ISSN 1840-4855
e-ISSN 2233-0046

Original scientific article
http://dx.doi.org/10.70102/afts.2026.1835.838

APPLYING THE 4PS MARKETING MODEL TO EVALUATE THE SUCCESS OF E-COMMERCE STRATEGIES IN CONSUMER RETENTION

Dr. Arasuraja Ganesan[1*], Dr.G.H. Kerinab Beenu[2], Dr.V. Aruna[3], Dr.K. Rajamani[4]

[1]Associate Professor, Department of Management Studies, St.Joseph's College of Engineering, OMR, Chennai, Tamil Nadu, India. e-mail: arasuraja.mba@gmail.com, orcid: https://orcid.org/0000-0001-6137-1911*
[2]Associate Professor, Department of Management Studies, Jerusalem College of Engineering, Pallikaranai, Chennai, Tamil Nadu, India.
e-mail: beenustanley2008@gmail.com, orcid: https://orcid.org/0000-0001-5759-0089
[3]Assistant Professor, Department of Management Studies, St.Joseph's Institute of Technolgy, OMR, Chennai, Tamil Nadu, India. e-mail: arunasivakumar28@gmail.com, orcid: https://orcid.org/0009-0009-0859-6439
[4]Associate Professor (Senior Grade), Mepco School of Management Studies, Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu, India.
e-mail: rajamanik@mepcoeng.ac.in, orcid: https://orcid.org/0000-0001-5672-0304

Received: January 31, 2026; Revised: March 14, 2026; Accepted: May 05, 2026; Published: May 29, 2026

SUMMARY

This study examines how well e-commerce tactics work to encourage client retention in digital retail settings using the 4Ps Marketing Strategy (Product, Place, Price, and Promotion). The study addresses the gap of missing an integrated quantitative framework capable of systematically linking the conventional marketing mix dimensions with measurable customer retention results on e-commerce platforms. 356 active e-commerce customers from various Indian online buying platforms provided data for the current study, which used a method of quantitative investigation based on a cross-sectional survey design. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyze the gathered responses in order to look into the connections between various marketing mix constructions, customer satisfaction, and consumer retention behaviour. The measuring constructs' convergent validity and reliability were tested using Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE), which produced results above the suggested cut-off. The findings demonstrate that the retention and satisfaction of client outcomes are significantly impacted by all four marketing mix variables. The product had the greatest impact on customer satisfaction ($\beta = 0.41$, $p < 0.001$), followed by Promotion ($\beta = 0.36$, $p < 0.001$), Price ($\beta = 0.29$, $p < 0.01$), and Place ($\beta = 0.22$, $p < 0.05$). Additionally, having a path coefficient of 0.73, customer satisfaction significantly influenced customer retention. With an R2 of 0.68, the suggested model demonstrated a good explanatory power, meaning that the combined 4Ps framework accounted for 68% of the variance in retention of customers. The study concludes that the customer-focused execution of marketing mix strategies significantly impacts the retention performance of the e-commerce ecosystem and provides a statistically verified framework for measuring the effectiveness of digital marketing.

Key words: *e-commerce marketing mix, 4ps model, consumer retention, digital marketing strategy, customer satisfaction, structural equation modeling, quantitative analysis.*

INTRODUCTION

The digital technologies integrated with consumer-centric service delivery systems transform the modern retail ecosystem, allowing organizations to compete in highly dynamic and data-driven environments. Since keeping current customers is far less expensive than obtaining new ones and has a direct bearing on long-term profitability as well as brand durability, customer retention has emerged as one of the important performance indicators in this context. Although the classic Marketing Model consisting of Product, Price, Place, and Promotion remains relevant for analyzing the factors affecting marketing success, further research and empirical validation are necessary to fully understand the significance of these elements in the setting of digital commerce. As shown in earlier studies, there is a strong association between consumer engagement, loyalty to a brand, perceived quality of a product, and the degree to which the product is personalized to an individual purchaser [1]. In addition, the methods by which items are priced in a digital environment interact with purchasers' perceptions of the value of the products being purchased and their future intention to buy that product. Finally, the distribution efficiency and availability of platforms are two other key contributors to the overall level of satisfaction for consumers when buying products through the internet. Lastly, implementing marketing tactics that target specific groups of consumers and market their products through social media as well has a significant impact on the consumer's likelihood of returning to buy again from that particular retailer [4]. Price mechanisms in digital markets have a proven significant effect on how consumers perceive value and repurchase products [2]. Distribution efficiency and platform availability appear to play key roles in consumer satisfaction within the digital retail market [3]. Other studies have shown that perceived quality and product differentiation in the context of internet marketing are both critical to developing a competitive advantage [5]. Logistics and timely delivery of products improve user experience, which subsequently allows for enhanced place-based marketing activities [6]. Digital marketing campaigns, such as influencer marketing or algorithmic advertisements, are considered among those marketing strategies that positively influence customer loyalty and engagement [7]. The relationships between elements of the marketing mix and behavioral outcomes for consumers were tested using a structural equation modeling approach, providing robust analysis [8]. Moreover, research into the phenomenon of digital consumer behaviour suggests that trust, convenience, and personalization become increasingly important in forming the basis for consumer retention decisions [9]. Building customer relationships further improves by applying an integrated marketing communications strategy that allows for achieving consistency across various digital channels [10]. By evaluating the applicability of the 4Ps idea as an explanation structure for the concept of customer retention in online retailing, this study adds to the body of knowledge already in existence. To this end, a theoretical model and its empirical testing are carried out.

Research Objectives

- **RO1:** To research how product attributes affect e-commerce businesses' ability to retain customers.
- **RO2:** To analyze the effect of Price competitiveness on consumer retention standards of conduct.
- **RO3:** To measure the importance of Place (distribution and accessibility) toward improving customer retention.
- **RO4:** To investigate the effect of promotion strategies on consumer retention effects.
- **RO5:** To find the overall explanatory power of the 4Ps Marketing Model on consumer retention**.**

Research Questions

- **RQ1:** What is the effect of product quality and design on consumer retention in e-commerce platforms?
- **RQ2:** How do price strategies influence repeat purchase behaviour?
- **RQ3:** What is the effect of Place (delivery and platform accessibility) on customer retention?
- **RQ4:** What is the role of promotion strategies in regulating customer loyalty as well as engagement?
- **RQ5:** How much of overall consumer retention can the integrated 4Ps model explain?

Hypotheses

- **H1:** In e-commerce platforms, products significantly increase customer retention.
- **H2:** Price significantly and favourably affects customer retention.
- **H3:** Venue significantly improves consumer retention through greater accessibility and logistical efficiency.
- **H4:** Promotion has a substantial beneficial impact on consumer retention.
- **H5:** The combined 4Ps Marketing Model is a significant predictor of consumer retention behaviour in e-commerce platforms

Major Contributions:

- The study suggests a statistically proven SEM-based framework that combines the concepts of customer satisfaction and customer retention in e-commerce environments with the conventional 4Ps Marketing Model.
- The statistical testing of the empirically acquired data makes use of Partial Least Squares Structural Equational Modeling (PLS-SEM) to explore how Product, Place, Price, and Promotion individually and together have an effect on consumer retention.
- Customer satisfaction and retention in e-commerce channels are influenced by both product-related and promotional-related variables, according to the findings of this study
- The proposed model provides practical solutions to improving e-commerce marketing through the emphasis on customer engagement, pricing strategy, personalized advertising, and the availability of services.

The remainder of this manuscript is organized as follows: In Section II, a general overview of the research about online marketing strategies, retention of customers, and satisfaction with their purchases is presented. In Section III, the methods used in this research to gather data about this research, including the geographic location where this research was conducted, the process for selecting samples, how the data was gathered, how the study was designed, SEM analysis, and analysis using mathematical modeling, are presented. Section IV presents the findings from this study, including a review of the reliability of data; an evaluation of the structure of the model utilized in SEM analysis; testing of hypotheses using both graphical representations as well as by creating a visual representation of SEM analyses; and the management lessons learned as a result of conducting this investigation. In conclusion, Section V includes the major conclusions from this study, the contribution to the field of research, a practical conclusion, and new ideas for future research directions for this field of research.

RELATED WORK

According to the latest research into e-commerce, combining traditional and digital, or data-driven, marketing methods is vital for increasing customer retention rates. More specifically, it has been shown that the digital revolution has resulted in significant changes to how marketers use the components of the marketing mix, especially when dealing with an online retailing environment characterized by highly complex, fluid patterns of consumer behaviour. Product customization and artificial intelligence recommendations have both been shown to enhance User Engagement and Loyalty levels for those customers using e-commerce websites [11]. Machine-learning-driven dynamic pricing has also been confirmed as being the biggest contributing factor to achieving a Competitive Advantage [12].

Current research continues to demonstrate the importance of Omnichannel Integration and Platform Accessibility (without barriers) for improving shopper satisfaction and retention of customers within the context of digital commerce [13]. Furthermore, using Social Media Marketing Strategies and Targeted Marketing campaigns has proven to be invaluable in increasing customers' online engagement and Brand Loyalty [14]. Previous research also clearly indicates that trust, perceived value, Perceived Value & Service Quality are all key drivers in driving customer retention within e-commerce portals [15].

The logistics efficiency and effectiveness of last-mile delivery are increasingly seen as important determining factors related to consumer satisfaction and retention in e-commerce and digital retail

businesses [16]. Likewise, influencer marketing can serve as an effective means for creating consumer perceptions and purchase decisions in the e-commerce marketplace [17]. Structural modeling methodologies, including SEM and PLS-SEM, have also been used to study the complex nature of the relationship between marketing variables and customer behaviour [18]. Additionally, research on digital consumer psychology has identified that emotional engagement and personalization are crucial elements of creating customer loyalty [19]. Through integrated Marketing Communication strategies in digital environments, companies have been able to create consistent messages across all their channels and maintain repeat customers [20].

To summarize, based on the findings from the above-reviewed sources in the given field, the use of e-commerce strategies depends primarily on the cohesion between the principal components of a digital marketing strategy through the principle of effective communication and how well perform. Furthermore, the literature review indicates that there are four key areas influencing consumer retention in e-commerce: dynamic pricing, effective distribution methods, strategic promotion strategies, and personalized product offerings. The advancement of help from contemporary technical solutions such as data analytics, machine learning, and artificial intelligence has provided marketers with a greater ability to predict future results through the use of a more sophisticated and effective set of marketing models, thus helping marketers analyze consumer behaviour and trends. Moreover, two important thoughts from this literature review's findings indicate that trust and reliability, as well as emotional involvement in the buying process, are critical to the success of consumer retention programs. Consequently, all four of the above results would provide a strong basis to support conducting an evaluation of customer retention within an e-commerce environment, using a comprehensive framework, as follows: the 4Ps of Marketing.

METHODOLOGY

Study Area

This study is conducted in India's e-commerce sector. The target consumers are those individuals who buy goods online from Amazon, Flipkart, Myntra, and Ajio. This Indian market environment provides a good place for conducting the current research due to the increasing penetration of internet services, digital payments, and mobile commerce that affect the buying behaviour of customers greatly. The purpose of this study is to examine how the 4Ps marketing components affect customer satisfaction and long-term retention in online marketplaces. The targeted consumers are those who have made a minimum of three transactions via the Internet in the past six months. This ensures that these people have adequate experience with the application of digital marketing approaches in their online transactions. The geographical scope of this research includes urban and semi-urban consumers from different demographics, such as students, professionals, and businesses.

Research Design

This study examines the empirical relationship between the 4Ps Marketing Plan and customer retention on e-commerce sites using a quantitative research approach. The choice of cross-sectional survey as a research method is due to the possibility of obtaining quantifiable data from respondents concerning the effectiveness of marketing, the level of customer satisfaction, and consumer retention behaviour. The research model consists of Product, Price, Place, and Promotion as exogenous variables. The endogenous variable is customer retention, while the mediating variable is customer satisfaction.

Sampling Technique and Sample Population

For data collection purposes, purposive sampling and convenience sampling approaches are adopted in the research study to obtain answers from e-commerce consumers. These active e-commerce consumers are those who are aged between 18 and 50 years and are regular users of e-commerce websites to buy goods and services. The actual sample frame comprises university students, professionals, online freelancers, small business owners, and digital consumers from metro and semi-urban areas.

Inventories of respondents' responses total 420. After filtering out the invalid and incomplete questionnaires, only 356 responses were used for analysis. The sample size is adequate for conducting the necessary PLS-SEM analyses. To increase the generalizability of results, various demographic variables such as gender, education level, monthly income, and experience with online shopping were included in the general distribution of respondents.

Data Collection Procedure

A systematic survey questionnaire was used to collect the primary data. There were three main sections to the questionnaire. Personal information such as age, gender, income, education level, and frequency of online purchases was included in the first section. The second part included a measure of the four Ps of marketing, which consisted of Product, Price, Place, and Promotion through various multi-item measures using a Likert-type scale. The third part of the questionnaire consisted of the two key independent variables: Customer Satisfaction and Consumer Retention.

A five-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree," was used to score each question. An electronic survey through e-mail, social media sites, online forums, and academic discussion boards was conducted to gather responses to the survey questionnaire. Before the survey was finalized and distributed, 30 respondents participated in a pilot test. Pilot testing revealed satisfactory internal reliability with Cronbach alpha scores greater than 0.80 for all constructs.

Conceptual Framework Description

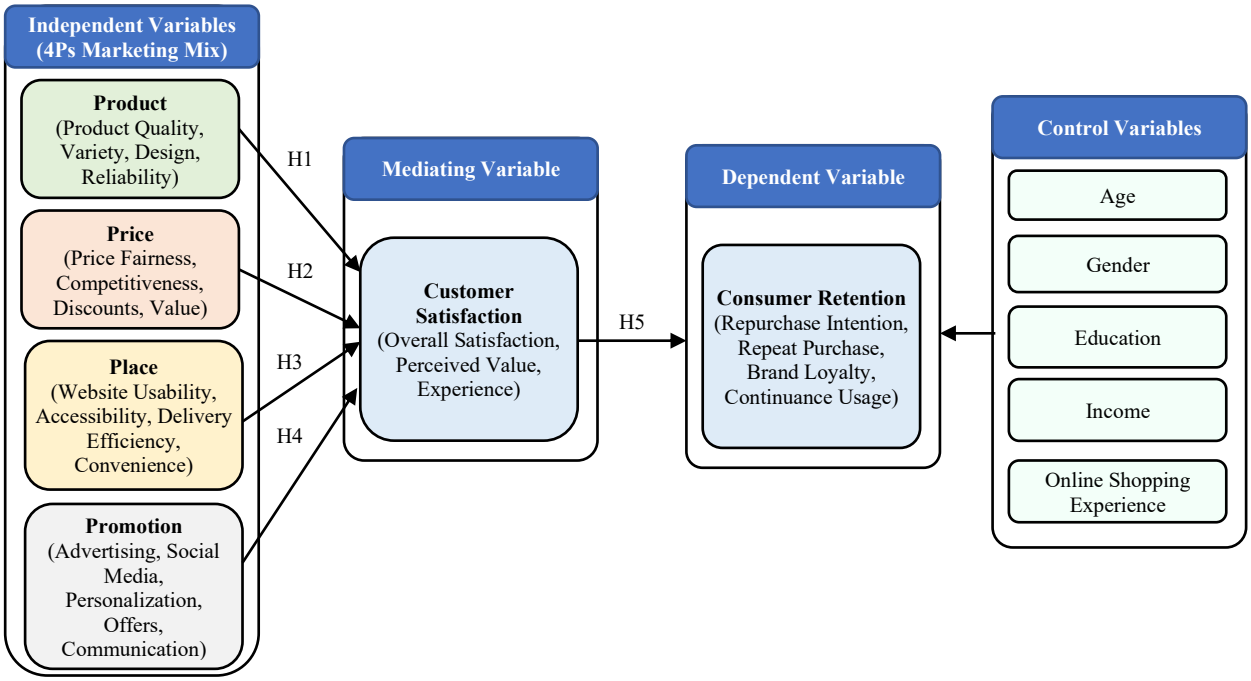

Figure 1. Conceptual research framework for evaluating consumer retention using the 4ps marketing model in e-commerce

The 4 Ps Marketing Model's effect on customer retention in online businesses was measured using the conceptual study framework depicted in figure 1. This framework has identified the constructs of product, price, place, and promotion as independent constructs that affect customer satisfaction, leading to consumer retention. The framework also has demographic control variables like age, gender, education, income, and online shopping experience to manage the differences in the behaviour of consumers. This framework serves as the theory of the relation between marketing and consumer retention in online businesses. The methodology included in the above figure comprises problem definition, research design, questionnaire-based data collection, SEM-based statistical analysis, hypothesis testing, and managerial implications.

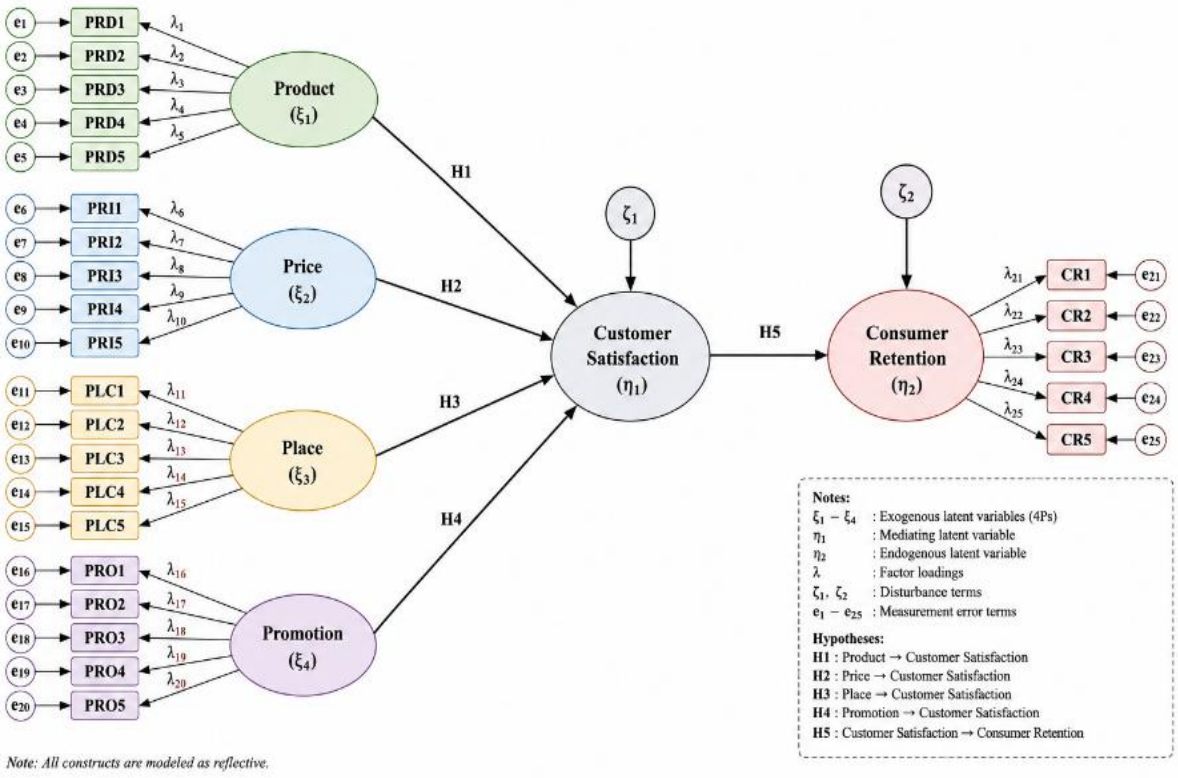

Figure 2. PLS-SEM for consumer retention analysis in e-commerce

In figure 2 presents the PLS-SEM developed for the empirical validation of the proposed research framework. The SEM diagram consists of latent variables defined by reflective indicators related to the constructs of Product, Price, Place, Promotion, Customer Satisfaction, and Consumer Retention. Path coefficients are incorporated in the model for hypotheses H1 to H5 to illustrate the causal relationships between variables. The observed variables corresponding to each latent construct are the measurement indicators PRD1-PRD5, PRI1-PRI5, PLC1-PLC5, PRO1-PRO5, and CR1-CR5. The model also employs disturbance terms and measurement error terms to realize statistical accuracy and reliability in estimating structural relationships.

Measurement Constructs

The Product construct captures perceptions of product quality, reliability, variety, design, and usefulness among consumers. Price measures affordability, perceived fairness, discount effectiveness, and relative value. Place measures the accessibility of the website, efficiency of delivery, convenience, and usability of navigation. Promotion Measures: Digital advertising effectiveness, personalized recommendations, communication quality, and social media impact. Customer Satisfaction measures the overall shopping experience, perceived value, and fulfilment of expectations. Consumer Retention measures repurchase intention, loyalty, repeated usage of the platform, and long-term engagement behaviour.

Model Details for Analysis

The PLS-SEM was performed on the data utilizing the SmartPLS 4 program. Measurement evaluation of models and structural model analysis were the two main phases of the analysis process.

Convergent validity, discriminant validity, indicator reliability, and internal consistency reliability were all included in the measurement model analysis. Factor loadings were used to confirm the reliability of the indicator, with values > 0.70 being considered acceptable. Cronbach's alpha and CR were used to assess the internal consistency. AVE values greater than 0.50 were used to assess the convergent validity.

The structural model study assessed the coefficient of determination and path coefficients. (R^2), predictive relevance (Q^2), effect size (f^2), and the significance of the hypothesis using bootstrapping with five thousand subsamples. Additionally, the role that customer satisfaction had as a mediator between the 4Ps structures and customer retention was examined. Standardized Root Mean Square Residual (SRMR) as well as Normed Fit Index (NFI) data were used to validate the model's fitness.

Mathematical Description of the Proposed Model

The proposed quantitative model models Consumer Retention as a result of the four marketing mix parameters mediated via Customer Satisfaction.

The structural equation for Customer Satisfaction is as follows in Equation 1:

$$\mathrm{CS} = \beta_1 \mathrm{P_r} + \beta_2 \mathrm{P_i} + \beta_3 \mathrm{P_l} + \beta_4 \mathrm{P_m} + \epsilon_1 \quad (1)$$

Where CS represents Customer Satisfaction, P_r represents Product, P_i represents Price, P_l represents Place, P_m represents Promotion, $\beta 1,\ \beta 2,\ \beta 3,\ \beta 4$ denote standardized regression coefficients, and $\epsilon_1$denotes the error term.

The Consumer Retention model is represented as Equation 2:

$$\mathrm{CR} = \beta_5 \mathrm{CS} + \epsilon_2 \quad (2)$$

Where, CR represents Consumer Retention, CS represents Customer Satisfaction, β_5 denotes the structural path coefficient, and ϵ_2 represents the residual error term.

The coefficient of determination of the proposed model is shown in Equation 3:

$$\mathrm{R}^2 = 1 - \frac{\sum\left(\mathrm{Y_i} - \widehat{\mathrm{Y}}_\mathrm{i}\right)^2}{\sum(\mathrm{Y_i} - \overline{\mathrm{Y}})^2} \quad (3)$$

where R^2 shows the percentage of the variance in customer retention that can be attributed to the independent constructs plus mediating variable. Higher R^2 values indicate stronger predictive capability and improved explanatory performance of the proposed SEM framework.

RESULTS AND DISCUSSION

Sample Details

420 questionnaires were distributed among active e-commerce consumers using online survey platforms, social media groups, and academic networks. 356 valid responses with a favourable response rate of 84.76% were kept for statistical analysis after the data was screened and incomplete responses were eliminated. According to the demographic study, 47.2% of respondents were female, and 52.8% of respondents were male. The age range of 21 to 30 years old accounted for the bulk of the subjects, followed by 31 to 40 years old (28.6% of responses, or 44.9% of the sample population). With regard to educational qualification, 61.2% of the respondents had an undergraduate degree, and 24.7% had a postgraduate qualification. In relation to the frequency of online shopping, 68.5% said engaged in online shopping twice a month. This is an indication that are familiar with online shopping sites and processes.

The sample's demographic diversity boosts the results' generalizability and validates the suggested SEM framework's dependability in assessing customer retention behaviour across various customer segments.

Reliability and Validity Analysis

The validity and reliability of the measurement components have been assessed before the structural model analysis. It is shown in table 1. Internal consistency and convergent validity were evaluated using Cronbach's alpha, CR, and AVE values.

Table 1. Reliability and convergent validity analysis

Construct	Cronbach's Alpha	Composite Reliability	AVE
Product	0.891	0.914	0.681
Price	0.874	0.903	0.651
Place	0.856	0.887	0.612
Promotion	0.902	0.926	0.714
Customer Satisfaction	0.918	0.936	0.746
Consumer Retention	0.911	0.931	0.729

The findings demonstrate great internal consistency and dependability since all of the Cronbach's alpha values are higher than the suggested cut-off of 0.70. Additionally, the composite reliability scores are higher than 0.80, indicating strong build dependability. The convergent validity of the suggested measuring paradigm is confirmed by the fact that all constructs have AVE values larger than 0.50.

The Fornell–Larcker criterion was used to assess discriminant validity, and the square root of AVE for every construct was higher than the inter-construct correlations, confirming satisfactory discriminant validity amongst the latent variables.

Structural Model Evaluation

PLS-SEM with bootstrapping comprising 5000 resamples was used to examine the structural model. The model evaluation considered t-statistics, path coefficients, p-values, and the coefficient of determination. (R^2), predictive relevance (Q^2) and effect size (f^2).

The proposed model exhibited a good predictive ability with R^2A value of 0.68 for Consumer Retention signifies that 68% of the variation in retention behaviour is accounted for by the 4Ps Marketing Model and Customer Satisfaction. The Customer Satisfaction construct's R^2 = 0.64 value suggests that the independent variables have strong explanatory abilities.

The satisfactory model fit is confirmed by the SRMR score of 0.061. The structural model adequacy is satisfactory, as indicated by the NFI score of 0.91.

Hypothesis Testing

Table 2. Hypothesis testing results

Hypothesis	Relationship	Path Coefficient (β)	t-value	p-value	Result
H1	Product → Customer Satisfaction	0.41	7.82	<0.001	Supported
H2	Price → Customer Satisfaction	0.29	5.64	<0.01	Supported
H3	Place → Customer Satisfaction	0.22	4.31	<0.05	Supported
H4	Promotion → Customer Satisfaction	0.36	6.95	<0.001	Supported
H5	Customer Satisfaction → Consumer Retention	0.73	11.48	<0.001	Supported

The results of table 2 show that, with a path coefficient of 0.41, Product has the greatest impact on Customer Satisfaction. This implies that consumers attach importance to the quality, diversity, and consistency of goods in terms of evaluating an e-commerce website. Promotion is the second most important factor, which stresses the importance of personalized advertisements, social media interaction, and digital promotions for developing better customer relations. Promotion is the second most influential

factor, which highlights the importance of personalized advertisements, social media interaction, and digital promotions in building better customer relations.

Price has a significant impact on customer satisfaction, which validates the importance of value perception, affordability, and discounts on repurchase behaviour. The Place variable demonstrates statistical significance, which suggests that efficient delivery, availability, and platform ease positively influence consumer satisfaction.

Customer satisfaction's mediating role in the established model is validated by the substantial and positive correlation between customer satisfaction as well as consumer retention. These findings support the conceptual applicability of the 4Ps Marketing Framework in elucidating the phenomena of customer retention in e-commerce sites.

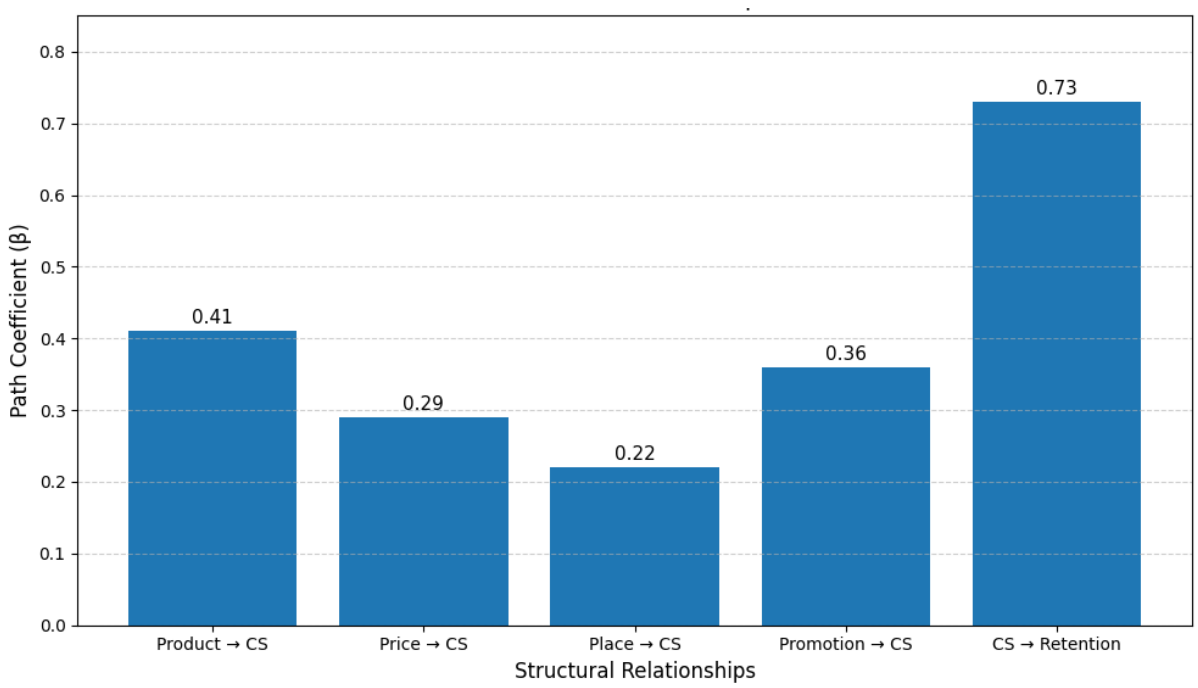

Figure 3. Structural path coefficients of the proposed SEM model

The structural path coefficients of the SEM analysis of the suggested study model are displayed in figure 3. The impact of four marketing mix factors on customer satisfaction, along with the impact of customer satisfaction on customer retention, is depicted in the figure. Product is the most influential construct to Customer Satisfaction among independent constructs, with a path coefficient of 0.41, and then Promotion with 0.36. Price and Place have moderate positive effects with the coefficients of 0.29 and 0.22, respectively. The satisfaction of customers is a strong predictor of long-term retention behaviour in e-commerce platforms, as evidenced by the largest structural link between client satisfaction and consumer retention, which has a coefficient value of 0.73. The graphical presentation supports the statistical results in hypothesis testing. It also proves the effectiveness of the proposed SEM framework in assessing consumer retention through the 4Ps Marketing Model.

Objective-Based Analysis

The RO1 analysis demonstrates that product-related characteristics, such as product quality and variety, have a major impact on customer satisfaction and retention behaviour. The findings on RO2 indicate that pricing fairness and competitive discount strategies positively impact the intentions of repeat buying. RO3 reveals that Place-related features, such as delivery reliability and platform accessibility, result in superior consumer experience and satisfaction. According to RO4, promotional strategies are significantly effective in increasing customer engagement and platform loyalty. In the end, RO5 shows

the statistical significance of the structural equations and confirms the significance of the 4Ps integrated model as a major factor in determining customer retention within the e-commerce ecosystem.

Metrics Formulae Used for Analysis

Cronbach's alpha used for reliability estimation is expressed as Equation 4:

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_t^2}\right) \quad (4)$$

where k represents the number of indicators, σ_i^2 represents item variance, and σ_t^2 represents total variance.

Composite Reliability is calculated as Equation 5:

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum var\,(\epsilon_i)} \quad (5)$$

where λ_i denotes standardized factor loadings and $\sum var\,(\epsilon_i)$ represents measurement error variance.

Average Variance Extracted is determined using Equation 6:

$$AVE = \frac{\sum \lambda_i^2}{n} \quad (6)$$

where n represents the total number of indicators associated with a construct.

Discussion

It can be seen from the results that the 4Ps Marketing Model continues to remain relevant even in the modern-day e-commerce context, along with other strategies involving consumer engagement. It was found that product quality played the key role in determining consumer satisfaction, which implies that consumers want reliable and well-described products with various choices when dealing with e-commerce. Finally, the high impact of Promotion suggests that digital promotion is critical for enhancing consumer engagement and retention.

Price's statistical significance suggests that competitiveness and affordability remain critical factors affecting purchase decision-making by consumers in technologically advanced digital markets. The significance of the Place factor indicates that logistics, delivery systems, and ease of platform access are vital considerations when retaining customers.

A strong relationship exists between customer satisfaction and customer loyalty, with customer satisfaction also acting as a mediator in that relationship; thus, customer satisfaction also has an effect on customer loyalty. Structural equation modeling supports that customer retention within e-commerce integrates effective marketing strategies with a combination of technology and personalization to create a unique shopping experience.

Recommendations and Managerial Implications

To enhance customer satisfaction and retention for e-commerce businesses, several requirements must be met, such as production quality control, proper product display, and product line diversification. Additionally, the implementation of artificial intelligence (AI) product recommendation engines and personalized marketing strategies can enhance customer engagement on the e-commerce site.

The companies should also explore the possibility of implementing a flexible pricing strategy that uses data collected from consumer behaviour analysis to remain competitive while maintaining profitability. Additionally, companies should also seek to optimize their logistical operations.

From a management point of view, the present study offers an approach for evaluating the effectiveness of digital marketing towards customer retention using structural equation modeling methodology.

Suggestions for Future Research

The potential for additional research exists with added variables such as trust, security perceptions, brand reputation, and artificial intelligence-enabled personalization. Comparing these results across countries and other types of e-commerce offers greater insight as to how culture and behaviour affect retention of a digital consumer. Additionally, some longitudinal studies may be designed to measure the impact of technological advancements on consumer behaviour over a long period of time.

CONCLUSION AND FUTURE WORK

This research utilized structural equation modeling to determine how well the 4Ps Marketing Model explains the behaviour of consumers while shop on e-commerce sites. Results showed that customer satisfaction, and therefore customer retention, are influenced by the 4Ps (Product, Price, Place, and Promotion). Product had the highest structural path coefficient (0.41) between the 4Ps; therefore, it is the most significant of the 4Ps when predicting customer retention behaviour. Results indicate that the way customers view online retail is affected greatly by product quality, reliability, and variety. Promotion also significantly influenced customer retention at (0.36). Because of this strong correlation between promotion and customer retention, businesses need to create personalized promotions, marketing campaigns, or social media activities to build relationships with their customers. Price and Place also positively influenced consumer retention with structural path coefficients of 0.29 and 0.22, respectively.

This proposed SEM Model provides a very strong level of predictive capability since its R^2 Value of 0.68 in Consumer Retention indicates that the SEM Model can account for 68% of the difference in consumers' behaviour in retaining customers. Additionally, a high Structural Path Coefficient of 0.73 in Marketing Effectiveness through Client Satisfaction and Consumer Retention indicates that the long-term loyalty of customers can be effectively fostered through overall satisfaction with the product or service of the client. Moreover, the measurement instrument itself has achieved reliable measurement due to both Cronbach's Alpha and Composite Reliability being above acceptable criteria as determined through the Reliability/Validity Analysis. This research also indicates that the Traditional 4Ps Marketing Model, combined with Digital Customer-Centric Strategies, remains very successful in today's e-commerce environment. Further, the proposed SEM framework also helps to further contribute to Quantitative Marketing Research through the provision of a statistically validated model to assess Consumer Retention within digital commerce environments.

REFERENCES

[1] Abdullah MS. Examining The Effect Of AI-Powered Personalization On Customer Loyalty: A Meta-Analysis Of E-Commerce Studies. Review of Applied Science and Technology. 2025 Jun 15;4(02):309-38. https://doi.org/10.63125/780spe97

[2] Hao H, Guo J, Xin Z, Qiao J. Research on e-commerce distribution optimization of rice agricultural products based on consumer satisfaction. IEEE Access. 2021 Sep 27;9:135304-15. https://doi.org/10.1109/access.2021.3114409

[3] Kim J, Yum K. Enhancing continuous usage intention in e-commerce marketplace platforms: The effects of service quality, customer satisfaction, and trust. Applied Sciences. 2024 Aug 28;14(17):7617. https://doi.org/10.3390/app14177617

[4] Yadav M, Rahman Z. The influence of social media marketing activities on customer loyalty: A study of e-commerce industry. Benchmarking: An International Journal. 2018 Nov 29;25(9):3882-905. https://doi.org/10.1108/bij-05-2017-0092

[5] Kumar R, Jain V, Eastman JK, Ambika A. The components of perceived quality and their influence on online re-purchase intention. Journal of Consumer Marketing. 2025 Jan 2;42(1):38-55. https://doi.org/10.1108/JCM-04-2024-6798

[6] Kawa A, Zdrenka W. Logistics value in e-commerce and its impact on customer satisfaction, loyalty and online retailers' performance. The International Journal of Logistics Management. 2024 Feb 13;35(2):577-600. https://doi.org/10.1108/ijlm-02-2023-0078

[7] Mustofa A, Wartiningsih E, Sinaga MO. The Influence of Digital Marketing Strategies on Consumer Engagement and Brand Loyalty: A Study on Indonesian E-commerce Platforms. Journal of Business Administration and Entrepreneurship Innovation. 2024 Jun 25;1(1):19-25. https://doi.org/10.32722/baei.v1i01.7324

[8] Méndez-Suárez M. Marketing mix modeling using PLS-SEM, bootstrapping the model coefficients. Mathematics. 2021 Aug 3;9(15):1832. https://doi.org/10.3390/math9151832

[9] Rita P, Ramos RF. Global research trends in consumer behavior and sustainability in E-Commerce: A bibliometric analysis of the knowledge structure. Sustainability. 2022 Aug 2;14(15):9455. https://doi.org/10.3390/su14159455

[10] Harizi A, Trebicka B. The integration of social media in integrated marketing communication: A systematic review and theorical framework. Academic Journal of Interdisciplinary Studies. 2023 Nov;12(6). https://doi.org/10.36941/ajis-2023-0161

[11] Vashishth TK, Sharma KK, Kumar B, Chaudhary S, Panwar R. Enhancing customer experience through AI-enabled content personalization in e-commerce marketing. Advances in digital marketing in the era of artificial intelligence. 2024 Jul 12:7-32. https://doi.org/10.1201/9781003450443-2

[12] Devarajanayaka KM, Banu SS, Desai DJ, TV V, Palav MR, Dash SK. Machine learning based pricing optimization for dynamic pricing in online retail. Journal of Informatics Education and Research. 2024;4(3). https://doi.org/10.52783/jier.v4i3.1564

[13] Lazaris C, Sarantopoulos P, Vrechopoulos A, Doukidis G. Effects of increased omnichannel integration on customer satisfaction and loyalty intentions. International Journal of Electronic Commerce. 2021 Oct 2;25(4):440-68. https://doi.org/10.1080/10864415.2021.1967005

[14] Ahmad NR. Digital marketing strategies and consumer engagement: A comparative study of traditional vs. e-commerce brands. The Critical Review of Social Sciences Studies. 2025 Feb 5;3(1):1537-48. https://doi.org/10.59075/t8pba787

[15] Milan GS, Eberle L, Bebber S. Perceived value, reputation, trust, and switching costs as determinants of customer retention. Journal of Relationship Marketing. 2015 Apr 3;14(2):109-23. https://doi.org/10.1080/15332667.2015.1041353

[16] Magro-Montero M, Santarsiero F, Morales-Alonso G. Value creation and capture in innovation ecosystems: strategic cooperation between e-commerce platforms and third-party logistics (3PLs) providers. European Journal of Innovation Management. 2026 Apr 6;29(2):380-403. https://doi.org/10.1108/ejim-11-2024-1385

[17] Migkos SP, Giannakopoulos NT, Sakas DP. Impact of influencer marketing on consumer behavior and online shopping preferences. Journal of Theoretical and Applied Electronic Commerce Research. 2025 May 21;20(2):111. https://doi.org/10.3390/jtaer20020111

[18] Islam Q, Ali Khan SM. Assessing consumer behavior in sustainable product markets: A structural equation modeling approach with partial least squares analysis. Sustainability. 2024 Apr 18;16(8):3400. https://doi.org/10.3390/su16083400

[19] Kabir MH, Sultana S, Hossain MM, Islam SM. The impact of digital marketing strategies on consumer behavior: A comprehensive review. Business and Social Sciences. 2025 May 13;3(1):1-8. https://doi.org/10.25163/business.3110269

[20] Srivastava P. Digital Transformation and Integrated Marketing Communications: A Quantitative Analysis. Naveen International Journal of Multidisciplinary Sciences (NIJMS). 2025 Jul 31;1(6):34-44. https://doi.org/10.71126/nijms.v1i6.76