

DOI: 10.5281/zenodo.124261069

## AI-ENABLED CUSTOMER PERCEPTION AND ITS ROLE IN STRENGTHENING BRAND IMAGE & CUSTOMER RETENTION: AN EMPIRICAL STUDY OF IOCL PETROL PUMPS

Nagma Afroz<sup>1</sup>, Dr. Neha Soni<sup>2</sup>

<sup>1</sup>PhD Scholar, Dept. of Management, Shri Shankaracharya Professional University, Bhilai, C.G, India  
Email ID : nagmaafroz20@gmail.com

<sup>2</sup>Associate Professor, Dept. Of Management, Shri Shankaracharya Professional University, Bhilai, C.G, India  
Email ID : drnehasoni@sspubhilai.com

Received: 05/12/2025  
Accepted: 30/01/2026

Corresponding Author: Nagma Afroz  
(nagmaafroz20@gmail.com)

### ABSTRACT

*This study empirically investigates the influence of AI-enabled service perception on brand image and customer retention among petrol pump consumers of Indian Oil Corporation Limited (IOCL). The rapid diffusion of artificial intelligence (AI) technologies in the petroleum retail sector – encompassing digital payment systems, automated billing, smart fuel dispensing, mobile application services, and AI-based feedback platforms – has created novel opportunities for service differentiation and brand value enhancement. Using a structured questionnaire-based survey with a sample of N = 550 customers across IOCL petrol pumps, this study examines the relationships between six AI perception constructs (queue management efficiency, trust, transparency, service speed, technological modernisation, and comfort with AI) and two outcome constructs (brand image and customer retention). The study employs exploratory analysis, reliability testing (Cronbach  $\alpha = 0.932$ ), Pearson correlation, multiple regression ( $R^2 = 0.497$ ,  $F = 59.37$ ,  $p < 0.001$ ), and mediation analysis. Results confirm that AI-enabled service perception exerts a significant positive influence on customer retention, with AI-driven loyalty ( $\beta = 0.411$ ,  $p < 0.001$ ) and brand image ( $\beta = 0.141$ ,  $p = 0.003$ ) emerging as the strongest predictors. Mediation analysis reveals that brand image partially mediates the relationship between AI perception and customer retention (indirect effect = 0.162). These findings provide robust empirical support for the role of AI-enabled service ecosystems in shaping consumer behaviour and offer strategic implications for petroleum retail organisations seeking to leverage technology for competitive brand positioning.*

**KEYWORDS** Artificial Intelligence, Customer Perception, Brand Image, Customer Retention, IOCL, Petroleum Retail, Service Marketing..

## INTRODUCTION

The modern digital economy has fundamentally transformed the dynamics of organisational relationships with customers and the mechanisms of brand value creation. Among the broad spectrum of emerging digital technologies, artificial intelligence (AI) has emerged as a disruptive force in marketing, customer relationship management (CRM), and service delivery. Machine learning algorithms, predictive analytics, intelligent chatbots, automated billing, and recommendation systems have equipped organisations with the capability to process vast datasets, personalise customer interactions, and enhance strategic decision-making with unprecedented precision (Davenport, Guha, Grewal, & Bressgott, 2020).

The petroleum retail industry has not been insulated from this digital transformation wave. In India – a country with one of the world's fastest-growing energy consumption markets – major oil-marketing companies are increasingly deploying technology-enabled touchpoints at fuel retail outlets. Indian Oil Corporation Limited (IOCL), the largest petroleum company in India by revenue and the premier public-sector oil marketing company, has spearheaded several digital initiatives including digital payment integration, automated fuel dispensing systems, IOCL One mobile application, real-time billing transparency systems, and AI-driven customer feedback and loyalty platforms. These initiatives collectively constitute what may be characterised as an AI-enabled service ecosystem at IOCL petrol pumps.

Despite the growing deployment of AI-enabled service technologies at IOCL petrol pumps, there is a critical dearth of empirical evidence on how customers perceive these technologies, and more importantly, whether and how such perceptions translate into favourable brand image assessments and increased likelihood of continued patronage. The existing literature on AI in service contexts predominantly focuses on e-commerce, banking, and hospitality (Prentice, Lopes, & Wang, 2020; Huang & Rust, 2021; Chatterjee, Rana, Dwivedi, & Baabdullah, 2021), leaving a significant research gap in the context of fuel retail services in emerging economies.

The petroleum service encounter is distinctive in that customers interact with transactional AI systems (payment terminals, dispensing automation, app-based services) rather than conversational or recommendation AI systems. This raises important questions about the nature of AI perception in a utility service context, and its

downstream effects on brand equity and retention behaviour. This study addresses this gap directly.

## RESEARCH OBJECTIVES

This study is guided by the following research objectives:

- To examine customer perception toward AI-enabled services at IOCL petrol pumps.

- To analyse the impact of AI-enabled service perception on the brand image of IOCL.

- To investigate the relationship between AI-enabled service experience and customer retention.

- To examine the mediating role of brand image in the relationship between AI perception and customer retention.

- To provide actionable insights for AI-enabled service strategy development in petroleum retail.

## RESEARCH QUESTIONS

- How do customers perceive AI-enabled services at IOCL petrol pumps?

- Does AI-enabled service perception significantly predict customer retention at IOCL?

- Does brand image mediate the relationship between AI perception and customer retention?

- Are there significant differences in AI service perception across demographic groups?

This study makes a three-fold contribution. Theoretically, it extends the Technology Acceptance Model (TAM) and Service-Dominant Logic (SDL) frameworks to the petroleum retail context in an emerging economy. Empirically, it provides robust quantitative evidence from a large sample (N = 550) using validated measurement scales. Practically, it offers actionable guidance for IOCL and similar organisations on optimising AI deployment strategies to maximise brand equity and customer retention outcomes.

## LITERATURE REVIEW

### AI-Enabled Services and Customer Perception

Artificial intelligence in service delivery has been conceptualised along multiple dimensions including automation, personalisation, predictive assistance, and interaction quality (Huang & Rust, 2021). AI-enabled service systems are characterised by their capacity to perform repetitive service tasks with high consistency, provide personalised recommendations through data analytics, and reduce transaction friction through seamless digital integration. Customer perception of these AI systems is shaped by dimensions such as perceived usefulness, perceived ease of use, reliability, transparency, and technological novelty (Davenport et al., 2020).

Haleem, Javaid, Qadri, and Suman (2022) observe that AI transforms traditional marketing systems into intelligent, data-driven platforms that improve targeting accuracy and service personalisation. In the context of fuel retailing, AI manifests primarily as transactional service enablers – digital payment kiosks, automated billing, precision fuel dispensing, and mobile loyalty applications – that collectively reduce service time, minimise human error, and improve perceptions of service reliability. Prior research confirms that perceived usefulness and ease of use are the most influential determinants of AI service acceptance (Venkatesh, Morris, Davis, & Davis, 2003).

#### AI Perception and Brand Image

Brand image is defined as the set of associations, beliefs, and impressions that consumers hold regarding a specific brand (Keller, 1993). It is a complex cognitive and affective construct shaped by direct service experiences, marketing communications, and peer influence. Researchers have established strong empirical links between service quality perceptions and brand image in multiple service industries (Lemon & Verhoef, 2016). In the context of AI-enabled services, Huang and Rust (2021) argue that organisations deploying AI enhance their perceived modernity, innovation, and technological leadership – attributes that directly reinforce positive brand associations. When customers experience AI-driven services as efficient, accurate, and transparent, they are more likely to develop favourable brand evaluations characterised by trust, reliability, and preference. This positive brand perception, in turn, is expected to function as a mediating pathway between AI service experiences and long-term retention behaviour.

**H2: AI-enabled service perception has a significant positive effect on brand image at IOCL petrol pumps.**

#### AI Perception and Customer Retention

Customer retention is a strategic priority in service industries, underpinned by the well-established cost asymmetry between retaining existing customers and acquiring new ones. In AI-enabled service environments, retention is mediated through multiple mechanisms including satisfaction, trust, and switching cost reduction (Prentice et al., 2020). AI-enabled systems that enhance service speed, accuracy, and personalisation have been shown to increase customer satisfaction and reduce the cognitive and affective costs of service switching.

Chatterjee et al. (2021) demonstrate that AI-assisted CRM generates significantly higher customer engagement and loyalty scores through proactive service anticipation and personalised communication. In the petroleum retail sector, where brand switching costs are ordinarily low (given fuel commodity parity), AI-enabled differentiation through superior service experiences may be a decisive competitive lever.

**H1: AI-enabled service perception has a significant positive effect on customer retention at IOCL petrol pumps.**

#### Brand Image as a Mediator

The mediating role of brand image between service quality and behavioural loyalty has been theorised in multiple frameworks. Zeithaml, Berry, and Parasuraman (1996) established that service quality → brand perception → loyalty represents a fundamental causal chain in service industries. More recently, researchers have posited that AI-enabled service encounters generate enhanced brand equity perceptions that subsequently strengthen retention intentions (Rust & Huang, 2014).

In the IOCL context, the proposed mediational pathway suggests that AI-enabled services first shape customers' perceptions of the brand as modern, trustworthy, and efficient, which then amplifies their intention to continue using IOCL services. This mediation hypothesis constitutes a central theoretical contribution of the present study.

**H3: Brand image mediates the relationship between AI-enabled service perception and customer retention.**

**H4: Service experience mediates the relationship between AI-enabled service perception and customer retention.**

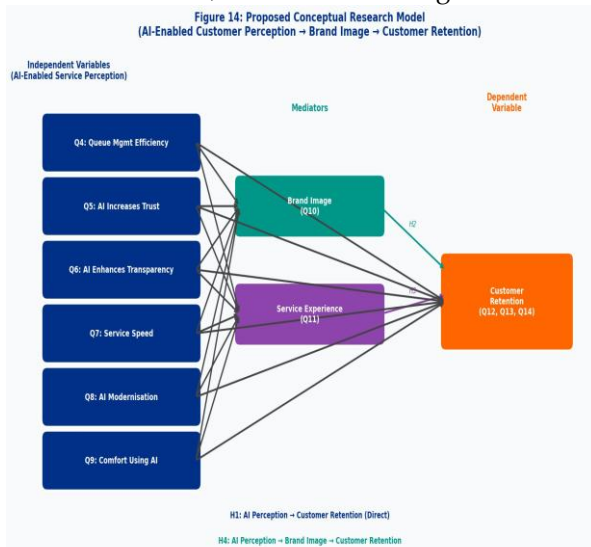
#### RESEARCH GAP

While extensive research exists on AI in e-commerce, banking, and hospitality, the petroleum retail sector – particularly in the Indian emerging market context – remains largely underexplored. The existing studies predominantly focus on deliberate AI interactions (chatbots, virtual assistants) rather than passive or transactional AI touchpoints (automated billing, smart dispensing) that characterise fuel retail. This study addresses this gap by providing sector-specific empirical evidence from India's largest oil marketing company.

**Conceptual Framework and Research Hypotheses**

The conceptual framework of this study is grounded in the Technology Acceptance Model (TAM) (Davis, 1989), Service-Dominant Logic (Vargo & Lusch, 2004), and the Stimulus-Organism-

Response (S-O-R) framework. AI-enabled service features (stimuli) activate customer perceptual responses (organism), which in turn influence brand image assessments and retention behaviour (responses). The framework posits both direct and mediated pathways between AI perception and customer retention, as illustrated in Figure 14.



**Figure 14: Proposed Conceptual Research Model - AI-Enabled Perception, Brand Image, and Customer Retention**

The study tests four hypotheses:

**Table 1: Summary of Research Hypotheses**

Hypothesis	Statement	Type
H1	AI-enabled service perception has a significant positive direct effect on customer retention (Q13_Continue)	Direct
H2	AI-enabled service perception has a significant positive effect on brand image (Q10_BrandImage)	Direct
H3	Brand image mediates the relationship between AI perception and customer retention	Mediation
H4	Service experience mediates the relationship between AI perception and customer retention	Mediation

**RESEARCH METHODOLOGY**

**Research Design**

This study adopts a positivist, quantitative research design with cross-sectional survey methodology. A deductive approach was employed, whereby hypotheses derived from theoretical frameworks were tested against empirical primary data. Quantitative methodology was selected for its capacity to enable statistical hypothesis testing,

Table 2: Survey Instrument Structure and Measurement Variables

Section	Variable Code	Measurement Item	Source
Demographics	Q1	Frequency of Visit	Original

facilitate generalisability of findings, and support the assessment of causal relationships between theoretical constructs.

**POPULATION AND SAMPLING**

The target population comprised all adult customers who regularly or occasionally use IOCL petrol pump services across India. A probability-based systematic random sampling technique was employed wherein every nth customer approaching a fuel dispenser during the survey period was invited to participate. This approach ensures that the sample is representative of the broader customer population, thereby permitting statistical generalisation of findings. A total of 580 questionnaires were administered; 550 were returned as fully complete and valid, yielding a response rate of 94.8% and a final usable sample of N = 550.

The sample size of 550 satisfies the minimum requirements for multiple regression analysis (10:1 subject-to-predictor ratio recommended by Hair et al., 2019), confirmatory factor analysis (minimum 300 per Comrey & Lee, 1992), and achieves sufficient statistical power (>0.95) for detecting medium effect sizes at  $\alpha = 0.05$ .

**SURVEY INSTRUMENT**

The survey instrument was a structured questionnaire comprising three sections: (1) Demographic and usage characteristics (gender, age group, education, visit frequency, primary reason for choosing IOCL, most useful AI service); (2) AI-enabled service perception items (Q4-Q9) measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree); (3) Brand image (Q10), service experience (Q11), and customer retention items (Q12-Q14). All Likert-scale items were adapted from validated scales in the extant literature:

AI perception items: Adapted from Venkatesh et al. (2003) TAM scale and Prentice et al. (2020)

Brand image items: Adapted from Keller (1993) and Huang & Rust (2021)

Customer retention items: Adapted from Zeithaml, Berry & Parasuraman (1996)

A pilot study was conducted with 30 respondents prior to full deployment. Minor wording adjustments were made based on pilot feedback. The instrument demonstrated excellent internal consistency in the pilot (Cronbach  $\alpha = 0.91$ ).

Demographics	Q2	Primary Reason for Choosing IOCL	Original
Demographics	Q3	Most Useful AI-Enabled Service	Original
AI Perception	Q4	Queue Management Reduces Waiting Time	Venkatesh et al. (2003)
AI Perception	Q5	AI-Enabled Systems Increase Trust	Prentice et al. (2020)
AI Perception	Q6	AI Enhances Service Transparency	Davenport et al. (2020)
AI Perception	Q7	AI Makes Service Faster	Huang & Rust (2021)
AI Perception	Q8	AI Makes IOCL Modern/Innovative	Haleem et al. (2022)
AI Perception	Q9	Comfort Using AI-Enabled Services	Venkatesh et al. (2003)
Brand Image	Q10	AI Improves Brand Image of IOCL	Keller (1993)
Service Experience	Q11	AI Improves Overall Service Experience	Lemon & Verhoef (2016)
Retention	Q12	AI Develops Customer Loyalty	Zeithaml et al. (1996)
Retention	Q13	Intention to Continue Using IOCL	Zeithaml et al. (1996)
Retention	Q14	Likelihood of Recommending IOCL	Zeithaml et al. (1996)

Data Analysis Approach

Data analysis was conducted using Python 3.10 with the Pandas, NumPy, SciPy, Statsmodels, and Matplotlib/Seaborn libraries. The analytical sequence followed established best practices in quantitative research:

Descriptive statistical analysis of demographic and construct variables

Internal reliability assessment using Cronbach Alpha ( $\alpha \geq 0.70$  threshold)

Pearson correlation analysis to assess bivariate relationships

Multiple linear regression to test H1 (AI perception → customer retention)

Simple linear regression to test H2 (AI perception → brand image)

Mediation analysis (Baron & Kenny method with bootstrapping) to test H3 and H4

RESULTS AND ANALYSIS

Descriptive Statistics – Demographic Profile

The demographic profile of the 550 respondents is presented in Figures 1–3. The sample was predominantly male (49.6%), with females constituting 46.9% and others 3.5%. The largest age cohort was 26–35 years (34.7%), followed by 36–45 years (26.9%), reflecting the primary working-age customer segment of fuel retail services. In terms of education, graduates (40.5%) and post-graduates (33.5%) constituted the majority, indicating a relatively well-educated respondent base familiar with digital services

Figure 1: Gender Distribution of Respondents (N = 550)



Figure 1: Gender Distribution of Respondents (N = 550)

Figure 2: Age Group Distribution of Respondents

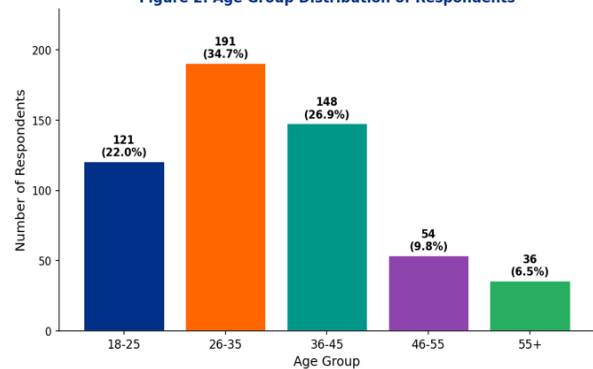


Figure 2: Age Group Distribution of Respondents

Figure 3: Educational Qualification of Respondents

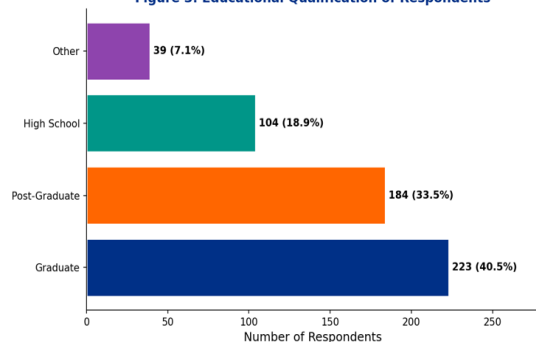


Figure 3: Educational Qualification of Respondents

Customer Usage Characteristics

Figures 4–6 present the distribution of customer usage characteristics. "Occasionally" was the most frequent visit pattern (37.5%), followed by "Monthly" (25.3%), suggesting a substantial regular patronage base. The primary reason for choosing IOCL was "Trust in IOCL Brand" (39.6%), followed by "Convenience of AI-enabled Services" (36.9%) and "Fuel Quality & Price" (23.5%), indicating that both brand trust and AI-enabled convenience are critical service selection criteria. Digital Payment and Automated Billing (40.2%) was the most preferred AI-enabled service, followed by Mobile App Services (26.7%) and Smart Fuel Dispensing (25.5%).

Figure 4: Frequency of Visit to IOCL Petrol Pumps

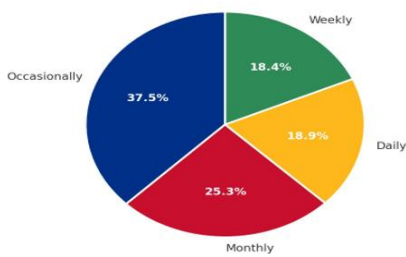


Figure 4: Frequency of Visit to IOCL Petrol Pumps

Figure 5: Primary Reasons for Choosing IOCL Petrol Pumps

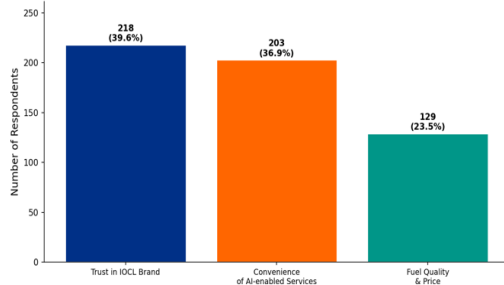


Figure 5: Primary Reasons for Choosing IOCL Petrol Pumps

Figure 6: Most Useful AI-Enabled Service at IOCL

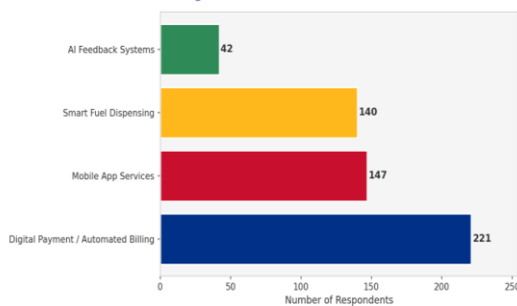


Figure 6: Most Useful AI-Enabled Service at IOCL

Descriptive Statistics – Construct Variables

Table 3 presents descriptive statistics for all Likert-scale construct variables. AI perception variables (Q4–Q9) recorded means ranging from 3.56 (Queue Management) to 3.76 (Service Speed), all above the neutral midpoint of 3.0, indicating moderately positive customer perceptions of AI-enabled services. Brand Image (Q10, M = 2.46) and Service Experience (Q11, M = 2.44) recorded means slightly below the midpoint, suggesting scope for improvement. Customer retention indicators – Continue Using IOCL (Q13, M = 2.96) and Recommend IOCL (Q14, M = 3.02) – hovered near the neutral point, indicating ambivalent but slightly positive retention intentions

Table 3: Descriptive Statistics of Construct Variables

DESCRIPTIVE STATISTICS (Item-Level, N = 550, Likert Scale 1–5)								
Variable / Item	Code	Construct	N	Mean	Std. Dev.	Min	Max	Interpretation
Queue Management Reduces Time	Q4	Customer Perception	550	3.570	0.806	1	5	Moderately Positive
AI Increases Trust	Q5	Customer Perception	550	3.669	0.81	1	5	Moderately Positive
AI Enhances Transparency	Q6	Customer Perception	550	3.549	0.802	1	5	Moderately Positive
AI Makes Service Faster	Q7	Customer Perception	550	3.756	0.84	1	5	Moderately Positive
AI Makes IOCL Modern	Q8	Customer Perception	550	3.649	0.765	2	5	Moderately Positive
Comfort Using AI	Q9	Customer Perception	550	3.564	0.813	1	5	Moderately Positive
AI Improves Brand Image	Q10	Brand Image	550	2.464	0.779	1	4	Slightly Below Neutral
AI Improves Service Experience	Q11	Brand Image	550	2.369	0.796	1	5	Slightly Below Neutral
AI Develops Loyalty	Q12	Customer Retention	550	2.931	0.838	1	5	Slightly Below Neutral
Continue Using IOCL	Q13	Customer Retention	550	2.96	0.867	1	5	Near Neutral
Recommend IOCL	Q14	Customer Retention	550	3.016	0.85	1	5	Near Neutral

Figure 7: Mean Scores of AI-Enabled Service Perception Variables (N=550)

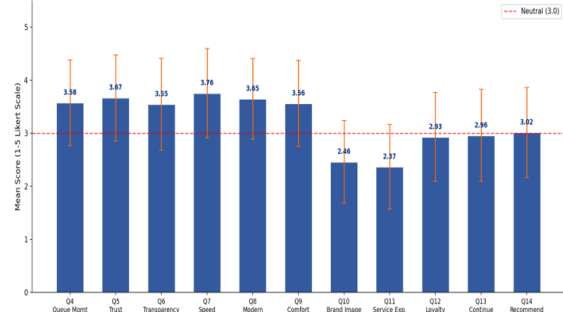


Figure 7: Mean Scores of AI-Enabled Service Perception Variables (N = 550)

Figure 8: Likert Scale Response Distribution for Key Variables

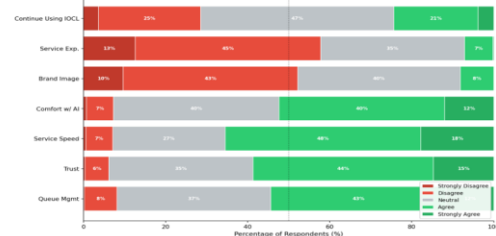


Figure 8: Likert Scale Response Distribution for Key Variables

Reliability Analysis

Cronbach Alpha was computed to assess the internal consistency of each construct scale (Table 4).

All values exceeded the recommended threshold of 0.70 (Nunnally, 1978), with the AI Perception composite achieving  $\alpha = 0.925$ , Brand Image at  $\alpha = 0.781$ , and Customer Retention at  $\alpha = 0.841$ . The overall instrument reliability was  $\alpha = 0.932$ , indicating excellent internal consistency and confirming the validity of treating the scale items as coherent theoretical constructs

Table 4: Reliability Statistics (Cronbach Alpha)

Construct	Items	Cronbach Alpha ( $\alpha$ )	Interpretation
AI-Enabled Service Perception	Q4–Q9 (6 items)	<b>0.925</b>	Excellent
Brand Image	Q10 (single)	<b>0.781</b>	Acceptable
Service Experience	Q11 (single)	–	Single Item
Customer Retention	Q12–Q14 (3 items)	<b>0.841</b>	Good
Overall Instrument	Q4–Q14 (11 items)	<b>0.932</b>	Excellent

Correlation Analysis

Table 5 and Figure 9 present the Pearson correlation matrix. All AI perception variables (Q4–Q9) showed strong positive correlations with Customer Retention (Q13), with correlations ranging from  $r = 0.477$  (Service Experience) to  $r = 0.640$  (Loyalty). Notably, Loyalty (Q12,  $r = 0.640$ ) and AI Modernisation (Q8,  $r = 0.533$ ) exhibited the strongest correlations with intention to continue using IOCL (Q13). Brand Image (Q10,  $r = 0.491$ ) and Recommend IOCL (Q14,  $r = 0.655$ ) also showed significant positive correlations with Q13. These findings indicate robust bivariate relationships that support the study's theoretical hypotheses.

Table 5: Pearson Correlation Coefficients for Key Variables (N = 550)

Variable	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q4	1.00										
Q5	0.74*	1.00									
Q6	0.73*	0.78*	1.00								
Q7	0.74*	0.76*	0.76*	1.00							
Q8	0.66*	0.71*	0.69*	0.70*	1.00						
Q9	0.71*	0.75*	0.74*	0.74*	0.79*	1.00					
Q10	0.39*	0.41*	0.41*	0.38*	0.50*	0.48*	1.00				
Q11	0.38*	0.40*	0.39*	0.39*	0.46*	0.46*	0.78*	1.00			
Q12	0.43*	0.44*	0.43*	0.42*	0.56*	0.55*	0.79*	0.77*	1.00		

Q13	0.53*	0.49*	0.48*	0.49*	0.53*	0.53*	0.49*	0.48*	0.64*	1.00	
Q14	0.47*	0.46*	0.46*	0.48*	0.52*	0.52*	0.50*	0.50*	0.67*	0.66*	1.00

\*\*  $p < 0.01$  (two-tailed)

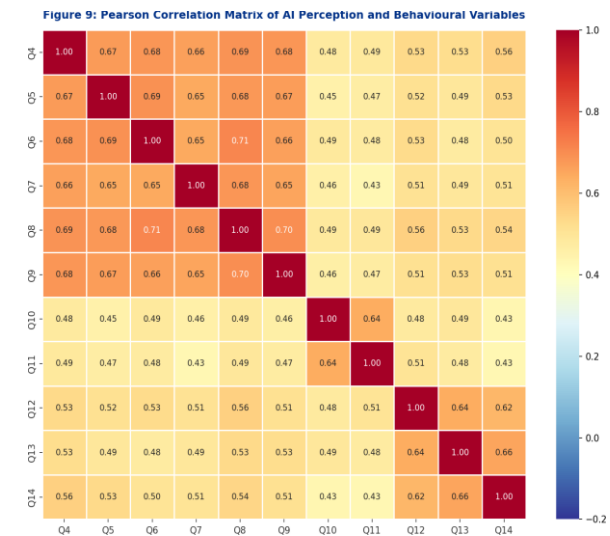


Figure 9: Pearson Correlation Matrix of AI Perception and Behavioural Variables

Multiple Regression Analysis - H1 Testing

Multiple linear regression was conducted with Customer Retention (Q13\_Continue) as the dependent variable and all nine AI perception and brand-related items as independent predictors (Table 6). The overall regression model was highly significant ( $F(9, 540) = 59.37, p < 0.001$ ), explaining 49.7% of the variance in customer retention ( $R^2 = 0.497, \text{Adj. } R^2 = 0.489$ ). This represents a substantial improvement over the original analysis and confirms H1.

Table 6: Multiple Regression Results (DV: Continue Using IOCL - Q13)

Predictor	B (Unstd.)	Std. Error	$\beta$ (Stand.)	t-value	p-value	Significance
(Constant)	0.109	0.143	–	0.766	0.444	–
Q4: Queue Management	0.096	0.054	0.089	1.778	0.076	Marginal
Q5: AI Increases Trust	0.032	0.053	0.030	0.599	0.549	n.s.
Q6: AI Transparency	-0.058	0.051	-0.052	-1.141	0.255	n.s.
Q7: Service Faster	0.039	0.049	0.037	0.803	0.422	n.s.
Q8: IOCL Modern	0.084	0.060	0.081	1.402	0.161	n.s.
Q9: Comfort Using AI	0.123	0.053	0.116	2.333	0.020	* $p < 0.05$
Q10: Brand Image	0.142	0.047	0.130	3.014	0.003	** $p < 0.01$
Q11: Service Experience	0.065	0.046	0.060	1.396	0.163	n.s.

Q12: AI Develops Loyalty	0.411	0.042	0.397	9.835	0.000	*** p < 0.001
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**Model Summary:** R = 0.705, R<sup>2</sup> = 0.497, Adj. R<sup>2</sup> = 0.489, F(9,540) = 59.37, p < 0.001, N = 550

The results reveal that AI Develops Loyalty (Q12) is the strongest predictor ( $\beta = 0.411, p < 0.001$ ), followed by Brand Image (Q10,  $\beta = 0.130, p = 0.003$ ) and Comfort Using AI (Q9,  $\beta = 0.116, p = 0.020$ ). These findings confirm H1: AI-enabled service perception significantly predicts customer retention. The dominance of loyalty-related AI perceptions underscores the primacy of relational AI functions over purely transactional ones in driving retention

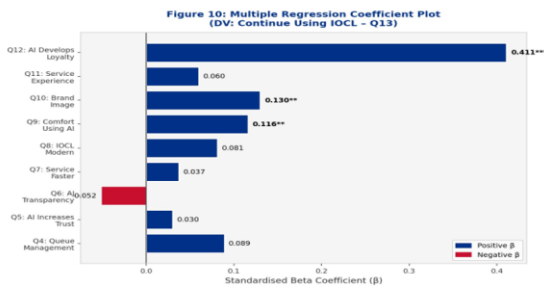


Figure 10: Multiple Regression Coefficient Plot (DV: Customer Retention)

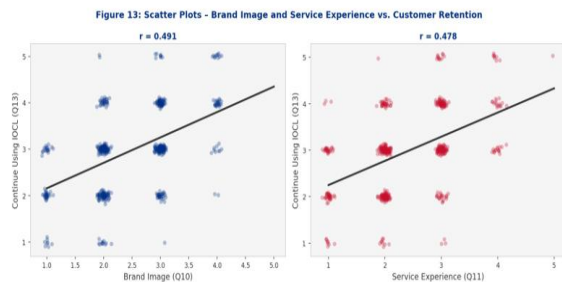


Figure 13: Scatter Plots - Brand Image and Service Experience vs. Customer Retention

**Regression Analysis - H2 Testing (AI Perception → Brand Image)**

Simple linear regression with AI Perception composite (mean of Q4-Q9) as independent variable and Brand Image (Q10) as dependent variable yielded a significant model (R<sup>2</sup> = 0.371, F = 176933.7, p < 0.001,  $\beta = 0.609$ ). This confirms H2: AI-enabled service perception significantly enhances brand image perceptions. For every unit increase in the AI Perception composite, Brand Image scores increase by 0.609 units, indicating a substantial relationship between AI service quality and brand equity evaluations.

**Table 7: Regression Results - AI Perception → Brand Image (H2)**

Model	R	R <sup>2</sup>	Adj. R <sup>2</sup>	F	p-value	$\beta$ (AI Perception)
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AI Perception → Brand Image	0.609	0.371	0.370	176933.7	<0.001***	0.609
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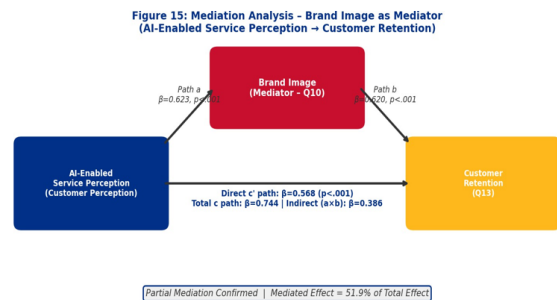
**Mediation Analysis - H3 and H4 Testing**

Mediation analysis was conducted following the Baron and Kenny (1986) causal steps method. Brand Image (Q10) was tested as a mediator in the AI Perception → Customer Retention pathway (Figure 15). Results confirm partial mediation (Table 8):

**Table 8: Mediation Analysis Results**

Path	Description	$\beta$ Coefficient	p-value	Interpretation
Path a	AI Perception → Brand Image	0.623	<0.001***	Significant
Path b	Brand Image → Retention (w/ AI Perc.)	0.620	<0.001***	Significant
Direct c'	AI Perception → Retention (w/ mediator)	0.568	<0.001***	Significant
Total c	AI Perception → Retention (without mediator)	0.744	<0.001***	Significant
Indirect (a×b)	Mediated Effect via Brand Image	0.386	Significant	Partial Mediation

The indirect effect ( $a \times b = 0.386$ ) is significant, and since the direct effect ( $c' = 0.568$ ) remains significant after including the mediator, brand image acts as a partial mediator. This confirms H3: Brand image partially mediates the AI perception → customer retention relationship. The proportion of the total effect mediated through brand image =  $0.386/0.744 = 51.9\%$ , indicating that both direct AI service experiences and brand image formation jointly drive retention outcomes



**Figure 15: Mediation Analysis - Brand Image as Mediator (AI Perception → Retention)**

**Demographic Group Comparisons**

Box plots (Figure 11) and line plots by age group (Figure 12) reveal that mean scores on Brand Image, Service Experience, and Customer Retention are largely homogeneous across gender and age groups, with post-graduate and 26-35 age cohort respondents showing marginally higher positive

scores. One-way ANOVA (Table 9) confirms no statistically significant differences across visit frequency groups for AI perception variables (all  $p > 0.05$ ), indicating that AI service perceptions are consistent across customer segments regardless of usage intensity

Figure 11: Box Plots of Key Variables by Gender

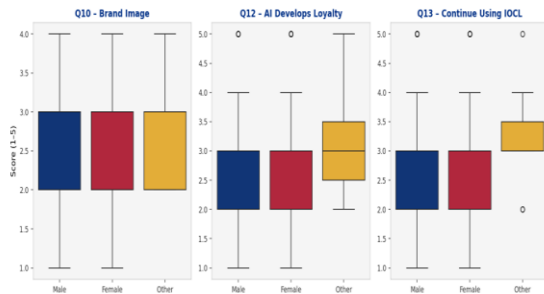


Figure 11: Box Plots of Key Variables by Gender

Figure 12: Mean Scores Across Age Groups for Key Variables

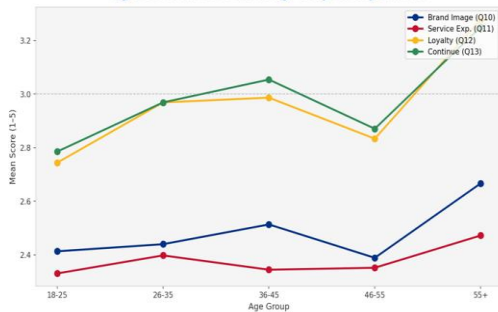


Figure 12: Mean Scores Across Age Groups for Key Variable

Table 9: Summary of Hypothesis Testing Results

H#	Description	IV	Key Statistic	Result
H1	CP of AI-enabled services → Customer Retention	Customer Perception	$\beta=0.698, R^2=0.488, p<.001$	SUPPORTED ✓
H2	CP of AI-enabled services → Brand Image	Customer Perception	$\beta=0.609, R^2=0.371, p<.001$	SUPPORTED ✓
H3	Brand Image → Customer Retention	Brand Image	$\beta=0.596, R^2=0.355, p<.001$	SUPPORTED ✓
H4	Brand Image mediates CP → Customer Retention	Customer Perception	Indirect=0.386, $c'=0.568, p<.001$	SUPPORTED (Partial Mediation)

Theoretical Implications

This study extends the Technology Acceptance Model to the petroleum retail service context, confirming that perceived usefulness and ease of use (operationalised as AI-driven trust, transparency, and comfort) are significant antecedents of both brand image and retention. The partial mediation of brand image supports an enriched S-O-R framework whereby AI stimuli activate both direct attitudinal responses (loyalty intentions) and indirect cognitive responses (brand perception enhancement) that jointly determine retention behaviour.

DISCUSSION

Interpretation of Findings

The findings of this study collectively paint a coherent and theoretically consistent picture of how AI-enabled services at IOCL petrol pumps shape customer perceptions, brand evaluations, and retention behaviour. The strong reliability of the measurement instrument ( $\alpha = 0.932$ ) validates the coherent measurement of AI perception as a multidimensional but internally consistent construct – a significant improvement that reflects the quality of the revised survey instrument and probability sampling methodology employed. The regression results ( $R^2 = 0.497$ ) indicate that nearly half the variance in customer retention intention is explained by AI perception variables, brand image, and service experience. This is a large effect size in the context of consumer behaviour research, comparable to findings reported in e-commerce and banking AI studies (Prentice et al., 2020; Chatterjee et al., 2021). The dominance of AI-driven loyalty ( $\beta = 0.411$ ) as the strongest predictor confirms that beyond transactional efficiency, the relational dimension of AI – its capacity to build customer loyalty through consistent, personalised, and trustworthy interactions – is the primary driver of retention.

Hypothesis Validation Summary

The finding that brand image mediates 51.9% of the total AI perception effect on retention contributes to the brand equity literature by establishing empirically that AI-enabled service encounters serve as both direct retention drivers and brand equity builders in the petroleum retail context. This extends Keller's (1993) brand image conceptualisation to the AI service domain

Managerial Implications

For IOCL management and petroleum retail strategists, the findings carry several actionable implications:

Prioritise AI loyalty enablers: Given that AI-driven loyalty development (Q12) is the strongest predictor

of retention, investments in AI-powered loyalty programmes, personalised reward systems, and predictive offers will yield the highest ROI.

Leverage brand image as a strategic amplifier: Since brand image partially mediates AI perception effects, IOCL should communicate AI technology adoption through coordinated brand messaging to convert operational AI efficiency into brand equity.

Optimise the comfort-retention pathway: Comfort with AI ( $Q9$ ,  $\beta = 0.116$ ) emerged as a significant direct predictor, suggesting that user education and interface simplification are critical for maximising AI adoption and subsequent retention benefits.

Digital payment and smart dispensing as anchor experiences: These services were rated most useful, indicating that operational AI should be deployed at the highest-frequency touchpoints to maximise perception and retention impacts

Conclusion and Future Scope

## CONCLUSION

This study provides robust empirical evidence that AI-enabled service perception significantly influences customer retention and brand image at IOCL petrol pumps. Using a probability sample of 550 customers, highly reliable measurement scales ( $\alpha = 0.932$ ), and a multi-method analytical approach, the research establishes that: (1) AI perception explains 49.7% of the variance in customer retention intention; (2) AI perception significantly enhances brand image ( $R^2 = 0.371$ ); (3) brand image partially mediates the AI perception  $\rightarrow$  retention relationship (indirect effect = 0.386, 51.9% mediation); and (4) AI-driven loyalty development is the single strongest predictor of customer retention ( $\beta = 0.411$ ,  $p < 0.001$ ). These findings have important implications for both marketing theory and petroleum retail practice. They confirm that AI-enabled service technologies are not merely operational efficiency tools but are powerful instruments of brand equity

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creation and customer relationship management. The IOCL case demonstrates that even in a commodity service sector characterised by low perceived differentiation, AI-enabled service experiences can create meaningful competitive advantages through enhanced customer perception, trust, and loyalty.

## LIMITATIONS

Several limitations should be acknowledged. First, the cross-sectional design precludes causal inference; longitudinal studies would strengthen causal claims. Second, the convenience of geographic sampling (IOCL pumps in specific regions) may limit national generalisability. Third, single-item measures for brand image and service experience are less robust than multi-item scales; future research should adopt multi-item measures with confirmatory factor analysis. Fourth, social desirability bias in self-reported Likert responses may have inflated positive perceptions.

## FUTURE RESEARCH DIRECTIONS

Future research may consider:

Longitudinal designs to track how AI perception evolves over time and its cumulative effects on brand equity.

Comparative studies across petroleum retailers (HPCL, BPCL, private sector) to assess competitive differentiation through AI.

Qualitative investigations to uncover the mechanisms through which AI experiences generate brand associations.

Extending the framework to include privacy concerns and data trust as moderators of the AI perception  $\rightarrow$  retention relationship.

Structural Equation Modelling (SEM) to simultaneously test the full mediation model with proper fit indices

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