

Article

Impact of Shopping Website Design on Customer Satisfaction and Loyalty: The Mediating Role of Usability and the Moderating Role of Trust

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Abstract: In a purchase situation, customer satisfaction and loyalty are primarily determined by usability, trust, and web design. However, the nature of their relationship remains unclear. According to the literature, trust can generate customer loyalty. Consumers' cognitive and affective processes in online shopping are well discussed in the literature. However, the role of trust in website design has yet to be thoroughly investigated. Given the above knowledge gaps, we studied 96 Chinese youths using two shopping websites. Structural equation modeling was considered to validate the hypothesized relationships, focusing on three key website design features. We discovered that the three design elements predicted usability and satisfaction differently. In addition, website usability and customer satisfaction mediated the relationship between navigation/information design and loyalty, and satisfaction mediated the relationship between visual design and loyalty. Furthermore, the effects of website design and usability on customer satisfaction are strengthened or weakened depending on customer trust. When trust is high, the effect of website design on satisfaction is strengthened, while the effect of usability on satisfaction is weakened. To retain customers, designers should pay more attention to website design and establish trust. These findings offer crucial insights for online retailers in promoting and capitalizing on the positive effects of various website design elements on customers' shopping experiences.



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Keywords: website design; online shopping; trust; usability; satisfaction; loyalty

1. Introduction

Online shopping websites have become an essential e-commerce tool and the primary interface for consumers to access the internet due to the rapid expansion of e-commerce technologies and the rising popularity of online shopping [1]. In an increasingly competitive and diverse e-commerce environment, users can switch between different shopping platforms if they experience problems with the electronic transaction process. They may also use other online resources or opt for offline, physical alternatives [2]. It emphasizes the importance of website design for e-commerce businesses seeking to retain their customers. A website's design quality directly affects the user experience, and well-designed websites have been shown to positively affect consumer pleasure, trust, arousal, and shopping intention [3–5]. Therefore, conducting usability tests on shopping websites is becoming increasingly important for improving the user experience. Shopping websites are more complex than others, and design elements can affect customer loyalty. Customer loyalty is essential to a company's long-term success and profitability [6]. Since shopping websites have a more significant impact on customer loyalty than information-intensive websites such as government departments [7], it is essential to understand how the design elements promote customer loyalty. The field of web design is increasingly recognizing that user needs go beyond usability and practicality to more experiential aspects such as visual aesthetics [8]. Lavie and Tractinsky [9] suggested that the visual aesthetics of computer

interfaces is a strong determinant of users' satisfaction and pleasure, in which the classical aesthetics dimension is closely related to perceived usability. The stimulus–organism–response (S-O-R) framework is widely used to assess the effects of website visual aesthetic elements on customer responses [10,11]. Other researchers found that informative and organized website design also lead to satisfaction [1,7,12,13], which involves the cognitive process more than the stimulus process. It seems that many kinds of website design features positively affect satisfaction [13–15].

Research has shown that website design can affect usability [1,16,17] and has focused on download delay, organization, navigation [1], layout, and performance [15]. However, comprehensive research on e-commerce-specific website design elements has been dearth. Therefore, we use an SOR framework to expand the antecedents of the cognition–affect–behavior (C-A-B) model by considering how website design affects customer cognition, emotion, and behavior through website design stimulus.

Some researchers have investigated the relationship between customer loyalty, satisfaction, and website design [5,18], but the mechanisms of action among these variables remain unclear. A positive website design is believed to increase satisfaction [3,14,15,19]. Kim et al. [20] discovered that informativeness significantly predicted satisfaction among online retail sites, but visual and emotional appeals did not. Cyr et al. [13] discovered that visual, navigational, and information design were all predictors of satisfaction. It is essential to clarify the various functions of website design features. Moreover, the factors influencing this association are still poorly understood [21]. According to some studies, website design elements directly impact customer satisfaction [3,13,15,21]. Faisal et al. [3] suggested that web design attributes such as aesthetic quality, organizational structure, and layout positively affect user satisfaction. However, some studies found that design quality, web appearance, and entertainment were insignificant to customer satisfaction [12,20]. Therefore, additional research is necessary to comprehend the primary website design elements influencing customer experience and usability.

Additionally, trust is a fundamental component of online shopping. Numerous studies have demonstrated the direct correlation between trust and loyalty [3,6,13,22–24]. However, the relationship between trust and satisfaction is highly complex and still vague. Some studies found trust to positively affect satisfaction [6,25,26], some found it to be positively affected by satisfaction [23,24], while others did not find a direct relationship between the two [3,13,20,21,27,28]. However, few studies have examined the potential mechanisms by which trust influences the generation of satisfaction. In addition, Faisal et al. [3] discovered that the relationship between trust and loyalty is stronger than that between satisfaction and loyalty. The influence of trust on the relationship between usability, satisfaction, and loyalty intrigues us. Consequently, another objective of this study is to investigate the mediating function of trust in an integrated research framework. The impact of shopping website design on usability, customer satisfaction, and loyalty will also be thoroughly examined.

2. Literature and Theoretical Underpinning

This work utilizes an improved model based on the cognition–affective–behavior (C-A-B) model, which provides a valuable framework for capturing people's attitudes [29,30]. Scholars in numerous fields, such as consumer psychology and attitude, have studied it [31,32]. We expanded the antecedents of the C-A-B model after considering the S-O-R framework. Cognition consists of perceptions or thoughts formed in response to marketing stimuli. Affect is a favorable disposition toward a product brought on by a stimulus. Based on the model, our study hypothesized that customer perceptions of website design formed through interactions with a shopping website positively influenced customers' perceived usability, satisfaction, and consequently, customer loyalty.

2.1. Website Design and Usability

The design of a website is crucial to the success of an online business or organization [5,33]. Websites serve as the primary interface between merchants and customers, and their design can significantly impact the user experience. Elements such as usability [15], satisfaction [13,15], and loyalty [34] are all influenced by website design. The design of shopping websites is crucial for a positive customer experience because they frequently display a wealth of product images and information. Visual elements, navigation, and information design are essential elements of shopping websites [13,16,35,36]. Visual design encompasses a website's visual appeal and consistency through images, colors, shapes, and more [7,37]. The structural layout of the website is addressed by navigation design, which enables users to navigate to various website sections [7,13,38]. Information design refers to the precision and organization of product and service information to effectively deliver the items [7,13]. All three elements contribute to a website's overall functionality, structure, and content [36], which shape the user experience.

Usability refers to how simple it is for users to navigate and use an information system [28]. High usability and a user-centered design, both in terms of interface and functionality, are frequently credited with resulting in a website's success [16]. Therefore, a reasonable hypothesis would be:

Hypothesis (H1). *Shopping website design (a. visual design; b. navigation design; c. information design) positively correlates with usability.*

2.2. Usability and Satisfaction

Customer satisfaction is a crucial metric that reflects a customer's overall experience with a product or service over time [39,40]. It is a vital indicator of the strength of the firm–customer relationship and consists of five crucial factors: content, format, accuracy, ease of use, and timeliness [41]. Furthermore, according to expectation confirmation theory (ECT) [42], if a customer's expectations are met, it results in confirmation and satisfaction [43].

Usability is a crucial driver of user satisfaction [15,34,44], as users are more satisfied when they perceive the system to be usable [23]. Tandon et al. [45] investigated the effect of perceived usability on customer satisfaction in online shopping among Indian consumers unfamiliar with the practice and discovered a significant adverse effect. They did not, however, investigate the specific factors that influence perceived usability. Usability will likely significantly impact satisfaction in China, where online shopping is widely practiced. The following hypothesis may be put forth:

Hypothesis (H2). *Usability is positively correlated with satisfaction.*

2.3. Website Design and Satisfaction

Web design elements significantly impact customer satisfaction in the e-banking and e-commerce industries [13–15]. Different design elements concentrate on various facets of the customer experience and, as a result, affect customer satisfaction. For example, visual design influences the visual and aesthetic experience, information design influences the functional experience, and navigation design influences the operational experience. The more a brand can evoke multiple dimensions of experience, the higher the customer satisfaction and the greater its impact on future-directed customer loyalty [46]. Chen et al. found that informativeness was the best predictor of attitudes toward representative communication websites, followed by entertainment and organization [12]. According to cognitive load theory, reducing cognitive demands is essential for increasing navigation, particularly website design, closely related to website usability [47]. Chae et al. discovered that all four dimensions of information quality significantly increased user satisfaction in the mobile internet domain, with connection and interaction quality having a more significant influence than content and contextual quality [48]. Connection and interaction

functions are predominantly used in the navigation system of shopping websites. In contrast, content is part of the information system; navigation and information design can significantly impact user satisfaction. Consequently, the following hypothesis can be put forth:

Hypothesis (H3). *Shopping website design features (a. visual design; b. navigation design; c. information design) are positively correlated with satisfaction.*

2.4. Usability and Satisfaction as Mediators

Customer loyalty conceptualization research can be divided into three main streams: the behavioral loyalty stream, which records actual customer behavior; the attitudinal loyalty stream, which focuses on customers' behavioral intentions; and the composite stream, which includes four phases—cognitive sense, affective sense, conative manner, and behavior [22,49,50]. Most existing research on customer loyalty views it as a result of expected behavior, specifically purchase behavior on shopping websites.

Some research has found that certain website design elements directly affect customer loyalty [7,34], while others found an indirect correlation [3,13,14]. The visual aspect of a website is essential for conveying information to users and influencing their emotions, such as pleasure and arousal, which influence their purchasing intentions [4,10]. Studies in e-commerce have consistently linked website usability to customer loyalty [19,23,34]. Increased usability results in lower search costs and fewer errors [19,51], which allows users to locate desired products more quickly, which positively influences loyalty. Satisfaction also has a positive effect on customer loyalty [14,19,23].

Therefore, the CAB model's cognition component is the information transmission of the website design that leads to usability, and its affect component is customer satisfaction. We hypothesize that the effect of website design features on loyalty is mediated by usability and satisfaction.

Hypothesis (H4). *Satisfaction is positively associated with loyalty.*

Hypothesis (H5). *The association between website design features and loyalty is mediated by usability and satisfaction.*

2.5. Trust as a Moderator

Trust is a crucial factor that influences consumer purchases [27,52] as it represents confidence in the quality and reputation of the goods and services provided by a business [6]. In the context of websites, trust involves a belief in the future behavior of others [53] and that the information on the site will not be misused. This belief enables consumers to rely on the other party in a specific circumstance [54], voluntarily accept all information and services offered, and make a purchase. As online transactions become more complex and uncertain, trust becomes increasingly important [55] as it ensures the security of the transactions conducted through the system [56]. Mayer et al. [57] summarized that ability, benevolence, and integrity are the three dimensions of trust. This suggests that trust may strengthen the relationship between site design and satisfaction due to a positive evaluation of trustees.

By reducing uncertainty and risk [58–60], increasing customer satisfaction and loyalty [23,25,26], and influencing their online experiences and purchase intentions [53,61,62], trust can have a significant impact on consumers' decision making. However, the potential mechanisms by which trust influences satisfaction on shopping websites remain unclear. Importantly, no empirical study has examined the moderator effect of trust on the relationships between shopping website design, usability, customer satisfaction, and loyalty in a single framework.

Trust comprises cognitive and emotional components to satisfy customers' perceived performance by consistently meeting their needs [37,63]. For example, the visual design

of a website, such as the colors, patterns, and layout, can provide customers with visual pleasure and enhance their understanding of the site [10]. The more customers trust the website's functionality, quality, and safety, the lower their perceived risk [35,64] and the greater the influence of aesthetics on their satisfaction. On the other hand, the effect of trust on the relationship between usability and satisfaction may not be as pronounced because high trust and high usability are closely related [23], and their impact on satisfaction is likely to be equivalent.

Tan et al.'s [65] comprehensive trust model consists of three dimensions: dispositional, institutional, and interpersonal. Dispositional trust involves an individual's general ability and willingness to trust; institutional trust involves web-related experiences and perceived protection; and interpersonal trust focuses on trust in a specific party. For example, institutional trust in online shopping refers to the perceived reliability of the website, while interpersonal trust encompasses trustworthiness, confidence, and willingness to complete the transaction. The scales utilized in this study were empirically validated [66].

Based on the context above, we proposed the following hypothesis:

Hypothesis (H6). *Trust positively moderates the relationship between shopping website design and satisfaction.*

3. Material and Methods

3.1. Participants

Ninety-six users participated in this study, 43 (45%) of whom were female and 51 (55%) were male, with a mean age of 22.45 ± 2.90 years. Most participants (85.1%) used shopping websites for over three years. The survey was conducted in China from January to March 2022. Three participants were excluded from the data analysis because they needed more help comprehending the tasks. Previous studies concluded that students are an excellent target group for e-retailing research because they frequently purchase products online and have high confidence in interactive tasks related to buying scenarios [3,67,68].

3.2. Tools

To ensure the content validity of the questionnaire, we first conducted a thorough literature review. Then, the following information was gleaned:

Website Design Attributes Questionnaire: The scale developed by Cyr and Bonanni [69] was used with three dimensions; namely, visual design, navigation design, and information design, as well as 11 items (visual design sample item: "The degree of interaction (video, demos) offered by this site is sufficient."; navigation design sample item: "I can easily navigate this site."; information design sample item: "I find the information logically presented.").

Website Usability Questionnaire: The scale developed by Casaló [19] was used, with seven items (sample item: "In this website, everything is easy to understand.").

Website Satisfaction Questionnaire: The scale developed by Casaló [19] was used, with four items (sample item: "I think that I made the correct decision to use this website.").

Website Trust Questionnaire: The scale developed by Edwards [66] was used, with five items (sample item: "I think that I made the correct decision to use this website.").

Website Loyalty Questionnaire: Behavioral scales from existing studies were used to measure the customer's future repeat purchase and revisit intentions [6,13,19], with two items ("I would consider purchasing from this website in the future."; "I would visit this website again.").

The face validity was determined using the method developed by Zaichkowsky et al. [70]. A panel of two expert raters classified each scale item as "clearly representative," "somewhat representative," or "not representative of the construct of interest." The item was retained if a high degree of consensus was observed among the experts [19].

Age, gender, occupation, level of education, and prior experience with shopping websites were all recorded as demographic information. Respondents rated their reactions

to the website on a 7-point Likert scale (ranging from 1—strongly disagree to 7—strongly agree). The validity of the content was checked by experts after the English versions of all scales were translated into Chinese (ergonomists and psychologists).

3.3. Procedures

To test our hypotheses, we conducted online shopping simulation experiments on two global e-commerce platforms, Taobao in China and eBay in the United States, because customers frequently use multiple sites to complete tasks [54] and tend to trust established service providers [27,64]. We used interface design software to replicate the sites and eliminate the effect of branding on trust. Participants were asked to manipulate the replica sites in a specific order and complete a questionnaire. We disabled the search box to encourage browsing rather than direct searching, despite the sites offering comprehensive features, easy access, various product information, logistics, and return services. All purchase processes, except payment, were presented via interfaces. Figure 1 provides a visual representation.

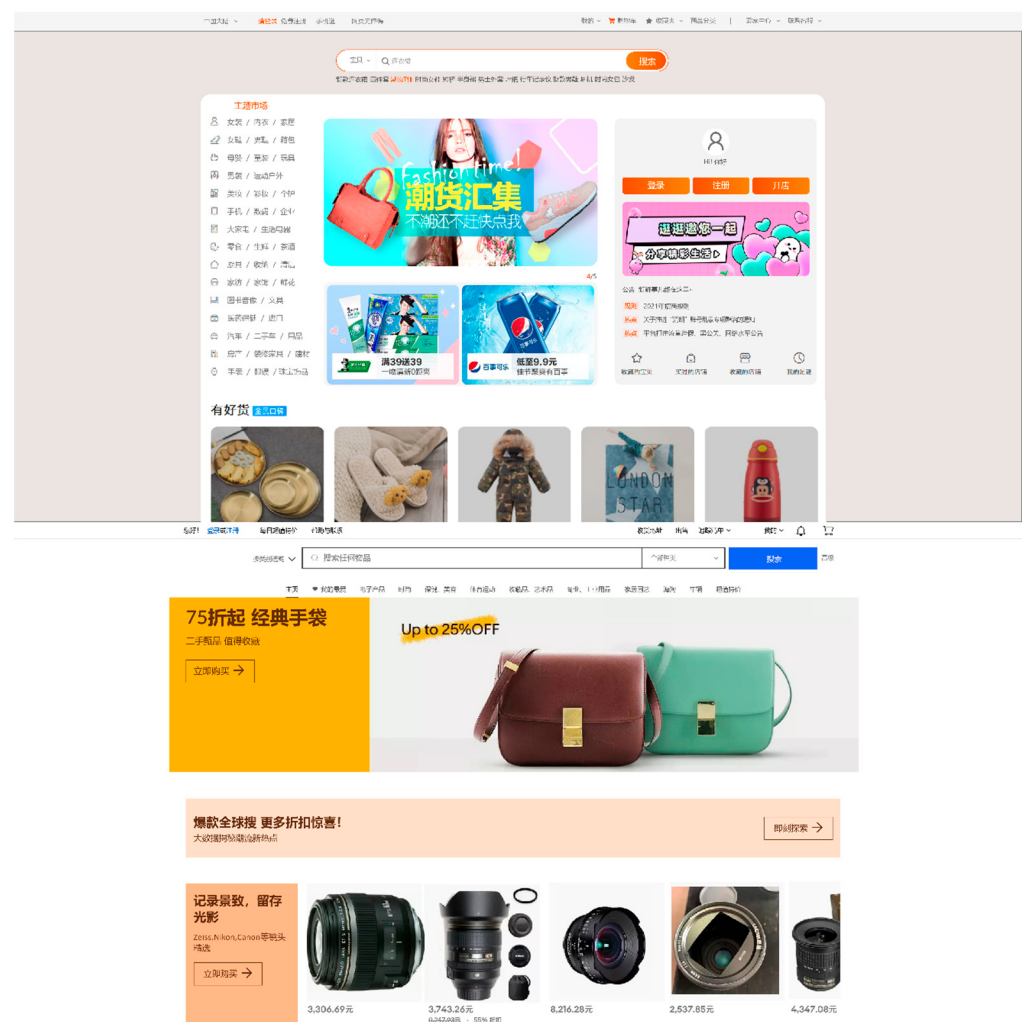


Figure 1. Two shopping websites replicated with the Adobe XD software (the top is China’s largest e-commerce platform—Taobao, and the bottom is the U.S. e-commerce platform eBay).

Before the current investigation began, usability engineering consultants evaluated the initial mockups of the two website prototypes using heuristics. Once the prototype was developed, a series of user tests were conducted with local users to ensure a high level of

usability of its interactive elements. The pilot study aimed to verify that the developed prototype was functional, for example, with the searching and purchasing processes.

In a controlled experiment, 96 Chinese shopping website users participated in this study and were rewarded with gifts. Two groups were randomly and equally assigned to them. Each subject group was asked to complete the same task on two websites: purchase a men's long-sleeved white cotton shirt. For each group, the two websites appeared in different order. Participants were required to: (1) navigate to find the specified type of shirt; (2) complete the initial steps of purchasing the shirt online; and (3) conclude the experiment when instructed to submit the order and payment. The entire procedure lasted approximately ten minutes. Participants completed the online questionnaire immediately after completing the experimental task, which ensured the quality of the sample [36]. A total of 186 questionnaires were collected, of which six from three respondents were deemed ineligible due to their inability to complete all tasks successfully.

3.4. Statistical Analysis

Statistical data were analyzed using SPSS V26.0 (IBM, Armonk, NY, USA). First, the normality of the numeric variables was examined. The data are presented as mean $\pm$ standard deviation (SD) for normal and non-normal variables, and frequency (%) for categorical ones. Next, an independent *t*-test and an analysis of variance (ANOVA) were used to compare the baseline measurements and demographic variables between groups. Before proceeding with the mediation and moderation analysis, correlations between all variables were examined using Pearson's *r*. Then, to test the hypotheses, we created a structural equation model using the Amos 24.0 software. Finally, the mediating and moderating effects were examined using Hayes' proposed PROCESS macro (v4.0) [71,72].

4. Results

4.1. Demographic Details

The one-way ANOVA in Table 1 revealed significant differences in the ratings of navigation design ($p < 0.01$), information design ($p < 0.001$), usability ($p < 0.01$), and trust ($p < 0.05$) between the two websites, with Taobao receiving higher ratings than eBay. The difference in navigation design between genders was also significant ($p < 0.05$), with females ($M = 5.00$, $SD = 1.5$) giving lower scores than males ($M = 5.35$, $SD = 1.3$).

Table 1. Users' characteristics and their scores of the variables.

	N(%)	VD	ND	ID	USAB	SAT	TRU	LOY
		Mean (SD)						
Web type (1: Taobao; 2: eBay)								
Website 1	93 (50)	5.39 (1.1)	5.68 (1.1) **	5.65 (1.0) ***	5.57 (1.1) **	5.52 (1.1)	5.38 (1.1) *	5.46 (1.2)
Website 2	93 (50)	4.89 (1.1)	4.71 (1.5)	4.78 (1.3)	4.78 (1.3)	4.72 (1.3)	4.54 (1.4)	4.56 (1.5)
Gender								
Female	42 (45.2)	4.95 (1.1)	5 (1.5) *	5.05 (1.3)	5.03 (1.3)	4.91 (1.3)	4.85 (1.4)	4.91 (1.6)
Male	51 (54.8)	5.29 (1.1)	5.35 (1.3)	5.36 (1.2)	5.3 (1.2)	5.29 (1.2)	5.05 (1.2)	5.09 (1.3)
Education								
High school	1 (1.1)	5.1 (0.1)	4.83 (0.7)	4.33 0	3.79 (1.1)	4.38 (1.2)	3.9 (0.7)	4.5 (0.7)
Undergraduate	48 (51.6)	5.43 (1)	5.66 (1.1)	5.69 (1)	5.66 (0.9)	5.56 (1)	5.44 (0.9)	5.41 (1.1)
Postgraduate	44 (47.3)	4.82 (1.2)	4.7 (1.5)	4.72 (1.3)	4.69 (1.4)	4.66 (1.4)	4.46 (1.5)	4.59 (1.6)
Age (yr)								
≤22	51 (54.9)	5.3 (1.1)	5.45 (1.2) **	5.53 (1.1) ***	5.41 (1.1) **	5.36 (1.1) **	5.22 (1.2) **	5.23 (1.3) *
23–26	36 (41.9)	4.91 (1.1)	4.82 (1.5)	4.76 (1.2)	4.81 (1.3)	4.78 (1.3)	4.58 (1.3)	4.69 (1.5)
>26	3 (3.2)	5.37 (1.8)	5.61 (1.8)	5.83 (1.6)	5.93 (1.5)	5.58 (1.7)	5.5 (1.7)	5.58 (1.4)

Table 1. Cont.

	N(%)	VD	ND	ID	USAB	SAT	TRU	LOY
		Mean (SD)						
Web usage experience (yr)								
0	3 (3.2)	4.47 (1.2)	4.17 (1.8)	4 (1.8) *	4.38 (1.5)	4.33 (1.4)	4.3 (1.4)	4.17 (1.5)
<1	4 (4.3)	5.43 (0.5)	5.63 (1.3)	5.08 (0.9)	5.32 (1)	5.34 (1)	4.8 (1)	4.88 (1.4)
1–3	7 (7.4)	5.61 (0.8)	5.38 (0.8)	5.81 (1)	5.48 (1.1)	5.7 (1)	5.3 (1.3)	5.32 (1.5)
>3	80 (85.1)	5.11 (1.1)	5.19 (1.4)	5.22 (1.2)	5.17 (1.3)	5.09 (1.3)	4.97 (1.3)	5.02 (1.4)
Total	93 (100)	5.14 (1.1)	5.19 (1.4)	5.22 (1.2)	5.18 (1.3)	5.12 (1.3)	4.96 (1.3)	5.01 (1.4)

Notes: N(%) means the number of participants (percentage). * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Abbreviations: VD, visual design; ND, navigation design; ID, information design; USAB, usability; SAT, satisfaction; TRU, trust; LOY, loyalty.

According to Table 1's ANOVA results, there were significant differences between the participants' ages on the ratings of navigation design ($p < 0.01$), information design ($p < 0.001$), usability ($p < 0.01$), satisfaction ($p < 0.01$), trust ($p < 0.01$), and loyalty ($p < 0.05$), with the elderly group giving the highest scores and the group aged 23–26 giving the lowest. Shopping website experience also significantly affected ratings of information design ($p < 0.05$), with those with no experience giving the lowest scores and those with 1–3 years of experience giving the highest. Regarding the education level of the participants, no significant differences were found.

4.2. Reliability and Validity Analysis

The reliability and validity were assessed using average variance extracted (AVE), combined reliability (CR), and Cronbach alpha values. The variables' Cronbach's alpha values ranged from 0.817 to 0.946, as shown in Table 2. These values were more significant than the standard value of 0.7, indicating that the scale data were accurate and reliable and that the measured items had a high internal consistency and good overall reliability.

Table 2. Scales for reliability and convergent validity.

Construct	Item	Loading	α	AVE	CR
VD	VD1	0.696	0.853	0.537	0.851
	VD2	0.668			
	VD3	0.819			
	VD4	0.827			
	VD5	0.631			
ND	ND1	0.878	0.909	0.775	0.912
	ND2	0.916			
	ND3	0.845			
ID	ID1	0.608	0.817	0.648	0.843
	ID2	0.886			
	ID3	0.889			
USAB	USAB1	0.824	0.939	0.693	0.94
	USAB2	0.726			
	USAB3	0.718			
	USAB4	0.881			
	USAB5	0.878			
	USAB6	0.887			
	USAB7	0.892			
SAT	SAT1	0.892	0.925	0.761	0.927
	SAT2	0.775			
	SAT3	0.929			
	SAT4	0.885			

Table 2. Cont.

Construct	Item	Loading	α	AVE	CR
LOY	LOY1	0.938	0.936	0.882	0.937
	LOY2	0.94			
	TRU1	0.86			
	TRU2	0.877			
TRU	TRU3	0.869	0.946	0.774	0.945
	TRU4	0.918			
	TRU5	0.875			

Notes: α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted.

Convergent validity requires AVE values of variables greater than 0.5, CR values greater than 0.7, and factor loading values greater than 0.5. As shown in Table 2, all the data satisfied the criteria. The convergent validity was thus satisfactory.

These variables were subjected to a Pearson correlation analysis, and the results indicated significant pairwise correlations between the variables (see Table 3). All correlation coefficients were greater than 0.5 but less than 0.9, indicating no significant multicollinearity [73]. The values of the square root of AVE on the diagonal of Table 3 were obtained using Amos 24.0. Regarding the discriminant validity, the square root of the AVE values of each variable must be greater than the correlation coefficient between the variables. Regrettably, some of the square roots of the AVE values of all the variables were close to their correlation coefficients.

Table 3. Correlation matrix and discriminant validity.

	1	2	3	4	5	6	7
1 VD	0.733	—					
2 ND	0.750 **	0.880	—				
3 ID	0.734 **	0.807 **	0.805	—			
4 USAB	0.747 **	0.887 **	0.840 **	0.832	—		
5 SAT	0.746 **	0.836 **	0.836 **	0.894 **	0.872	—	
6 LOY	0.716 **	0.768 **	0.735 **	0.791 **	0.857 **	0.939	—
7 TRU	0.681 **	0.785 **	0.771 **	0.826 **	0.893 **	0.818 **	0.880

Notes: ** $p < 0.01$. Scores in bold represent the square root of AVE for a construct.

4.3. Structural Model Analysis

We developed structural equation models to test the hypotheses, as depicted in Figure 2. Based on the results, we modified the measurement model by adjusting the highly correlated residual paths one at a time and removing three insignificant paths (website design to loyalty and usability to loyalty). In Amos 24.0, the maximum likelihood estimation method yielded acceptable results ($\chi^2 = 412.992$, 234 d.f., $p < 0.001$; NFI = 0.914; NNFI = 0.953; CFI = 0.960; IFI = 0.961; RMSEA = 0.064; 90% CI RMSEA (0.054, 0.074)). The standardized path coefficients (Figure 3) were used to test the hypotheses with good fit indices. Most results corresponding to hypotheses 1–4 are presented in Table 4, except for H1a, H3b, and H3c. The R^2 values for satisfaction ($R^2 = 0.931$) and usability ($R^2 = 0.929$) were significant. The findings revealed that shopping website design elements have different effects on usability and satisfaction, with the visual design having a significant main effect on usability and the navigation design and information design having significant main effects on satisfaction. Usability was more affected by navigation design than by information design. Together, navigation design and information design accounted for 93.1% of usability. With visual design, usability significantly impacted satisfaction, accounting for 92.9%. In total, 83.3% of loyalty was explained by satisfaction. These findings further demonstrate the crucial role that website design factors play in influencing consumers' online shopping environments regarding usability and satisfaction.

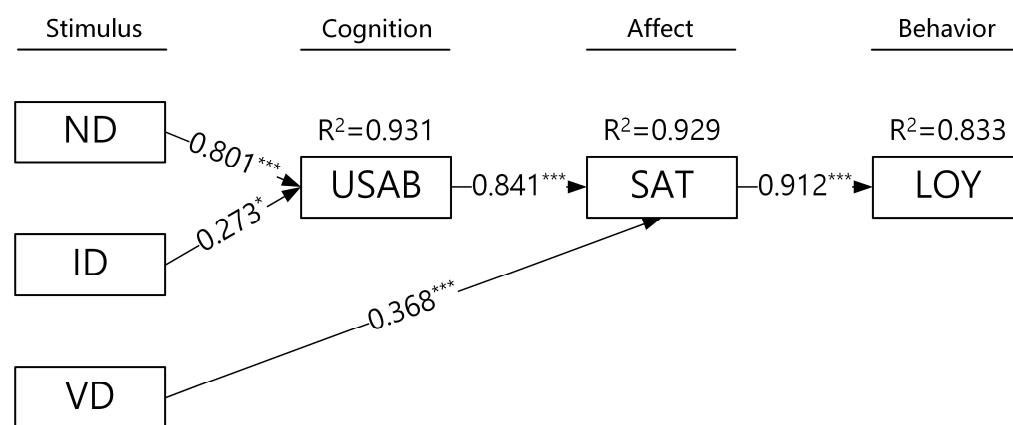


Figure 2. Structural model (* $p < 0.05$; *** $p < 0.001$).

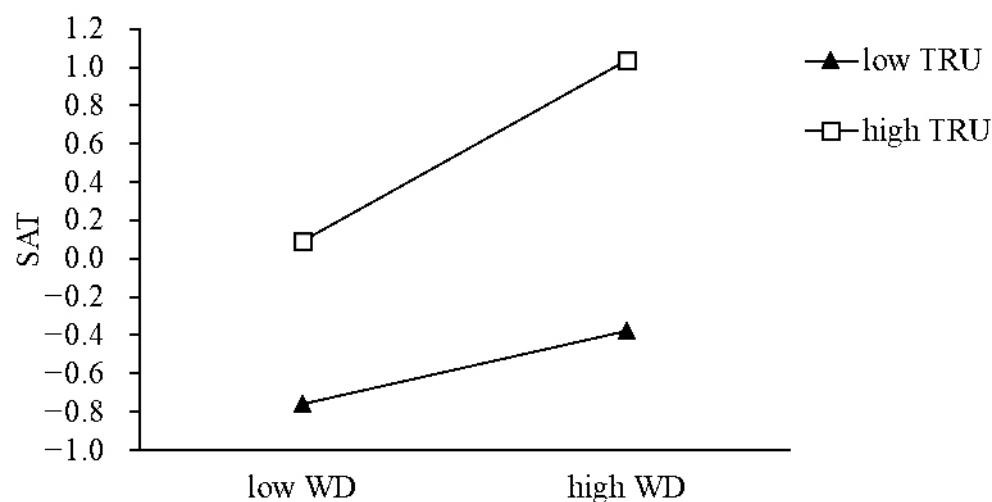


Figure 3. Interaction between website design and trust on satisfaction.

Table 4. Results of hypothesis testing.

Hypothesis ($n = 186$)	Unstd.	S.E.	C.R.	P	Std.	R ²	Remark
H1a VD→USAB	−0.134	0.133	−1.003	0.316	−0.101	0.931	Not supported
H1b ND→USAB	0.772	0.122	6.311	***	0.801		Supported
H1c ID→USAB	0.389	0.175	2.216	*	0.273		Supported
H2 USAB→SAT	0.802	0.212	3.780	***	0.841	0.929	Supported
H3a VD→SAT	0.465	0.139	3.346	***	0.368		Supported
H3b ND→SAT	−0.226	0.212	−1.070	0.285	−0.246		Not supported
H3c ID→SAT	0.050	0.172	0.290	0.772	0.037	0.833	Not supported
H4 SAT→LOY	1.004	0.059	17.054	***	0.912		Supported

Notes: * $p < 0.05$; *** $p < 0.001$.

4.4. Mediation Analysis

The mediation effect, or H5 of our hypotheses, was examined using Model 6 of the PROCESS macro [74]. Website design positively predicted usability ($b = 0.98$, $t = 24.41$, $p < 0.001$), satisfaction ($b = 0.43$, $t = 5.20$, $p < 0.001$), and loyalty ($b = 0.31$, $t = 2.55$, $p < 0.05$). Moreover, usability had a significant predictive effect on satisfaction ($b = 0.55$, $t = 7.46$, $p < 0.001$), so did satisfaction on loyalty ($b = 0.77$, $t = 7.51$, $p < 0.001$). The bias-corrected percentile bootstrapping suggested that the indirect effect of usability was ($b = -0.04$, $SE = 0.14$) and its 95% confidence interval was $(-0.29, 0.24)$. Similarly, the results indicated that the indirect effect of satisfaction was ($b = 0.33$, $SE = 0.09$), and its 95% confidence

interval was (0.17, 0.52). The indirect effect accounted for 69.7% of the total effect of website design on loyalty. Hypothesis H5 is proven.

4.5. Moderated Mediation Analysis

We anticipated that trust would moderate the relationship between website design and satisfaction, so we used Model 92 of the PROCESS macro to examine the moderated mediation effect, i.e., H6 of our hypotheses. Website design was positively correlated with satisfaction ($b = 0.29, t = 4.07, p < 0.001$), and trust moderated this relationship ($b = 0.09, t = 2.21, p < 0.05$).

A simple slopes analysis (Figure 3) revealed that the relationship between website design and satisfaction was significant ($b_{simple} = 0.41, t = 4.12, p < 0.001$) for participants with high trust (i.e., one SD above the mean). However, this relationship was significantly weaker for participants with low trust (i.e., one standard deviation below the mean) ($b_{simple} = 0.17, t = 2.10, p < 0.05$).

A conditional indirect effects analysis suggested that trust moderated the indirect effect of website design on customer satisfaction, particularly for participants with high trust (indirect effect = 0.41, SE = 0.10, 95% CI = (0.22, 0.61), $p < 0.001$). For participants with low levels of trust, the indirect relationship between website design and satisfaction was less significant (indirect effect = 0.17, SE = 0.08, 95% CI = (0.01, 0.33), $p < 0.05$). Trust reinforces the positive impact of website design on customer satisfaction. This finding supports hypothesis H6.

Moreover, Figure 4 revealed that the moderating effect of trust on the process of usability affecting satisfaction was also significant ($b_{simple} = 0.19, t = 2.08, p < 0.05$) for participants with high trust. For participants with low trust (i.e., one SD below the mean), the relationship between usability and satisfaction was stronger ($b_{simple} = 0.41, t = 5.86, p < 0.001$).

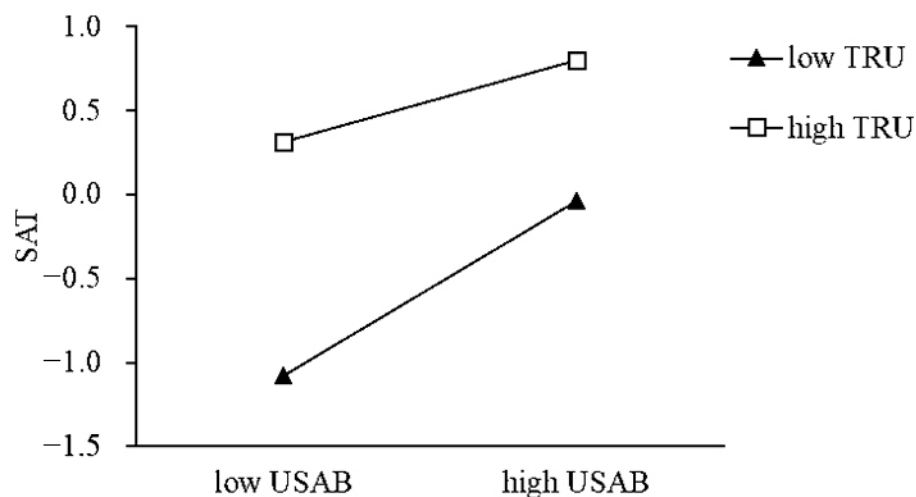


Figure 4. Interaction between usability and trust on satisfaction.

For participants with low trust, the indirect relationship between usability and satisfaction was more significant (indirect effect = 0.41, SE = 0.07, 95% CI = (0.27, 0.55), $p < 0.001$) than for participants with high trust (indirect effect = 0.19, SE = 0.09, 95% CI = (0.01, 0.38), $p < 0.05$). This indicates that high trust can mitigate the positive impact of high website design on customer satisfaction or the negative impact of low website design on customer satisfaction.

5. Discussion

This study investigated the impact of shopping website design features on usability, satisfaction, and customer loyalty, demonstrating the moderating role of user trust and

the mediating role of usability and satisfaction in the total effect of the website design on loyalty. The findings offer helpful information for businesses looking to improve the usability and satisfaction of their shopping websites and help enhance users' shopping experiences.

This study discovered that shopping websites with superior visual, navigational, and information design are perceived as more usable and satisfying and retain more customers. While navigation and information design predict usability, visual design predicts satisfaction. The findings are consistent with previous research that found that website design features and usability are closely related to user satisfaction [15], extending prior work by elucidating the distinct functions of the three website design features. Functional attributes may be more important for customers than aesthetic attributes; navigation and information design had a stronger correlation with usability, satisfaction, and loyalty than visual design. Koo et al. [10] supported our conclusion; they discovered that visual design has the greatest impact on satisfaction due to its role in the aesthetic presentation and eliciting positive emotional responses.

High levels of trust correlate with high satisfaction levels. As users' trust in the shopping site grows, their satisfaction with its design improves, which amplifies the positive effect on sales. Intriguingly, while website design and usability satisfaction continue to be significant predictors of customer satisfaction, customers' trust strengthens or weakens their effects. The findings indicate that trust moderates the relationship between website design and customer satisfaction for both low and high website designs. When levels of trust are high, website design has a more significant influence on the website. However, when trust levels are low, usability has a greater impact on satisfaction. Flavián et al. discovered that high trust is associated with high usability [23], so for customers with a high trust level, improving website design may lead to higher satisfaction than improving usability, which support our finding. Therefore, well-known shopping platforms can try to improve their interfaces' visual design to satisfy customers. In order to significantly increase customer satisfaction, retailers new to the market should pay more attention to the usability of their interface navigation structure and the richness or accuracy of their information.

In contrast to the e-finance domain study [56], where satisfaction plays a more prominent role than it does in e-commerce, the moderating effect of trust on the relationship between satisfaction and loyalty on shopping sites is not significant. In the e-finance domain, trust plays a more important role than satisfaction when dealing with financial services because of the uncertainty and risks associated with the network environment and the nature of financial services. Trust may be a stronger predictor of loyalty than satisfaction in an uncertain scenario such as e-finance. Faisal et al. [3] suggested trust to be a stronger determinant of loyalty for risk-/high-uncertainty-avoidance cultures. They found that the relationship between trust and loyalty in e-commerce websites was stronger than between satisfaction and loyalty. In the field of e-tailing in China, customer satisfaction may be more crucial than trust because e-retailers usually provide a perfect return service within a certain period of time after receiving the goods, and the shopping site is less risky.

6. Limitations

This study's recommendations for website design are based on shopping website design, which emphasizes how different design features affect customer loyalty through usability and satisfaction. Further research could be conducted by using various website attributes for various types of websites. In addition, all of the participants in this study were from China, and the experimental material used shopping websites from two countries; therefore, customers from different cultural environments could be studied further to obtain results with broader applicability and better understanding. Numerous studies have concluded that customers tend to trust a service provider with whom they have conducted business for a considerable amount of time and who leaves them satisfied [27,64]. However, the paradox of high initial trust suggests that the most crucial time for users to develop trust with an organization is at the beginning of their relationship [54], and trust may not

increase as site experience increases. In order to obtain a more precise level of trust, we urge future research to use long-term studies and various situational experiments. This article only examines the relationship between the usability, satisfaction, and loyalty of three shopping website design features. Future research may also investigate the relationship between different types of websites or website-design characteristics to generate more robust findings about website design.

7. Conclusions

Based on the CAB model, this study builds an integrated model to validate the hypothesized relationships, focusing on three key website-design features: visual design, navigation design, and information design. The findings indicate that the three Shopify website design elements affect customers' perceptions of usability and satisfaction, which affect loyalty. Enhancing website navigation and information design can significantly improve website usability, while visual design strongly predicts customer satisfaction. Through the mediating role of usability and satisfaction, website design features affect customer loyalty, and trust acts as a moderator to control the process of generating customer satisfaction. Moreover, website design and usability are significant predictors of customer satisfaction, and their effects are strengthened or weakened by customers' trust. As the level of customer trust increases, the positive impact of website design on satisfaction is enhanced and the positive impact of usability on satisfaction is weakened.

The empirical findings suggest some implications practical to web designers and online retailers. In particular, when considering different customer groups, retailers should varied different strategies. For new customers, website designers must focus on the aesthetics of the interface design. For regular customers, the usefulness of the website is more significant to retain customers. In this case, designers should pay attention to a reasonable interface navigation layout and display perfect information.

This study sheds new light to better understand the generation of customer satisfaction and loyalty on shopping websites, thereby helping marketing managers of the retail industry to implement effective strategies and maintain long-lasting relationships with their customers. With the ever-expanding conceptual knowledge about shopping website design and customer attitude expands, it will likely result in a sustainable and well-functioning e-commerce environment.

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