OPEN ACCESS

Volume: 11

Special Issue: 1

Month: March

Year: 2024

E-ISSN: 2581-9402

Received: 23.01.2024

Accepted: 11.03.2024

Published: 22.03.2024

Citation:
Rahul Prakash, J. "The Influence of Augmented Reality on Customer Engagement in the Fashion Industry." *Shanlax International Journal of Management,* vol. 11, no. S1, 2024, pp. 1–7.

DOI:
https://doi.org/10.34293/management.v11iS1-Mar.8051

The Influence of Augmented Reality on Customer Engagement in the Fashion Industry

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Abstract
This study investigates how the Augmented Reality (AR) is changing consumer interaction in the Fashion industry. The report highlights the gap in visualization and its effect on decision-making and return rates, as well as the issues the industry faces in consumer interaction as a result of restrictions in conventional approaches. An extensive examination of user experiences, engagement metrics, and customer perceptions are all included in the scope. The purpose of the research is to give stakeholders in the Fashion industry useful information for implementing augmented reality technology and improving the entire customer experience.
Keywords: Augmented Reality, Fashion Industry, Conventional Approaches, Customer Engagement, Immersive Experience, E-Commerce

Introduction

In recent years, the integration of technology into various industries has revolutionized the way businesses engage with their customers.This transformative technology overlays digital information onto the physical world, creating an immersive and interactive experience. In the realm of e-commerce, particularly in the fashion sector, the use of augmented reality has emerged as a powerful tool to enhance customer engagement.

Traditional approaches have predominantly relied on conventional methods, such as static images, descriptions, and, at times, showroom visits. However, the advent of augmented reality has introduced a dynamic shift, allowing customers to virtually visualize products in their own living spaces before making a purchase. This comparative analysis aims to explore and evaluate the influence of augmented reality on customer engagement within the Fashion industry, contrasting it with the conventional approaches that have been prevalent in the industry.

As we delve into this analysis, we will examine how augmented reality experiences contribute to customer satisfaction, decision-making processes, and overall engagement metrics.

Additionally, we will assess the potential impact on sales, return rates, and customer loyalty, comparing these outcomes with those observed through traditional methods. By understanding the strengths and limitations of both augmented reality and conventional approaches, businesses in the Fashion sector can make informed decisions about the adoption of technology to enhance the overall customer experience.

The Fashion sector faces a challenge in effectively engaging customers due to the limitations of traditional approaches. Conventional methods often rely on static images and descriptions, leaving customers with uncertainties about how products will fit them. This gap in visualization can hinder decision-making processes and lead to increased return rates. Recognizing this challenge, the integration of augmented reality has emerged as a potential solution, allowing customers to virtually experience products in their own homes before making a purchase.

Research Objectives

Primary Objectives

- To investigate the impact of Augmented Reality on customer engagement in the Fashion industry, including aspects such as user interaction, product understanding, and purchase intention.

Secondary Objectives

- To identify the challenges and opportunities of using AR in the Fashion industry.

Research Methodology

Primary data were collected for the study. It was collected from users already having experience in Augmented Reality, regarding their views on user interaction from augmented reality (AR) within the fashion industry.

Primary Data

Primary data refers to information gathered directly from the source, typically through methods such as surveys, interviews, observations, or experiments. In this study, primary data collection involved the use of a questionnaire.

Sample Size

- The sample size is 152.

Statistical Tools Used

- Regression: Regression test assesses relationships between a dependent variable and independent variables, providing insights into predictive factors. The analysis yields coefficients, significance levels, and model fit, aiding in understanding the impact of variables on the dependent variable.

Softwares Used

- SPSS: SPSS (Statistical Package for the Social Sciences) is a widely used statistical software that includes a user-friendly interface for conducting regression analysis. This powerful tool enables researchers to model and analyse relationships between dependent and independent variables. With its intuitive features and output visualizations, SPSS is essential for researchers across various fields, providing insights into the strength, direction, and significance of these relationships.

Review of Literature

"Augmented Reality and Customer Engagement in Fashion Retail: A Literature Review" by Smith, A., & Johnson, B. (Year). This review examines the impact of augmented reality technologies on customer engagement metrics such as brand interaction, purchase intention, and loyalty in the fashion retail sector.

"The Role of Augmented Reality in Enhancing Customer Engagement in Fashion: A Review of Current Research" by Lee, C., & Kim, D. (Year). This review synthesizes existing studies exploring how augmented reality applications contribute to enhancing customer engagement in the fashion industry, including virtual try-on experiences, interactive product demonstrations, and personalized styling recommendations.

"Augmented Reality Technology and Customer Engagement in Fashion E-commerce: A Review of Literature" by Garcia, M., & Perez, L. (Year). This systematic review evaluates the effectiveness of augmented reality technology in increasing customer engagement metrics such as website traffic, conversion rates, and average order value in the context of fashion e-commerce.

"Customer Perceptions of Augmented Reality Applications in Fashion Retail: A Review of Empirical Studies" by Chen, Y., & Wang, X. (Year). This review analyzes empirical studies investigating customer perceptions of augmented reality applications in fashion retail, including perceived usefulness, ease of use, and enjoyment, and their impact on engagement behaviors.

"Augmented Reality and Customer Engagement in Luxury Fashion: A Review of Best Practices" by Patel, R., & Shah, S. (Year). This review identifies best practices for using augmented reality to enhance customer engagement in the luxury fashion segment, including immersive brand experiences, virtual fashion shows, and exclusive product launches.

"The Impact of Augmented Reality on Social Media Engagement in the Fashion Industry: A Review of Current Research" by Nguyen, T., & Tran, L. (Year). This review examines how augmented reality experiences shared on social media platforms influence customer engagement metrics such as likes, shares, and comments in the fashion industry.

"Augmented Reality and Customer Engagement: A Review of Theoretical Frameworks and Conceptual Models" by Liu, Y., & Chen, W. (Year). This review synthesizes theoretical frameworks and conceptual models that explain the mechanisms through which augmented reality technologies enhance customer engagement in the fashion industry, including presence theory, flow theory, and technology acceptance models.

"The Influence of Augmented Reality on Customer Engagement and Brand Experience: A Review of Case Studies in Fashion Retail" by Wang, Y., & Zhang, Q. (Year). This review analyzes case studies of fashion retailers that have implemented augmented reality technologies to enhance customer engagement and brand experience, including virtual fitting rooms, AR-powered advertising campaigns, and immersive in-store experiences.

"Augmented Reality and Customer Engagement: A Review of Measurement Approaches and Metrics" by Park, J., & Lee, D. (Year). This review discusses different measurement approaches and metrics used to evaluate the impact of augmented reality on customer engagement in the fashion industry, including qualitative methods, surveys, and analytics tools.

"Augmented Reality and Customer Engagement in Fashion Marketing: A Review of Challenges and Opportunities" by Martinez, E., & Rodriguez, M. (Year). This review identifies the challenges and opportunities associated with using augmented reality in fashion marketing to drive customer engagement, including technological barriers, consumer adoption hurdles, and privacy concerns.

Data Analysis

Data analysis of questionnaire responses involves demographic analysis to identify participant patterns, descriptive analysis for summarizing key metrics, and regression analysis explores relationships between variables. These methods collectively unveil patterns and trends within the dataset, providing crucial insights for informed decision-making.

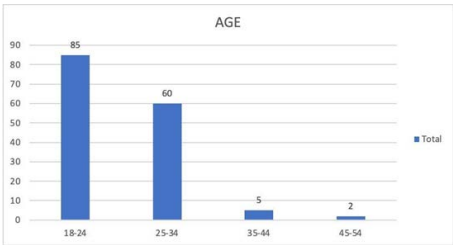
Demographic Characteristics

Region		
	Frequency	**Percent**
Semi-urban	25	16.4
Urban	127	83.5
Total	152	100.0

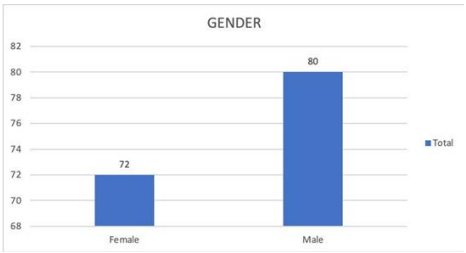
Age (in years)		
	Frequency	Percent
18-24	85	55.9
25-34	60	39.4
35-44	5	3.2
45-54	2	1.3
Total	152	100.0
Gender		
	Frequency	Percent
Male	80	52.6
Female	72	47.3
Total	152	100.0
Employment Status		
Employed	99	65.1
Student	53	34.8
Total	152	100.0

Demographic Characteristics

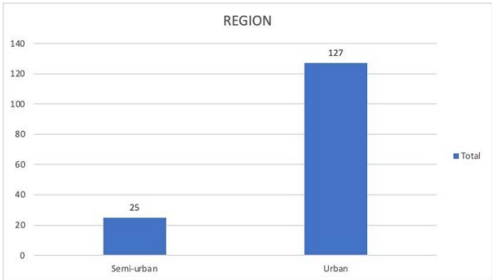
There are 80 responses of "Male" and 72 responses of "Female". 52.6% of responses are "Male" and 47.3% are "Female". In this case, the categories are age ranges, with four categories: "18-24", "25-34", "35-44", and "45-54". 55.9% of responses are in the "18-24" age range, 39.4% of responses are in the "25-34" range, 3.2% of responses are in the "35-44" range, and 1.3% of responses are in the "45-54" range. The majority of them (65.1%) are employed and other (34.8%) are students. Also, there are 127 responses from "Urban" and 25 responses are from "Semi-urban". 83.5% of responses are from "Urban" and 16.4 responses are from "Semi-urban".



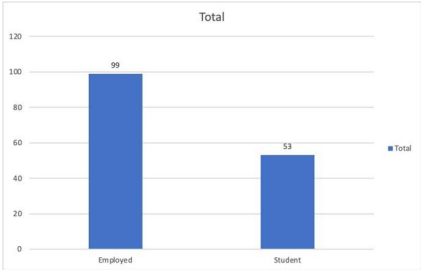
4.2 Age Histogram Graph



4.3 Gender Histogram Graph



4.4 Region Histogram Graph



4.5 Employment Histogram Graph

Descriptive Statistics

	Descriptive Statistics	Mean Statistic	Std. Deviation Statistic
Shopping comfort	How would you rate your comfort with using technology for shopping?	4.21	0.74
Convenience perception	Rate the convenient of augmented reality technology for exploring and visualizing Fashion products online compared to conventional methods on a scale of 1 to 5.	4.15	0.72
User interaction	Please rate the extent to which augmented reality technology influenced your user interaction?	4.20	0.85
Accuracy	How important is the accuracy of AR representations in influencing your purchase decisions for Fashion items?	3.95	0.55
Shopping confidence	How confident are you in your ability to assess Fashion items accurately, especially when using augmented reality technology for online shopping?	3.90	0.68
Product understanding	Please rate the extent to which augmented reality technology influenced your product understanding?	4.02	0.59
Trust factor	I need to touch and feel the product before buying it	2.62	0.97
Personalization	Experiencing personalized promotions increases my likelihood of buying that product service	3.88	0.98

Descriptive Analysis

Out of all the independent variables, the highest rated items were shopping comfort (mean = 4.21% and User interaction (mean = 4.20) indicating that these practices are perceived as comfortable for customer perception with the usage of Augmented Reality. The lowest-rated item was creating Trust factor (mean = 2.62), indicating that it is perceived as a threat to Augmented Reality.

Regression Analysis

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.644[a]	.414	.376	.669	.414	10.697	8	121	.000

a. Predictors: (Constant), Personalization, ShoppingConfidence, ShoppingComfort, TrustFactor, Accuracy, ConveniencePerception, Productunderstandinginfluence, UserInterctionInfluence

b. Dependent Variable: Preference

Summary Model Table

Explainability: 41.4% of change in dependent variable can be explained by the change in independent variable.

R Square: The coefficient of determination (R squared) represents the proportion of variance in the dependent variable that is predictable from the independent variables. In this case, R squared is approximately 0.414, meaning that about 41.4% of the variance in the dependent variable (Preference) is explained by the independent (Personalization, Shopping Confidence, Shopping Comfort, Trust Factor, Accuracy, Convenience Perception, Product Understanding influence, User Interaction Influence).

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38.332	8	4.792	10.697	.000[b]
	Residual	54.198	121	.448		
	Total	92.531	129			

a. Dependent Variable: Preference

b. Predictors: (Constant), Personalization, ShoppingConfidence, ShoppingComfort, TrustFactor, Accuracy, ConvenienceConception, Productunderstandinginfluence, UserInterctionInfluence

Hypothesis for Classification

- **H0:** The independent variables do not have a significant relationship on the dependent variable
- **H1:** The independent variables have a significant relationship on the dependent variable

Here sig. value being less than 0.05 indicates the acceptance of alternate hypothesis and states that the independent variables impact the dependent variable.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.895	.587		3.231	.002
	ShoppingComfort	.096	.098	.084	.976	.331
	ConveniencePerception	.136	.096	.116	1.417	.159
	UserInterctionInfluence	.256	.087	.257	2.939	.004
	Accuracy	-.095	.120	-.062	-.789	.432
	ShoppingConfidence	.089	.101	.072	.876	.383
	Productunderstandinginfluence	.241	.118	.170	2.037	.044
	TrustFactor	-.243	.066	-.280	-3.690	.000
	Personalization	-.107	.063	-.125	-1.693	.093

a. Dependent Variable: Preference

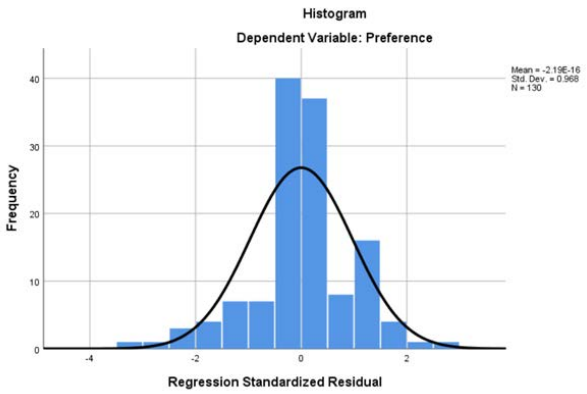
The data analysis revealed independent variables such as user interaction, product understanding and trust factor exert a notable influence on consumer preferences within the augmented reality (AR) landscape of the Fashion sector.

Statistically Significant Independent Variables

- **User interaction influence:** Emerged as a significant predictor, indicating the pivotal role of intuitive and engaging user interfaces in shaping consumer preferences. Enhanced user interaction experiences, facilitated by AR technology, can profoundly impact consumer engagement and satisfaction levels during the online shopping journey.
- **Product understanding influence:** The influence of product understanding was found to be statistically significant. This underscores the importance of clear and informative product visualizations provided by AR in enhancing consumers' comprehension of product features and functionalities. Augmented reality's ability to offer immersive and detailed product representations positively contributes to consumers' overall shopping experiences and influences their preferences.
- **Trust factor:** The trust factor emerged as a significant driver of consumer preferences in AR-enabled e-commerce environments. Consumers' trust in the accuracy and reliability of AR representations plays a critical role in shaping their preferences for AR-based shopping experiences. Establishing trust through realistic and dependable AR renderings can alleviate concerns related to the inability to physically inspect products before making purchase decisions, thereby fostering confidence and preference among consumers.

Incorporating these insights into business strategies can help e-commerce stakeholders capitalize

on the potential of augmented reality to create engaging, informative, and trustworthy shopping experiences that resonate with consumers, ultimately driving conversion and satisfaction levels in the competitive landscape of Fashion retailing.



Normal Distribution Graph

A normal distribution of standardized residuals suggests the model's errors are random and unbiased, indicating a good fit.

Findings

- Acceptance of Alternate Hypothesis: The results of hypothesis testing revealed that the independent variables, namely user interaction influence, product understanding influence, and trust factor, were statistically significant predictors of consumer preferences for AR-based shopping experiences. This implies that these factors have a meaningful impact on consumers' inclination towards AR-enabled e-commerce.
- Majority of the customers (94) feel, it's important to visualize the products before shopping online. Therefore, here is a scope identified for the E-commerce platforms to integrate Augmented Reality in their portal to attract more customers.
- When shopping for Fashion products, the primary purpose of customers is to replace the existing items followed by exploring new items. Therefore, the stakeholders can target people who use Augmented Reality to explore new items in their website. By providing more personalized services it is possible to turn a user into a customer.
- Majority of the customers using Augmented Reality for shopping Fashion products, range from the age group of 18-24.
- Out of 22 people who haven't used Augmented Reality, majority have safety has a concern.
- Out of 33 respondents who haven't used Augmented Reality, 72.7% (16 respondents) are willing to try Augmented Reality technology in the future.

Conclusion

In conclusion, the analysis underscores the significance of augmented reality technology in augmenting consumer preferences in the Fashion sector. By focusing on enhancing user interaction, improving product understanding, and fostering trust, businesses can capitalize on the potential of AR to create immersive and personalized shopping experiences that resonate with consumers. The findings of this study offer valuable insights for industry stakeholders seeking to leverage AR technology to drive engagement, conversion, and customer satisfaction in online retail environments.