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AUGMENTED REALITY AND CUSTOMER EXPERIENCE IN ONLINE SHOPPING IN NIGERIA

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ABSTRACT

Augmented Reality (AR) is transforming the online shopping experience by bridging the gap between digital and physical retail. This study explores the impact of AR on customer experience in online shopping, focusing on key factors such as customer engagement, purchase confidence, and overall satisfaction. The study revealed how AR enhances customer interactions, reduces uncertainty in decision-making, and fosters a more immersive and personalized shopping experience. The researchers collected data from 478 online shoppers across Nigeria, using both online and offline methods via a questionnaire designed in Likert 5 – point scale. Three null hypotheses were tested using Regression Analysis to ascertain the impacts of impact of AR on customer engagement, purchase confidence, and overall satisfaction. Findings suggest that AR significantly improves customer engagement by making online shopping more interactive and enjoyable. AR applications allow customers to visualize products in real-world settings, leading to higher purchase confidence and lower return rates. Furthermore, AR enhances customer satisfaction by providing a seamless and informed shopping journey, reducing post-purchase regret. Thus, as AR technology continues to evolve, its integration into e-commerce platforms can further enhance customer experience and drive business growth. The study therefore concludes that AR is not merely an enhancement but a necessity for competitive advantage in digital retail, fostering greater consumer engagement, confidence, and satisfaction. To maximize the benefits of augmented reality in online shopping in Nigeria, practical recommendations are proposed which could ultimately drive growth and innovation in the e-commerce sector. Future research should explore long-term behavioral changes in consumers using AR shopping experiences, as well as the economic implications for online retailers.

Keywords**:** ***Augmented Reality, Online Shopping, Customer Experience, Purchase Confidence, Customer Engagement, Customer Satisfaction, E-commerce.***

BACKGROUND TO THE STUDY

The rapid advancement of technology has transformed the global retail landscape, with e-commerce becoming an integral part of modern shopping experiences. One of the most innovative technologies reshaping online shopping is augmented reality (AR), which allows customers to interact with digital representations of products in real-world environments. AR technology enhances consumer engagement, reduces uncertainty in online purchases, and fosters a more immersive shopping experience (Javornik, 2016). While AR adoption has seen significant growth in developed markets, its impact on online shopping in emerging economies such as Nigeria remains an area of growing interest.

Nigeria has one of the largest e-commerce markets in Africa, driven by an increasing internet penetration rate and a tech-savvy youth population (Statista, 2023). However, one of the major challenges facing online retailers in Nigeria is the reluctance of consumers to make purchases due to concerns about product authenticity, quality, and fit (Ndukwe et al., 2021). AR technology has the potential to address these concerns by allowing consumers to visualize products before purchasing, thereby bridging the gap between online and offline shopping experiences. For example, AR-enabled virtual try-on solutions for fashion and beauty products enable shoppers to

see how items look on them, reducing the likelihood of returns and increasing purchase confidence (Poushneh & Vasquez-Parraga, 2017).
The integration of AR in online shopping also plays a role in enhancing brand engagement and customer satisfaction. Studies have shown that interactive and immersive shopping experiences lead to higher customer retention and increased brand loyalty (Hilken et al., 2017). In the Nigerian e-commerce sector, where competition among online retailers such as Jumia, Konga, and PayPorte is intense, the adoption of AR can serve as a key differentiator that enhances customer experience. Additionally, AR applications in online shopping align with the growing trend of mobile commerce in Nigeria, as many consumers rely on smartphones for their digital shopping activities (Olanrewaju et al., 2022).

A review of existing literature reveals a scarcity of studies examining the role of AR in shaping customer experiences in Nigeria's online retail sector. Most research on AR in e-commerce focuses on Western markets (Poushneh & Vasquez-Parraga, 2017), with limited empirical evidence on its adoption and effectiveness in Africa. This study seeks to fill this gap by investigating how AR influences the online shopping experience of Nigerian consumers, exploring its impact on customer engagement, customer satisfaction, and purchase confidence. By addressing this research gap, the study provides valuable insights for e-commerce businesses, policymakers, and technology developers aiming to enhance digital retail experiences in emerging economies.

CONCEPTUAL FRAMEWORK

As shown in the conceptual framework, augmented reality is the predictor variable and customer experience is the criterion variable. Augmented reality is used a one-dimensional variable whilst customer experience is measured in terms of customer engagement, purchase confidence, and customer satisfaction.

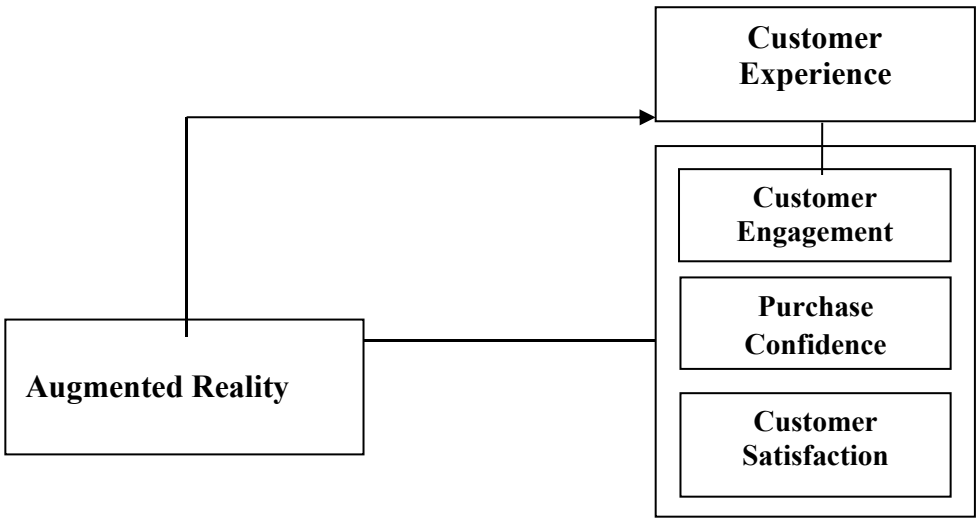

Figure 1: *Conceptual framework of the impact of augmented reality on customer experience in online shopping in Nigeria.*
Source: Adapted from Javornik (2016)

PURPOSE OF THE STUDY

The purpose of this study was to investigate the impact of augmented reality on customer experience in online shopping in Nigeria. Specifically, the objectives were to:

i. Explore the extent to which augmented reality impacts customer engagement in online shopping in Nigeria.
ii. Identify the extent to which augmented reality impacts purchase confidence in online shopping in Nigeria.

iii. Examine the extent to which augmented reality impacts customer satisfaction in online shopping in Nigeria.

RESEARCH QUESTIONS

Three research questions were answered by testing three null research hypotheses. The research questions are:

i. To what extent does augmented reality impact customer engagement in online shopping in Nigeria?
ii. To what extent does augmented reality impact purchase confidence in online shopping in Nigeria?
iii. To what extent does augmented reality impact customer satisfaction in online shopping in Nigeria?

THEORETICAL FOUNDATION: Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a widely used framework for understanding the adoption and use of new technologies. Developed by Davis (1989), TAM posits that an individual's acceptance of technology is primarily influenced by two key factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). PU refers to the extent to which an individual believes that using a technology will enhance their performance, while PEOU represents the degree to which an individual perceives that using the technology will be free of effort. These two factors shape an individual's attitude toward technology adoption, which ultimately influences their behavioral intention and actual usage (Venkatesh & Davis, 2000).

In the context of augmented reality (AR) adoption in online shopping in Nigeria, TAM provides a strong theoretical foundation for understanding consumer behavior. Nigerian consumers often experience skepticism regarding product authenticity, quality, and fit when shopping online (Ndukwe et al., 2021). AR has the potential to mitigate these concerns by allowing consumers to visualize and interact with products before making a purchase, thereby enhancing their Perceived Usefulness. Furthermore, the ease with which users can navigate AR-enabled shopping platforms influences their Perceived Ease of Use, which in turn affects their willingness to adopt this technology (Poushneh & Vasquez-Parraga, 2017).

Additionally, TAM can be extended by incorporating external factors such as trust, perceived risk, and technological infrastructure, which are particularly relevant in the Nigerian e-commerce landscape. Poor internet connectivity and limited consumer awareness may act as barriers to AR adoption, necessitating further modifications to TAM for more context-specific insights (Olanrewaju et al., 2022). Given the increasing penetration of mobile commerce in Nigeria, applying TAM in this study helps explain the factors driving or inhibiting AR adoption, providing valuable insights for online retailers seeking to enhance customer experiences.

OVERVIEW OF NIGERIA'S E-COMMERCE MARKET

In 2020, the number of online shoppers in Nigeria was estimated at 76.7 million (Statista, 2024). As of 2023, Nigeria's e-commerce market has experienced significant growth, with an estimated 89% of internet users making purchases online (Truehost, 2024). As of January 2024, Nigeria had approximately 103 million internet users, representing an internet penetration rate of 45.5% (DataReportal, 2024). Given the growth in internet users, it's reasonable to infer that the number of online shoppers has also increased since then. This surge in online shopping is reflected in the customer bases of major e-commerce platforms such as Jumia, Konga, and PayPorte.

In 2019, Jumia reported partnerships with over 110,000 sellers, including local African companies and entrepreneurs, to serve its extensive customer base across multiple African countries (Jumia,

2019). While specific customer numbers for Nigeria are not disclosed, Jumia's significant presence in the Nigerian market suggests a substantial user base. Similarly, specific customer figures for PayPorte are not readily available in the public domain. However, as one of Nigeria's prominent online retailers, PayPorte continues to adapt to the dynamic e-commerce landscape to maintain and grow its customer base (Quartz Africa, 2017).

According to a 2023 report, Konga has a customer pool of approximately 750,000 online shoppers, with around 200,000 active customers. Notably, rural areas account for only 10% of its active customer base, likely due to challenges such as low internet penetration and inadequate electricity supply in these regions (AB Digital, 2023). Overall, Nigeria's e-commerce sector is poised for continued expansion, with projections indicating that the market will reach a value of $9 billion in 2023 and grow to $14.1 billion by 2027, encompassing a user base of 143.9 million (Oxford Business Group, 2024).

THE CONCEPT OF AUGMENTED REALITY

Augmented Reality (AR) is a transformative technology that overlays digital content onto the real world, enhancing user interaction and engagement. It has been widely adopted across various industries, including retail, healthcare, education, and entertainment (Azuma, 2019). AR differs from virtual reality (VR) by integrating virtual elements into the physical environment rather than creating a fully immersive digital space (Billinghurst et al., 2018).

One of the most significant applications of AR is in e-commerce, where it enhances the customer experience by providing interactive product visualizations. Studies indicate that AR enables consumers to make more informed purchasing decisions by allowing them to preview products in a real-world context (Poushneh & Vasquez-Parraga, 2017). For instance, AR-powered virtual try-ons in fashion retail or 3D product visualization in furniture shopping increase consumer confidence and reduce return rates (Javornik, 2016).

Moreover, AR fosters higher engagement levels, leading to increased purchase intentions. According to Heller et al. (2019), interactive AR features improve brand perception and customer satisfaction, as they provide a more immersive and personalized shopping experience. By bridging the gap between online and offline shopping, AR mitigates common e-commerce challenges such as uncertainty about product size, fit, and authenticity (Flavián et al., 2019).

Despite its advantages, AR adoption faces several challenges. The high cost of development and implementation limits small and medium-sized enterprises (SMEs) from integrating AR into their platforms (Dwivedi et al., 2020). Additionally, AR applications require high-speed internet and advanced mobile devices, which may not be accessible to all consumers, especially in developing regions (Rauschnabel et al., 2022). Furthermore, consumer awareness and technological familiarity affect AR adoption rates. Studies show that while younger demographics are more receptive to AR, older consumers may require additional education and usability enhancements to engage effectively with AR-powered applications (Speicher et al., 2019).

Augmented Reality is reshaping digital interaction, particularly in e-commerce, by improving customer engagement, enhancing decision-making, and reducing uncertainty. However, widespread adoption requires addressing technological barriers, cost concerns, and consumer awareness. As AR technology advances, its impact is expected to grow, leading to broader applications in both commercial and non-commercial sectors.

THE CONCEPT OF EXPERIENCE

Customer experience (CX) has emerged as a critical factor in shaping consumer behavior and business success in the digital age. Defined as a holistic perception of a customer's interactions with a brand across multiple touchpoints (Lemon & Verhoef, 2016), CX encompasses emotional, cognitive, and behavioral responses that influence customer satisfaction and loyalty. The significance of CX is rooted in its direct impact on customer retention, brand advocacy, and competitive advantage. Businesses that prioritize CX often benefit from increased customer loyalty and higher profitability (Homburg, Jozić, & Kuehnl, 2017). For instance, companies that invest in personalized experiences, seamless digital interactions, and responsive customer service tend to outperform competitors in customer retention (Verhoef et al., 2009).

Technology plays a crucial role in enhancing CX. The rise of artificial intelligence (AI), augmented reality (AR), and data analytics enables businesses to deliver hyper-personalized services that cater to individual preferences (Grewal, Roggeveen, & Nordfält, 2017). E-commerce platforms, for example, leverage machine learning algorithms to recommend products based on user behavior, thereby improving the shopping experience (Bolton et al., 2018). Similarly, AR applications in retail provide customers with immersive product interactions, reducing purchase uncertainty and increasing satisfaction (Hilken et al., 2017).

However, challenges such as data privacy concerns, inconsistent service quality, and the digital divide can hinder the effectiveness of CX strategies. Consumers are increasingly aware of data security risks and demand transparency in how their information is used (Smith, 2020). Additionally, businesses must ensure that CX remains consistent across both digital and physical channels to maintain trust and engagement (Lemon & Verhoef, 2016). CX is a multifaceted concept that significantly impacts business performance. Companies that invest in technology-driven, customer-centric approaches are better positioned to enhance satisfaction and foster long-term relationships. As digital transformation continues to evolve, CX will remain a key determinant of market success.

MEASURES OF EXPERIENCE

Several factors that demonstrate an enhanced customer experience due to augmented reality (AR) are identified in literature including increased customer engagement, and high purchase intention (Poushneh & Vasquez-Parraga, 2017), increased customer, engagement, increased purchase confidence, and enhanced satisfaction (Javornik, 2016), Personalization and Customization (Scholz & Duffy, 2018), enhanced emotional connection and brand loyalty (Rauschnabel et al., 2019), reduction in Cognitive Load (Yim et al., 2017), improved purchase confidence (Heller et al., 2019). However in this study, three marketing performance measures put forward by Javornik (2016) were examined.

Customer Engagement

Customer engagement is a key factor in the success of online shopping, as it determines how actively customers interact with a brand and its products. It goes beyond transactions, encompassing emotional and cognitive connections between consumers and businesses (Hollebeek et al., 2014). Highly engaged customers are more likely to develop brand loyalty, advocate for the brand, and make repeat purchases. In the digital era, businesses seek innovative ways to enhance customer engagement, and Augmented Reality (AR) has emerged as a powerful tool to achieve this.

Customer engagement in e-commerce is driven by interactivity, personalization, and immersive experiences. When customers find an online platform engaging, they spend more time exploring products, which increases the likelihood of making a purchase (Brodie et al., 2011). However,

traditional online shopping often lacks the interactive elements of physical retail, leading to lower engagement levels. Static product images and descriptions may not be sufficient to capture customer interest, making it challenging for brands to differentiate themselves.

AR enhances customer engagement by creating immersive and interactive shopping experiences. AR applications allow customers to virtually try on clothing, place furniture in their living spaces, or interact with 3D models of products before making a purchase (Javornik, 2016). These features create a more engaging experience, as customers can actively explore and interact with products rather than passively viewing images.

Furthermore, AR fosters emotional connections by making the shopping experience more enjoyable and memorable. Studies show that immersive technologies increase customer involvement, brand attachment, and time spent on e-commerce platforms, all of which contribute to higher engagement levels (Poushneh & Vasquez-Parraga, 2017). Personalized AR features, such as tailored recommendations based on user preferences, further enhance engagement by making the shopping journey unique to each customer.

Customer engagement is essential for building brand loyalty and driving sales in online shopping. AR significantly enhances engagement by providing interactive, immersive, and personalized experiences, making the shopping process more dynamic and enjoyable. As more businesses integrate AR into their platforms, customer engagement in e-commerce is expected to increase, ultimately leading to improved customer relationships and higher conversion rates.

Purchase Confidence

Purchase confidence refers to the level of certainty and trust customers have in their buying decisions. In online shopping, purchase confidence is influenced by factors such as product information, user reviews, brand reputation, and the ability to visualize the product before purchase (Kim & Forsythe, 2008). When consumers feel assured about the accuracy and quality of their chosen product, they are more likely to proceed with the transaction and have a positive post-purchase experience. However, in traditional online shopping, the lack of physical interaction with products often leads to hesitation, skepticism, and high return rates. Augmented Reality (AR) has emerged as a technological solution that enhances purchase confidence by providing realistic product visualization and interactive experiences.

In e-commerce, purchase confidence is closely linked to product accuracy, trust, and informed decision-making (Gao et al., 2021). Consumers often experience uncertainty regarding product size, color, texture, and overall quality when shopping online. Such uncertainties can lead to abandoned carts or post-purchase dissatisfaction. Businesses seek to enhance purchase confidence through high-quality images, customer reviews, and detailed product descriptions, but these methods may still fall short of replicating the in-store shopping experience.

AR technology bridges the gap between online and offline shopping by allowing consumers to interact with digital representations of products before making a purchase. For example, AR-powered virtual try-ons for fashion and cosmetics enable customers to see how items will look on them, reducing concerns about fit and style mismatches (Javornik, 2016). Similarly, AR applications in furniture and home decor shopping allow users to place virtual products in their real-life environments, ensuring compatibility with their space and preferences (Poushneh & Vasquez-Parraga, 2017).

By offering a more immersive and accurate representation of products, AR minimizes uncertainty and strengthens purchase confidence. Consumers who can visualize products in 3D and interact

with them before purchasing are less likely to experience post-purchase regret, leading to lower return rates and higher satisfaction levels.

Purchase confidence is a crucial factor influencing online shopping behavior. AR significantly enhances purchase confidence by improving product visualization, reducing uncertainty, and fostering trust in e-commerce platforms. As AR technology continues to evolve, its integration into online retail is expected to further enhance customer decision-making and reduce hesitation, leading to increased sales and brand loyalty.

Customer Satisfaction

Customer satisfaction is a crucial determinant of success in online shopping, as it influences repeat purchases, brand loyalty, and overall consumer trust. Satisfaction arises when customers perceive that their expectations align with the actual shopping experience (Kotler & Keller, 2016). However, challenges such as uncertainty about product quality, fit, and usability often lead to dissatisfaction in online shopping. Augmented Reality (AR) has emerged as a solution by offering immersive and interactive experiences that enhance customer satisfaction.

Customer satisfaction in e-commerce is influenced by factors such as ease of navigation, product accuracy, personalization, and post-purchase experience (Parasuraman et al., 1988). A major challenge in online shopping is the inability to physically inspect products before purchase, leading to skepticism and increased return rates. When customers receive products that do not meet their expectations, dissatisfaction arises. Ensuring that online platforms provide accurate product descriptions, high-quality images, and interactive features can help bridge the gap between expectation and reality, improving satisfaction levels.

AR enhances customer satisfaction by improving product visualization, personalization, and decision-making. AR applications allow customers to view products in 3D, try on fashion items virtually, or place furniture in their real-life space before making a purchase (Heller et al., 2019). This reduces uncertainty and helps customers make informed decisions, lowering dissatisfaction caused by mismatched expectations.

Moreover, AR creates a more interactive and enjoyable shopping experience, increasing engagement and emotional connection with brands. This immersive experience can lead to higher trust and lower return rates, ultimately improving customer satisfaction (Javornik, 2016). Retailers using AR also benefit from personalized shopping experiences, as AI-driven AR tools recommend products based on user preferences, leading to a tailored and seamless experience.

Customer satisfaction is a key factor in the success of online shopping, and AR significantly enhances it by improving product visualization, personalization, and engagement. As AR technology continues to evolve, its adoption in Nigerian e-commerce can further improve consumer trust, leading to sustained growth in online retail.

EMPIRICAL REVIEW

There is a plethora of empirical studies similar to the impact of augmented reality (AR) on customer experience in online shopping. Some of these studies are examined, highlighting the purpose, tools for analysis, findings and conclusion. Guo and Zhang (2023) investigated the impact of AR online shopping experience on customer purchase intention: an empirical study based on the TAM Model. The study aimed to explore how AR experiences in online shopping influence customer purchase intentions, utilizing the Technology Acceptance Model (TAM) to assess consumer acceptance of AR technology. Structural Equation Modeling (SEM) was employed to analyze data collected through surveys. The study found that AR shopping experiences positively affect perceived ease of use and perceived usefulness, which in turn enhance customer

purchase intentions. Therefore the study concluded that integrating AR into online shopping platforms can effectively boost customer purchase intentions by improving the perceived usability and utility of the shopping experience.

Similarly, Voicu et al. (2023) conducted a study entitled "consumers' experience and satisfaction using augmented reality apps in e-shopping: new empirical evidence". The study examined factors influencing consumer experience and satisfaction when using AR applications in online makeup shopping. Structural Equation Modeling (SEM) was used to analyze the data, which indicated that AR applications enhance consumer satisfaction by providing immersive and personalized shopping experiences. Hence it was concluded that, AR technology in e-shopping, particularly for makeup products, significantly improves customer satisfaction and experience.

Furthermore, Poushneh and Vasquez-Parraga (2017) investigated the discernible impact of augmented reality on retail customer's experience, satisfaction, and willingness to buy. The research aimed to assess how AR influences retail customers' experiences, satisfaction levels, and their willingness to make purchases. Quantitative analysis through surveys was conducted to ascertain the impact of augmented reality on the criterion variables. The study found that AR applications enhance customer experiences by providing interactive and engaging product information, leading to increased satisfaction and purchase intentions. In view of the findings, the study concluded that implementing AR in retail settings can positively impact customer satisfaction and encourage purchasing behavior.

More also, Xu et al. (2022) carried out a study on "AR shopping: in-store shopping decision support through augmented reality and immersive visualization". The study aimed to develop and evaluate an AR-based prototype to assist in-store shopping decisions by providing immersive product information. Prototype development and user interviews were conducted. Findings indicated that the AR prototype effectively communicated detailed product information, aiding consumers in making informed purchasing decisions and enhancing the shopping experience. The study concluded that AR technologies can serve as valuable tools in physical retail environments, improving customer decision-making and satisfaction.

Additionally, Sanaei (2024) investigated "how customers' satisfaction changes with the use of AR shopping application: a conceptual model". The paper proposed a conceptual model to understand how different levels of experiential AR application features affect customer experience, satisfaction, and purchase behavior. A conceptual modeling was done and the model suggests that immersive AR features positively influence customer experience, leading to higher satisfaction and increased likelihood of purchase. The study therefore concluded that enhancing AR application features can improve customer satisfaction and encourage purchasing behavior in online shopping contexts.

These studies highlight the essential role that augmented reality plays in enhancing customer experience in the online shopping environment. However, the following hypotheses were tested to answer the research questions and achieve the objectives, and purpose of the study.

- H_{01}: Augmented reality does not significantly impact customer engagement in online shopping in Nigeria.
- H_{02}: Augmented reality does not significantly impact purchase confidence in online shopping in Nigeria.
- H_{03}: Augmented reality does not significantly impact customer satisfaction in online shopping in Nigeria.

METHODOLOGY

The methodology of this study is rooted in the positivist research paradigm which relies on deductive logic, formulation and testing of hypotheses, offering operational definitions and mathematical equations, calculations, extrapolations and expressions to derive conclusions. Thus, cross-sectional survey of causal research deign particularly explanatory design was employed by the researchers to establish the impact of augmented reality on customer experience in online shopping in Nigeria. The population of the study comprised customers on online shops in Nigeria. While the specific number of online shoppers in Nigeria is not disclosed, it is estimated that, millions of people buy products through the various online shops.
However, data were collected from 478 online shoppers using both online and offline methods. Semi-structured questionnaire consisting of 20 items was the instrument used in collecting the data. The instrument was designed in Likert 5–point scale of very high extent to very low extent, i.e. very high extent = 5; high extent = 4; moderate extent = 3; low extent = 2; very low extent = 1. Using the online data collection method, the questionnaire was prepare in Google Form and administered to respondents who filled and submitted the Google Form via the Internet. In the offline method, the respondents were given questionnaire personally by the researchers, and all the responses were collated and analyzed.

Cronbach's (1951) alpha reliability test was conducted to determine the reliability of the study instrument. The test was to find out whether a comparable result could be realized if this study was carried out again in a similar condition. A threshold of 0.70 established by Nunally (1978) was adopted in determining the reliability of the research instrument. More so, Exploratory Factor Analysis (EFA) was conducted to ascertain whether variables in the study had discriminant validity. The results are shown in the factor loadings which were not less than 0.4 to indicate that the constructs had discriminant validity. Table 1 shows results of the Cronbach's alpha reliability and Exploratory Factor Analysis (EFA) results. Furthermore, Simple Linear Regression Analysis was used to test the three null hypotheses stated in the study with a critical value of 0.05. All the analyses were done with the aid of the Statistical Package for Social Sciences (SPSS) version 22.

Table 1: Results of Reliability and Validity Tests

S/N	Variables	Number of Items	Cronbach's Alpha Coefficients	Factor Loadings
1	Augmented Reality	5	0.723	0.624
2	Customer Engagement	5	0.706	0.725
3	Purchase Confidence	5	0.798	0.843
4	Customer Satisfaction	5	0.801	0.750

Source: SPSS output form field data

Table 1 shows that, Cronbach's (1951) alpha reliability test was conducted and the results showed that all the variables in the study produced excellent and very high Cronbach's alpha coefficients. This means that, if this study is carried out again under a similar condition the results will be comparable to the results of this study. More so, Exploratory Factor Analysis (EFA) was conducted and the results revealed that all questionnaire items relating to augmented reality loaded heavily on the variable, and customer engagement, purchase confidence, and customer satisfaction, loaded heavily on customer experience. These loadings (no factor loading is less than 0.4) indicate that the constructs have discriminant validity.

TEST OF RESEARCH HYPOTHESES

Testing Hypothesis One: Augmented reality does not significantly impact customer engagement in online shopping in Nigeria.

Table 2: Model Summary[b] Showing the Impact of Augmented Reality on Customer Engagement in Online Shopping in Nigeria

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.716[a]	.512	.511	2.041

a. Predictors (Constant), Augmented reality
Source: SPSS output from field data

A simple regression analysis was run to determine the impact of augmented reality on customer engagement in online shopping in Nigeria. As shown in Table 2, augmented reality has a strong and positive impact on customer engagement. This is evident in the regression coefficient (R) of 0.716. Furthermore, the coefficients of determination (R Square & R Square Adjusted) are 0.512 and 0.511 respectively. This means that 51% of the changes in the criterion variable (customer engagement) are attributable to the impact of the predictor variable (augmented reality), whilst the remaining 49% changes are due to the impact of stochastic variables.

Table 3: ANOVA[a] Showing the Impact of Augmented Reality on Customer Engagement in Online Shopping in Nigeria

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2082.741	1	2082.741	499.832	.000[b]
	Residual	1983.435	476	4.167		
	Total	4066.176	477			

a. Dependent Variable: Customer engagement
b. Predictors (Constant), Augmented reality
Source: SPSS output from field data

As shown in Table 3, augmented reality statistically, significantly predicts customer engagement in online shopping in Nigeria. This is indicated by the probability value of 0.000, which is less than the decision threshold of 0.05. Statistically, augmented reality significantly predicts customer engagement at $F(1, 476) = 499.832$, $p = 0.000 < 0.05$, $R^2 = 0.512$; R^2 Adjusted = 0.511. The results also showed that the regression model is a good fit for the data.

Table 4: Coefficients[a] Showing the Impact of Augmented Reality on Customer Engagement in Online Shopping in Nigeria

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	8.750	.454		19.258	.000
	Augmented reality	.544	.024	.716	22.357	.000

a. Dependent Variable: Customer engagement
Source: SPSS output from field data

As shown in the regression model in Table 4, the unstandardized coefficients indicate how much the dependent variable – customer engagement varies with the independent variable – augmented reality. As shown in the Table, before the introduction of the predictor variable, customer engagement stood at 8.750, but at the introduction of the predictor variable, there is an additional unit. Specifically, as shown in the Table, the intercept B_0 is 8.750, which is the predicted

value of customer engagement without the contributions of the predictor variable. That is, when augmented reality is equal to zero, customer engagement is 8.750. However, the slope B_1 is 0.544, indicating that 1 unit increase in augmented reality will bring about 0.544 unit increase in customer engagement.

In view of the results of the analysis, the researchers rejected the hypothesis which states that; augmented reality does not significantly impact customer engagement in online shopping in Nigeria. Thus, the alternate hypothesis which was not stated explicitly was accepted.

Test of Hypothesis Two: Augmented reality does not significantly impact purchase confidence in online shopping in Nigeria.

Table 5: Model Summary[b] Showing the Impact of Augmented Reality on Purchase Confidence in Online Shopping in Nigeria

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.860[a]	.740	.740	5.527

a. Predictors (Constant), Augmented reality

Source: SPSS output from field data

A simple regression analysis was run to determine the impact of augmented reality on purchase confidence in online shopping in Nigeria. As shown in Table 5, augmented reality has a very strong, positive impact on purchase confidence. This is evident in the regression coefficient (R) of 0.860. Furthermore, the coefficients of determination (R Square & R Square Adjusted) are 0.740 and 0.740 respectively. This means that 74% of the changes in the criterion variable (purchase confidence) are attributable to the impact of the predictor variable (augmented reality), whilst the remaining 26% changes are due to the impact of stochastic variables.

Table 6: ANOVA[a] Showing the Impact of Augmented Reality on Purchase Confidence in Online Shopping in Nigeria

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41438.389	1	41438.389	1356.757	.000[b]
	Residual	14538.107	476	30.542		
	Total	55976.496	477			

a. Dependent Variable: Purchase confidence

b. Predictors (Constant), Augmented reality

Source: SPSS output from field data

As shown in Table 6, augmented reality statistically, significantly predicts purchase confidence in online shopping in Nigeria. This is indicated by the probability value of 0.000, which is less than the decision threshold of 0.05. Statistically, augmented reality significantly predicts purchase confidence at $F(1, 476)$, R = 1356.757, $p = 0.000 < 0.05$, $R^2 = 0.740$; R^2 Adjusted = 0.740. The results also showed that the regression model is a good fit for the data.

Table 7: Coefficients[a] Showing the Impact of Augmented Reality on Purchase Confidence in Online Shopping in Nigeria

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	21.452	1.230		17.440	.000

Augmented reality	2.427	.066	.860	36.834	.000

a. Dependent Variable: Purchase confidence
Source: SPSS output from field data

As shown in the regression model in Table 7, the unstandardized coefficients indicate how much the dependent variable – purchase confidence varies with the independent variable – augmented reality. As shown in the Table, before the introduction of the predictor variable, purchase confidence stood at 21.452, but at the introduction of the predictor variable, there is an additional unit. Specifically, as shown in the Table, the intercept B_0 is 21.452, which is the predicted value of purchase confidence without the contributions of the predictor variable. That is, when augmented reality is equal to zero, purchase confidence is 21.452. However, the slope B_1 is 2.427, indicating that 1 unit increase in augmented reality will bring about 2.427 unit increase in purchase confidence.

In view of the results of the analysis, the researchers rejected the hypothesis which states that; augmented reality does not significantly impact purchase confidence in online shopping in Nigeria. Thus, the alternate hypothesis which was not stated explicitly was accepted.

Test of Hypothesis Three: Augmented reality does not significantly impact customer satisfaction in online shopping in Nigeria.

Table 8: Model Summary[b] Showing the Impact of Augmented Reality on Customer Satisfaction in Online Shopping in Nigeria

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.575[a]	.330	.329	2.973

a. Predictors (Constant), Augmented reality
Source: SPSS output from field data

A simple regression analysis was run to determine the impact of augmented reality on customer satisfaction in online shopping in Nigeria. As shown in Table 8, augmented reality has a moderate impact on customer satisfaction. This is evident in the regression coefficient (R) of 0.575. Furthermore, the coefficients of determination (R Square & R Square Adjusted) are 0.330 and 0.320 respectively. This means that 33% of the changes in the criterion variable (customer satisfaction) are attributable to the impact of the predictor variable (augmented reality), whilst the remaining 67% changes are due to the impact of stochastic variables.

Table 9: ANOVA[a] Showing the Impact of Augmented Reality on Customer Satisfaction in Online Shopping in Nigeria

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2075.063	1	2075.063	234.829	.000[b]
	Residual	4206.161	476	8.836		
	Total	6281.224	477			

a. Dependent Variable: Customer satisfaction
b. Predictors (Constant), Augmented reality
Source: SPSS output from field data

As shown in Table 9, augmented reality statistically, significantly predicts customer satisfaction in online shopping in Nigeria. This is indicated by the probability value of 0.000, which is less than the decision threshold of 0.05. Statistically, augmented reality significantly predicts customer

satisfaction at $F(1, 476) = 234.829$, $p = 0.000 < 0.05$, $R^2 = 0.330$; R^2 Adjusted = 0.329. The results also showed that the regression model is a good fit for the data.

Table 10: Coefficients[a] Showing the Impact of Augmented Reality on Customer Satisfaction in Online Shopping in Nigeria

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	8.845	.662		13.369	.000
	Augmented reality	.543	.035	.575	15.324	.000

a. Dependent Variable: Customer satisfaction

Source: SPSS output from field data

As shown in the regression model in Table 10, the unstandardized coefficients indicate how much the dependent variable – customer satisfaction varies with the independent variable – augmented reality. As shown in the Table, before the introduction of the predictor variable, customer satisfaction stood at 8.845, but at the introduction of the predictor variable, there is an additional unit. Specifically, as shown in the Table, the intercept B_0 is 8.845, which is the predicted value of customer satisfaction without the contributions of the predictor variable. That is, when augmented reality is equal to zero, customer satisfaction is 8.845. However, the slope B_1 is 0. 543, indicating that 1 unit increase in augmented reality will bring about 0.543 unit increase in customer satisfaction.

In view of the results of the analysis, the researchers rejected the hypothesis which states that; augmented reality does not significantly impact customer satisfaction in online shopping in Nigeria. Thus, the alternate hypothesis which was not stated explicitly was accepted.

DISCUSSION OF FINDINGS

Results of the analyses revealed that, augmented reality has a strong and positive impact on customer engagement, a very strong, positive impact on purchase confidence, and a moderate impact on customer satisfaction in online shopping in Nigeria. These findings affirmed the findings of previous studies examined. For instance, the findings are consistent with the findings of Guo and Zhang (2023) who investigated the impact of AR online shopping experience on customer purchase intention: an empirical study based on the TAM Model, and found that AR shopping experiences positively affect perceived ease of use and perceived usefulness, which in turn enhance customer purchase intentions.

Similarly, the findings are consistent with the findings of Voicu et al. (2023) who examined factors influencing consumer experience and satisfaction when using AR applications in online makeup shopping, and found that AR applications enhance consumer satisfaction by providing immersive and personalized shopping experiences. Furthermore, our findings are consistent with the findings of Poushneh and Vasquez-Parraga (2017) who investigated the discernible impact of augmented reality on retail customer's experience, satisfaction, and willingness to buy, and found that AR applications enhance customer experiences by providing interactive and engaging product information, leading to increased satisfaction and purchase intentions.

More also, our findings align with the findings of Xu et al. (2022) who developed and evaluated an AR-based prototype to assist in-store shopping decisions by providing immersive product information. Findings of the study indicated that the AR prototype effectively communicated detailed product information, aiding consumers in making informed purchasing decisions and enhancing the shopping experience. Additionally, our findings are in concord with the findings of Sanaei (2024) who investigated how customers' satisfaction changes with the use of AR shopping

application, using a conceptual model, which suggests that immersive AR features positively influence customer experience, leading to higher satisfaction and increased likelihood of purchase.

Considering the foregoing, it is clear that there is a significant consistency between the findings of our study and the results of other studies examined, highlighting the role of augmented reality plays in enhancing customer experience in the online shopping environment.

CONCLUSION

The impact of Augmented Reality (AR) on customer experience in online shopping in Nigeria is significant, influencing key aspects such as customer engagement, satisfaction, and purchase confidence. As online retail continues to grow in Nigeria, AR technology has emerged as a transformative tool, bridging the gap between traditional and digital shopping experiences.

Customer engagement is enhanced through immersive and interactive experiences, allowing shoppers to visualize products in real time. AR applications enable users to virtually try on clothing, accessories, or makeup and place furniture within their living spaces. These interactive elements keep customers engaged, increase their time spent on shopping platforms, and strengthen brand relationships, ultimately driving loyalty and higher conversion rates.

Purchase confidence is boosted as AR reduces uncertainty and enhances trust in online transactions. Nigerian consumers, like others globally, often hesitate to make online purchases due to concerns about product authenticity, fit, and quality. AR solutions mitigate these concerns by allowing shoppers to make informed decisions through realistic previews. This increased confidence lowers hesitation, encourages purchases, and fosters a sense of security in online shopping, benefiting both consumers and e-commerce businesses.

Furthermore, customer satisfaction is also significantly improved as AR provides a more realistic and personalized shopping experience. Traditional online shopping often lacks the ability for customers to inspect products physically, leading to uncertainty and dissatisfaction. AR addresses this issue by offering realistic 3D product models and virtual try-on features, which reduce the mismatch between expectations and reality. As a result, Nigerian consumers experience fewer disappointments, leading to lower return rates and greater overall satisfaction.

The study therefore concluded that, the integration of AR into online shopping platforms in Nigeria presents significant opportunities for enhancing the customer experience. By improving engagement, satisfaction, and purchase confidence, AR has the potential to revolutionize e-commerce in Nigeria, fostering greater adoption and growth in the digital retail sector. As technological advancements continue, the widespread adoption of AR in Nigerian online shopping is expected to drive increased consumer trust, higher sales, and stronger brand loyalty.

RECOMMENDATIONS

To maximize the benefits of Augmented Reality (AR) in online shopping in Nigeria, the following recommendations are proposed:

i. Investment in AR Infrastructure: E-commerce businesses in Nigeria should invest in robust AR technology to improve the online shopping experience. This includes developing mobile-friendly AR applications that allow users to interact with products in real time, enhancing their confidence and satisfaction.

ii. Expanding AR to More Product Categories: Currently, AR is widely used in fashion, beauty, and furniture shopping. Nigerian e-commerce businesses should explore AR applications in other

product categories, such as electronics, automobiles, and grocery shopping, to widen its impact on customer experience.

iii. Improving Internet Access and Speed: Since AR experiences rely on high-speed internet connectivity, efforts should be made to enhance broadband infrastructure across Nigeria. This will ensure smooth AR interactions without lag, making the shopping experience seamless for customers.

iv. Integrating Augmented Reality and AI: The convergence of augmented reality (AR) and artificial intelligence (AI) presents a transformative opportunity for Nigeria's e-commerce sector, offering personalized, immersive, and intelligent shopping experiences. As online retail continues to expand, leveraging these technologies can address key challenges such as low consumer trust, product misrepresentation, and limited engagement, ultimately driving growth and innovation. This will ultimately drive growth and innovation in Nigeria's e-commerce sector.

v. Conducting Further Research on AR in Nigerian E-Commerce: There is a need for more empirical research on AR adoption in Nigeria, focusing on consumer behavior, business challenges, and success stories. This will help refine AR strategies and improve its effectiveness in the Nigerian market.

By implementing these recommendations, Nigerian online retailers can harness the full potential of AR technology to enhance customer engagement, satisfaction, and purchase confidence, ultimately driving growth and innovation in the e-commerce sector.

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