# Elements and Effects of Online-Shopping for Sustainable E-Business: Experimental Research of Online-Shopping Malls

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**Abstract**

The rise of the internet has seen a rise in electronic (online) business. This research aims to explore how retailers can improve their shopping processes and thus contribute to the sustainability of their e-business. Hence, we have developed a combined information system-consumer behaviour (IS-CB) online shopping model to investigate factors influencing online shopping. We tested the model with an online survey of 633 online shoppers and applied structural equation modeling (SEM) to match the differences. Factors that significantly impact the IS-CB model for online shopping include perceived value (PV), perceived risk (PR), social factors (SF), perceived ease of use (PEOU), perceived usefulness (PU), online shopping intention, trust, online shopping experience, actual online shopping purchases, entertainment gratification (EG), website irritation (WI), information design (ID), visual design (VD), and navigation design (ND). The study has theoretical and practical implications. Online shopping PV and trust can breed favourable perceptions and intention to shop online. Attractive websites result in higher trust and lower WI. Likewise, increased ID, ND and VD on online shopping websites decrease WI and increase trust. This research addresses gaps in prior studies regarding IS and CB and explains specific impacts of IS and CB constituents on online shopping acceptance and use. The unified IS-CB model captures consumer online shopping behaviour for a sustainable e-business.

**Keywords:** consumer behavior; online shopping mall; perceived value; website designs; online shopping intention

## Introduction

Online shopping is a burgeoning business, and is forecasted to see global growth with a compound annual growth rate, CAGR ≥ 19% by 2020 [1]. In April 2017, 40% of internet users in the US reported they bought products and services online a few times a month and 20% once a week Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023) [2]. This growth has been due to the benefits of online shopping.

Given the importance of online sales and consumers, it is critical for retail practitioners to have a broad awareness of online shoppers [3,4]. Earlier research has argued that online practitioners need to acknowledge the constituents of consumer acceptance of online

shopping [5,6]. There are a great number of studies that have investigated factors that influence online shopping, such as the information system (IS) and consumer behavior (CB). But the present study considers IS and CB constituents for online shopping. Even though some studies have emphasised the need for more research on customer ongoing usage of online shopping websites, there has been limited research on experimentally justified models of IS and CB constituents for online shopping Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023) [7,8]. Marketing-wise, it costs a lot less to retain a customer than to acquire one, which makes it important to determine how to increase customer usage of online shopping sites. Earlier research has only focused on specific and isolated issues on online shopping constituents or outcomes. The other significant omission is the interaction between website design factors and website irritation and trust, and risk perceptions and customer trust and attitudes in online shopping. It is important for retailers to have a higher level of understanding not only of factors that induce pleasant feelings and responses in customers, but also of factors that trigger negative feelings and responses, which could inhibit online shopping [9], to better understand customer online shopping.

To our knowledge, this is the first study to look at these opportunities and put forward a unified model to explain online shopping issues based on a solid theoretical foundation. We combine recent literature with a holistic IS-CB model to better understand online shopping. The model combines many previous models (e.g., theory of reasoned action (TRA) (CB perspective), technology acceptance (TAM) (IS viewpoint), user gratification theory (UGT) (IS perspective) Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023) [10,11]) and extends to include recent research supporting factors including: perceived value (PV) [12], trust [13], online shopping knowledge [14,15], social factors [16,17], website design (WD) Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023) [18], website irritation (WI) [8], and perceived risk (PR) [19].

Furthermore, we examine actual online shopping behavior instead of asking users to imagine an online shopping experience, and therefore avoid some of the inconsistencies in previous studies. Specifically, our study used frequent online customers of a real online website rather than low online shopping tendency customers and/or students. The larger sample size also ensures more validity of results for online retailers.

As a result, we offer an integrated model of online shopping behavior from IS and CB approaches. Our model was tested experimentally with online shoppers in the online shopping environment. Blending IS and CB approaches resulted in higher consistency, enhancing understanding of basic constituents and their relation with CB. Validating the practical relevance of constituent and consequences, e.g., encouraging customers to initiate online shopping, allows online retailers to concentrate on efforts to change customer behavior, and more appropriately and practically take action to increase retention rate. Hence, the paper integrates as many empirical findings about useful IS-CB constructs that affect on online shopping acceptance as possible.

This paper is structured in the following way. Section 2 outlines the proposed model based on existing CB and IS research, and discusses the relationships between CB and IS and online shopping acceptance. The hypotheses are also presented. The research

methodology is explained in Section 3 and the results for an empirical examination of factors affecting online shopping using data collected from frequent online shoppers and structural equation modeling (SEM) in Section 4. Section 5 presents the results and discussion. Section 6 concludes the paper with implications and recommendations for marketing and retail managers.

## Theoretical Framework and Hypothesis

### Consumer Behavior Model

In this study, the CB model (Figure 1), based on the TRA, has been proven to be a very effective model of studying shopping behaviour. TRA posits that human behavior is rational, and people use the information at their disposal, and that attitudes and subjective norms influence human behavior Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023) [20]. The CB model illustrates that the associations between attitudes, subjective norms, intentions and behavior, not only appear to predict customers' intentions and behavior, but also offers a fairly simple approach to determine where and how to focus on customers' behavioral change [21]. TRA suggests individual behavior for a given behavior is regulated by an intention to perform the behavior, which is regulated by attitudes and subjective norms [22].

Earlier using TRA provide a generic description for factors that form online customer attitudes towards online shopping behavior and the effects of these formed attitudes about intentions to shop online prior to making online purchase decisions, and the result of actual online shopping purchases on post-purchase online shopping experiences and trust [23]. Zenithal Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023) [24] proposed that PV was "the consumer's overall assessment of the utility of a product (or service) based on perceptions of what is received and what is given". Therefore, PV was regarded as a predictor of online customer attitudes [25], and a predictor of purchase intention, which impacts attitude [26]. The CB model suggests that value seeking intentions toward online shopping are affected by online shoppers' attitudes [27], which in turn affect intentions to shop with online retailers [28], which leads to online shopping behaviour [29,30], such as online shopping purchases and online loyalty. Earlier studies suggested that online shopping experiences can only be acquired by online customers through past online purchases, and online shoppers are highly reliant on past online shopping experiences when deciding whether to purchase from an online retailer that they have ever purchased from in the past Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023) [31,32]. This idea has been supported by other studies, which propose that online shopping experiences reflect online customers' experiences in shopping with the online retailers hence have immediate impacts due to actual online purchases, which significantly impact online intentions and online purchasing with that particular online retailer [33,34].

Trust in online shopping is highly related to previous online shopping experiences, therefore online retailers offering secure online shopping experiences will positively affect online customer trust Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023) [35,36]. Online purchase intention is built on the concept of trust [37,38], and has been proposed as the crucial factor in making sales [39,40]. Therefore, online purchase intention is enhanced by online customer trust [35,41].

Perceived risk is a key predictor of online intention, which has a negative influence on attitudes or intentions [42–45]. Park et al. [46] verified the negative effect of PR on apparel purchase intentions in an online product display environment, (i.e., higher PR leads to lower purchase intentions) Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023)[47,48]. PR has a negative effect on customer trust in an e-commerce environment [19]. Thus, we proposed the following hypotheses.

**Hypotheses 1 (H1).** Online shopping PV will influence online customers' attitude to online shopping.
**Hypotheses 2 (H2).** PV of online shopping will have positive effect on intention.
**Hypotheses 3 (H3).** Customers' intentions to shop online will be positively influenced by positive attitudes to online shopping.
**Hypotheses 4 (H4).** Online customers' online shopping purchases will be positively influenced by online shopping intentions.
**Hypotheses 5 (H5).** Online shoppers' online shopping purchases will have a positive impact on their online shopping experience.
**Hypotheses 6 (H6).** Online customer online shopping experiences will be positively affected by their intentions to shop online.
**Hypotheses 7 (H7)**. Online customer online shopping experiences will be positively affected by their intentions to shop online.
**Hypotheses 8 (H8).** Online customer trust in online shopping will positively influence their online shopping intentions.
**Hypotheses 9 (H9).** Increased perceived customer trust results in lower PR of online shopping.
**Hypotheses 10 (H10).** Higher PR results in lower intention to purchase online.
**Hypotheses 11 (H11).** Higher PR provides lower customer attitude in online shopping.

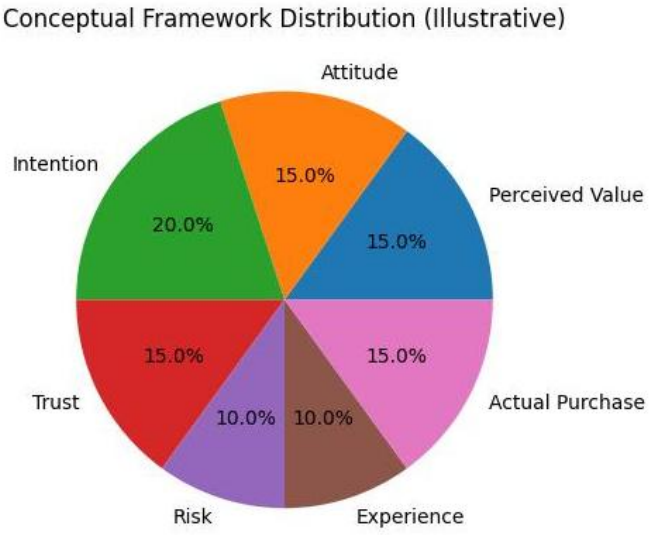


**Figure 1.** Proposed consumer behavior model for online purchasing.

***Proposed Information Systems Model***

The proposed IS model incorporates TAM, UGT, WI, and WD, as shown in Figure 2.

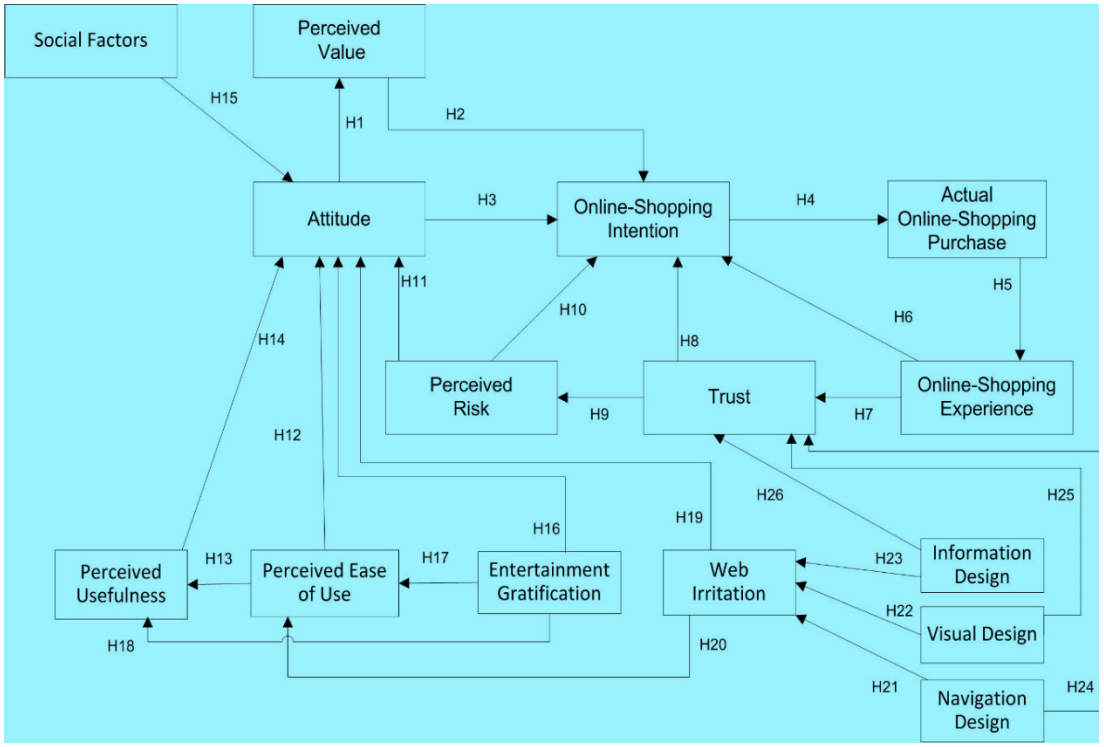


**Figure 2.** Proposed unified consumer behavior and information system (CB-IS) model

**TAM Fusion**

TAM [49] is founded on the TRA [20,22,29] to explain acceptance and use of information technology. In theory, an IS perceived as useful if it helps customers to make purchases. Therefore, if an IS easy to use it will be perceived as easy to use [50], and several ISs have been applied in different technology areas, e.g., internet banking, mobile banking, mobile commerce, RFID (Radio-Frequency Identification), augmented reality, electronic labels, e-health services, e-financial services, location based services, and digital signage based online stores Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [51-54]. Davis [49] demonstrated that TAM is a parsimonious and robust model which assumes that PU and PEOU are the major factors driving customer acceptance of a new technology [55]. Ha and Stoel [6] applied TAM to understand the factors affecting the user acceptance of online shopping and demonstrated that PU and PEOU were key factors to the acceptance.

Shopping performance, shopping productivity and more importantly, shopping goal attainment are the key items to make customers shopping successful [56]. This was confirmed by Barkhi et al, Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [57] where consumers develop favourable attitudes to products or services that they perceive to have adequate features that contribute to a solution and unfavourable attitudes to products or services that do not. Kim et al. [58] showed online shopping sites that were helpful for customers to make decisions were perceived as more useful. Lim [11] also demonstrated that online shopping sites that offer services to consumers not provided by traditional shopping, such as product comparison, were perceived as more useful by consumers, thus creating propitious attitudes towards online shopping.

Ease of learning and becoming proficient with online shopping sites' technologies and interfaces have been shown to be valid factors in determining ease of use of a technology

[59]. Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) Selamat et al. [60] also demonstrated that if a technology is perceived to be more easy to use than another, it would be more likely to be adopted, and the easier the technology perceived to be, the faster the adoption. This finding concurred with Teo [61], which demonstrated that systems perceived to be easier to use, have lower user effort, making it more likely to be adopted and used. There have also been studies that have recognised the importance of PEOU as a key predictor of attitudes towards technology driven services Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [62]. Prior IS research has demonstrated PEOU affects user attitudes [63] and PU [64].

Another extension of the TAM is the inclusion of subjective norms, which refer to the beliefs of other people [22]. A link has been found from subjective norms to attitudes [65]. As a result, we add the following hypotheses.

**Hypotheses 12 (H12).** PEOU of online shopping sites will positively influence online customer attitudes towards online shopping.

**Hypotheses 13 (H13).** Online shopping site PEOU will positively impact on online customer PU for online shopping sites.

**Hypotheses 14 (H14).** Online shopping site PUs will positively influence online customer attitude toward online shopping.

**Hypotheses 15 (H15).** Social factors will positively impact online customer attitude toward online shopping.

**User Gratification Integration**

Earlier research in UGT suggested that human behavior is influenced by the social, psychological and sociocultural media characteristics for gratification [66]. Affective and cognitive gratifications influence user choices to use media Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [67]. Li [68] demonstrated that gratifications included cognitive, affective, personal integrative, social integrative, escapist and medium appeal gratifications. The theory has been used for the adoption of online services, online shopping and human behaviour in SNS (Social Networking Service) [69-71]. UGT is widely used by marketing and IS practitioners for new media such as internet blogs, SNSs and user generated media Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [70,72-76]. A number of gratification types are related to social media marketing messages [75], intention to return to SNSs [51], social needs satisfaction [67], and social connection [76].

Entertainment gratification (EG) is the extent to which online shopping is fun [77]. Online shoppers want to shop for entertainment [78], and websites providing such entertainment are useful [79,80]. The value of media value is its ability to meet the customers' needs for offline world escape, hedonic enjoyment, aesthetic and/or emotional catharsis Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [81]. Kim and Forsythe [80] also reported that e-merchants that provide entertainment as virtual proxies, e.g., virtual display and 360-degree view of products, were rated as more usable and useful by customers. Specifically, web sites that offer more entertainment to users create positive attitudes and encourage customers to visit the website more often Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [82].

Customers' annoyance and disturbances of online shopping sites are often sources of WI [83], which can negatively affect media usefulness and generate negative reactions. Li et

al. [84] demonstrated that websites with pop-up banners usually cause WI for e-customers because they distract customers' browsing. Azeem [9] illustrated that inappropriate use of interactive web applications on e-shopping websites, which spam, distracts and intrudes on customer privacy and inhibit customer acceptance, can also cause WI. Past research supports severe negative WI effects on customer attitudes towards the target issue [81,85], and WI may cause usability problems Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [8]. Thus, we add the following hypotheses.

**Hypotheses 16 (H16).** EG will positively affect customer online shopping attitudes.
**Hypotheses 17 (H17).** EG will positively impact customer PEOU of online shopping sites.
**Hypotheses 18 (H18).** EG will positively impact customer PU of online shopping sites.
**Hypotheses 19 (H19).** WI will be negatively associated with customer attitudes towards online shopping.
**Hypotheses 20 (H20).** WI will negatively influence customer PEOU of online shopping sites.

**Websites Design and Websites Annoyance**

Website design is primarily focused on the content of the website, aesthetic appeal, ease of navigation and time spent navigating. The creation of an appealing, well-organised and easy to use shopping website is essential to improve customers' perceptions and attract online shoppers Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [86,87]. Many business websites, even those created by website professionals are ineffective [88]. The limited menus, lack of navigation, and complex accessibility to different products result in a negative shopping experience [89]. There are major design issues with most e-business websites [90]. Failure of usage of websites is likely due to poor designed interface [91]. Well designed user interface positively affects customers to re-use the shopping website [92]. So, low-quality websites have negative impacts on the online shopping experience. Customer experience of WI while browsing through the website leads to abandonment of the purchase and website. This frustrating and irritating experience influences customer's belief about the vendor's capability to deliver a user friendly shopping environment in the long term [93,94]. So, a badly designed website can lead to valid reasons for customers not to purchase from the site [95]. Poorly designed websites annoy potential customers and prevent them from navigating, searching and purchasing [79,93,96,97].

Visual, navigational and informational design are the three key website design elements, as follows. Visual design in a website influences the emotional appeal through quality of content and beauty of the website (e.g. colours, fonts, images, shapes, layout) [98]; and can affect customer trust [18,99]. So, an attractive visual design of a website can influence customer perceptions of the site and lower WI.

Navigation design is the backbone structure to help users navigate through the website [100], and it can positively impact customer trust [18,99], and hence reduce WI. Information design is the structure of the information presented on the website [99], and can enhance customer trust Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [18,99], which results in lower WI.

Therefore, we have the following additional hypotheses.

**Hypotheses 21 (H21).** Higher perceived website navigation design is negatively related to WI for online shopping.
**Hypotheses 22 (H22).** Higher perceived website visual design is negatively related to WI for online shopping.
**Hypotheses 23 (H23).** Higher perceived website information design is negatively related to WI for online shopping.
**Hypotheses 24 (H24).** Higher perceived website navigation design is positively related to trust in online shopping.
**Hypotheses 25 (H25).** Higher perceived website visual design enhances customer trust in online shopping.
**Hypotheses 26 (H26).** Higher perceived website information design has a positive impact on customer trust in online shopping.

**Methodology**
This study involves the development of constructs, exploratory factor analysis, confirmatory factor analysis, and testing the structural model.

**Pretest**
A pretest was conducted with 30 respondents (19 men, 11 women) with online shopping experience. There were some problems in the questionnaire, with respondents having trouble understanding some of the wording of the questions, and some slight changes were made to the wording to help understanding.

**Sample and Procedure**
This research gives a great insight into online shopping patterns of customers by considering only regular customers (two or more purchases a month). Therefore, we only examined real and regular customers rather than just online browsers of shopping sites. We used an online questionnaire, which was emailed to Korean respondents who were randomly selected from online shopping mall customers who made two or more online shopping purchases per month for the past 6 months. We used the incentive of a 15% chance of winning different prizes via the survey to encourage participation. To ensure that each respondent only supplied one response, we used the respondent's email ID. We surveyed for six weeks in spring 2017.

Respondents who matched at least one of the following were excluded.

(a) The same respondent completed the survey multiple times.
(b) Incomplete response.
(c) Respondent always gave the same answer.
(d) Respondent has not bought groceries at least two times a month for the last 6 months.

We used convenience sampling to collect data. A cover letter was provided to each respondent detailing the purpose of the study and confidentiality. The cover letter also requested that the respondents reflect on the questions as best as they could, as there were no correct or incorrect responses. Given that individuals tend to feel pressure to conform to norms in the presence of others Pathan, M. S. K. (2022); Khan, M. S. (2021);

Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [101], we chose to use the internet to collect data directly, in anticipation that most respondents would fill out the questionnaire at home in private with the use of their PCs and/or handheld devices. Therefore, the potential for conformity was diminished for most to some extent.

A total of 959 online customers were identified, and 889 completed the survey; 633 of these were valid and complete surveys. Table 1 outlines the overall demographics of the respondents. Some 60% were men and 40% women; with a nice *representation of undergraduate (53%), master's (36%), and PhD (10%) students. The majority (80%) of respondents were aged 30 years or under.

Common method bias is present in data when a single factor explains more than 50% of the variance extracted [102]. We used Harman's one-factor test to test for common method bias for all of the measured variables. This exploratory factor analysis (EFA) revealed no single factor explained more than half of the variance in the data set, with the first factor explaining 38.94% of variance. This indicated no common method bias in our sample.

**Table 1.** Respondents' demographic characteristics.

| Category | Sub-Category | Frequency (N) | Percentage (%) |
|---|---|---|---|
| **Gender** | Male | 381 | 60.2 |
| | Female | 252 | 39.8 |
| **Age Range (Years)** | 0–25 | 237 | 37.4 |
| | 26–30 | 270 | 42.7 |
| | 31–40 | 104 | 16.4 |
| | 41–50 | 22 | 3.5 |
| **Education Level** | Undergraduate | 337 | 53.3 |
| | Postgraduate | 232 | 36.7 |
| | Ph.D. | 63 | 10.0 |
| **Online Shopping Frequency** | Less than once a month | 212 | 33.5 |
| | A few times a month | 133 | 21.0 |
| | A few times per week | 175 | 27.7 |
| | About once a day | 113 | 17.8 |
| **Monthly Income (USD)** | 500 and below | 179 | 28.2 |
| | 501–1000 | 137 | 21.7 |
| | 1001–1500 | 92 | 14.5 |
| | 1501 and above | 225 | 35.6 |

***Measurements***

Measurement scales were adapted from previous studies, with all items constructed on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree), as shown in Table 2. Appendix A explains the detailed questionnaire items.

**Table 2.** Constructs and their sources.

| Construct | Source(s) |
|---|---|
| **Perceived Value** | Zeithaml [24] |
| **Entertainment Gratification** | Huang [79] |
| **Attitude** | Kim and Forsythe [80] |
| **Social Factors** | Ramayah et al. [103] |
| **Online Shopping Intention** | Chiu et al. [104] |
| **Web Irritation** | Gao and Koufaris [96] |
| **Online Shopping Experience** | Alam and Yasin [105] |
| **Navigation Design** | Ganguly et al. [99] |
| **Trust** | Broekhuizen and Huizingh [33] |
| **Visual Design** | Ganguly et al. [99] |
| **Perceived Ease of Use** | Davis [49] |
| **Information Design** | Ganguly et al. [99] |
| **Perceived Usefulness** | Davis [49] |
| **Actual Online Purchase Behavior** | Sihombing [106] |
| **Perceived Risk** | Park et al. [46] |

## Empirical Results

### Exploratory Factory Analysis

We performed a maximum likelihood principle component analysis for the 17 constructs. Retained items had factor loadings and communalities of ≥0.50 with no significant cross-loadings. The total variance explained by each set of items was greater than 50% and the Kaiser Meyer Olkin measure of 0.84 (minimum 0.50) and significant result ($p < 0.01$) of Bartlett's test indicated the items were suitable for EFA. Hence, the scales were valid and fit for the next step.

### Confirmatory Factor Analysis

We used confirmatory factor analysis (CFA) to test the measurement models' reliability for the path analysis. We used SPSS 23 and AMOS 23 to analyse the data. All scales had acceptable reliability, convergent and discriminant validity. Table 3 indicates that Cronbach's α reliability coefficients are in the range 0.78-0.94, above the acceptable standard (0.70). Factor loadings were significant and in the range 0.74-0.97, exceeding the recommended minimum for convergent validity (0.50) [107]. All constructs had composite reliability well above the minimum (0.50) [107].

Table 4 illustrates that discriminant validity (i.e., average variance extracted (AVE) for each construct) was greater than correlation of the particular construct with other constructs in the model. While some pairs of constructs had a high correlation among factors and the square root of AVE scores higher than their inter-correlations, these constructs have been well established and used in the marketing field Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [12] (Table 2, sources). Convergent discriminant was confirmed when diagonal elements (square root of AVE) are larger than off-diagonal elements (i.e., correlations between two factors). Because the highest coefficient value below the cut-off (0.90), we assumed that the multicollinearity problem was not significant [108]. Therefore, there was no problem

with multicollinearity.

Table 5 presents a number of goodness of fit indices from past studies that have been used to assess the fit of the CFA model, such as: chi-square ($\chi 2$), root mean square error of approximation (RMSEA), goodness of fit (GFI), comparative fit index (CFI) and Tucker-Lewis index (TLI). The fit indices show that the measurement and integrated models are adequate [108].

**Table 3.** Measurement model results.

| Construct / Item | Mean | SD | EFA | CFA | AVE | CR | α |
|---|---|---|---|---|---|---|---|
| **Perceived Value (PV)** | 5.34 | 0.61 | — | — | 0.70 | 0.87 | 0.91 |
| **PV1** | 5.42 | 0.74 | 0.63 | 0.86 | — | — | — |
| **PV2** | 5.39 | 0.59 | 0.58 | 0.74 | — | — | — |
| **PV3** | 5.26 | 0.84 | 0.61 | 0.91 | — | — | — |
| **Attitude (AT)** | 5.25 | 0.64 | — | — | 0.65 | 0.85 | 0.89 |
| **AT1** | 5.32 | 0.91 | 0.74 | 0.81 | — | — | — |
| **AT2** | 5.48 | 0.67 | 0.71 | 0.87 | — | — | — |
| **AT3** | 4.96 | 0.81 | 0.73 | 0.73 | — | — | — |
| **Online Shopping Intention (OSI)** | 5.50 | 0.61 | — | — | 0.75 | 0.89 | 0.87 |
| **OSI1** | 5.14 | 0.75 | 0.50 | 0.81 | — | — | — |
| **OSI2** | 5.64 | 0.68 | 0.54 | 0.86 | — | — | — |
| **OSI3** | 5.71 | 0.85 | 0.56 | 0.92 | — | — | — |
| **Online Shopping Experience (OSE)** | 5.57 | 0.71 | — | — | 0.76 | 0.90 | 0.93 |
| **OSE1** | 5.63 | 0.78 | 0.67 | 0.79 | — | — | — |
| **OSE2** | 5.41 | 0.83 | 0.61 | 0.93 | — | — | — |
| **OSE3** | 5.68 | 0.81 | 0.59 | 0.89 | — | — | — |
| **Trust (TR)** | 5.67 | 0.81 | — | — | 0.61 | 0.82 | 0.87 |
| **TR1** | 5.47 | 0.69 | 0.54 | 0.78 | — | — | — |
| **TR2** | 5.71 | 0.82 | 0.51 | 0.83 | — | — | — |
| **TR3** | 5.84 | 0.76 | 0.59 | 0.74 | — | — | — |
| **Perceived Ease of Use (PEOU)** | 5.52 | 0.83 | — | — | 0.74 | 0.92 | 0.90 |
| **PEOU1** | 5.11 | 0.67 | 0.56 | 0.94 | — | — | — |
| **PEOU2** | 5.48 | 0.59 | 0.63 | 0.83 | — | — | — |
| **PEOU3** | 5.63 | 0.78 | 0.58 | 0.90 | — | — | — |
| **PEOU4** | 5.87 | 0.73 | 0.65 | 0.77 | — | — | — |
| **Perceived Usefulness (PU)** | 5.45 | 0.83 | — | — | 0.69 | 0.90 | 0.94 |
| **PU1** | 5.35 | 0.72 | 0.57 | 0.91 | — | — | — |
| **PU2** | 5.38 | 0.76 | 0.53 | 0.82 | — | — | — |
| **PU3** | 5.46 | 0.83 | 0.58 | 0.78 | — | — | — |
| **PU4** | 5.63 | 0.87 | 0.59 | 0.81 | — | — | — |
| **Entertainment Gratification (EG)** | 5.44 | 0.84 | — | — | 0.58 | 0.80 | 0.85 |
| **EG1** | 5.23 | 0.91 | 0.53 | 0.88 | — | — | — |
| **EG2** | 5.37 | 0.83 | 0.55 | 0.94 | — | — | — |
| **EG3** | 5.74 | 0.86 | 0.51 | 0.86 | — | — | — |

**Table 3.** *Cont.*

| Construct / Item | Mean | SD | EFA | CFA | AVE | CR | α |
|---|---|---|---|---|---|---|---|
| **Social Factors (SF)** | 5.55 | 0.87 | — | — | 0.68 | 0.87 | 0.84 |
| SF1 | 5.63 | 0.79 | 0.61 | 0.79 | — | — | — |
| SF2 | 5.48 | 0.86 | 0.65 | 0.83 | — | — | — |
| SF3 | 5.38 | 0.73 | 0.74 | 0.83 | — | — | — |
| **Website Irritation (WI)** | 2.73 | 0.67 | — | — | 0.61 | 0.82 | 0.78 |
| WI1 | 2.62 | 0.72 | 0.62 | 0.74 | — | — | — |
| WI2 | 2.85 | 0.69 | 0.63 | 0.81 | — | — | — |
| WI3 | 2.73 | 0.86 | 0.67 | 0.79 | — | — | — |
| **Navigation Design (ND)** | 5.58 | 0.76 | — | — | 0.70 | 0.87 | 0.83 |
| ND1 | 5.38 | 0.73 | 0.61 | 0.79 | — | — | — |
| ND2 | 5.64 | 0.86 | 0.63 | 0.84 | — | — | — |
| ND3 | 5.73 | 0.91 | 0.62 | 0.89 | — | — | — |
| **Visual Design (VD)** | 5.57 | 0.84 | — | — | 0.77 | 0.91 | 0.87 |
| VD1 | 5.42 | 0.68 | 0.53 | 0.85 | — | — | — |
| VD2 | 5.61 | 0.77 | 0.64 | 0.87 | — | — | — |
| VD3 | 5.68 | 0.69 | 0.68 | 0.91 | — | — | — |
| **Information Design (ID)** | 5.73 | 0.82 | — | — | 0.72 | 0.89 | 0.89 |
| ID1 | 5.74 | 0.81 | 0.54 | 0.90 | — | — | — |
| ID2 | 5.66 | 0.68 | 0.59 | 0.84 | — | — | — |
| ID3 | 5.79 | 0.79 | 0.51 | 0.81 | — | — | — |
| **Perceived Risk (PR)** | 2.55 | 0.86 | — | — | 0.56 | 0.79 | 0.80 |
| PR1 | 2.61 | 0.70 | 0.51 | 0.82 | — | — | — |
| PR2 | 2.57 | 0.84 | 0.56 | 0.89 | — | — | — |
| PR3 | 2.49 | 0.91 | 0.52 | 0.93 | — | — | — |
| **Actual Online Purchase Behavior (AOPB)** | 5.52 | 0.67 | — | — | 0.72 | 0.89 | 0.83 |
| AOPB1 | 5.42 | 0.77 | 0.52 | 0.85 | — | — | — |
| AOPB2 | 5.66 | 0.64 | 0.53 | 0.89 | — | — | — |
| AOPB3 | 5.49 | 0.84 | 0.56 | 0.81 | — | — | — |

**Table 4.** Correlation matrix.

| Constructs | PV | AT | OSI | OSE | TR | PEOU | PU | EG | SF | WI | ND | VD | ID | PR | AOPB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PV** | **0.84** | | | | | | | | | | | | | | |
| **AT** | 0.51 | **0.81** | | | | | | | | | | | | | |
| **OSI** | 0.41 | 0.62 | **0.86** | | | | | | | | | | | | |
| **OSE** | 0.18 | 0.52 | 0.61 | **0.87** | | | | | | | | | | | |
| **TR** | 0.48 | 0.57 | 0.47 | 0.61 | **0.78** | | | | | | | | | | |
| **PEOU** | 0.36 | 0.27 | 0.35 | 0.47 | 0.51 | **0.86** | | | | | | | | | |
| **PU** | 0.22 | 0.34 | 0.36 | 0.42 | 0.57 | 0.44 | **0.83** | | | | | | | | |
| **EG** | 0.52 | 0.33 | 0.48 | 0.35 | 0.19 | 0.39 | 0.49 | **0.76** | | | | | | | |
| **SF** | 0.42 | 0.49 | 0.35 | 0.43 | 0.22 | 0.27 | 0.46 | 0.14 | **0.82** | | | | | | |
| **WI** | -0.27 | -0.47 | -0.33 | -0.46 | -0.19 | -0.26 | -0.34 | -0.46 | -0.37 | **0.78** | | | | | |
| **ND** | 0.15 | 0.24 | 0.23 | 0.41 | 0.35 | 0.33 | 0.37 | 0.36 | 0.49 | -0.31 | **0.84** | | | | |
| **VD** | 0.37 | 0.61 | 0.52 | 0.49 | 0.17 | 0.24 | 0.32 | 0.19 | 0.11 | -0.36 | 0.14 | **0.88** | | | |
| **ID** | 0.67 | 0.39 | 0.46 | 0.24 | 0.37 | 0.29 | 0.14 | 0.14 | 0.24 | -0.42 | 0.23 | 0.41 | **0.85** | | |
| **PR** | -0.41 | -0.22 | -0.48 | -0.17 | -0.12 | -0.15 | -0.26 | -0.29 | -0.35 | -0.19 | -0.32 | -0.36 | -0.48 | **0.75** | |
| **AOPB** | 0.49 | 0.38 | 0.48 | 0.45 | 0.37 | 0.16 | 0.51 | 0.18 | 0.26 | -0.46 | 0.14 | 0.45 | 0.27 | 0.14 | **0.85** |

Note: Diagonal elements in bold are the square root of the average variance extracted. The correlations between each construct have $p < 0.05$.

**Table 5.** Fit indices for measurement and unified models

| Fit Index | Measurement Model | Structural (Unified) Model | Recommended Threshold |
|---|---|---|---|
| $\chi^2$/df | 1.74 | 1.92 | < 3.00 |
| GFI | 0.93 | 0.98 | > 0.90 |
| CFI | 0.91 | 0.96 | > 0.90 |
| TLI | 0.94 | 0.97 | > 0.90 |
| RMSEA | 0.05 | 0.06 | < 0.08 |

***Hypothesis Testing***

In the unified model, online customer attitudes and shopping intentions indicated higher variance 25–74% and 41–45%, respectively. Therefore, the unified model confirms that combining CB and IS describe online shopping behavior more efficiently. Suggested links in the unified model were enriched when CB and IS factors were combined to anticipate online shopping behavior. Path analysis was utilized to test the hypotheses, as shown in Figures 3 and 4 (after checking goodness of fit, Table 5).

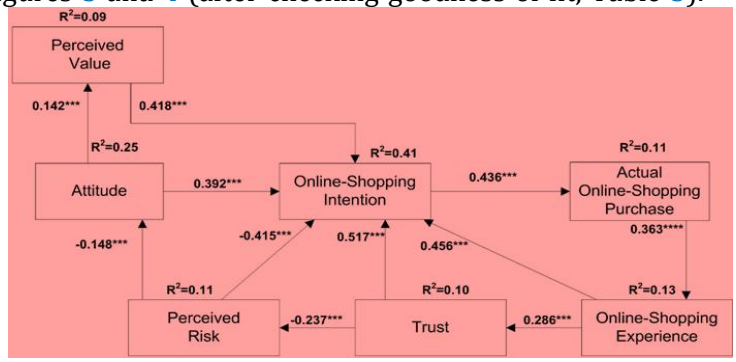


**Figure 3.** Structural equation modeling (SEM) for the consumer behavior model. Note: Standardized path coefficients are described with significant values on the top of each value (*** $p < 0.01$).

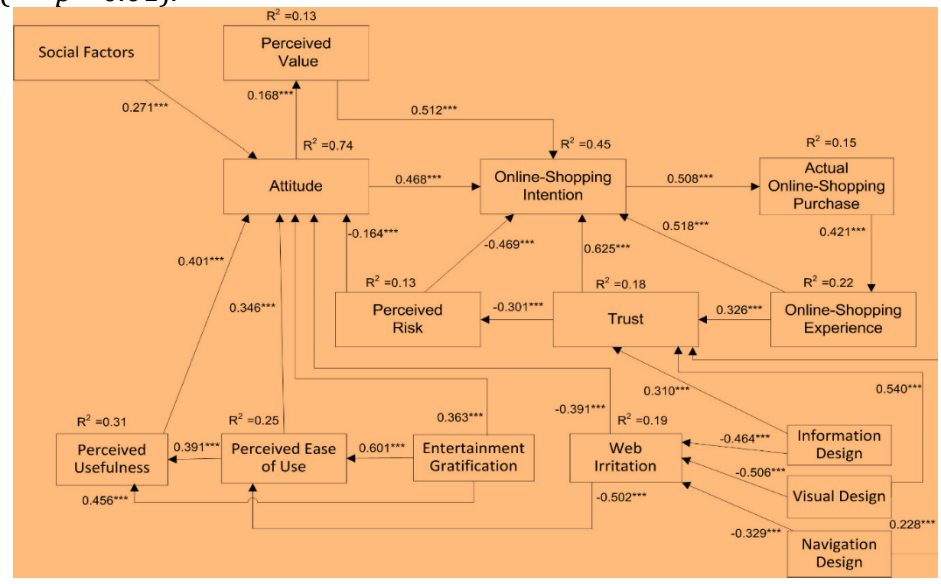


**Figure 4.** SEM for the proposed unified CB-IS model. Note: Standardized path coefficients are described with significant values on the top of each value (*** $p < 0.01$)

Hypotheses were verified by examining standardized path coefficients, standard error, and *t*-values at 0.05 significance level. Table 6 shows that all 26 proposed hypotheses were supported. Therefore, the data supported the proposed unified model.

**Table 6.** Hypothesis testing for the proposed unified model.

| Hypothesis | Relationship | β (Beta) | SE | t-value | Result |
|---|---|---|---|---|---|
| **Descendants of Perceived Value ($R^2$ = 0.13)** | | | | | |
| **H1** | **Attitude → Perceived Value** | **0.168** | **0.051** | **3.29*** ** | **Supported** |
| **Descendants of Attitude ($R^2$ = 0.74)** | | | | | |
| **H11** | **Perceived Risk → Attitude** | **-0.164** | **0.046** | **-3.56*** ** | **Supported** |
| **H12** | **Perceived Ease of Use → Attitude** | **0.346** | **0.041** | **4.56*** ** | **Supported** |
| **H14** | **Perceived Usefulness → Attitude** | **0.401** | **0.051** | **7.86*** ** | **Supported** |
| **H15** | **Social Factors → Attitude** | **0.271** | **0.067** | **4.04*** ** | **Supported** |
| **H16** | **Entertainment Gratification → Attitude** | **0.363** | **0.056** | **6.48*** ** | **Supported** |
| **H19** | **Web Irritation → Attitude** | **-0.391** | **0.041** | **-9.53*** ** | **Supported** |
| **Descendants of Online Shopping Intention ($R^2$ = 0.45)** | | | | | |
| **H2** | **Perceived Value → Online Shopping Intention** | **0.512** | **0.076** | **6.74*** ** | **Supported** |
| **H3** | **Attitude → Online Shopping Intention** | **0.468** | **0.073** | **6.41*** ** | **Supported** |
| **H6** | **Online Shopping Experience → Online Shopping Intention** | **0.518** | **0.063** | **8.22*** ** | **Supported** |
| **H8** | **Trust → Online Shopping Intention** | **0.625** | **0.071** | **8.80*** ** | **Supported** |
| **H10** | **Perceived Risk → Online Shopping Intention** | **-0.469** | **0.059** | **-7.95*** ** | **Supported** |
| **Descendants of Actual Online Purchase Behavior ($R^2$ = 0.15)** | | | | | |
| **H4** | **Online Shopping Intention → Actual Online Purchase Behavior** | **0.508** | **0.061** | **8.32*** ** | **Supported** |

| | | | | | |
|---|---|---|---|---|---|
| **Descendants of Online Shopping Experience ($R^2$ = 0.22)** | | | | | |
| **H5** | **Actual Online Purchase Behavior → Online Shopping Experience** | **0.421** | **0.037** | **11.37*** ** | **Supported** |
| **Descendants of Trust ($R^2$ = 0.18)** | | | | | |
| **H7** | **Online Shopping Experience → Trust** | **0.326** | **0.046** | **7.08*** ** | **Supported** |
| **H24** | **Navigation Design → Trust** | **0.228** | **0.062** | **3.68*** ** | **Supported** |
| **H25** | **Visual Design → Trust** | **0.540** | **0.063** | **8.57*** ** | **Supported** |
| **H26** | **Information Design → Trust** | **0.310** | **0.058** | **5.34*** ** | **Supported** |
| **Descendants of Perceived Risk ($R^2$ = 0.13)** | | | | | |
| **H9** | **Trust → Perceived Risk** | **-0.301** | **0.045** | **-6.69*** ** | **Supported** |
| **Descendants of Web Irritation ($R^2$ = 0.19)** | | | | | |
| **H21** | **Navigation Design → Web Irritation** | **-0.329** | **0.084** | **-3.91*** ** | **Supported** |
| **H22** | **Visual Design → Web Irritation** | **-0.506** | **0.077** | **-6.57*** ** | **Supported** |
| **H23** | **Information Design → Web Irritation** | **-0.464** | **0.092** | **-5.04*** ** | **Supported** |
| **Descendants of Perceived Ease of Use ($R^2$ = 0.25)** | | | | | |
| **H17** | **Entertainment Gratification → Perceived Ease of Use** | **0.601** | **0.055** | **10.93*** ** | **Supported-** |
| **H20** | **Web Irritation → Perceived Ease of Use** | **-0.502** | **0.061** | **-8.23*** ** | **Supported** |
| **Descendants of Perceived Usefulness ($R^2$ = 0.31)** | | | | | |
| **H13** | **Perceived Ease of Use → Perceived Usefulness** | **0.391** | **0.048** | **8.14*** ** | **Supported** |
| **H18** | **Entertainment Gratification → Perceived Usefulness** | **0.456** | **0.066** | **6.90*** ** | **Supported** |

Note: Standardized path coefficients are described with the significant values on the top of each value (*** $p < 0.01$).

## Discussion and Implications

### The purpose of the current study was threefold.

1. Contribute to knowledge on the antecedents of online shopping acceptance and online customer behaviour from the perspectives of IS and CB.
2. Tests the proposed IS-CB unified model.
3. Offer useful and effective implications for online retailers.

The proposed unified model is more explanatory than the CB model, and the proposed unified model links were enhanced (i.e., higher coefficients) while linking CB and IS to predict online consumer behavior.

### Customer Belief Constituents

The CB model was defined in hypotheses H1-H11. H1-H8 indicated a positive association between attitude, PV, online shopping intention, online shopping purchase, and trust. Attitude and trust were significant factors for online shopping intention, as well as PV and online shopping experience. These results are in line with Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [11,31]. Therefore, to increase customer attitude and trust, and online shopping intention, online retailers need to improve their online shopping sites and make online shopping process easy and secure to enhance customer attitude and trust. H9-H11 described the relationships between PR, trust, attitude and online shopping intention. PR was negatively related to attitude, trust and online shopping intention. Therefore, if customers perceive the shopping process as unsafe and risky they will not go online to do their shopping. This finding is in line with [45-48].

### Customers' Beliefs and Technology Acceptance

H12-H20 represent TAM and UGT. PU, PEOU, EG and SF all positively influenced customer online shopping attitudes, however EG indirectly influenced customer attitudes through PEOU and PU. Moreover, PEOU affected online customer attitudes indirectly via PU. Attitudes towards online shopping positively impacted customer intentions to purchase online, and online shopping intentions with online retailers positively impacted the actual use of online shopping retail sites. Hence, enhancing the adequacy of online shopping should focus on SF, PU, PEOU and EG. These findings are consistent with Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [6,11,58,63,65,82]. Hypotheses H19 and H20 argue that WI has a negative relationship with PEOU and customer attitudes towards online shopping. The level of WI significantly influences customer attitudes towards online shopping; i.e., if online shopping websites annoy the customers, then they develop a negative attitude towards the website. This result supports [8,84,85], which argued that WI negatively impacts on customer attitudes. WI is a nightmare for retailers to keep and draw customers to the website [81]. So, retailers should proactively reduce WI to enhance their business, or they will be "dead" in the online retail market.

In recent years, social networking sites (SNSs) have gained significant impact on customer information searches and resulting purchasing behaviour. This implies a lucrative opportunity for online retailers to boost their website traffic and revenues. This research illustrates that web designers and online marketers should consider intrinsic and extrinsic motivation concerns in their interface design and promotion to increase online customer engagement with their websites, e.g., add intuitive chat tools or SNS fan pages, etc. To prevent creating WI, online retailers should ensure their web-based shopping sites are uncluttered

and free of pop-ups. Failure to consider these issues will lead to negative PEOU and unpleasant attitudes. So online shopping websites should use framework features that guarantee online customers have a pleasant, useful, and easy experience.

**Real Online-Shopping Purchase and Post-Purchase Predictions**

The proposed integrated model explains only 15% of the variance in actual online shopping purchase. This is relatively low compared to the external factors (PV, PEOU, PU, EG, WI, SF) which explain 74% of variance of online customer attitudes. The results are in line with [29,109], who suggested that although customers have positive attitudes and intentions towards a certain act, they may not actually participate in the act since other factors such as perceived behavioural control and cost may deter the customers from participating in that particular action. The online customers' actual behavior also positively influenced their online shopping experience. So, ensuring online customers are satisfied, delighted and having fun shopping on the web are key to having a good online shopping experience. In this study, it was revealed that these online customers were safe when shopping from online shopping sites as reflected in the positive trust results. Likewise, online shopping sites should increase online customer confidence that their websites protect their privacy. This research revealed that successful, safe and secure online shopping experiences lead to trust and increase the likelihood of repeat online purchases. So, online shopping sites should engage in trust-building activities. Creating trust by offering safe online shopping sites is necessary to boost the possibility of repurchase for online customers.

**Online Shopping Perceived Value**

The findings of the current study are in line with the previous studies that online customer attitudes towards online shopping are positively influenced by their PV of online shopping sites [24,27]. Specifically, this study demonstrated that attitudes towards online shopping is positively affected by their PV of online shopping, and the findings support the importance for online retailers to ensure high PV products and services. To improve customers' PV of online shopping, it is recommended to retailers to display price, time, increased number of products and the selection of products.

**The effects of Website Design and Website Irritation**

H21 to H26 examined the relationships between ND, ID, VD, WI and trust in online shopping. H21 found that website visual design significantly impacted WI, which implies that a website with irritating visual design can annoy visitors, causing WI. So, website visual design that might trigger WI should be avoided, such as bad layout, small text, irritating and flashy colours and graphics, etc. [77]. Other research has also found that annoying visual aids like popup messages, twinkling text, animated banners, and sponsored advertisements could distract customers and induce a negative attitude toward the website [83]. The website visual design is extensively used by customers to assess the look, feel and quality of products. So it is important for websites to use appealing visual designs to present products [97].

Hypothesis H22 indicated that navigation design has significant negative effect on WI, in line with [110], thus strongly confirming that navigation design is a critical component that impacts users' impression and assessment of the website. Internet shoppers desire to purchase from websites with simple and friendly navigation design, so that they can fulfil their tasks effortlessly Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P.

(2023); Pathan, M. S. K. (2022) [111]. So, websites with well-designed navigation have more positive feelings of pleasure and gratification [112], which increase customer satisfaction. So, retailers need to have a good understanding of the importance of navigation design and make sure customers can navigate through the website without much effort.

In H23, information design was found to have negative effect on WI. If customers did not have to complete many information-related tasks, then they find the information design useful for their purchase. Alternatively, respondents did not make full use of the information design as they abandoned the shopping. Our results are in line with that of [55,79,81], which demonstrated that information design was critical to grab online customers' attention. Hence, online retailers should focus more on information design so that customers can easily access specific and accurate information. This will ensure customers have positive - experience, which will also benefit the retailers.

Hypotheses H24-H26 examined the relationships between trust in online shopping, ID, ND, and VD. Lack of trust is a major barrier to online transactions. To create sustainable e-businesses, online sellers need to understand how trust is built and its impact on purchase intention in online shopping. The present study demonstrated that website design factors are drivers of trust, which increase online purchase intention. Online practitioners should appropriately use website design factors, e.g., ID, VD, and ND, as a tool in online advertising to increase trust in the site and subsequently purchase intention.

**Conclusions**

This research presented a consolidated IS-CB model of online shopping that integrated TRA, TAM and UGT including PV, PR, online shopping experience and trust to explain the IS and CB components for acceptance and usage of online shopping. The main findings of this study from the hypotheses and experiments were

- The direct factors influencing customer acceptance of online shopping are PV, PEOU, PU, WI and SF.
- EG has an indirect effect on customer acceptance of online shopping through PEOU and PU.
- WI has an indirect impact on customer acceptance of online shopping via PEOU.
- PU influences customer acceptance of online shopping indirectly through PU.

The customer acceptance of online shopping in terms of their attitudes, which influences their intention to shop online and hence their online shopping purchase, along with the serious effect of online shopping experience and trust, provides a comprehensive list of the key reasons for online shopping with respect to using online shopping sites. These factors will increase website visits and shopping transactions. These findings show multi-disciplinary IS research in relation to IS and CB to explain the online shopping trend in the virtual environment.

**Theoretical Implications**

The current study filled in the gap between the previous research about IS and CB and explained the effects of the IS and CB components on customer acceptance and usage of online shopping. This study adopted a theoretical perspective of TRA, TAM, UGT, and website design, to explain customer acceptance and use and the importance of a range of key constructs on online shopping. Specifically, this study demonstrates online customers perceive IS-CB constructs when engaging in online shopping, providing insights into how IS influences customers' shopping behavior in the online environment.

Mikalef et al. [113] grounded their study in UGT to investigate the effects of socializing, personal recommendation agents, product selection and information availability. They found socializing and personal recommendation agents had positive impacts on purchase and WOM (Word of Mouth) intentions, while product selection only increased purchase intentions. Surprisingly, information availability had no significant impact on purchase and WOM intentions. Lastly, the impact of purchase intentions had a positive influence on WOM intentions. In this way, Mikalef et al. provided new research opportunities for online retailers to use social media forums as a means of marketing and getting consumer feedback. By doing so, online retailers would gain valuable information about the value of their brand and online shopping, and in turn improve value, trust and online shopping intentions. Online consumers are motivated by time and effort saving [114]. E-commerce has been extended with social commerce through social media and networks. Social commerce is much different from traditional e-commerce, enabling social interactions and generation and dissemination of user generated content Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [113]. Merchants should examine a broad spectrum of social media innovations to connect with potential customers and gather useful feedback from existing customers [113].

This study identified the perception of online customers of a particular combination of IS-CB construct while they shop online, which can lead to a better understanding of how IS motivates customer behavior for virtual shopping. Such findings will greatly help IS developers for online shopping to manage numerous fast-emerging issues such as ease of use, enjoyment, perceived value, etc., and therefore meet online customer desires.

Our study offers a holistic summary that can be translated into knowledge of the state of online shopping. The proposed unified model's outcomes offer the ideal means to meet online customers' expectations that their desires will be satisfied. Intellectual shopping support can significantly adapt knowledge obtained from IS-CB viewpoints to manage and extend the knowledge obtained from online shopping environments.

**Managerial Implications**

The current study demonstrated that a positive online attitude will trigger positive online shopping intention, and increase the likelihood of online purchase. Satisfying online shopping systems and processes will assist with delivering great online shopping experiences,

increasing online trust in shopping with particular online retailers. This study gave valuable information to website designers and online retailers to enhance their processes.

Retailers appreciate the power of the internet but sometimes find it difficult to recognise suitable methods to influence customers. This study offered empirical evidence that PV, attitude, PR, trust and online shopping experience are all factors that predict online shopping. Unfriendly shopping environments are considered a major factor in not shopping online. Higher PR makes customers worried and reluctant to shop online. Online retailers should develop less hostile systems and ensure a secure transaction in order to reduce PR. This will increase customer trust and attitude towards online shopping. While the PEOU, PU, EG have positive influences on online shopping attitudes, i.e. an enjoyable and easy to navigate shopping website will induce positive attitudes, but a cluttered and irritating site will lead to negative attitudes, and lower PEOU. Thus, nicely designed websites will have low WI and higher trust, resulting in increased online shopping intentions. Therefore, online retailers should be concerned with enhancing potential shopper beliefs and attitudes, by emphasising positive experiences of various customers. Specifically, online retailers' presence in social media and sharing information about their products and services (blogs, etc.) will help customers' decision making, and thus increasing customer trust and positive attitude towards the online retailer.

In the current competitive environment, if marketers can get feedback early on which customer segments care about information, navigation and visual design, this will help them simplify their website navigation and thus focus their marketing efforts. Web designers should focus on designing websites that will not irritate customers, and minimise WI due to website design or layout. Positive navigational experience increases the probability of purchase in online retail stores [74], and superior hypertext features (e.g., conceptual map) increase customers' positive navigational experience Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [75]. As a result, navigational experience is the key to success in the online business world. Poorly designed websites with irrelevant information, inappropriate information layout and/or disagreeable information media (e.g., pop-up advertisements and continuous animations) increase the cognitive effort to process information, distracting the customers and enhancing WI [59]. Therefore, to provide convenience to shoppers, it is important for retailers to understand the significance of website design and issues affecting the design. The present study confirms that retailers should consider customers' interaction with the online shopping website. Improved collaboration between different areas (e.g., human-computer interaction, marketing, and retailing) will improve online shopping experience.

The study verified that VD, ID and ND significantly influenced customer WI (and attitude). Improved website design will reduce WI (and vice versa), and decrease of WI will increase customer online shopping intention, with increased PEOU, PU and EG. So e-commerce websites are important for online shopping and managers should continuously improve website designs in order to retain existing

customers for sustainable business. This will enhance customer trust, online shopping and increase revenue. Minimum requirements to enjoy online shopping include: increase PV,

decrease PR, and increase ease of use, and safe shopping. Online retailers must consider making their websites easy to use, promote positive EGT, and lower WI. It's essential that online retailers consider SNSs to assist customers to communicate with the retailer. Implementing these measures will have a positive effect on customers, and will help increase the likelihood of making a purchase.

**Limitations and Directions for Future Research**

Our study has a number of limitations that should be taken into account when interpreting the results.

- We collected the data from only Korean consumers, and future studies should consider the consumer base from other countries, such as Europe, the United States, China, and others, in order to consider cross-cultural issues and identify any similarities or differences among the relationships.
- We did not analyse demographical effects, e.g., differences between males and females or income levels, only the overall effects. This further examination might be beneficial to figure out the moderating effects (e.g., age, sexual orientation and race), to better understand online shopping.
- We examined the online shopping of individuals only. But some online stores provide group purchasing, where a group of customers come together to receive greater discounts. Therefore, future research should extend the integrated model to consider generalizing to group purchasing.
- There are various designs for online stores such as tree, pipeline, guide path Pathan, M. S. K. (2022); Khan, M. S. (2021); Muhammad, S. K. P. (2023); Pathan, M. S. K. (2022) [65]. A thorough investigation of these different design elements would be interesting to find out which ones affect online customers' trust and WI.
- Trust has been used as mediator [13] in the relationship between consumers' perceived risk and online purchase intention in previous studies. Ganguly et al. [99] also demonstrated trust mediated positive relationships of information design, visual design and navigational design on purchase intention. Therefore, there are many significant mediators. The current study mainly examined significant attributes of online shopping, and identifying significant mediators needs to be examined in future studies of mediating effects of variables.
- This study used data from an online shopping mall that is used by consumers of all ages. But samples were taken from only one online shopping mall. Future research will collect data from multiple online shopping malls offering a variety of products, to enhance the generalizability of the present findings.
- In addition, future studies will also explore total and indirect effects of mediators, to help better understand customers' behavior.

**Appendix A**

| Construct | Code | Measurement Item |
|---|---|---|
| **Perceived Value (PV)** | PV1 | While shopping online, I feel a sense of adventure. |
| | PV2 | While shopping online, I am able to find the items I am looking for. |
| | PV3 | Shopping online is a source of enjoyment for me. |
| **Attitude (AT)** | AT1 | I feel comfortable shopping on online platforms. |
| | AT2 | I like purchasing products through online shopping websites. |
| | AT3 | I have a positive evaluation of online shopping. |
| **Online Shopping Intention (OSI)** | OSI1 | I prefer to shop online rather than through traditional channels. |
| | OSI2 | I intend to increase my online shopping in the future. |
| | OSI3 | I am likely to recommend online shopping websites to others. |
| **Online Shopping Experience (OSE)** | OSE1 | I am satisfied with my online shopping activities. |
| | OSE2 | I have a pleasant experience when shopping online. |
| | OSE3 | I feel comfortable using online shopping websites. |
| **Trust (TR)** | TR1 | I feel safe purchasing from online retailers that protect my privacy. |
| | TR2 | I believe that trustworthy online retailers safeguard customers' personal information. |
| | TR3 | I am confident when purchasing from secure online retailers. |
| **Perceived Ease of Use (PEOU)** | PEOU1 | Learning to use an online shopping platform is easy for me. |

| Construct | Item Code | Measurement Statement |
|---|---|---|
| **Social Factors (SF)** | SF1 | I feel concerned about others' opinions when making purchases online. |
| | SF2 | I am more inclined to shop from online platforms that are commonly used by my friends. |
| | SF3 | I tend to purchase products online that are endorsed or shared by my friends on social media platforms. |
| **Web Irritation (WI)** | WI1 | The website provides comprehensive and clearly displayed product choices, features, and details. |
| | WI2 | I frequently experience frustration while engaging in online shopping. |
| | WI3 | Many online shopping platforms appear complicated and difficult to understand. |

| | | |
|---|---|---|
| **Navigation Design (ND)** | ND1 | I can move through the website smoothly without difficulty. |
| | ND2 | The website is user-friendly and easy to operate. |
| | ND3 | The site offers effective navigation tools that help locate information efficiently. |
| **Visual Design (VD)** | VD1 | The website provides an adequate level of interactive features (such as videos and demonstrations). |
| | VD2 | The platform enables me to customize and access information according to my preferences. |
| | VD3 | The overall appearance of the website reflects a professional and appealing design. |
| **Information Design (ID)** | ID1 | The animations used on the website contribute meaningfully to the user experience. |
| | ID2 | The information presented on the website is structured in an organized manner. |
| | ID3 | The content available on the website is logically arranged and easy to follow. |
| **Perceived Risk (PR)** | PR1 | I am concerned that my personal information may be misused or compromised by the website. |
| | PR2 | I believe that some information on the website may be overstated for promotional purposes. |
| | PR3 | Purchasing and receiving products online may take more time than expected. |
| **Actual Online Shopping Purchase (AOP)** | AOP1 | I frequently engage in online purchasing activities. |
| | AOP2 | I make a significant number of purchases through online platforms. |
| | AOP3 | Overall, my experience includes a high volume of online transactions. |

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