

-RESEARCH ARTICLE-

THE INFLUENCE OF PERCEIVED VALUE ON CUSTOMER LOYALTY IN ONLINE SHOPPING ENVIRONMENT: MEDIATING ROLE OF CUSTOMER SATISFACTION AND CUSTOMER TRUST

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—Abstract—

The rapid advancement of science and technology has driven significant growth in the service industry, enabling the retail sector to overcome traditional regional constraints and embrace globalization. Due to the quick advancements in digital technology, managing retail online has grown in importance compared to traditional shopping. Nevertheless, research on how customer perceived value leads to customer loyalty has paid little attention to the roles of satisfaction and trust among online customers. The authors study how these associations exist among the people of Northeast China which shares the same digital media consumption patterns as other areas. 508 complete

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answers were obtained from the distribution of a structured questionnaire to online shoppers. With SEM, the study looked at the direct and indirect ways six areas considered as perceived value—service quality, product quality, cost, convenience, safety and experience—influenced satisfaction, trust and loyalty. It has been confirmed that satisfaction and trust highly participate in shaping the link between value and loyalty. The generated results influence theories in digital consumer behaviour and help improve the ways firms design platforms aimed at keeping customers coming back to E-business. In addition, the study shares guidance on how to improve trust and satisfaction among users of e-government services.

Keywords: Online Shopping, Customer Perceived Value, Customer Satisfaction, Customer Trust, Customer Loyalty

INTRODUCTION

E-commerce is now the main way for people to shop because digital technology and internet connections have developed so rapidly in recent years. Online platforms for shopping are now key elements in the worldwide economy, providing convenience, access and personal choices of unprecedented quality (Homburg et al., 2017; Park & Yoon, 2024). Salesforce reported in its 55th Statistical Report on Internet Development in China CNNIC (2025) that by December 2024, China had 1.108 billion Internet users leading to an internet penetration rate of 78.6%. Since everyone is hiring online now, E-commerce is growing quickly, with younger and tech-savvy buyers looking for quick, safe and customized online shopping. In the digital age, E-commerce platforms perform as ecosystems by adding digital governance, user analytics, service quality and customer relationship management to their basic function (Saputra et al., 2024; Venkatakrisnan et al., 2023). The value customers perceive, including convenience, cost-effectiveness, consistent service, security and using the product, is now commonly linked to being satisfied, having trust and remaining loyal (Hong et al., 2023). People appreciating what E-businesses do is relevant, but turning pleased customers into long-term ones is still a problem for many firms. Because of this disconnect, it seems necessary to study how perceived value, satisfaction, trust and loyalty affect each other, especially with online platforms that rely primarily on digital signals for trust (Chaparro-Peláez et al., 2015). Although different studies have researched service quality, trust and loyalty on their own in online environments, there are still no comprehensive models that bring together several value dimensions to examine their shared impact on loyalty (Bernarto et al., 2024; Ginting et al., 2023). Furthermore, most studies tend to forget that customer satisfaction and trust strongly influence whether E-commerce companies can establish lasting relationships. Since online platforms need to retain users and digital consumer behaviour is complex, looking at relationships between value, satisfaction and trust helps a lot. Moreover, most of the data is found in specific areas or applies to certain groups, so conclusions cannot always be applied to

all kinds of consumers (Muharam et al., 2021; Widiyanti & Tukiran, 2024). To fill these gaps, this study presents a conceptual model that looks at the relationships between online shoppers' perceived value, satisfaction, trust and loyalty. The study uses real data from China, which is known for its booming E-commerce, to deliver helpful information for global E-business strategy.

Research Aim and Objectives

This study aims to examine how customer perceived value affects customer loyalty in online shopping environments, with a focus on the mediating roles of customer satisfaction and customer trust. The study has objectives:

1. To identify and evaluate the key dimensions of customer perceived value that influence satisfaction, trust, and loyalty in online shopping.
2. To investigate the mediating roles of customer satisfaction and customer trust in the relationship between perceived value and customer loyalty.
3. To provide strategic recommendations for E-commerce platforms to enhance customer retention through value-driven digital engagement.

Significance of Study

The study adds value to E-business and digital marketing by showcasing a well-designed model that combines several perceived value aspects and investigates the ways they affect the loyalty level of customers. Thus, the study suggests helpful points for platform managers, digital strategists and policymakers to follow in the development of services that focus on consumers. These results are useful for digital governance since making users trust the system and believe it is fair helps ensure stable grassroots operation (Hassan et al., 2025; Zhou et al., 2022). In addition, this study highlights the need to enhance customer experience everywhere in the digital world, ensuring a close match between technology, user happiness and loyal customers as global E-commerce continues to grow.

CORE CONCEPTS AND THEORETICAL FOUNDATIONS

The Key Dimensions of Customer Perceived Value that Influence Satisfaction, Trust, and Loyalty in Online Shopping

Consumers are more likely to choose a product or service in E-commerce if it provides enough customer-perceived value. It covers the decisions individuals make by comparing what they gain from a product or service to what they need to pay for it (Hong et al., 2023). Because touchpoints are absent in online shopping, CPV involves evaluating the product or service along with the online environment, how payments are secured and the shopping experience (Shin, 2020). Recent studies generally agree that

perceived value in retail includes product quality, service quality, safety, convenience, how cost-effective something is and how enjoyable using it is (Sann et al., 2024). When it comes to e-commerce, ensuring safety and privacy supports trust (as shown by Patil (2024)) and design and how the website works influences whether shoppers are satisfied and loyal (as found by Venkatakrishnan et al. (2023)). Digital platforms need to choose these dimensions carefully in their strategies. The authors explain in Bernarto et al. (2024) that CPV greatly influences how likely a consumer is to repeat a purchase and share experiences online. With subscriptions, the platforms aim to maintain CPV delivery by offering personalization and a consistently reliable service (Lindström et al., 2024). However, before, many models only saw CPV as a simple factor and didn't consider how its features may change satisfaction, trust and loyalty differently. For this reason, the study examines CPV as more than one dimension and studies its influence on customer satisfaction, trust and loyalty within E-business settings.

The Mediating Roles of Customer Satisfaction and Customer Trust in the Relationship between Perceived Value and Customer Loyalty

Customer satisfaction (CS) and trust play an important role both in causing loyalty and in mediating the process of creating it. A consumer judges their satisfaction by comparing what they noticed during the purchase to what they expected to find (Haralayya, 2021). When used in digital businesses, CS includes things like website convenience, fast service, the support provided after someone buys and how easy it is to complete a purchase (Rather et al., 2023). Several studies point to a strong way in which customer identity impacts brand loyalty. Hong et al. (2023) make the point that both good service and convenience help to make customers more satisfied and improve their loyalty. They also observe that when customers are very satisfied, they become less affected by price changes and remain subscribers for longer. It turns out that trust acts as both a result of enjoying what a company offers and as a factor that draws customers back (Rizki et al., 2024). Satisfied customers trust the platform more which gets stronger if their prior experiences prove the brand is reliable. Having trust eliminates doubts and leads to a stronger attachment which is important since E-business is based on remote purchasing (Astono, 2021; Patil, 2024). As a result, satisfaction and trust act as valuable mediators and make the transition from perceived value to lasting loyalty. Even so, only a few works have modelled both parallel and serial purposes of trust and security in E-business, an issue that this study analyses empirically.

Strategic Recommendations for E-commerce Platforms to Enhance Customer Retention through Value-driven Digital Engagement

Depending on loyalty in both feelings and behaviour, customers make E-business a stable success in the long term (Jenneboer et al., 2022). While products certainly help, loyal customers are kept online through strong engagement, ease of shopping and

tailored service (Zhou et al., 2022). They are inclined to try new products, suggest your brand to others and choose your prices. Any action users take on a digital service platform should boost the experience they receive. For example, web design improves visitors' emotions, whereas keeping the logistics the same encourages customers to remain loyal (Venkatakrisnan et al., 2023). Ginting et al. (2023) observed that both handling user satisfaction and ensuring trust help determine if a customer will remain loyal. From a business standpoint, adopting recommendation systems, tailoring content with AI and making algorithms clear are new strategies that increase both value and trust (Shin, 2020). Yet not many previous studies have proposed a full strategic model that looks at CPV, satisfaction, trust and loyalty between customers and an E-business. To address this gap, this research provides well-supported, multi-faceted information about how online platforms grow customer loyalty.

Theoretical Framework

Two widely accepted theories are combined in the study. The Expectancy-Disconfirmation Theory (EDT) suggests that as long as there is a variation between what a customer expected and what was received, satisfaction will follow (Haralayya, 2021). When it comes to e-commerce, this theory means that how convenient, good the service is or how good the quality is can influence customers' happiness after making a purchase. Trust-commitment theory (TCT) explains that both trust and commitment are needed to keep relationships running smoothly over time (Sirdeshmukh et al., 2002). Trust that grows from the use of safe systems, reliable service and clear information is what inspires people to use the internet repeatedly (Patil, 2024). This study builds a model in which perceived value affects loyalty by going directly through satisfaction and trust. Assemble customer perceived value, customer satisfaction, customer trust and customer loyalty to assemble a conceptual framework. It is seen in Figure 1 that customer satisfaction ties directly to customer loyalty, with the impact of customer perceived value on customer loyalty being mediated by customer satisfaction and customer trust.

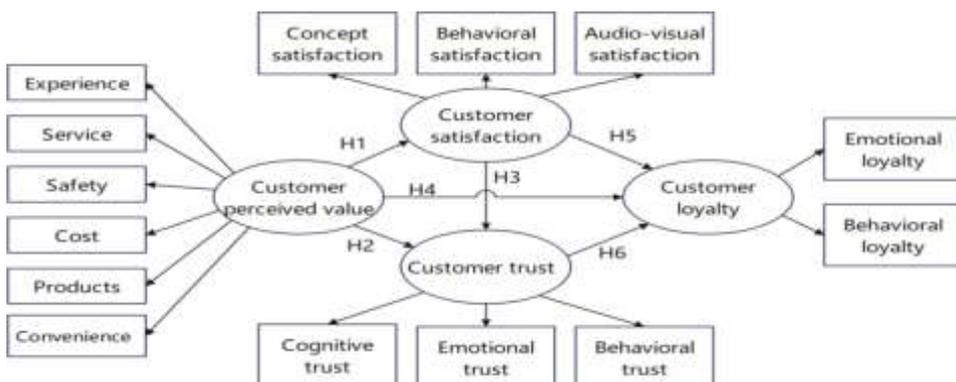


Figure 1: Conceptual framework

Hypothesis Development

Based on the reviewed literature and theoretical foundations, the following hypotheses are proposed:

1. **H1:** *Customer perceived value has a positive impact on customer satisfaction in the online shopping environment.*
2. **H2:** *Customer perceived value has a positive impact on customer trust in the online shopping environment.*
3. **H3:** *Customer satisfaction has a positive impact on customer trust in the online shopping environment.*
4. **H4:** *Customer perceived value has a positive impact on customer loyalty in the online shopping environment.*
5. **H5:** *Customer perceived value has an indirect effect on customer loyalty with customer satisfaction as a mediator.*
6. **H6:** *Customer perceived value has an indirect effect on customer loyalty with customer trust as a mediator.*

Literature Gap

While there is a huge amount of research on digital consumer behaviour, several important gaps remain. Many researchers have focused on the direct impact of hospitality value on customer satisfaction, trust and loyalty, but mediation (especially dual mediation) requires more study (Ginting et al., 2023). What's more, a number of these models fail to fully apply EDT or TCT which means they explain less about E-commerce concerns (Sirdeshmukh et al., 2002). Moreover, many researchers consider perceived value to be just one dimension, without looking at how it plays out in digital services (Sann et al., 2024). Western texts take up the greatest share of the available research. We have little empirical evidence from places like China, where E-commerce is rapidly advancing. Such information is valuable and needed (Thanapuech & Pankham, 2024; Widiyanti & Tukiran, 2024). To fill these gaps, this study introduces a theory-supported, proven model of customer loyalty based on perceived value in online platforms.

RESEARCH METHODOLOGY

The primary objective of this study is to investigate the relationship between customer-perceived value and customer loyalty in the context of online shopping, with customer satisfaction and customer trust serving as mediating variables. Given the nature of the study, it is essential to collect data primarily from individuals who have actively engaged in online shopping, as only such participants can accurately assess the service experience, perceived value, and their resultant trust and loyalty behaviours (Mazhar et al., 2021). To get useful information, the study targeted online shoppers in Northeast

China, a region that has cities such as Shenyang, Dalian and Harbin. The area was chosen for several reasons. Being one of the most digitally active regions aside from Beijing, Shanghai and Guangzhou, it accurately reflects the growing trend of digital shopping seen all over China. Regional economy statistics and information on digital penetration prove that the use of E-commerce in Northeast China has greatly increased (Wang et al., 2022). In addition, the large numbers of urban residents, students and workers in the service sector in Northeast China are similar to those who shop online most frequently in China (Yao & Qiu, 2024). That's why it is a suitable and useful area for understanding consumer opinions, contentment and loyalty in the online ecosystem.

Data Collection

According to the research purpose of this paper, consumers who have had online shopping experiences are the research objects, mainly college students and government workers. Therefore, the survey filled in developed questionnaires requires that only those who have online shopping experience can be selected as a valid questionnaire. In this paper, Questionnaire Star was used as a platform for questionnaire surveys, and data was collected online from July 2024 to October 2024. The respondents were selected for the study using a random sampling method to minimize bias. To be included in the final analysis, participants were required to confirm recent online shopping experience, thereby ensuring the relevance and validity of their responses. The data collection was conducted via an online questionnaire distributed between July and October 2024. The sample predominantly included education professionals and university students, two demographics that are highly familiar with digital technologies and frequently engaged in E-commerce. This sample is thus representative of a digitally literate and active online consumer base, allowing for meaningful insights into perceived value, satisfaction, trust, and loyalty behaviours in the context of E-business (Roopa & Rani, 2012). The questionnaire for the data survey is mostly collected online. In this study, 510 questionnaires were recovered and 508 valid questionnaires with a response rate of 99.6%.

Procedure

For this study, a well-structured questionnaire was used online to gather information about people's opinions about value, satisfaction, trust and loyalty during online shopping. Items used in the questionnaire were taken from previously tested sources and edited to fit E-commerce in China. Surveys were distributed through the Chinese service Wenjuanxing (Questionnaire survey) which is popular in Chinese academia. Sampling for the study was purposeful because participants needed to be familiar with online shopping and random sampling was used with college students and education employees based in Northeast China. Because of these steps, the participants were fit for the research and matched the online consumer community profile.

Data Analysis Method

Descriptive statistics, reliability analysis, validity testing and SEM were all used to examine the data. The study started by using SPSS 26.0 to summarize the demographic information and check the reliability of items via Cronbach's alpha and CITC. EFA was run first to check the structure of the constructs and later CFA was carried out using AMOS 26.0 to look at convergent and discriminant validity. The model fit was studied by looking at the indices Chi-square/df, GFI, CFI, TLI, RMSEA and NFI. After that, structural equation modelling was applied to analyse the relationships predicted by the hypotheses. Both direct and indirect effects were estimated using the maximum likelihood method and we checked the mediation effects of customer satisfaction and customer trust through bootstrapping analysis. The detailed analysis approach allowed for complete testing of the conceptual framework and increased the usefulness of the outcomes.

Ethical Considerations

Ethical research standards were maintained in every part of the research study. Before answering the survey, all participants were told about the research, assured anonymity and given a consent statement to read. Respondents were told they were free to withdraw anytime and would not face any penalties. All respondents remained protected because no information that could be used to identify them was collected. The project was conducted according to institutional guidelines on social science research ethics and the design of the questionnaire steered clear of touchy, biased or threatening material. All collected responses were protected and could not be seen by anyone other than the researchers involved in the research. As the research carried little risk, it was agreed by the research team that an ethics review board's approval could be waived, since this was in line with practices for survey research in schools.

DATA ANALYSIS

Confirmatory factor analysis (CFA) was done on the variables for this study using AMOS 26.0 software and composite reliability (CR) and mean-variance extraction (AVE) were both used to confirm that each dimension of the variables is reliable. Initially, the fit of the model for the validation factor analysis scale was examined. Data from the questionnaire was imported into AMOS26 and the maximum likelihood method was used to obtain the model fitting parameters which are displayed in the table.

Sample Description

In online shopping, the research scope of customer perception value and customer loyalty is widely covered. This paper focuses on the final customer. The research subject

is individual consumers, and the research object is mainly online shopping consumers in China. The demographic summary is shown in [Table 4.1](#).

Table 4.1: Demographic Summary

Item	Options	Frequency	Percent (%)
Your gender	Male	251	49.41
	Female	257	50.59
Your age	18-25	133	26.18
	26-35	196	38.58
	36-45	112	22.04
	over 46	67	13.18
Your educational background	Junior high school	21	4.13
	Senior high school	35	6.89
	Bachelor's degree	296	58.26
	Master's degree or above	156	30.70
What is your disposable monthly income?	500 dollars and below	51	10.03
	501-700 dollars	226	44.48
	701-1200 dollars	154	30.31
	over 1200 dollars	77	15.15
How much do you spend on online shopping every month?	Less than 80 dollars	71	13.97
	81-220 dollars	234	46.06
	221-350 dollars	159	31.29
	More than 351 dollars	44	8.66

According to the questionnaire data, 251 people in the respondents were male, accounting for 49.41%; 257 people were female, accounting for 50.59%. From the age of the respondents, Age in 18-25 frequency 133, percentage 26.18%; 26-35 frequency 196, percentage 38.58%; 36-45 frequency 112, percentage 22.04%; over 46 frequency is 67, accounting for percentage 13.18%. The subjects of the survey are between 18 and 35 years old. Consumers at this age stage are active and willing to express themselves. From respondents' education level, the highest rate was undergraduate degree at 296 or 58.26%, followed by master's degree or higher at 156 or 30.70%, junior high school at 21 or 4.13% and senior high school at 35 or 6.89%. About 88.977% of the respondents have a bachelor's degree or higher education. From the perspective of the monthly disposable income of respondents, the frequency of income at \$500 and below is 51, accounting for 10.039%; the frequency of \$501-700 is 226, and the percentage is 44.48%; the frequency of \$701-1200 is 154, accounting for 30.31%; the frequency above \$1200 is 77, accounting for 15.15%.

From the perspective of monthly online shopping expenses, the percentage of less than \$80 is 71, accounting for 13.97%; the frequency of \$ 80-220 is 234, accounting for 46.063%; the frequency of \$221-350 is 159, accounting for 31.29%; the monthly frequency of over \$351 is 44, accounting for 8.66%.

Reliability Analysis and Validity Analysis

Test of Reliability and Validity

The study also applied correction item-total correlation to check the reliability of single problems. The following two circumstances show that a problem item should be removed in the study: (1) TC, the overall correlation coefficient, is under 0.4; (2) Cronbach alpha for the total scale is bigger than that of a specific dimension. Reliability analysis results are displayed in the following table.

Table 4.2: Reliability analysis

	Item	The corrected terms are correlated with the total	Delete item after Cronbach Alpha	Cronbach Alpha
Experience	Q7	0.770	0.848	0.887
	Q8	0.761	0.851	
	Q9	0.749	0.856	
	Q10	0.729	0.864	
Service	Q11	0.723	0.836	0.871
	Q12	0.707	0.842	
	Q13	0.722	0.836	
	Q14	0.745	0.827	
Safety	Q15	0.738	0.845	0.879
	Q16	0.734	0.846	
	Q17	0.733	0.847	
	Q18	0.747	0.842	
Cost	Q19	0.752	0.845	0.882
	Q20	0.732	0.852	
	Q21	0.749	0.846	
	Q22	0.739	0.850	
Products	Q23	0.766	0.847	0.885
	Q24	0.748	0.854	
	Q25	0.749	0.854	
	Q26	0.737	0.858	
Convenience	Q27	0.737	0.836	0.874
	Q28	0.731	0.838	
	Q29	0.742	0.834	
	Q30	0.709	0.847	
Concept satisfaction	Q31	0.709	0.783	0.844
	Q32	0.710	0.783	
	Q33	0.710	0.783	
Behavioural satisfaction	Q34	0.737	0.768	0.848
	Q35	0.701	0.803	
	Q36	0.711	0.794	
Audio-visual satisfaction	Q37	0.802	0.755	0.864
	Q38	0.786	0.769	

	Q39	0.646	0.898	
Cognitive trust	Q40	0.669	0.765	0.822
	Q41	0.695	0.739	
	Q42	0.670	0.763	
Emotional trust	Q43	0.769	0.720	0.842
	Q44	0.735	0.753	
	Q45	0.622	0.862	
Behavioural trust	Q46	0.683	0.755	0.824
	Q47	0.701	0.737	
	Q48	0.657	0.781	
Emotional loyalty	Q49	0.704	0.820	0.859
	Q50	0.701	0.822	
	Q51	0.726	0.811	
	Q52	0.684	0.829	
Behavioural loyalty	Q53	0.739	0.839	0.876
	Q54	0.732	0.842	
	Q55	0.734	0.842	
	Q56	0.729	0.844	

The Experience, Service, Safety, Cost, Products, Convenience, Concept, Behavioural and Audiovisual satisfaction variables were shown in [Table 4.2](#) as having Cronbach alpha coefficient scores of 0.887, 0.871, 0.879, 0.882, 0.885, 0.874, 0.844, 0.848 and 0.865, respectively. For the Cognitive trust variable, the Cronbach alpha coefficient measures 0.822, for Emotional trust it measures 0.842, for Behavioural trust it measures 0.824, Emotional loyalty it measures 0.859 and for Behavioural loyalty, it measures 0.876. All of the Cronbach alpha coefficients for the measured variables have a value higher than 0.7. At the same time, the research requirements are met because the values from the CITC and Cronbach alpha tests for deleted items are acceptable and each variable in the questionnaire is considered very stable.

Validity Analysis

The KMO test and Bartlett's spherical test should be run first to see if the indicators for the analysed variables are suitable for factor analysis. Kaiser's measure indicates that, if the KMO is greater than 0.7, then factor analysis might be used. Based on the results from SPSS, the significance is below 0.05 which hints that the questionnaire data is good for factor analysis. So, check the KMO value, if it's higher than 0.8, the validity is high; if it's between 0.7 and 0.8, the validity is favoured; if this range is between 0.6 and 0.7, it's shown to be acceptable; and lastly, a KMO value less than 0.6 indicates poor validity. It is clear from [Table 4.3](#) that the data from every dimension span enough points to make factor analysis possible.

Table 4.3: KMO and Bartlett tests

Dimension	KMO	Chi-square	df	p
Customer perceived value	0.947	7547.24	276	.000
Customer satisfaction	0.833	2376.036	36	.000
Customer trust	0.88	2245.686	36	.000
Customer loyalty	0.892	2082.989	28	.000

Customer perceived value (customer perceived value) has a KMO value of 0.947, almost equal to 1, so the variables here have a strong relationship and are appropriate for factor analysis. Customer satisfaction, customer trust and customer loyalty all had KMO values over 0.8 which indicates that factor analysis can be used. All dimensions (including Customer perceived value which is 7547.24 and the rest above 2000) show very large chi-square values with p-values equal to 0.000 which are far less than the significance level (for example, 0.05). It means that the variables from each dimension are not independent, but are strongly tied together, emphasizing the reason for doing a factor analysis.

Confirmatory Factor Analysis of Customer Perceived Value

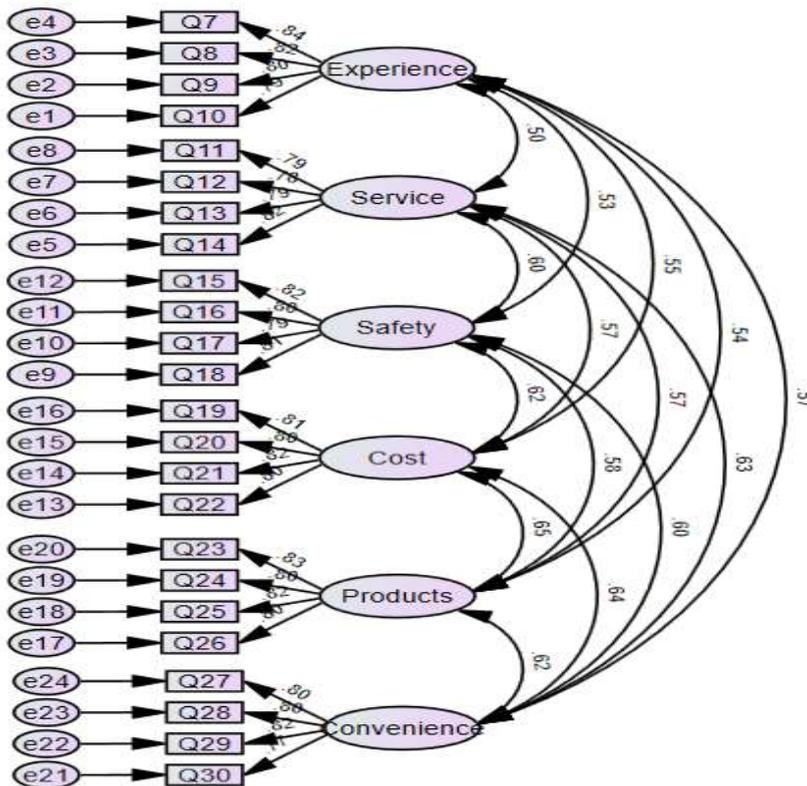


Figure 4.1: Measurement model of customer perceived value

Table 4.4: Model fit results of Customer perceived Value

Fitting indicators	Evaluation criteria	Fitting results
Chi-Square	$p \geq 0.05$	242.083
Chi-Square /df	$< 2-3$	1.021
GFI	> 0.90	0.963
IFI	> 0.90	0.999
TLI	> 0.90	0.999
CFI	> 0.90	0.999
NFI	> 0.90	0.968
RMSEA	< 0.08	0.007

Table 4.4 shows that CMIN / DF is $1.021 < 2$, NFI, RFI, IFI, TLI, CFI and GFI are all greater than 0.9 and RMSEA is $0.007 < 0.08$, suggesting that the CFA model is a good fit and the overall model fit for experience, service, safety, cost, products and convenience is good.

Table 4.5: Convergence Validity Result of Customer Perceived Value

Factor	Items	Non-standardized Estimate	S.E.	C.R.	Std. Estimate	AVE	CR
Experience	Q7	1.000			0.841	0.663	0.887
	Q8	0.970	0.045	21.352	0.821		
	Q9	0.895	0.043	20.717	0.803		
	Q10	0.877	0.043	20.288	0.791		
Service	Q11	1.000			0.789	0.628	0.871
	Q12	1.000	0.055	18.175	0.777		
	Q13	1.023	0.055	18.489	0.789		
	Q14	1.053	0.055	19.190	0.815		
Safety	Q15	1.000			0.817	0.644	0.879
	Q16	0.933	0.047	19.738	0.799		
	Q17	0.958	0.049	19.427	0.789		
	Q18	0.967	0.048	19.995	0.807		
Cost	Q19	1.000			0.812	0.651	0.882
	Q20	0.960	0.049	19.740	0.798		
	Q21	1.018	0.050	20.327	0.817		
	Q22	0.964	0.049	19.786	0.800		
Products	Q23	1.000			0.832	0.659	0.886
	Q24	0.939	0.046	20.346	0.797		
	Q25	1.017	0.048	21.030	0.817		
	Q26	0.941	0.046	20.497	0.802		
Convenience	Q27	1.000			0.804	0.635	0.874
	Q28	0.976	0.051	19.255	0.795		
	Q29	1.040	0.052	19.849	0.816		
	Q30	0.967	0.052	18.575	0.772		

From the factor loading coefficient in [Table 4.5](#), it was noted that every corresponding variable's standard factor loading is above 0.6.

CFA was used to assess the validity of the structure in the measurement model of this study. The maximum likelihood approach is used in this paper to calculate the appropriate parameters of the model. Convergence validity measures how much each indicator aligns with its specified dimension. Normally, the higher the correlation between items, the simpler it is to gather and the more substantial the convergence for that item connected to the dimension. In this analysis, the convergent validity of the samples was estimated by standardized factor loading, combined reliability, mean-variance extraction rate and the arithmetic square root of each. The process of applying these criteria recommends that samples have a normalized factor load of 0.5, the square root of combined reliability of 0.7 and AVE and AVE must be over 0.5. [Table 1](#) shows that all of the models satisfy the criteria set.

Table 4.6: Discriminate validity of customer perceived value

	Experience	Service	Safety	Cost	Products	Convenience
Experience	0.814					
Service	0.501	0.792				
Safety	0.526	0.601	0.802			
Cost	0.550	0.572	0.620	0.807		
Products	0.538	0.569	0.576	0.653	0.812	
Convenience	0.573	0.628	0.603	0.641	0.616	0.797

AVE squared being higher than the relation between this latent variable and other variables demonstrates that it is a statistically significant way to differentiate the variables in the study. As per [Table 4.6](#), the correlation coefficients between the variables in this study are less than the AVE of each relevant latent variable which is better discriminant validity.

Confirmatory Factor Analysis of Customer Satisfaction

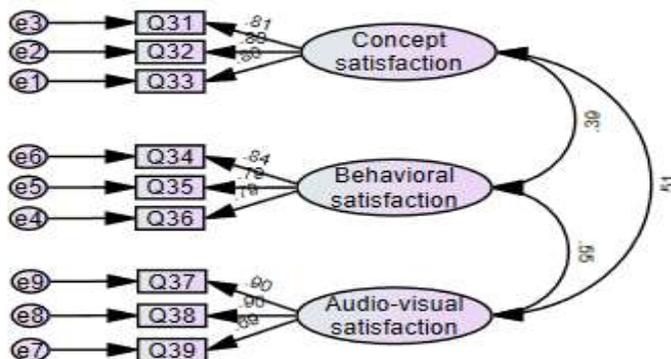


Figure 4.2: Measurement Model of customer satisfaction

Table 4.7: Model fit results of customer satisfaction

Fitting indicators	Evaluation criteria	Fitting results
Chi-Square	$p \geq 0.05$	37.940
Chi-Square /df	< 2-3	1.581
GFI	> 0.90	0.984
IFI	> 0.90	0.994
TLI	> 0.90	0.991
CFI	> 0.90	0.994
NFI	> 0.90	0.984
RMSEA	< 0.08	0.034

The table above, table 4.7, demonstrates that CMIN / DF is 1.581 <2 and NFI, RFI, IFI, TLI, CFI, GFI and RMSEA are all greater than 0.9 or 0.08 which means the fit of the model from confirmatory factor analysis is good.

Table 4.8: Convergence validity result of customer satisfaction

Factor	Items	Non-standardized Estimate	S.E.	C.R.	Std. Estimate	AVE	CR
Concept satisfaction	Q31	1	-	-	0.807	0.643	0.844
	Q32	0.996	0.056	17.749	0.801		
	Q33	0.993	0.056	17.685	0.797		
Behavioural satisfaction	Q34	1	-	-	0.841	0.652	0.849
	Q35	0.918	0.05	18.323	0.787		
	Q36	0.933	0.051	18.443	0.793		
Audio-visual satisfaction	Q37	1	-	-	0.899	0.701	0.874
	Q38	1.02	0.04	25.41	0.901		
	Q39	0.807	0.045	18.061	0.694		

The table above table 4.8 reveals that the standardized factor loading coefficient for each variable is greater than 0.6.

This study proved that the measurement model for the study variables was indeed correct, using CFA. The maximum likelihood method is used in this paper to find out the necessary parameters of the model. Convergence means that the items of a scale are not more than one dimension. In most cases, the stronger the link between items, the better they can be aggregated, and the more significant the relevant item's convergence phenomenon will be. Combined reliability, mean-variance extraction rate, their arithmetic square root and standardized factor loading were all used to establish the convergent validity of the samples. Concerning statistical analysis, good convergent validity is indicated by a normalized factor load greater than or equal to 0.5, the square root of combined reliability greater than 0.7 and an AVE and AVE more than 0.5. From the table, all the models have satisfied the criteria.

Table 4.9: Discriminate validity of customer satisfaction

	Concept satisfaction	Behavioural satisfaction	Audio-visual satisfaction
Concept satisfaction	0.802		
Behavioural satisfaction	0.394	0.807	
Audio-visual satisfaction	0.507	0.546	0.837

Good discrimination is shown when the AVE squared value of the latent variable is higher than the correlation coefficient between the latent variable and the others. Table 4.9 indicates that each of the correlations in this study is lower than the square root of its respective AVE, so the discriminant validity between these latent variables is higher.

Confirmatory Factor Analysis of Customer Trust

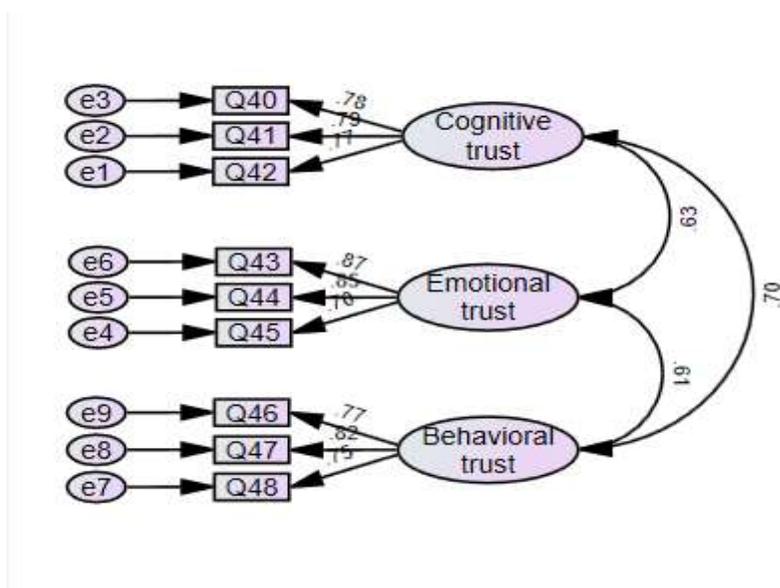


Figure 4.3: Measurement model of customer trust

Table 4.10: Model fit results of customer trust

Fitting indicators	Evaluation criteria	Fitting results
Chi-Square	$p \geq 0.05$	55.423
Chi-Square /df	< 2-3	1.309
GFI	> 0.90	0.976
IFI	> 0.90	0.986
TLI	> 0.90	0.979
CFI	> 0.90	0.986
NFI	> 0.90	0.976
RMSEA	< 0.08	0.051

Table 4.10 demonstrates that the model passes the test for good model fit due to CMIN / DF being 1.309 and all CMIN / DF values being less than 2, as well as all NFI, RFI, IFI, TLI, CFI and GFI are good and RMSEA being less than 0.08.

Table 4.11: Convergence validity Result of customer trust

Factor	Items	Non-standardized Estimate	S.E.	C.R.	Std. Estimate	AVE	CR
Cognitive trust	Q40	1			0.776	0.608	0.823
	Q41	0.96	0.057	16.954	0.791		
	Q42	0.943	0.057	16.625	0.772		
Emotional trust	Q43	1			0.867	0.658	0.851
	Q44	0.999	0.047	21.216	0.854		
	Q45	0.837	0.049	17.1	0.701		
Behavioural trust	Q46	1			0.773	0.612	0.825
	Q47	1.066	0.061	17.421	0.82		
	Q48	0.994	0.061	16.247	0.752		

Looking at the table above 4.11, we find that all of the corresponding variables have standard factor loadings higher than 0.6. A CFA process was applied to test and confirm the structure of the study measurement model. The maximum likelihood method is applied to estimate the parameters of our model in this paper. Convergence validity measures how much each measurement matches its corresponding dimension. The more highly correlated two items are, the simpler it is to aggregate them and the more noticeable the convergence effect of the item is within the dimension. Standardized factor loading, combined reliability, mean-variance extraction rate and the square root of their mean were used in this study to test for convergent validity among the samples. Normally, good convergent validity means a normalized factor load of 0.5, a square root of combined reliability of 0.7 and both AVE and AVE are greater than 0.5. The table above shows that each model meets the criteria.

Table 4.12: Discriminate validity of customer trust

	Cognitive trust	Emotional trust	Behavioural trust
Cognitive trust	0.780		
Emotional trust	0.625	0.811	
Behavioural trust	0.704	0.615	0.782

When the latent variable has an AVE squared greater than its correlation with the other variables, it is considered to discriminate between them well. Table 4.12 shows that the correlation coefficient for each pair of variables didn't equate to the square root of the AVE of any of the latent variables which means that the variables are better discriminated from each other.

Confirmatory Factor Analysis of Customer Loyalty

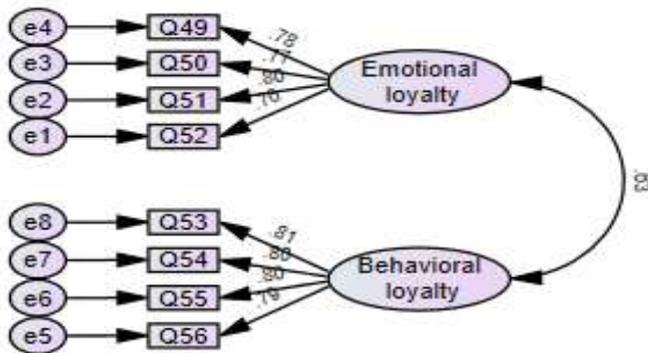


Figure 4.4: Measurement model of customer loyalty

Table 4.13: Model fit results of customer loyalty

Fitting indicators	Evaluation criteria	Fitting results
Chi-Square	$p \geq 0.05$	23.704
Chi-Square /df	< 2-3	1.248
GFI	> 0.90	0.989
IFI	> 0.90	0.998
TLI	> 0.90	0.997
CFI	> 0.90	0.998
NFI	> 0.90	0.989
RMSEA	< 0.08	0.022

Table 4.13 demonstrates that the CMIN / DF is smaller than 2, NFI, RFI, IFI, TLI, CFI and GFI are all better than 0.9 and RMSEA is only 0.022, suggesting that both the confirmation of the model and the overall model fit are acceptable.

Table 4.14: Convergence Validity Result of Customer Loyalty

Factor	Items	Non-standardized Estimate	S.E.	C.R.	Std. Estimate	AVE	CR
Emotional loyalty	Q49	1.000			0.776	0.604	0.859
	Q50	1.009	0.058	17.288	0.772		
	Q51	1.037	0.058	17.857	0.798		
	Q52	0.988	0.058	17.065	0.763		
Behavioural loyalty	Q53	1.000			0.806	0.639	0.876
	Q54	0.993	0.052	19.200	0.800		
	Q55	0.991	0.051	19.241	0.802		
	Q56	0.972	0.051	18.922	0.790		

Note: * refers to $p < 0.05$; ** refers to $p < 0.01$; *** refers to $p < 0.001$.

The standard factor loading coefficients in Table 4.14 indicate that all the corresponding variables meet the standard of having a coefficient greater than 0.6. CFA was applied to the study measurement model to confirm its structure. Using maximum likelihood, this paper estimates the main parameters of the model. Each item's level of convergence with its dimension measures how close it is to that dimension. The easier the aggregation and the stronger the convergence, of an item is when its items tend to correlate highly within the dimension. The convergent validity of the samples was measured using standardized factor loading, combined reliability, mean-variance extraction rate and the arithmetic square root of these measures. Good convergent validity in samples is marked by having a normalized factor load of 0.5, square root of combined reliability of 0.7 and AVE and AVE both over 0.5. All of the models listed above pass the required criteria. If the AVE squared of the latent variable is bigger than the correlation between it and all others, then the latent variable has a good ability to separate these two types of variables. Since the correlations given in Table 4.15 are less than the square root of the AVE for each latent variable, discriminant validity is enhanced.

Table 4.15: Discriminate validity of customer trust

	Emotional loyalty	Behavioural loyalty
Emotional loyalty	0.777	
Behavioural loyalty	0.628	0.800

Structural Equation Model

This framework uses latent variables from REM in connection with each other to map the research model hypothesis. After that, we establish the latent variables and their related residual variables by reviewing the items used in the scale. A detailed look at the results from the final structural equation model can be seen in Figure 4.5.

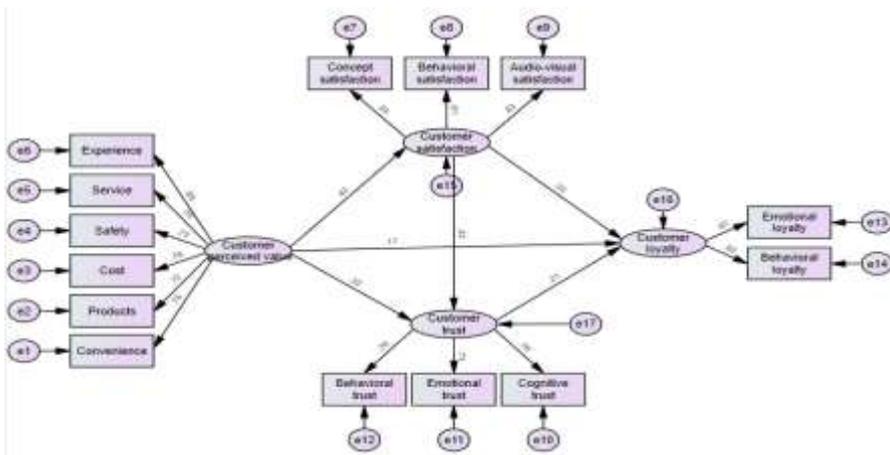


Figure 4.5: Structural equation mode

The structural equation being used seeks to find parameters that let the difference between the observed variation in data and the expected variation in the model be a minimum. If the data in the model is reasonable for the theoretical one, then the parts of the residual matrix are close to zero, so the model fits the sample data. Remember, the fitting index is designed to look at how well the data and the model are aligned, so just using it to judge the validity of the model isn't proper. Only the goodness of fit should make you choose a model; you must still check if this model is appropriate for your problem. Even when the fit would not be perfect, a model that fits the theory is still more useful.

The model fitting index is a way of finding out how closely your theoretical model fits the data. A measure of model fitting index for different categories can be compared to theoretical models based on criteria such as complexity, number of samples and how relative and absolute the models are. Initially, the entire structural model was tested and made in this study and presented the results in [Table 4.16](#).

Table 4.16: Model fitting results table

Fitting indicators	Evaluation criteria	Fitting results	Consistency
Chi-Square	$p \geq 0.05$	283.22	Not Pass
Chi-Square /df	< 2-3	3.989	Pass
GFI	> 0.90	0.923	Pass
IFI	> 0.90	0.917	Pass
TLI	> 0.90	0.903	Pass
CFI	> 0.90	0.917	Pass
NFI	> 0.90	0.893	Not Pass
RMSEA	< 0.08	0.077	Pass

The hypothesis model proposed in this article has been tested for adaptability, $CMIN/DF=3.989$, greater than 3. Indicating that the hypothetical model needs further refinement. Use the Modification Indicators in the Analysis of Moment Structures to partially improve the model. The MI value represents how much the Chi-square value of the model decreases if a fixed parameter (such as path coefficient or covariance) is released. Usually, when the MI value is greater than a certain threshold, it indicates that the parameter may have a significant impact on the model fitting. After each correction, reevaluate the MI value to avoid releasing multiple parameters at once. After two rounds of correction, a good model fit was obtained, and the SEM image is shown in [Figure 4.6](#).

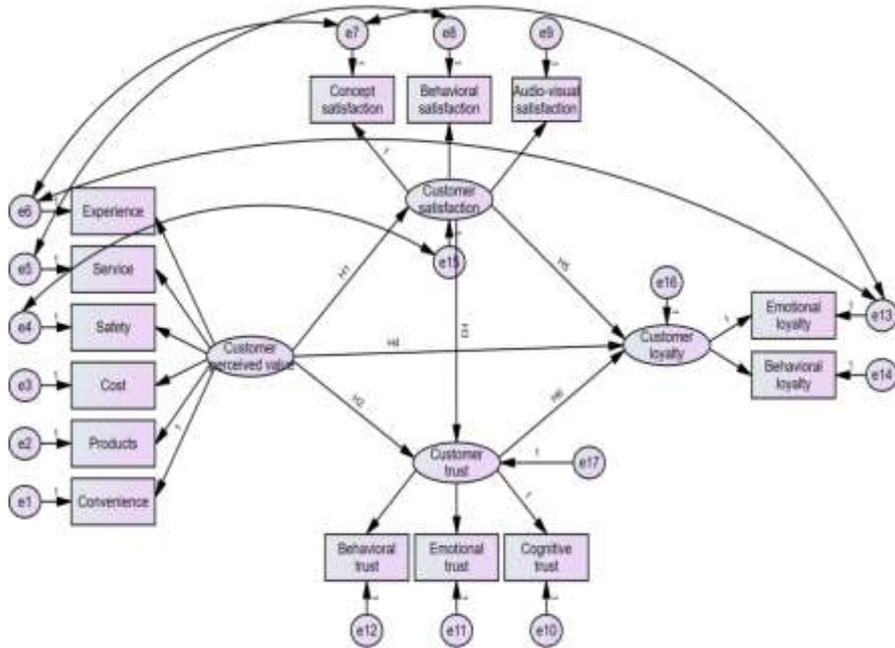


Figure 4.6: Adjusted Structural equation mode

Table 4.17: Revised model fitting results

Fitting indicators	Evaluation criteria	Fitting results	Consistency
Chi-Square	$p \geq 0.05$	125.77	Pass
Chi-Square /df	< 2-3	1.906	Pass
GFI	> 0.90	0.965	Pass
IFI	> 0.90	0.977	Pass
TLI	> 0.90	0.968	Pass
CFI	> 0.90	0.977	Pass
NFI	> 0.90	0.952	Pass
RMSEA	< 0.08	0.042	Pass

In Table 4.18, the results reflect that the overall model performs well, and the indicator ranges agree with set recommendations. The table below displays our findings for parameter estimation. Before anything else, check that your model's parameters are significant and that the path coefficient is similar to how we would assess the importance of parameters in a regression test, as the null hypothesis states that the path coefficient should equal 0. Amos suggests using an easy method called CR (Critical Ratio). The CR value uses the ratio of the parameter estimate to its standard deviation and is called a Z statistic. Amos also provides the P-value for CR, giving you the chance to look at these path coefficients and test their statistical significance using the P-value. When the p-value next to the CR value is below 0.05, the path coefficient is thought to be significant.

Table 4.18: Structural model path analysis results

Path	Estimate	S.E.	C.R.	P	β
Customer satisfaction<---Customer perceived value	0.361	0.047	5.786	***	0.423
Customer trust<---Customer perceived value	0.321	0.056	5.61	***	0.323
Customer trust<---Customer satisfaction	0.232	0.077	3.917	***	0.218
Customer loyalty<---Customer satisfaction	0.291	0.072	4.594	***	0.329
Customer loyalty<---Customer trust	0.215	0.055	3.431	***	0.211
Customer loyalty<---Customer perceived value	0.163	0.05	2.779	0.005	0.171
Products<---Customer perceived value	0.724	0.065	15.736	***	0.722
Cost<---Customer perceived value	0.76	0.064	16.536	***	0.76
Safety<---Customer perceived value	0.722	0.063	15.675	***	0.725
Service<---Customer perceived value	0.702	0.063	15.533	***	0.696
Concept satisfaction<---Customer satisfaction	0.518				0.536
Behavioural satisfaction<---Customer satisfaction	0.589	0.118	9.821	***	0.608
Audiovisual satisfaction<---Customer satisfaction	0.884	0.172	9.906	***	0.832
Cognitive trust<---Customer trust	0.762				0.761
Emotional trust<---Customer trust	0.728	0.07	13.926	***	0.725
Behavioural trust<---Customer trust	0.754	0.071	14.153	***	0.757
Emotional loyalty<---Customer loyalty	0.642				0.665
Behavioural loyalty<---Customer loyalty	0.882	0.167	8.465	***	0.822
Experience<---Customer perceived value	0.654	0.065	14.478	***	0.651
Convenience<---Customer perceived value	0.752				0.749

Customers’ satisfaction \leftarrow Customers’ perceived value: This link demonstrates that how much value customers see in a product has a strong effect on their happiness. Customer perceived value is seen in the difference between the advantages of products or services and the related costs. A good customer experience results from perceiving that the product or service is valuable. As a result, the path coefficient for this path (0.423) is significant, proving that customer-perceived value strongly influences customer satisfaction.

The path demonstrates that what customers value helps to develop trust. If customers get more than they hoped for, they are more prone to trust the business or brand. Customers trust the brand and because of this, they are more likely to come back to it next time. The path coefficient was significant and indicated that customer-perceived value greatly affects how much a customer trusts a company.

Creating satisfied customers helps customers trust you more. If customers like what they get from the business, they feel the brand understands what they need and will stick with them for good service in the future. This trust comes from collecting information on how satisfied customers have been before. Customer satisfaction was found to be important for improving customer trust with a path coefficient of 0.218 and reaching statistical significance.

Customer satisfaction \leftarrow Customer loyalty: This path links directly to how satisfied customers are with their loyalty. When customers are satisfied, they are more likely to become loyal and buy from you again, recommending your company to their friends. The direct relationship between customer satisfaction and customer loyalty is revealed by the path coefficient of 0.329.

Customer loyalty \leftarrow customer trust. Being trusted makes customers remain loyal to a brand and choose it over other possible alternatives. As a result, customers feel less risk when dealing with the brand and trust it more. The result revealed that customer trust and loyalty were strongly correlated, reaching statistical significance ($p = 0.001$).

DISCUSSION

This study aimed to evaluate the influence of customer perceived value (CPV) on customer loyalty in online shopping, with customer satisfaction and customer trust as mediating variables. The findings from structural equation modelling (SEM) provided empirical support for all six hypothesized relationships.

Strategic Implications for Digital Service Design

The study shows that placing value at the heart of digital service design helps customers feel loyal. Providing high quality in all six CPV areas allows e-commerce platforms to increase both trust and satisfaction among users. As a result, businesses are now designing their platforms to include emotional as well as practical value, tailoring their work for users and helping them through personalized interfaces (Homburg et al., 2017). Improving users' sense of security and responsiveness should be a big focus for digital service providers because these factors are vital for generating trust and positive experiences. For instance, using clear recommendation algorithms, allowing customers to see where their parcel is at any time and providing quick support can build trust which can improve sales and keep customers from abandoning their carts. In addition, the way services are designed should enable operators to reassign resources to the areas of greatest value to different groups of users. So, those who focus on price may not want extra features, while those used to technology usually want convenience and can customize their plans.

Policy and Platform Governance Implications

This study's findings can guide platform regulation and e-commerce policies, mainly in digital economies that are growing rapidly such as China. According to organizations, both regulators and platform managers should view satisfying and building digital trust as primary, firmly embedded goals that require input from different departments. To keep trust, platforms are responsible for following data privacy regulations and opening up about their algorithms as they become important parts of user experience

-RESEARCH ARTICLE-

Table 5.1: Summary of Hypothesis Testing Results

Hypothesis	Path	Standardized Coefficient (β)	p-value	Result	Theoretical Support	Key Insight
H1	CPV \rightarrow Satisfaction	0.423	< 0.001	Accepted	Expectancy-Disconfirmation Theory (EDT)	Higher perceived value leads to greater customer satisfaction.
H2	CPV \rightarrow Trust	0.323	< 0.001	Accepted	Trust-Commitment Theory (TCT)	Perceived value enhances trust in digital platforms.
H3	Satisfaction \rightarrow Trust	0.218	< 0.001	Accepted	Trust-Commitment Theory (TCT)	Satisfied customers are more likely to develop trust.
H4	CPV \rightarrow Loyalty	0.171	0.005	Accepted	EDT and TCT (combined model)	Direct effect is significant but weaker than mediated effects.
H5	CPV \rightarrow Satisfaction \rightarrow Loyalty (Mediated Path)	Indirect	Significant	Accepted	Expectancy-Disconfirmation Theory (EDT)	Satisfaction mediates the relationship between value and loyalty.
H6	CPV \rightarrow Trust \rightarrow Loyalty (Mediated Path)	Indirect	Significant	Accepted	Trust-Commitment Theory (TCT)	Trust mediates the link between perceived value and customer loyalty.

-RESEARCH ARTICLE-

Support for consumer rights in online commerce such as well-defined refund and conflict resolution policies, is necessary to develop trust throughout the system. These implications also have significant effects on e-government and digital public services. Digital versions of public services which operate like private businesses by making services quicker to obtain, giving instant updates and keeping communication open, help earn people's trust and satisfaction which supports lasting involvement and the authority of government. Using value models from E-commerce can guide modifications in public services, making the platforms more effective, beneficial to users and appreciated by citizens.

Comparison with Previous Research and Theoretical Models

As found in [Hong et al. \(2023\)](#) and [Ginting et al. \(2023\)](#), our research agrees with prior studies that see CPV as a main cause of customer satisfaction and trust. Using a broad mediation approach, this study improves our theoretical view of how value turns into loyalty. While previous studies generally treat satisfaction and trust as much the same, this study emphasizes they work together step by step, in line with the trust commitment theory and expanding its use in digital platforms surroundings. By adding EDT and TCT to the model, there is a better understanding of customers' overall behaviour, as it shows how thinking about something relates to feeling it and eventually acting on it. Additionally, the experimental proof for the combined pathways matches closely with [Sirdeshmukh et al. \(2002\)](#) framework on relational exchanges but adds digital trust cases from online environments affected by algorithms and artificial agents. By acknowledging that Northeast China is a rapidly growing digital area, the study's findings help explain consumer behaviour better in E-business worldwide.

Theoretical and practical significance

Customer Satisfaction and Customer Trust are the Basis of Maintaining the Long-Term Relationship between Network Enterprises and Consumers. Customer trust is the cornerstone of building a long-term relationship with consumers. Research shows that customer satisfaction has a significant impact on customer trust, and consumers' purchase decision is a continuous process. Multiple satisfaction experiences can establish customers' trust in the enterprise, to maintain the long-term relationship between consumers and the enterprise. At the same time, customer satisfaction and customer trust can also bring repeated purchases and actively spread word of mouth, making consumers insensitive to price and finally establishing customer loyalty. Therefore, enterprises should develop products that truly meet the needs of customers, set reasonable prices, provide meticulous and thoughtful services, and achieve and

improve customer satisfaction. The continuous improvement of service quality is the investment of enterprises in customers, which can bring more generous profits. Network enterprises should improve the quality of service for all aspects of customers' perceived value and the humanistic attributes of customers, to improve customer satisfaction and loyalty.

CONCLUSION

To provide consumers with better service, enterprises must establish a rapid response mechanism and actively respond to the needs of customers. Network enterprises must create a comprehensive safe and reliable trading platform for customers, strengthen the network security of network enterprises, and ensure the security of customer-related interests. Constantly improve the quality of products and services, ensure the authenticity and reliability of the products sold by E-commerce websites, and strive to achieve website publicity and customer expectations. Constantly for the sake of customers, the various links of online shopping for customers to save costs, and provide convenience so that the relationship between enterprises and customers is more friendly. In the future development process, enterprises should pay attention to the basis of product functions, but more on mastering the psychological development trend of consumers, and strengthening the experience and participation of consumers.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

After this paper, there are inevitably some defects, mainly including the following points:

1. The source of the sample size is relatively concentrated. Due to time, manpower and economic reasons, the samples in this study are mainly taken from schools and public institutions, and the population type is relatively single. This will have some impact on the results of the study, and future studies should expand the scope of the study.
2. Although this paper includes the demographic characteristics of consumers into the scope of the survey, it designs questions about the demographic characteristics of consumers, such as gender, age, education, income, nature of work, etc. However, due to the small number of questionnaires, it is not enough to support the study of the relationship between demographic characteristics and perceived value dimensions. Therefore, the follow-up research needs to study the relationship between the demographic characteristics and the brand equity dimension based on expanding the sample, to better serve different online retail enterprises.
3. The most commonly used statistical analysis software used in this paper is SPSS. In addition, other advanced statistical analysis software such as LISREL, PLS-GUI, and PLS-Graph can be used to enhance the persuasion of empirical analysis.

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