



Impact of Augmented Reality on Actual Purchase Behavior: The Role of Customer Brand Engagement and Purchase Intention

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ABSTRACT

The purpose of this study is to empirically investigate the impact of augmented reality on the actual purchase behavior of online consumers in Pakistan, considering the role of familiarity and the interconnected role of customer brand engagement and purchase intentions. The study used a positivist paradigm, a deductive approach, and quantitative techniques with a cross-sectional time horizon. A sample of 150 online consumers from Lahore was selected using the convenience sampling method. The study used PLS-SEM to test the proposed hypotheses using Smart PLS 3 for analysis. The results showed that augmented reality has a positive impact on customer branding. There was a statistically significant relationship between augmented reality and customer brand engagement. However, this familiarity did not dampen the relationship between augmented reality and customer brand engagement. The relationship between augmented reality and customer brand engagement was not moderated by the familiarity factor. The study offers companies a strategic opportunity to redefine themselves through technological development and address the decline in sales due to intense competition through unique affiliation with theory of planned behavior. This study provides valuable insights into the use of augmented reality to enhance brand image and influence customer purchasing behavior. It guides decision-makers to develop strategies that reflect customers and build brand loyalty in Pakistan.

Introduction

In the current competitive business environment, corporations look for fresh, creative concepts to back and advertise their goods and services. In addition to promoting a good or service, traditional marketing has continuously fallen short of the needs of the modern market (Leder et al., 2024). The mission, which is primarily focused on retaining customers, nearly misled the public by employing conventional marketing techniques; in this sense, experts are forced to confront the primary obstacle (Aleva et al., 2024). In particular, as consumers shift from conventional media to digital media in the era of the digital Internet, marketers are constantly changing due to the rapid growth of Internet users and literacy (Ming et al., 2024).

In order to concentrate on the consumer, advertisers take brief breaks from highlighting the features and advantages of their company's objective (Jalilvand & Ghasemi, 2024). Moreover, not all clients are anonymous; rather, their purchase plans are influenced by certain measurement profiles, pay ranges, corporate requirements, and selection techniques. According to García et al. (2024), advertising channels are currently required to provide a service other than individual communication that allows customers to concurrently get crucial and explicit information. Numerous online and offline sources based on recurring sales, library usage, individual customer data, rapid response code replies, computer channel brand interaction, and many other data sources should be able to provide such information (Orlandi et al., 2024).

With more applications in retail, augmented reality (AR) is intended to be a smart gadget in the advertising space development of applications for smart devices (Negm, 2024). With the use of virtual highlights like photos and data, augmented reality can overlay the actual environment while offering consumers more options in terms of content delivery. Thus, augmented reality has the potential to alter product and data search purchase behaviors (Schultz & Kumar, 2024). Given the rise in augmented reality usage in recent years, it is important to comprehend how it contributes to consumer brain exploration. Using innovation as an approach, this study aims to give insight into the buyer's brain research in the context of augmented reality with media functionalities (Attri & Choudhary, 2024).

Innovation is regarded a primary source of development and has considerably enhanced purchasers' e-commerce activities and branding practices (Jalil et al., 2024). Difficulties discovered in customers' response to established and more intuitive improvements have led to a wide spectrum of study (Malau, & Sitanggang, 2024) lately evaluating the possible influence of AR development on purchasers. Neither an expert survey plan nor one was suggested in numerous instances (Handoyo, 2024). With the advancement of smart device technology, augmented reality (AR), which was first developed as an interactive tool for marketing objectives, has become more and more popular in the retail sector (Quintus et al., 2024).

Augmented reality overlays the real environment and creates new ways for content to reach viewers by utilizing virtual components like images and information that may interact with it in real time (Hilal, et al., 2023). Because of this, augmented reality may have an impact on customer behavior, including product and information searches (Murmura et al., 2023). Understanding the significance of augmented reality technology for consumer psychology is crucial, especially in light of the surge in augmented reality applications in recent years. This research aims to give a general overview of consumer psychology in relation to media features in augmented reality, i.e. technology (Lavoye, 2023).

Technology is viewed as a major driver of progress and has profoundly changed how customers purchase online and how brands operate (Cheng et al., 2023). The advancement of Web 2.0 and 3.0, along with a rise in the usage of mobile devices and active engagement in e-commerce, business-to-business, and consumer-to-consumer communication on social media platforms (Elsaeed et al., 2024). The potential effects of rising AR innovation on customers have not received much attention, despite the fact that a plethora of research has been conducted in response to the difficulties in consumer reaction to known interactive improvements large number of instances and no worthwhile study has also been suggested (Thompson, 2024).

With the use of virtual highlights like photos and statistics that progressively match the actual environment, augmented reality may cover the real climate and provide purchasers with new opportunities for content delivery (Freund, 2024). As a result, augmented reality may alter how people look for products and data while making purchases (Reed, 2023). Given the current surge in augmented reality use, it is imperative to have a deeper comprehension of its significance in consumer brain research. This study aims to throw light on consumer brain research in the context of augmented reality by utilizing improvements in media features. Innovation is regarded as a key driver of growth and has greatly enhanced consumers' online purchasing and branding behaviors (Parsons, 2024).

As previously stated, many businesses have realized the potential of augmented reality as they look for new and inventive ways to attract clients and have determined that it is the most important component of their marketing campaigns for sales (Kucuksarac, 2023). This tactic improves client impressions by connecting to the perceptual experience. Eventually, the client sees the extracted data from the computer in an actual environment. Combining conventional and computational imagery has been found to enhance prior perception and expand understanding of complex 3D scenes, hence enhancing and elevating meaning and user engagement (Siagian, & Octoyuda, 2024) stated that most technology-enabled promotions and campaigns use an immersive, reality-based approach that highlights the brand offer (goods and services) and the whole experience designed specifically for the consumer. Brand experiences include sensations, emotions, and behavioral responses (Huang & Chung, 2024).

This study addresses the following research objectives:

- To investigate the influence of augmented reality on customer brand engagement.
- To determine the impact of augmented reality on actual purchase behavior.
- To check the impression of customer brand engagement on purchase intention.
- To highlight the influence of purchase intention on actual purchase behavior.
- To demonstrate the moderator role of familiarity (literacy, proximity and knowledge) between augmented reality and customer brand engagement.

This study addresses the following research questions:

- What is the effect of augmented reality on customer brand engagement and purchase intention through the role of purchase intention of Pakistani internet consumers?
- How does Familiarity (intimacy, knowledge and literacy) moderate the effect of augmented reality and customer brand engagement among online consumers in Pakistan?

This study examines, from the perspective of Pakistani internet users, the genuine consequences of augmented reality on consumers' purchase inclinations. Additionally, this study examines the moderating role that familiarity (knowledge and intimacy) plays as a mediator of brand image. The study aims to clarify how important brand and media components may use augmented reality to boost purchase intentions in digital transactions. There is a dearth of research on augmented reality in the field of marketing. Consequently, this study offers recommendations and further information for more investigation. This study may assist to increase the utilization of augmented reality in the electronic equipment business by providing a better understanding of how it effects purchasing intention.

Literature Review

Theoretical foundation

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is a widely used framework for understanding purchase intentions (Ngo-Thi-Ngoc et al., 2024; Shanbhag et al., 2023). This theory, which evaluates the decision of an individual to engage in a specific activity, explains human behavior (Omran and Van Etten, 2007; Bernardus et al., 2020). Ajzen developed this theory in 1991. In general, the TPB proposes that behavioral beliefs, normative beliefs, and control beliefs influence people's social behavior. These behaviors are planned and occur for specific reasons (Ajzen, 1991). According to the TPB, behavioral beliefs lead to positive or negative attitudes toward behavior. This means that people's behavioral attitudes, shaped by their experiences, explain why they tend to behave positively or negatively (Kan & Fabrigar, 2020; Nguyen et al., 2023; Kashyap & Kumar, 2024). The proposed research model links augmented reality (AR), customer brand engagement (CBE), purchase intention (PI), and actual purchase behavior (APB) and moderated by familiarity (FM). It is worth mentioning, however, that there is a parallel to the Theory of Planned Behavior TPB, which posits that intention to perform a behavior is shaped by attitudes, subjective norms, and perceived control and that those factors influence actual behavior (Ajzen, 2020). In a similar way, the AR serves as an external factor independent variable that triggers the development of emotional connection to the brand, which together with the intention to make a purchase deviates APB. FM also affects them by further developing the relationship between the technology and CBE when customers are more knowledgeable about the brand (Conner, 2020). Thus, both TPB and the proposed model define how the use of will is shaped by predetermined attitudes or external influences. Notably, the latter is unique in that it introduces technology and emotional connection to the explanations of customer choices (Ajzen & Schmidt, 2020).

Hypothesis Development

Augmented reality, customer brand engagement and actual purchase behavior

Augmented reality is a collective technological approach that enhances the real environment with overlapping virtual components (Walker et al., 2017). Virtual thickness is implanted between physical situations and the user can bypass text, images, recordings, or any other virtual thing to see the physical environment of a person (Fabre et al., 2024). Objects that allow such an overlap can be mobile phones or tablets, mobile devices, fixed interactive screens or projectors (Pessot et al., 2023; Vo et al., 2022). Augmented reality technology has become quite well-known in the fields of information technology and human-computer interaction. According to Şenel (2024) augmented reality (AR) includes computer sources that are familiar and compatible with

physical reality in terms of interaction, in addition to the coexistence of virtual and original material in one location. This exemplifies the interactive elements and progressively integrated architecture of augmented reality, as contrast to virtual reality. The main advantage of augmented reality devices, according to Cannella (2022), is their near-mobile and portable nature. This benefit only applies to individual devices; other devices are immobile (Caboni & Bruni, 2022). To determine the most user-friendly settings for various augmented reality applications, brands have tested and utilized them in a variety of scenarios. Among the cutting-edge methods that augmented reality has employed thus far are broad natural displays, either overtly or covertly, in retail (Lee, 2023).

Modern equipment by scanning a product logo or related picture, a user using augmented reality (AR) applications can observe a virtual object positioned in the real environment, such as a virtual piece of furniture in a room, or access more digital material, such as a filtered magazine ad campaign that plays as a video on a tablet (Ikeda & Szafir, 2024). Finally, virtual components may be added to huge interactive screens to create a more lifelike environment. One such instance is a retail store's augmented reality layout that motivated shoppers by drawing attention to the problems endangered animals face (Jingru et al., 2024). Customers were given the idea that they were in the mall by the swinging animals in the exhibit. Furthermore, by filtering the majority of its parts or the object itself utilizing a number of smart widgets, augmented reality applications allow you to observe things from a better angle and customer point of view (Gahlot et al., 2024). This is more than merely enlarging the object's zoom (Wahid et al., 2024).

Lastly, the majority of programs may add a lot of space thanks to virtual partitions. It is used to see how an object would seem in a setting (e.g., furniture of a given color would appear in a room) or to gather more information from the surrounding area (e.g., the perspective of an object is presented on the screen) camera, the road that leads to the neighborhood café, and the establishments that hold the shop) (Koumpouros, 2024). Given the aforementioned considerations, augmented reality technology is currently being used to increase public awareness. Augmented reality technology may increase brand participation in addition to income. Therefore, it is hypothesized as:

H1: *Augmented reality has a positive impact on customer brand engagement.*

H2: *Augmented reality has a positive impact on Actual purchase behavior.*

Customer brand engagement and purchase intention

Online customers do not immediately affect a brand's success or failure; rather, they are devoted to it over the long run. It is assumed that online customers have a positive and optimistic view of the business (Husain et al., 2022). Surprisingly, increasing overall brand engagement and consumer brand engagement may also increase revenue (Amankona & Kampamba, 2024; Chen et al., 2021; Vo Minh et al., 2022). Building consumer brand engagement requires, according to Rizkia et al. (2024), fostering a relationship that values cooperation, communication, and attending to the demands of the customer. Customer brand engagement, as defined by Gong et al. (2023), is the emotional commitment made in a functional connection with a particular brand via a computer or website with the goal of mediating brand identification. It is true that the buyer's values for online buying and the product or products featured in the marketing become more well-known, which might raise anticipation for future purchases and foster more confidence in the website. According to Mohammad et al. (2024), consumers characterize customer brand engagement as an actively and affectively engaged connection with a particular brand via a computer or website that uses gadgets intended to convey brand value. The level of brand commitment from consumers will likely influence consumer sustainability strategies. Thus, it is hypothesized that:

H3: *Customer brand engagement has a positive association with purchase intention.*

Purchase intention and actual purchase behavior

Purchase intention is a self-promised commitment to repurchase an item when needed or desired (Ayyub et al., 2021; Phan Tan, & Le, 2023). It is important since the businesses want to increase sales of a certain brand or product in order to attain a specified quantity. Several factors, such as customer happiness, loyalty, and retention, affect purchase intention (Goyal & Verma, 2024). A buyer is drawn to a brand because of certain benefits or features. A few of these factors include features, product involvement, brand image, and item quality and familiarity (Khan et al., 2022; Al Falah et al., 2024). The purpose of this study is to show if augmented reality might boost online purchasing behaviors in addition to important factors like familiarity with devices and apps, which are essential for increasing brand engagement (Singh et al., 2024). Recommendation, whether positive or bad, has

the greatest impact on customers' inclinations to buy. Once your transaction is complete, abide by the instructions listed below. Customers shop around to discover the best deal (Noe, 2024). Throughout the application process, the customer evaluates a number of product features. that is, consider a range of factors, such as cost, functionality, dependability, and durability, before placing a purchase. The popularity of online buying in Pakistan is growing because it gives consumers access to product knowledge that is hard for Pakistani shops to provide (Meet et al., 2024). The younger generation in Pakistan is poised to revolutionize the conventional retail trend since online shopping is dependable and easy to use. Marketing managers value purchase intent because it helps with sales forecasting. Furthermore, the information might help managers decide which advertising initiatives and peak consumer demand to run. Hence, it is hypothesized as:

H4: Purchase intension has a positive association with actual purchase behavior.

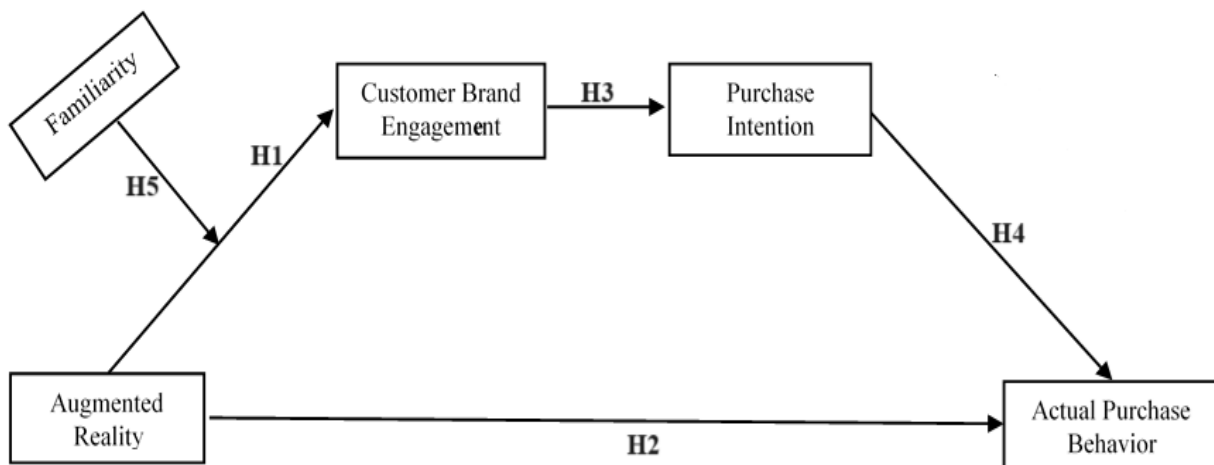
Moderating role of familiarity

Arohman et al. (2024) and Nawaz et al. (2020) assert that brand awareness has a major impact on purchasing intentions. Additionally, based on research by Wu (2024), customers who have previously used the goods are aware of it. Store brand awareness and retailer brand purchase intentions are favorably associated, claim. This study argues that brand familiarity has an impact on a consumer's propensity to buy a product. This study demonstrates that familiarity has a moderating effect on customer brand engagement and augmented reality (Li et al. 2024). It's a well-established fact that consumers who find a company's website easily identifiable will be more likely to interact with the brand on any smart device or application, which will increase brand engagement. Literacy is essential to interacting with these devices and applications because most programs and devices that are accessible are configurable and need literacy on the part of the user (Faruq, 2024). Therefore, it is hypothesized that:

H5: Familiarity moderates the relationship of augmented reality and customer brand engagement.

Therefore, after a detailed discussion of earlier studies in the presence of the theory of planned behavior the study proposed following theoretical framework in figure 1:

Figure 1: Theoretical Framework



Source: Author proposed

Methodology

Research design, data collection and sampling

This study employed the quantitative methods, deductive methodology, and positivist paradigm as several previous studies in the field (Brodie et al., 2011). Simultaneous data collection was conducted. The temporal span was hence cross-sectional. The purpose of this study was to investigate how augmented reality affected Pakistani online customers' engagement and purchase intentions.

Consequently, the population was selected with great care, bearing in mind the goals of the study. The target audience for the study was Pakistani online buyers of mobile phones. Data was collected from youth in Pakistan's public and private sectors who had previously made online purchases. The researchers were free to choose how to acquire the data. A sample size of between 30 and 500 is considered adequate (Wright & Crimp., 1995). Due to the broad range of results as well as scheduling and budgetary constraints, the study's sample size was limited to 150. Online comments from customers were collected to find out more about Pakistan's Lahore. For this study, convenience sampling was employed to collect data through the distribution of an online questionnaire on Google and Facebook groups. To collect data, groupings that represented different brands were looked at. The online survey method was chosen to collect responses because it is more cost-effective and time-efficient than many traditional approaches. The essence of the study also made it feasible to choose an online survey. Apart from requesting responses from members of these groups via private messaging, the online survey was sent to groups on Facebook and Google until 150 responses were obtained. Participants were only allowed to complete the questionnaire once, and after it was uploaded online, they were unable to change their answers.

Measures

Measurement scales used in this investigation were already verified in the literature. A 5-point Likert scale was used to quantify the variables, and the responses ranged from 1 (strongly disagree) to 5 (strongly agree). Frequency distribution, correlation, reliability analysis, moderated regression, and structural equation modeling (SEM) with a route diagram were among the data analysis techniques used. With the exception of route analysis, which was carried out in Smart PLS, the majority of analyses were carried out using SPSS. The augmented reality scale, consisting of 3 items, was sourced from Bulearca and Tamarjan (2010). The customer brand engagement scale, containing 6 items, was taken from Hollebeek et al. (2014). The purchase intention scale, made up of 5 items, was based on the work of Spears and Singh (2004). Brand Familiarity scale having 7 item by Kent and Allen (1994) was used. Additionally, 17 items measuring actual purchasing behavior were adapted from Lee (1991).

Ethical considerations

Ethics are extremely important for conducting a good research study. Ethical themes supply scientists with ethical and ethical concepts and guidelines concerning the analysis layout and processes. We have been ethical throughout the study. In this respect we have adhered to the following ethical standards and guidelines:

- We notified participants in the study of what we were studying.
- We assured the confidentiality of the respondent's personal information.
- All responses were stored in a secure document.
- Respondents signed consent prior to data collection and could opt-out at any moment.
- In this study, we are responsible for our behavior.

Empirical Findings

PLS-SEM was utilized in this study to analyze the proposed hypothesis using Smart PLS 3 as it is a commonly used and recognized modern evaluation technique in various business sectors, especially in the hotel and tourism industry. (Ali et al., 2018). The objective of this empirical study was to determine and articulate the implicit factors under inquiry using contemporary theory. PLS-SEM has shown to be an effective method when the research and evaluation of structures is the subject to be examined for the application of construction modeling (Hair et al., 2016). Additionally, it is predicted to be a flexible model estimate technique (Ringle et al., 2005). Since PLS-SEM has smaller sample size requirements than Amos, it was chosen in this experiment to minimize concerns about data normalcy and sample size (Hair et al., 2016). This serves as the second justification for selecting PLS-SEM dimensions. In addition, the PLS technique and bootstrapping strategy are used to find factor loadings in order to evaluate construct validity and internal consistency reliability (Ali et al., 2018). Next, path coefficients for hypothesis testing are found together with the corresponding significance level. After the measurement model was developed, estimates were obtained using a structural model test.

Demographic Profile

Table 1 below highlights the results of the demographic profile. Based on the demographic profile of the respondents, it may be noticed that more males responded to the survey than females. A total of 63.3% were male and only 36.7% were female. The findings also show that only 17.2% were young and 9.8% were older than 45 years. Most of the respondents are between 26 and 45 years of age. A majority of them have a Ph.D. certificate as proof of the highest level of education. By extension, most of them

hold a permanent job and their average period is 2 to 5 years. It also suggests that only 3.3% of the sample population had a bachelor's degree. Proof of master's level of education was held by 34% of the respondents and the others did not have a degree; 2.7% for other qualifications and 10% for no formal qualifications. It may also be deduced that 45.9% of the respondents were in their first 2 to 5 years of employment. A lesser 39.3% was never her 5 to 10 periods of employment. The rest were either new at work, less than one year (10.7%), or more than 10 years at their respective organizations (4.1%).

Table: 1 Demographic profile of respondents

Variable	Particulars	Frequency	Percent
Gender	Male	95	63.3
	Female	55	36.7
Age	Up to 25	21	17.2
	26 to 45	89	73.0
	46 to 55	12	9.8
	Bachelor's	5	3.3
Education	Masters	51	34.0
	PhD	90	60.0
	Others	4	2.7
Nature of job	Contractual	15	10.0
	Permanent	134	89.3
	Others	1	.7
Service period	Up to 1 year	13	10.7
	2 to 5	56	45.9
	5 to 10	48	39.3
	10 years +	5	4.1

Source: Author calculated through SPSS

Common method bias

Because senior staff members were the only source of data used in this study, the research approach made it more likely that Common Method Bias (CMB) would have an impact on our conclusions. Previous research has shown that a perfect collinearity test may be used to determine if a common approach has been applied to the data when using the Partial Least Squares (PLS-SEM) methodology for Structural Equation Modeling (SEM) (Kock, 2015). Following Kock's (2015) work, earlier studies attempted to assess Common Method Bias by using Variance Inflation Factors (VIF) calculated using a thorough collinearity test. According to the VIF scores, results below the given value of 3.3 may indicate that the model that was evaluated is CMB-free, while values over 3.3 suggest that the model that was estimated may be related to the CMB problem. Appreciatively, the findings demonstrated that all latent variable VIF scores examined were below the specified cut-off value, supporting the claim that CMB inaccuracy did not taint the data used in the current investigation. Finally, as CMB wasn't the study's main focus, it might be examined further through empirical research.

Measurement model assessment

The measurement model was estimated and convergent validity assessed using loadings, mean variances, and competitor reliability. With a few exceptions, Table 1 and Figure 2 show that factor loadings were higher than the suggested 0.60. Additionally, every composite resistance (CR) value was higher than the suggested 0.70 threshold. For every under-researched concept, the average variance extracted (AVE) values were more than the suggested threshold of 0.50 (Hair et al., 2016). The items that had the lowest factor loadings (<0.50) were eliminated. The Heterotrait-Monotrait Ratio (HTMT) results in Table 2 also support the measure's discriminant validity. As Kline (2011) reviewed, all values in the HTMT results are below the 0.85 cut-off value in table 3, indicating that the measurement has proven to be discriminately valid if it is less than that amount. In general, the two findings verified that discriminant validity does not pose a risk to the current body of research.

Table: 2 Convergent Validity

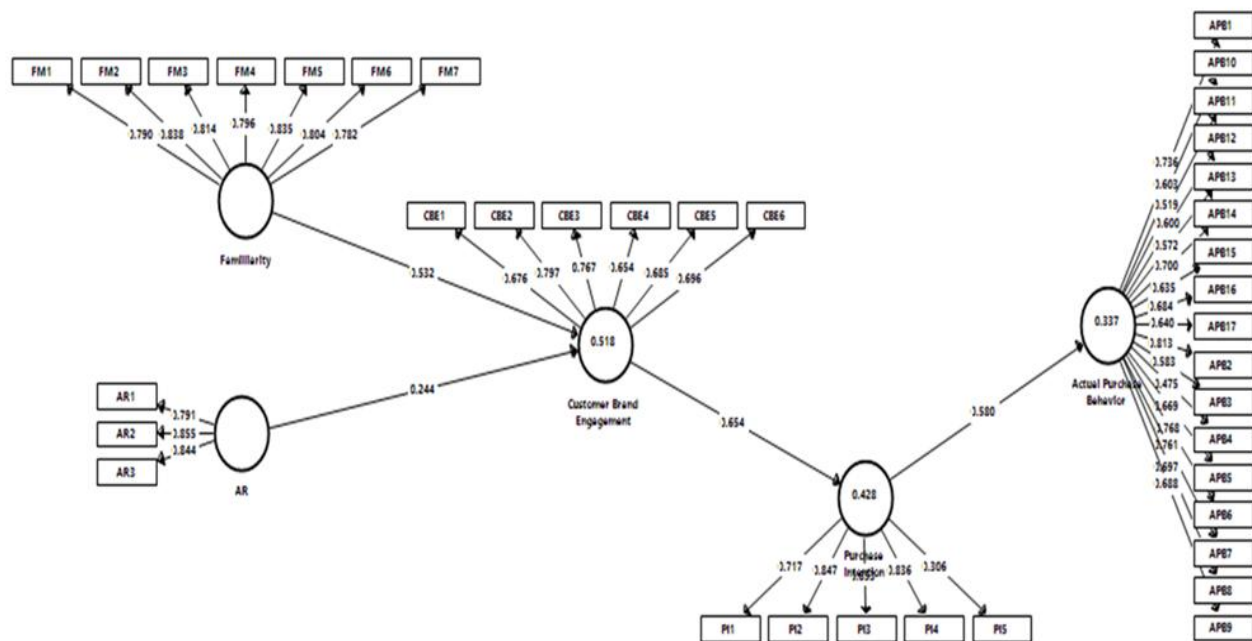
Constructs	Items	Loadings	Alpha	CR	AVE
Actual Purchase Behavior	APB1	0.736	0.919	0.928	0.437
	APB10	0.603			
	APB11	0.519			
	APB12	0.6			
	APB13	0.572			
	APB14	0.7			
	APB15	0.635			
	APB16	0.684			
	APB17	0.64			
	APB2	0.813			
	APB3	0.583			
	APB4	0.475			
	APB5	0.669			
	APB6	0.768			
	APB7	0.761			
	APB8	0.697			
	APB9	0.688			
Augmented Reality	AR1	0.791	0.775	0.869	0.69
	AR2	0.855			
	AR3	0.844			
Customer Brand Engagement	CBE1	0.676	0.807	0.862	0.51
	CBE2	0.797			
	CBE3	0.767			
	CBE4	0.654			
	CBE5	0.685			
	CBE6	0.696			
Familiarity	FM1	0.79	0.912	0.93	0.654
	FM2	0.838			
	FM3	0.814			
	FM4	0.796			
	FM5	0.835			
	FM6	0.804			
	FM7	0.782			
Purchase Intention	PI1	0.717	0.764	0.849	0.55
	PI2	0.847			
	PI3	0.853			
	PI4	0.836			
	PI5	0.306			

Source: Author calculated through Smart PLS

Table: 3 Discriminant Validity (HTMT Ratio)

HTMT Ratios	Actual Purchase Behavior	Augmented Reality	Customer Brand Engagement	Brand Familiarity	Purchase Intention
Actual Purchase Behavior					
Augmented Reality	0.595				
Customer Brand Engagement	0.646	0.76			
Familiarity	0.599	0.795	0.809		
Purchase Intention	0.651	0.576	0.826	0.674	

Source: Author calculated through Smart PLS

Figure 2: Measurement Model Assessment

Source: Author designed through Smart PLS

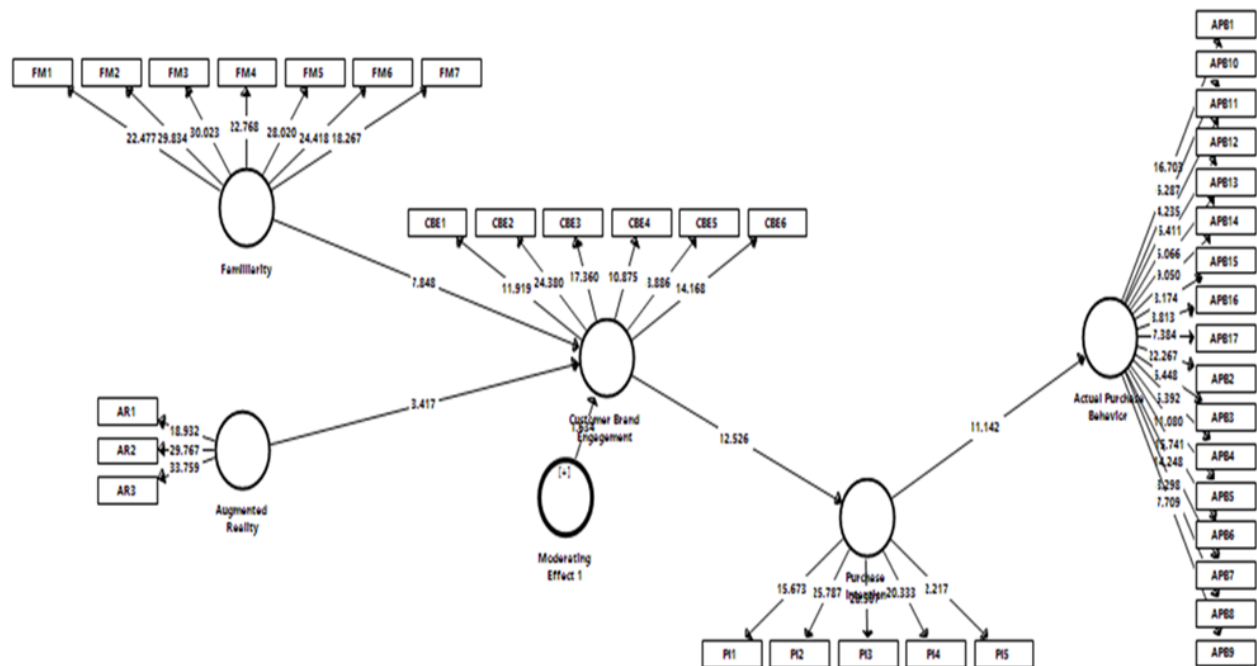
Structural Model Assessment

After the measurement model's validity and reliability were confirmed, structural modeling was done to assess the hypotheses in the setting of manufacturing organizations. To evaluate if the model and connections are significant with the data gathered, path coefficients, t-values, and standard errors are computed. The values of the path coefficients showed whether or not the assumptions were supported. To estimate main and moderated effects, a bootstrap technique was computed in Smart PLS 3 (Ringle et al., 2005). Customer brand engagement is positively impacted by augmented reality, as Table 4 and Figure 3 demonstrate. H1 is thus supported ($\beta = 0.1$, $t = 3.081$; LL = 0.049, UL = 0.152). Additionally, the results revealed a statistically significant correlation ($\beta = 0.252$, $t = 3.358$; LL = 0.136, UL = 0.384) between augmented reality and consumer brand engagement, supporting H2. Furthermore, purchase intention and consumer brand involvement are significantly correlated ($\beta = 0.662$, $t = 12.767$; LL = 0.57, UL = 0.739), supporting H3. Furthermore, it was discovered that buy intention and actual purchase behavior had a substantial and positive connection ($\beta = 0.597$, $t = 10.779$; LL = 0.508, UL = 0.684), supporting H4. Furthermore, familiarity was shown to be ineffective in mediating the relationship between augmented reality and customer brand engagement ($\beta = 0.111$, $t = 1.577$; LL = -0.004, UL = 0.234), indicating that H5 is not supported.

Table 4 Path Analysis

Path Analysis	Mean	S.D.	t-value	P Value	L.L	U.L	Decision
H1: Augmented Reality -> Actual Purchase Behavior	0.100	0.032	3.081	0.001	0.049	0.152	Supported
H2: Augmented Reality -> Customer Brand Engagement	0.252	0.077	3.358	0.000	0.136	0.384	Supported
H3: Customer Brand Engagement -> Purchase Intention	0.662	0.051	12.767	0.000	0.57	0.739	Supported
H4: Purchase Intention -> Actual Purchase Behavior	0.597	0.054	10.779	0.000	0.508	0.684	Supported
H5: Moderating Effect 1 -> Customer Brand Engagement	0.111	0.073	1.577	0.058	-0.004	0.234	Not Supported

Source: Author calculated through Smart PLS

Figure 3: Structural Model Assessment

Source: Author designed through Smart PLS

Discussion and Implications

Discussion

The results of this study underscore the high significance of augmented reality in the context of consumer behavior and digital buying in Pakistan. The findings prove that AR influences CBE positively, which leads to a greater degree of purchase intention and actual behavior (Enyejo et al., 2024). This can be interrelated with the results uncovered and other researchers who determine that the technology can improve customer satisfaction and experience because AR is used for overlaying virtual materials on actual environments thus forming an interactive interaction between customers and the brand (Ahmad et al., 2022).

The presented findings can also reflect the debated issues of the Theory of Planned Behavior. In this instance, the technology is used to promote brand purchase that is one of the TPBs aspects. Also, the findings reveal that the association between AR use and customer behavior can be mediated by the level of CBE and purchase intention. In this way, consumers' intentions can significantly impact their behavior as TPB presupposes (Daoud et al., 2023).

The findings of the study highlight the relevance of AR for companies operating in Pakistan. This innovative technology could be effectively used for boosting the levels of brand engagement and affecting purchasing behavior for the enterprises working in industries, where digital purchasing is becoming increasingly popular (Dong & Wang, 2024). In addition, AR may help businesses gain a competitive edge in the extremely competitive environment by not only attracting, but by converting attention into sales (Diaa, 2022).

In addition, it was found that purchase intention role in relationship between CBE and actual purchase, thereby highlighting that higher emotional and cognitive engagement towards the use of the brand led to a higher purchase intention. In addition, the latter had a positive impact on actual purchase decision. Therefore, companies must consider AR as a tool to achieve not only higher engagement but also stimulate sales in the competitive digital environment (Nawres et al., 2024).

Yet, what was surprising is that familiarity did not moderate the effect of AR on customer-based experience in either case. For instance, in the case of brand familiarity, if I was more familiar with a brand, I would anticipate the effect of AR on customer-based experience to be stronger (Ojiaku et al., 2024). Conversely, if the customer is less familiar, AR will have a lesser effect on experience. Apparently, this is not the case, as AR still has a positive effect on experience, regardless of brand familiarity (Hairani et al., 2024). It may be hard to explain why brand familiarity does not make AR experiences stronger as opposed to the argument that one's familiarity with a brand can predispose them to have better experiences with AR.

Theoretical Contributions

The theoretical contributions of the study are significant, as they allow to expansion of the new technology impact understanding, namely, the augmented reality application for consumer behaviour, customer brand engagement, and purchase intention, considering the moderating variable of familiarity. These contributions can be considered in several distinct aspects: The first and foremost theoretical contribution lies in the development of the application of the Theory of Planned Behaviour. The study incorporates augmented reality as a technological factor that has an impact on consumer behaviour. The study created by AR itself can be more perfectly mediated when customers are engaged with brands. The study also emphasises the increasing importance of digital tools, namely, AR, in changing the modes of consumer behaviour perception and rendering an existing driver for the form of a virtual brand perception. This aspect of the contribution is still insufficiently analysed in the marketing literature.

Customer brand engagement is introduced as the linking variable between two technological aspects: augmented reality and the purchase behaviour of consumers. Thus, this mediating variable enables to understand better how augmented reality enhances the emotional and cognitive connection with the brand that creates a more powerful purchase intention. The final contribution in terms of theory is related to connecting the purchase intention with the purchase activity itself, which is an insufficiently studied field in the marketing literature. If the purchase intention has been studied in the marketing literature, less attention has been paid to the influence of augmented reality with the form of customer brand engagement to change the purchase activity itself. The theoretical variable relationship presented above allows widening the model of the digital purchase process.

Another important theoretical contribution can be considered in the introduction of the moderating variable familiarity. However, the findings suggested that familiarity does influence the relationship between augmented reality and customer brand engagement is counter-intuitive. Instead, it can be suggested that AR impacts CBE at any level of consumer familiarity with a brand. This theoretical contribution allows understanding that technology can change the existing brand perception limitation components and allows superseding past stereotypes. Theoretical contribution in this sphere made so AR can help develop existing five-dimensional familiarity in the form of knowledge, intimacy, dependence, and brand awareness. If the latter two aspects decrease the level of familiarity, then AR can increase these metrics.

Further theoretical contribution lies in AR application for the organisation of consumer intention to purchase any good or service. This intention can be considered as connecting the augmented reality with the TPB components. Thus, developed concepts take into account the external impact of some new technologies on changing existing attitudes, subjective norms, and perceived ability to behave components. These technological components of the previously presented components imply the theoretical

contribution of the study. Another theoretical contribution can be related to the application of augmented reality in the study of the Pakistani market's effect. Indeed, technology has some country-specific cultural and technological differences in obtaining and accepting impact that are still not well understood. The expansion of the understanding of these aspects was made in the study, which allows the existing AR knowledge to expand in marketing globally.

Practical Implications

The development of technology has brought about significant changes in today's environment, making nearly everything conceivable that was before unthinkable. Every field has changed with time. But marketing has changed throughout the years. The majority of people's lives are now significantly impacted by technology due to its growing significance. Organizations nowadays are debating the value of technology use, how to position the company's product in the marketing paradigm and how social media influences consumers' propensity to make a purchase. Examining the many technological innovations that might affect purchasing decisions is crucial in this setting. Furthermore, in order to comprehend how businesses are improving, the consumer must embrace technological developments like augmented reality.

The current study's strategy might be seen as an experimental attempt to bridge these gaps in the literature. Customers' intents to buy are impacted by augmented reality, particularly those with higher education. The research provided a strategic option for businesses that are reinventing themselves through technology advancement and have seen a decline in revenue as a result of fierce competition. Companies can obtain a fair market share and one-time payment by repositioning their brands. In addition to influencing consumers' online buying habits, these kinds of activities may also help develop word-of-mouth advertising strategies. Prior research has demonstrated that purchasing intention is positively impacted by augmented reality. Policymakers and marketers should pay attention to and welcome new technology advancements, as informed consumers want to surf and shop on these platforms.

Limitations and future research directions

An independently created questionnaire was utilized to assess the study's structure. To right the wrong in this instance, more study has to be done. Pakistani mobile goods purchasers were included in the study's sample frame. This study's findings cannot be applicable to other sectors of the economy or services. Probability sampling was replaced with convenience sampling, a non-probability sampling technique. The sample frame depicts Pakistani consumers of wearable technology on average. Using a probability sample approach is advised to increase the validity of current study findings, even though it prevents researchers from generalizing their findings. The familiarity function, which was mostly shown to be unimportant, was utilized as a moderator between the independent and mediating factors. Thus, a few more indications. In addition to augmented reality and customer brand involvement, a number of other variables may be utilized to demonstrate which variables lead to higher purchase intensity. Similar to this study, most research hypotheses were approved while others were denied; yet, other sectors may have different results. Since there isn't much study in this field, future studies that get over these obstacles should give more accurate information regarding augmented reality with more factors.

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Awais Akram (conception and design or acquisition of data; analysis or interpretation of data; drafting the paper); Muhammad Bilal (methodology, review and editing) Dr. Nadia Nasir, Dr. Waqas Khan and Aysha Zummar (review and editing). All authors read and approved the final manuscript.

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