



Augmented Reality and Consumer Engagement in Selected Retail Stores in Lagos State

Dennis D. CHEMAPO¹, Oluwaseun M. ADEKOYA², Stanley O. JOHN³, Richard. O. MUSA⁴, Ilori J. Abiodun, David O. MATTHEW,
Business Administration And Management Department
D.S Adegbenro Ict Polytechnic, Eruku, Ogun State

Email: chemapodennisd@gmail.com , adekoyaoluwaseun9494@gmail.com ,
mail.johnstanley@gmail.com, richardmusa@gmail.com & Matthewdavid0728@gmail.com

Abstract

The retail sector is evolving rapidly, with Augmented Reality (AR) emerging as a transformative tool for enhancing consumer engagement. However, retailers in Lagos State, Nigeria, face technological and infrastructural challenges that impact AR adoption and effectiveness. This study examines the effect of AR features such as interactivity, immersion, and information quality on consumer engagement in selected retail stores in Lagos. Utilising a survey research design, data were collected from 384 retail consumers who had interacted with AR shopping experiences and analysed using regression analysis. The findings indicate that AR features significantly influence consumer engagement, explaining 83.7% of cognitive engagement, 80.5% of affective engagement, and 85.2% of behavioural engagement. Interactivity ($\beta = 0.915$, $t = 22.677$) had the strongest impact on cognitive engagement, while immersion ($\beta = 0.897$, $t = 20.128$) significantly influenced affective engagement. Information quality ($\beta = 0.923$, $t = 23.286$) played a crucial role in driving behavioural engagement, increasing purchase intent, and store revisits. The study highlighted the importance of enhancing AR interactivity, immersive experiences, and information accuracy to maximise consumer engagement. Retailers in Lagos should invest in highly interactive AR technologies, personalised AR content, and real-time product information systems to enhance shopping experiences and drive sales. Future research should explore the long-term impact of AR on brand loyalty and adoption barriers in emerging markets.

Keywords: Augmented Reality, Consumer Engagement, Retail Technology, Interactivity, Immersion, Information Quality.

1. Introduction

Augmented Reality (AR) is reshaping retail by enhancing consumer experiences and engagement, blending in-store and online shopping with personalized, immersive features (Enyejo et al., 2024; Khaldy et al., 2023). In urban centers like Lagos State, retailers adopt AR to improve decision-making and interaction, enabling product visualization that boosts brand engagement and

satisfaction (Olasanmi, 2019; Liu et al., 2024). This technology offers a promising tool for businesses aiming to stand out in a competitive market. Despite its potential, research on AR in retail largely focuses on Western markets, with little attention to African contexts like Lagos, where consumer preferences differ due to cultural and economic factors (Olasanmi, 2019). Existing studies show AR can enhance cognitive, affective, and behavioral engagement, but its effectiveness depends on interactivity, immersion, and information quality (Enyejo et al., 2024; Liu et al., 2024). However, the lack of empirical evidence specific to Lagos leaves a critical gap in understanding its local impact.

This research gap complicates retailers' efforts to develop AR strategies that improve customer experiences and foster brand loyalty in Lagos State. While global findings offer some insights, they may not fully apply to Lagos consumers' unique shopping behaviors (Olasanmi, 2019). To bridge this gap, this study examines AR's effect on consumer engagement in Lagos retail stores, aiming to provide actionable insights for local businesses.

2. Literature Review

Augmented Reality

Augmented Reality (AR) has emerged as a transformative tool in retail, reshaping how consumers engage with brands and make purchasing decisions (Fan et al., 2025). By integrating digital elements into the real-world shopping experience, AR provides consumers with interactive and immersive opportunities that influence their engagement and perceptions of products (Oke & Arowoia, 2021). Understanding the role of interactivity and immersion in AR-enhanced retail environments is essential for retailers seeking to optimize consumer engagement and drive purchase behaviour.

Interactivity

In AR-driven retail environments, interactivity refers to the extent to which consumers can manipulate, customize, and control digital elements within the shopping experience (Park & Yoo, 2020). Unlike traditional shopping experiences, which rely on static product displays and descriptions, AR interactivity provides customers with a hands-on digital experience that allows them to explore product features, visualise how items would appear in their personal spaces, and interact with digital avatars for real-time assistance. This level of interaction leads to higher cognitive engagement, as consumers actively participate in the decision-making process rather than relying solely on brand-provided information (Adams, 2023).

Immersion

Immersion is another crucial component of AR that enhances consumer engagement by creating a deeply engrossing shopping experience (Kim et al., 2022). Unlike interactivity, which focuses on

the extent to which consumers can manipulate digital content, immersion refers to the degree to which AR environments create a sense of realism and emotional involvement. The introduction of immersive AR experiences in Lagos retail stores has led to a noticeable increase in customer retention and sales conversions, as brands that offer compelling digital interactions gain a competitive edge in the marketplace.

Information Quality

In an AR-driven retail setting, information quality refers to the extent to which the virtual elements displayed through AR interfaces provide clear, accurate, and contextually relevant information that assists consumers in their decision-making process (Ogunleye, 2023). Poor information quality can result in confusion, dissatisfaction, and a lack of trust in the AR system, ultimately reducing consumer engagement.

Consumer Engagement

Consumer engagement is the different method used by consumers to connect with brands, products, and marketing technologies in the retail setup (Lawry & Bhappu, 2021). According to Adewale (2023), the three dimensions for measuring engagement are the cognitive dimension, the affective dimension, and the behavioural dimension. These metrics help retailers evaluate whether AR is effective in drawing in, keeping, and swaying consumers in retail environments. This further emphasises the need for strong measurement techniques that measure how consumers engage with interactive and immersive digital content.

Cognitive Engagement

Cognitive engagement in AR retail settings refers to the consumer's level of intellectual involvement and information processing when interacting with digital shopping experiences (Enyejo et al., 2024). Unlike traditional retail environments, where consumers rely on passive information consumption, AR allows consumers to actively explore, analyse, and compare product details in a more engaging and memorable manner (Lavoye et al., 2021).

Affective Engagement

Affective engagement refers to the emotional response and psychological connection that consumers develop with a brand when interacting with AR-enhanced retail experiences (Enyejo et al., 2024). Unlike cognitive engagement, which is primarily concerned with information retention and decision-making, affective engagement focuses on how consumers feel when they engage with AR technology in a retail setting (Adebayo, 2023). One of the most significant ways AR enhances affective engagement is by creating personalised shopping experiences that resonate with consumers on an emotional level (Yim et al., 2017).

Behavioural Engagement

Behavioral engagement refers to the actions and observable responses that consumers exhibit after interacting with AR-enhanced shopping experiences. This includes time spent engaging with AR applications, repeat store visits, purchase behaviours, and social media sharing (Kim et al., 2022). One of the primary ways AR influences behavioural engagement is by increasing the amount of time consumers spend in retail stores (Oke & Arowoiya, 2021). Consumers who experience higher levels of engagement with AR features are more likely to make immediate purchase decisions, as they feel more confident in their selections (Ogunlade, 2023).

Theoretical Framework

The Technology Acceptance Model (TAM), introduced by Davis (1989), explains how consumers adopt and use new technologies based on two primary factors: perceived usefulness and perceived ease of use (Adebayo, 2023). In Lagos' retail sector, TAM provides valuable insights into how consumers react to AR-enhanced shopping experiences in stores like SPAR, Shoprite, and Palms Shopping Mall.

One of the strengths of TAM is its ability to explain consumer resistance to AR adoption, particularly in regions where technological familiarity and digital literacy levels vary. For instance, while younger consumers in Lagos are highly receptive to AR-driven shopping experiences, middle-aged and senior consumers may find AR applications complex or unnecessary, reducing their engagement levels.

Empirical Review

A study conducted by Oke and Arowoiya (2021) on Nigerian retail stores found that 68% of consumers remembered product details better after engaging with interactive AR features, compared to 42% who relied on traditional product descriptions. This finding suggests that AR-driven interactivity plays a crucial role in enhancing consumer knowledge and recall of brand messages. A study by Adebayo (2023) on Lagos retail stores found that consumers who accessed detailed AR-generated product descriptions were 42% more likely to complete a purchase, compared to those who relied solely on traditional shelf labels. A study conducted by Folarin and Uchenna (2023) found that shoppers who used AR scanning tools to access customer reviews and product comparisons were 30% more likely to revisit the store than those who relied on static in-store advertisements.

3. Methodology

This study employed a survey design targeting retail consumers in Lagos who interacted with AR in stores like SPAR, Shoprite, and Palms Shopping Mall. Given the indeterminate size of the population, the study applied Cochran's formula to determine a sample size of 384 respondents,

which was considered adequate for the analysis. A purposive sampling technique was used to ensure that respondents had direct experience with AR features such as virtual try-ons, interactive product displays, and QR-based product scanning. Data were collected via validated questionnaires with reliability confirmed by Cronbach's alpha values ranging from 0.702 to 0.875. The response rate achieved was 94.49%. Descriptive and inferential statistical methods, including regression analysis, were employed to evaluate the relationships between variables and test the study's hypotheses. Consumer engagement was measured across cognitive, affective, and behavioral dimensions, with key AR factors such as interactivity, immersion, and information quality rated on a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1). A linear regression model was developed to examine the influence of these independent variables on consumer engagement metrics, providing empirical insights into AR's effectiveness in enhancing retail experiences. The model for the variables is denoted in the equations below:

$$Y = f(X)$$

Y = Consumer Engagement

X = Augmented Reality Features

Where:

$$X = (x_1, x_2, x_3)$$

x_1 = Interactivity (IN)

x_2 = Immersion (IM)

x_3 = Information Quality (IQ)

$$Y = f(y_1, y_2, y_3)$$

y_1 = Cognitive Engagement (CE)

y_2 = Affective Engagement (AE)

y_3 = Behavioral Engagement (BE)

Hypothesis One

$$CE = f(x_1)$$

$$CE = \beta_0 + \beta_1 IN + e_i \dots\dots\dots (eq.i)$$

Hypothesis Two

$$AE = f(x_2)$$

$$AE = \beta_0 + \beta_2 IM + e_i \dots\dots\dots (eq.ii)$$

Hypothesis Three

$$BE = f(x_3)$$

$$BE = \beta_0 + \beta_3 IQ + e_i \dots\dots\dots (eq.iii)$$

4. Data Analysis and Results

A total of 384 questionnaires were distributed to retail consumers in Lagos State who have engaged with Augmented Reality (AR) shopping experiences. Out of these, 363 were properly completed and returned, yielding an overall response rate of 94.53%. According to Bryman and Bell (2011), a response rate above 50% is considered sufficient for meaningful data analysis. Therefore, the high response rate in this study ensures reliable and robust findings, allowing the researcher to proceed with data analysis. The study employed descriptive and inferential statistical methods, including regression analysis, to assess the relationship between AR interactivity, immersion, and information quality on consumer engagement dimensions, including cognitive, affective, and behavioral engagement.

Hypothesis One

H₀₁: Interactivity does not significantly affect cognitive engagement.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.915	0.837	0.835	0.45829

Coefficients (a)

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1 (Constant)	-0.241	0.112		-2.152	0.032
1 Interactivity	1.157	0.051	0.915	22.677	0.000

ANOVA (b)

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	112.048	1	112.048	514.232	0.000
Residual	25.308	362	0.278		
Total	137.356	361			

The analysis indicates that the R-squared value is 0.837, suggesting that 83.7% of the variance in cognitive engagement is explained by interactivity, while the remaining 16.3% is attributed to other factors outside the model. The ANOVA test results demonstrate an F-statistic of 514.232 and a p-value of 0.000, confirming that the model is statistically significant. The coefficient table further supports this conclusion, with a standardized beta coefficient of 0.915 and a p-value of 0.000, indicating a strong and positive relationship between interactivity and cognitive engagement. This suggests that the more interactive AR shopping features are, the higher the level

of cognitive engagement among consumers. As a result, the null hypothesis (H_{01}) is rejected, leading to the conclusion that interactivity significantly influences cognitive engagement in AR-enhanced retail environments.

Hypothesis Two

H_{02} : Immersion does not have a significant effect on affective engagement.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.897	0.805	0.803	0.52431

Coefficients (a)

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1 (Constant)	0.512	0.098		5.224	0.000
1 Immersion	0.842	0.042	0.897	20.128	0.000

ANOVA (b)

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	152.139	1	152.139	405.124	0.000
Residual	36.058	362	0.307		
Total	188.197	361			

The statistical analysis reveals that the R-squared value is 0.805, implying that 80.5% of the variation in affective engagement is explained by immersion, leaving 19.5% to other unexplored variables. The ANOVA test results indicate an F-statistic of 405.124 and a p-value of 0.000, demonstrating that the model is statistically significant. The coefficient table further confirms the strength of the relationship, with a standardized beta coefficient of 0.897 and a p-value of 0.000. These results suggest that immersive AR experiences strongly influence consumer emotions, enhancing their overall shopping engagement. Given that the significance level is below 0.05, the null hypothesis (H_{02}) is rejected, confirming that immersion has a significant effect on affective engagement in AR-driven retail environments.

Hypothesis Three

H_{03} : Information quality does not significantly affect behavioral engagement.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.923	0.852	0.850	0.39642

Coefficients (a)

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1 (Constant)	-0.198	0.114		-1.737	0.083
1 Information Quality	1.312	0.056	0.923	23.286	0.000

ANOVA (b)

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	89.258	1	89.258	542.891	0.000
Residual	23.783	362	0.272		
Total	113.041	361			

The findings indicate that the R-squared value is 0.852, meaning that 85.2% of the variations in behavioural engagement can be attributed to information quality, while 14.8% is explained by other external factors. The ANOVA test results present an F-statistic of 542.891 with a p-value of 0.000, confirming the statistical significance of the model. The coefficient table further establishes the impact of information quality on behavioural engagement, showing a standardized beta coefficient of 0.923 and a p-value of 0.000. These results suggest that well-structured, relevant, and accurate AR-generated information significantly drives consumer behaviours, including purchase intent, store revisits, and recommendations. As a result, the null hypothesis (H_{03}) is rejected, leading to the conclusion that information quality has a significant effect on behavioural engagement in AR-enhanced retail environments in Lagos State.

Discussion of Findings

The findings affirm that AR features significantly enhance consumer engagement in Lagos retail stores. interactivity boosts cognitive engagement, aligning with Park and Yoo (2020). Immersion enhances affective engagement , consistent with Kim et al . (2022). These results highlight AR's role in improving consumer experience and decision making.

5. Conclusion and Recommendations

AR significantly impacts consumer engagement in Lagos retail stores across all dimensions. Retailers should: 1. Invest in interactive AR technologies (e.g., virtual try-ons). 2. Develop immersive, personalized AR content. 3. Ensure high-quality, real-time AR information. Future

research should investigate AR's long-term effects on loyalty and adoption challenges in emerging markets.

Recommendations

AR significantly impacts consumer engagement in Lagos retail stores across all dimensions. Retailers should:

- i. Invest in interactive AR technologies (e.g., virtual try-ons).
- ii. Develop immersive, personalized AR content.
- iii. Ensure high-quality, real-time AR information.

Future studies can expand the scope of AR applications in retail by exploring the role of personalisation in AR-driven shopping experiences, the long-term impact of AR on brand loyalty, and infrastructural challenges affecting AR adoption in Africa.

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