This study used partial least squares structural equation modeling (PLS-SEM), due to high levels of statistical power (Klarner *et al.*, 2013). The partial least square structured equation modeling (PLS-SEM) was carried out to develop the model and investigate the inter-relationship among the latent variables. The high-quality business research on technological advancements is still in its early stage of development. PLS-SEM is a widely used SEM method that will be further employed in studies involving technology adoption (Zhang *et al.*, 2019). Therefore, taking support from the previous literature, PLS-SEM has been applied to validate the impact of DPM, CBs and VTO on customer satisfaction of online shoppers.

5. Results

5.1 Measurement model

Table 1 reports Cronbach's alpha, composite reliability (CR), average variance extracted (AVE) and Rho. In general, the internal consistency of the survey instrument is considered excellent if the Cronbach's alpha value is greater than 0.90. The alpha value ranges from 0.70 to 0.80 is considered as acceptable and 0.60 to 0.70 is questionable (Cronbach, 1951). In the present case, all the constructs have a value of Cronbach's alpha is greater 0.80, which is acceptable in the PLS-SEM model. Table 1 also reports the results for the composite reliability (CR) and the average variance explained (AVE). The thumb rule is that the AVE value should be greater than 0.5, and the value for composite reliability (CR) should be greater than 0.7 (Ab Hamid *et al.*, 2017). In the present study the composite reliability of all the latent variables are quite high, greater than 0.90 except for price value. In the case of price value, the CR is close to 0.90. Similarly, the AVE value of all the constructs is also quite higher than the threshold limit. High value of CR and AVE reflect that the overall reliability of the model is very good and there is no problem of reliability in the current model.

Table 2 reports the discriminant validity of the PLS-SEM model. In the current study, two criterion have been used to check the discriminant validity. The first criterion is suggested by Fornel and Larcker (1981), and second is the heterotrait-monotrait ratio of correlations (HTMT). In Table 2 the square root of AVE is shown as diagonal values with italic letters. Since the square root of AVE is greater than the correlation involving the constructs, it reflects discriminant validity in the model, which further means that different constructs are unrelated.

Table 1. Reliability and average variance extracted (AVE)

Construct	Cronbach's alpha	CR	AVE	Rho
Customer satisfaction	0.900	0.925	0.756	0.893
Effort expectancy	0.851	0.931	0.870	0.854
Continued intention	0.900	0.937	0.833	0.900
Chatbots	0.853	0.911	0.773	0.855
Habit	0.858	0.903	0.699	0.873
Virtual try-on technology	0.917	0.941	0.801	0.918
Digital payment mode	0.893	0.949	0.903	0.894
Performance expectancy	0.825	0.920	0.851	0.825
Price value	0.864	0.899	0.597	0.868
Social influence	0.854	0.902	0.699	0.852

Source(s): Authors' calculations with PLS-SEM

Table 2. Discriminant validity (Fornell and Larcker criteria)

	CB	CI	CS	DPM	EE	H	PE	PV	SI	VTO
CB	*0.879*									
CI	0.524	*0.913*								
CS	0.544	0.798	*0.869*							
DPM	0.521	0.689	0.665	*0.951*						
EE	0.761	0.482	0.524	0.469	*0.933*					
H	0.273	0.493	0.486	0.401	0.273	*0.836*				
PE	0.661	0.611	0.644	0.567	0.693	0.413	*0.923*			
PV	0.514	0.675	0.700	0.681	0.537	0.440	0.608	*0.773*		
SI	0.362	0.462	0.495	0.511	0.356	0.610	0.473	0.471	*0.836*	
VTO	0.381	0.618	0.605	0.539	0.370	0.602	0.493	0.607	0.573	*0.895*

Note(s): CI: Continued Intention; FC: Facilitating Conditions; H: Habit; HM: Hedonic Motivation; DPM: Digital Payment Mode; PE: Performance Expectancy; PV: Price Value and SI: Social Influence

Source(s): Authors' calculations with PLS-SEM

HTMT as depicted by Table 3 is the new method to check the discriminant validity in partial least squares structural equation modeling. HTMT values close to 1 indicates a lack of discriminant validity.

Table 4 shows the path coefficient and t-statistics of the inner model. Chatbots, performance expectancy, effort expectancy, social influence, digital payment mode, habit, price values and virtual try-on technology are the exogenous variables, whereas customer satisfaction is mediating and continued intention is an endogenous variable. The study aims to see the impact of different exogenous variables on customer satisfaction and the impact of customer satisfaction on continued intention. All the exogenous variables in UTAUT2 except social influence and effort expectancy show a significant positive impact on customer satisfaction. All these exogenous variables are found to be significant at the 1% level (p-value < 0.01) except chatbots, which is found to be significant at the 5% level (p-value < 0.05). Customer satisfaction shows a positive significant impact on continued intention at the 1% level (p-value < 0.01). Results of the study demonstrate that chatbots, performance expectancy, price value, digital payment mode, habit and virtual try-on technology increase customer satisfaction toward online shopping. The customer satisfaction positively enhances continued intention toward online shopping, whereas the other significant exogenous variables reflect the indirect significant impact on continued intention. The R-square of

Table 3. HTMT ratio

	CBs	CI	CS	DPM	EE	H	PE	PV	SI	VTO
Chat bots										
Continued intention	0.599									
Customer satisfaction	0.621	0.889								
Digital payment mode	0.596	0.768	0.744							
Effort expectancy	0.892	0.550	0.600	0.537						
Habit	0.291	0.540	0.541	0.447	0.295					
Performance expectancy	0.787	0.710	0.750	0.659	0.824	0.469				
Price value	0.594	0.762	0.793	0.776	0.623	0.495	0.718			
Social influence	0.404	0.516	0.554	0.572	0.400	0.707	0.548	0.540		
Virtual try-on technology	0.429	0.679	0.667	0.595	0.417	0.671	0.566	0.681	0.637	

Source(s): Authors' calculations with PLS-SEM

Table 4. Path coefficients

Construct	Original sample (O)	*t*-statistics (O/STDEV)	*p*-values
Chatbots	0.085	1.998	0.046
Customer satisfaction	0.798	43.445	0.000
Digital payment mode	0.218	5.186	0.000
Effort expectancy	0.005	0.103	0.918
Habit	0.095	2.647	0.008
Performance expectancy	0.195	4.237	0.000
Price value	0.259	5.820	0.000
Social influence	−0.003	0.085	0.933
Virtual-try-on technology	0.145	3.562	0.000

Note(s): ***Significant at 0.01% level; *Significant at 10% level and **Significant at 5% level
Source(s): Authors' calculations with PLS-SEM

customer satisfaction is also quite higher (0.633). It means the different significant exogenous variables explain 63.3% variance of customer satisfaction. The value of R-square is 0.636 and the adjusted R-square is 0.635 of continued intention. The different significant exogenous variables indirectly and customer satisfaction directly explain 63.6% variance of the model. Overall, the model is acceptable, and it is fulfilling all the parameters satisfactorily. The model relating drivers of online shopping with continued intention is shown in Figure 2.

5.2 Structural model assessment

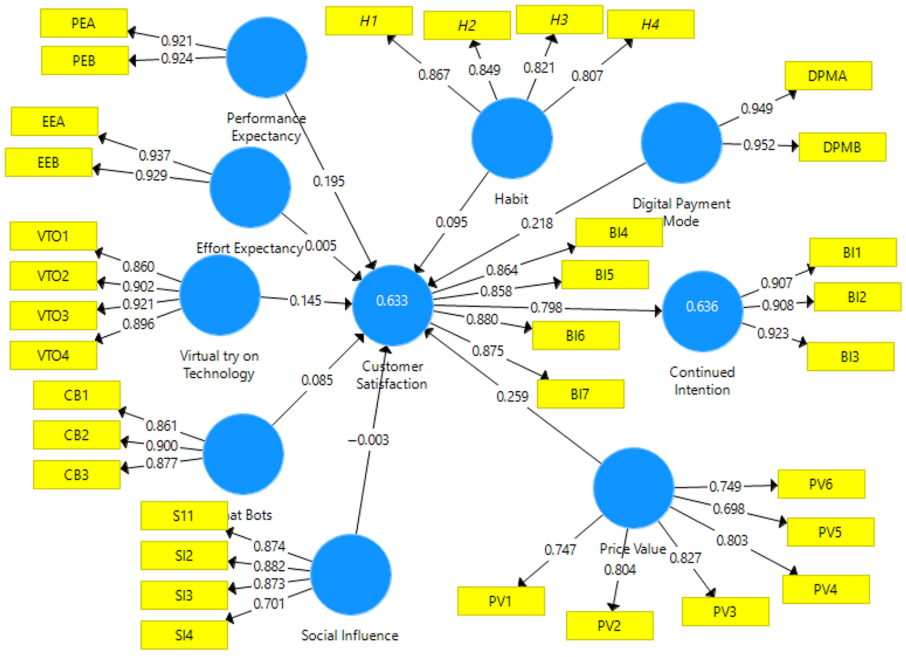

Figure 2. Model relating drivers of online shopping with continued intention. Source: The authors with PLS-SEM

6. Discussion

The primary objective of the present study was to investigate the influence of various factors of online shopping on customer satisfaction and finally on continued intention. This study employed partial least squares structural equation modeling (PLS-SEM) and a comprehensive model was developed to illustrate the impact of various factors of online shopping on customer satisfaction and continued intention. In this model continued intention is the final dependent variable. Notably, the inclusion of customer satisfaction in the model resulted in an increase in the R-square value, from 0.633 to 0.636. Customer satisfaction is being adversely affected by social influence. The beta value of 0.003 indicates that there is no significant impact of effort expectancy on customer satisfaction. PV, DPM, PE, VTO, H and CBs have emerged as effective catalysts for the success of online shopping. While CBs, VTO and DPM show statistically significant impacts on customer satisfaction, their effectiveness may depend on factors not fully captured in the model – such as user trust, technical quality or privacy concerns. For example, chatbots can enhance satisfaction only when their communication is natural and helpful; otherwise, they may frustrate users. Similarly, not all users perceive VTO as valuable if the technology lacks precision or realism.

Sivathanu (2019) stated that the research constructs of perceived ease of use (PE), functional convenience (FC), hedonic motivation (HM) and habit (HA) have a substantial and positive impact on behavioral intention (BI) when it comes to the adoption of digital payment systems. Performance expectancy, which is the perceived likelihood of achieving desired outcomes, has a strong influence on consumer intention and serves as the primary motivator for engaging in online shopping (Celik, 2016; Dharmawirya and Smith, 2012; Li *et al*., 2018; Tandon and Kiran, 2018). Social influence has a beneficial impact on the intention to behave in a certain way. The studies conducted by Palau-Saumell *et al.* (2019) and Baptista and Oliveira (2015) yield contradictory results compared to the earlier study by Foon and Fah (2011) as well as the studies by Venkatesh *et al*. (2012) and Yaprakli *et al*. (2013). This discrepancy highlights the intricate nature of these relationships by indicating variations in the influence of social factors on the inclination to make online purchases. The weak role of social influence suggests a potential disconnect between peer opinions and actual shopping behavior. This finding contradicts several earlier studies, indicating that as digital shopping becomes more individualistic and personalized, users may rely less on social cues and more on their own experiences or platform features. This represents an important shift and warrants deeper examination.

The insignificant impact of effort expectancy (EE) deserves further scrutiny. Though traditionally considered critical, especially in early adoption models, EE may be less relevant today due to rising digital literacy. However, this also raises questions: Does this shift reflect genuine user competence or have other constructs (like habit or system design) subsumed EE's role? Future studies could disaggregate this further across demographics. As shown by Sareen and Jain (2014) and Yaprakli *et al.* (2013), the body of research continuously confirms that favorable conditions are a critical factor in the adoption of new technology. The results of this investigation support the body of established literature, demonstrating that UTAUT2 drivers do, in fact, promote behavioral intention. While there is not much research on technology interface drivers, studies by researchers like Zhang *et al.* (2019), Chu *et al*. (2022) and Tandon (2023) have shown that chatbots and virtual try-on technology are emerging drivers of online shopping. In summary, the discussion highlights the influence of both traditional UTAUT2 drivers and newly integrated constructs like CBs, VTO and DPM on customer satisfaction and continued intention. These findings not only confirm earlier research but also extend theoretical understanding in emerging market contexts.

In the following section, the study consolidates these insights by presenting key conclusions and exploring both theoretical and practical implications for researchers and practitioners in the field of e-commerce and technology adoption.

7. Conclusion and implications

7.1 Conclusion

The findings demonstrate an encouraging relationship between the drivers of online shopping and continued intention. Thus, this paper contributes to UTAUT2 theory. Digital payment mode has emerged as an important predictor, followed by VTO and chatbots. The paper has brought about the importance of chatbots in enhancing customer satisfaction and continued intention. Firms need to switch from website design and ease of use to offer interactive communication. The findings confirm the importance of chatbots conversation (Liebrecht *et al*. (2021). Chatbots assist in the online purchase process, as they improves experience (Hoyer *et al*., 2020). The key aim of the current study was to study the impact of different factors of online shopping on customer satisfaction. The results are consistent with Hoyer *et al*. (2020), supporting new technology for behavioral intentions of online shoppers. The results are significant for CBs and VTO, highlighting their importance in online shopping. This study has helped in analyzing VTO and offered a holistic perspective of how this technology leads to customer satisfaction, in line with Zhang *et al*. (2019).

7.2 Theoretical and practical implications

From a theoretical perspective, this research enhances the knowledge of online shopping literature, especially the role of CBs and VTO technology. The study enriches the limited research by investigating the role and importance of online customer experience through CBs as highlighted by Sampson and Chase (2020). The present study is very important for both online shoppers and retailers. No doubt, digital monetary services improve access to debit and credit cards, in addition to an improved inclination for other digital payments, but how digital payment drivers influence online shopping behavior is still an under-researched area. Therefore, there is scope for theory and practice. The growth of e-commerce has brought many changes to the purchasing power of shoppers as well as their payment modes. It is necessary to concentrate on promising technological changes in terms of the mode of payment. This research provides evidence of a strong impact of DPM drivers on online shoppers' BI. Thus, Indian managers need to adopt DPM as a major support service to make online shopping a worthwhile experience. By addressing these research implications, scholars can contribute to the knowledge base on improving satisfaction of online consumers and support evidence-based decision-making for formulating strategies for the online retail sector of India. Understanding the combined impact of these factors can lead to the development of strategies to promote the adoption and acceptance of digital payment modes.

Moreover, the theoretical implications of this study are strongly aligned with ongoing debates surrounding technology adoption in emerging economies. As these markets face distinct challenges such as digital infrastructure gaps, socioeconomic diversity and varying levels of digital literacy, integrating CBs, VTO and DPM within UTAUT2 offers a localized lens to understand adoption behavior. This context-specific extension contributes meaningfully to current academic discourse by validating how emerging technologies are perceived and adopted in settings where digital maturity is still developing.

Additionally, the study highlights the insignificant impact of certain traditionally important variables, such as effort expectancy (EE), both theoretically and practically. While EE has often been emphasized as a strong determinant in earlier technology acceptance models, the current study's findings suggest that its role is diminishing in highly digitalized environments where users are already familiar with online interfaces. This indicates a shift in user expectations, where convenience is now assumed and no longer a critical predictor in influencing satisfaction or continued usage. This theoretical insight challenges prior assumptions and encourages future researchers to re-evaluate the importance of such constructs in rapidly evolving digital contexts.

This digital payment sector is a highly competitive market with great growth and potential; these financial solutions will reach out to the next generations since the majority are "digital

natives" ready for innovative payment services. As a consequence of the networking effects, the various competitors are trying to win the race to dominate this "winners-take-all" market (Wirtz *et al*., 2018). Thus, financial providers need to identify the competitive advantages that will allow them to lead digital services in their markets.

The study suggests that managers need to adopt chatbots and virtual try-on technology to enhance the shopping experience. Online retailers should design and manage chatbots by monitoring user involvement and giving due attention to time, tone of communication, and, of course, the quality of the information that is provided. Thus, this study is of practical use for online consumers as well as sellers to use the latest technology in payment modes and also to enhance the technology interface to add more flavor to online shopping. Designers should prioritize intuitive interfaces and integrate AI capabilities into chatbots to enable personalized customer interactions and resolve queries in real time. For VTO features, realism in visualization, cross-platform integration and responsiveness across devices should be emphasized to enhance the immersive experience. E-commerce managers are advised to invest in secure, fast and user-friendly digital payment systems while also tracking behavioral data to refine customer journeys. Continuous user feedback loops are essential to optimize these technological tools in alignment with evolving customer expectations.

Furthermore, these additions – namely chatbots (CBs), virtual try-on (VTO) and digital payment mode (DPM) – enrich the theoretical model by extending the scope of UTAUT2 to include modern, experience-driven and utility-based digital tools. This integration addresses key limitations of prior studies that largely focused on traditional constructs such as effort expectancy and facilitating conditions. Earlier research did not fully capture the evolving digital landscape and the emergence of intelligent technologies shaping consumer experience. By empirically validating the impact of CBs, VTO and DPM on customer satisfaction and continued intention, the study provides a context-specific understanding of technology adoption in emerging economies. These insights reflect the changing consumer priorities from mere usability to the trust in digital environments, thereby filling critical gaps in the current literature on online shopping behavior.

8. Limitations and future research direction

Though due care is being taken to ensure that the research methodology is robust and unbiased, still the present study is not free from limitations. Though empirically tested, few of the factors and item indicators considered in the present study are recent and new. Moreover, the study has not used control variables. Hence, this can be taken as an opportunity to be studied in the future. Additionally, the study is geographically limited to Northern India, which may not fully represent consumer behavior across other cultural and economic regions of the country. Future research could benefit from broader geographic sampling and cross-country comparative studies to generalize findings. Another limitation is the cross-sectional nature of the data, which restricts the ability to capture dynamic behavioral changes over time. Longitudinal studies could offer a deeper understanding of evolving technology adoption patterns, particularly in fast-changing digital economies.

Future research could also explore demographic segmentation to better understand how different consumer groups (e.g. age, digital literacy or income level) interact with chatbots, VTO and DPM. Additionally, incorporating qualitative approaches such as in-depth interviews or focus groups may uncover deeper behavioral motivations that quantitative surveys cannot fully capture. Expanding the model to include emotional, cultural or trust-related dimensions would provide a more holistic view of digital consumer behavior. Finally, comparative studies between developed and emerging markets could reveal critical insights into how contextual factors influence technology adoption and satisfaction.

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Supplementary material

The supplementary material for this article can be found online.

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Further reading

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