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Big Five Personality Traits and Attitude Towards Augmented Reality Advertisement: Mediating Role of Consumer Attitude and Moderating Role of Brand Image

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Abstract: *The primary objective of this research is to discern the profound impact of distinct personality traits, namely agreeableness, conscientiousness, extraversion, openness to experience, and neuroticism, on consumer attitudes and perceptions of AR advertisements. Simultaneously, the study investigates the nuanced moderating role of brand image, examining its effect on the intricate interplay between personality traits and consumer attitudes. This investigation employs a robust quantitative approach, drawing upon a sample of 475 respondents meticulously selected through a purposive sampling technique, ensuring a well-rounded representation. The findings unveil compelling insights into the complex relationships at play. Notably, personality traits exhibit substantial correlations with attitudes toward AR advertisements. Furthermore, consumer attitudes are identified as key mediators, illuminating the pivotal role they play in bridging the gap between personality traits and attitudes toward AR advertisements. The implications of these findings extend far beyond the confines of this study. Marketers operating in Pakistan and beyond stand to gain invaluable guidance in their endeavors to harness the potential of AR technology. A deeper understanding of the intricate interplay between personality traits and brand image can empower marketers to craft more precise and impactful advertising strategies.*

Key Words: Big Five Personalities, Consumer Attitude, Augmented Reality, Brand Image

Introduction

In today's digitally immersive world, advertising has undergone a profound transformation, with Augmented Reality (AR) emerging as a captivating and innovative tool to engage consumers. AR advertisements seamlessly blend the virtual and physical worlds, offering a unique and interactive experience that has the potential to shape consumer attitudes and behaviors. However, the effectiveness of these AR advertisements does not exist in isolation but is intricately connected to the psychological makeup of individuals and the image projected by the brands (El-Said, 2020; Hameed et al., 2023; Uhm et al., 2022). AR technologies have been gaining numerous applications and users as a result of internet-connected devices. With the new levels of professional and educational applications that weren't previously possible, AR enables a higher level of engagement between the user and real-world items, broadening the user's experience of how they perceive and feel such objects. The goal is to create an AR system to direct information and historical, cultural, and commercial activities. The internet's extension of AR to the five senses of taste, sight, hearing, touch, and smell makes it new.

The use of AR in advertising is becoming more popular in Pakistan's marketing sector. AR technology has evolved into a powerful marketing tool, providing innovative ways to capture consumers' attention and potentially revolutionizing marketing tactics. Because of the integration of AR into the marketing environment, advertising and marketing professionals in Pakistan now have new opportunities and horizons. The challenge is not only capturing consumers' attention but also keeping their interest in a highly competitive market with numerous options. In this endeavor, marketers are increasingly employing

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cutting-edge technologies such as AR (Ahmad et al., 2023; Fanea-Ivanovici et al., 2023). AR has the potential to bridge the gap between advertising catered to younger demographics' preferences and consumers' ever-changing needs. It serves as a dynamic means of interacting with and engaging customers in new and interesting ways.

In Pakistan, an emerging economy, intense market competition provides consumers with a wide range of options across numerous product categories. Marketers must use cutting-edge tools to differentiate themselves from the competition and successfully connect with their target audience in this environment. One such tool is AR technology, which cannot be overstated in terms of its importance in bridging the gap between consumer preferences and advertising that appeals to the younger generation. However, as the use of AR in advertising in Pakistan expands, the critical component of a brand image must be considered in this equation. The brand image represents consumer perceptions and associations with a specific brand. It has a significant influence on how consumers make decisions and respond to advertising. To fully grasp the implications of AR in advertising in the Pakistani market, it is necessary to understand how AR affects the brand image and how brand image affects consumer attitudes and behaviors. In the age of digitization, consumer awareness is also a critical prerequisite for innovation and market success. The exposure and engagement of consumers with AR advertisements have a significant impact on their attitudes toward purchasing specific brands. As a result, it is critical for marketers and researchers alike to gain insights into the changing dynamics of advertising in Pakistan by investigating the interactions between AR, brand image, consumer attitudes, and purchasing behavior.

The aim of this present study is to reveal a general overview of the Five-Factor Model and customer perceptions of the brand industry in Pakistan. Additionally, we used this theoretical framework to investigate the study's hypotheses with Big Five personality traits with AR. We concentrate on those who have the ability to participate in consumer attitudes, which is consistent with the underlying proposition. Additionally, the connection between the various factors will be looked at. This current study demonstrates the mediating effect of the attitudes of different types of consumers and the urgent necessity for enterprises to investigate cutting-edge methods to increase user awareness. Therefore, the purpose of the current acknowledgment is to explain the degree to which persona traits and customer attitudes are attitudes toward AR advertisements.

Literature Review

Extensive research in the field of advertising psychology has revealed a growing interest in comprehending the complex interactions between a person's personality traits and their attitude toward contemporary advertising mediums (Srivastava et al., 2021). Extraversion, one of these traits and a component of the well-known Big Five personality model has gotten a lot of attention (Blair et al., 2022). Extraversion is defined by sociability, assertiveness, and a desire for new and stimulating experiences (Toonkamthornchai, 2020). AR advertising has emerged as a dynamic, cutting-edge tool for marketers as consumers increasingly immerse themselves in the digital world. It becomes clear whether a person's extraversion, with its inherent proclivity for social interaction and novelty-seeking, influences their perception of AR advertisements (Tarka et al., 2022). Previous research has revealed some fascinating details about this relationship. Extraverts, according to the study, are more likely to respond positively to AR advertising because it corresponds to their outgoing and daring nature (Beitelspacher & Getchell, 2023). This points to a possible link between extraversion and attitudes towards AR advertising. Nonetheless, because of the complexities of human personality traits and the ever-changing nature of digital advertising, this relationship remains an intriguing subject for future research. So it is hypothesized that:

H1: There is a relationship between Extraversion and attitude toward AR advertisement.

Extraversion has been identified as a fascinating topic by researchers studying the intricate web of human personality traits and their influence on consumer behavior, marketing, and psychology (Smith, 2020). The Big Five personality model's most prominent extraversion dimension is frequently characterized by sociability, assertiveness, and a natural proclivity for constructive interpersonal interactions (Butt et al., 2021). Similarly, Parmaksız (2022) conducted a thorough investigation into extraversion's role as a mediator in the formation of consumer attitudes. Their findings suggest that extraversion can act as a



mediator, influencing how consumers react to and interact with various advertisements and products (M. K. Iqbal et al., 2021). According to the authors, extroverts are more likely to form emotional connections with brands and marketing initiatives, which influences their general attitudes toward consumers. So it is hypothesized that:

H1a: There is a relationship between Extraversion and the consumer attitude.

In the realm of advertising psychology, understanding the multifaceted connections between personality traits, consumer attitudes, and advertising effectiveness has been a persistent focus of investigation (Morimoto, 2022). Furthermore, research by Duffett Dr & Miller (2022) reinforced this notion by emphasizing that the mediation effect of consumer attitude is statistically significant in the context of AR advertising. This implies that the disposition of being extraverted not only directly influences one's consumer attitude but also subsequently sways one's specific attitude towards AR advertisements, underscoring the importance of this mediating mechanism (Du et al., 2022). However, as with any research, there exist nuances and exceptions within this framework, as individual variations in Extraversion may lead to varying degrees of mediation. So it is hypothesized that:

H1b: Consumer attitude mediates the relationship between Extraversion and attitude toward AR advertisement.

Within the realm of advertising psychology, an intriguing facet under scrutiny is the association between individual personality traits and attitudes toward contemporary advertising channels (Rehman & Zeb, 2023). In this context, Agreeableness, one of the key dimensions in the widely accepted Big Five personality model, holds a particular interest (Rehman & Al-Ghazali, 2022). Numerous studies have explored this relationship, shedding light on the potential influence of Agreeableness on attitudes toward AR advertising (Tsai et al., 2021). For instance, the research conducted by Hatzithomas et al. (2021) revealed a notable connection between higher Agreeableness scores and a positive attitude toward AR advertisements. Their findings suggest that individuals who exhibit more agreeable traits may be predisposed to respond favorably to AR advertising due to its potential for fostering interpersonal connections and delivering socially responsible messages. So it is hypothesized that:

H2: There is a relationship between Agreeableness and attitude toward AR advertisement.

The landscape of consumer behavior has long been enriched by investigations into the role of personality traits, and among the Big Five personality traits, Agreeableness stands out as an essential dimension (Al-Gasawneh et al., 2023). Agreeableness encapsulates attributes such as empathy, cooperation, and a predisposition toward interpersonal harmony (Shahab et al., 2021). Similarly, Khatri et al. (2022) conducted a study examining the relationship between Agreeableness and brand loyalty. Their findings revealed that individuals high in Agreeableness are more likely to develop strong, enduring attachments to brands that align with their values and display ethical practices. This suggests that Agreeable individuals' proclivity for cooperation and maintaining positive relationships extends to their consumer choices and attitudes. So it is hypothesized that:

H2a: There is a relationship between Agreeableness and consumer attitude.

The interplay between personality traits and consumer attitudes toward modern advertising mediums like AR has piqued the curiosity of researchers and marketers alike (Islam & Bowling, 2022). Research by Baykal et al. (2022) uncovered evidence that consumer attitude indeed acts as a mediator in the relationship between Agreeableness and attitude towards AR advertisements. Their study suggests that Agreeable individuals' proclivity toward positive interpersonal interactions and cooperation translates into a more favorable consumer attitude, which, in turn, positively influences their attitude toward AR advertisements (Alqahtani & Kavakli-Thorne, 2020). This mediation effect underscores the importance of understanding the underlying psychological mechanisms through which personality traits impact consumer responses to emerging advertising formats. So it is hypothesized that:

H2b: Consumer attitude mediates the relationship between agreeableness and attitude toward AR advertisement.

The impact of personality traits on individuals' attitudes towards advertising has long been a topic of study in the field of consumer psychology (Al Kurdi & Alshurideh, 2023). Furthermore, Sajjad et al. (2023)

discovered the importance of conscientiousness in predicting consumer attitudes towards AR advertisements. They hypothesized that because conscientious people prefer structured and purpose-driven experiences, they would value the structured and educational nature of AR advertisements (K. Iqbal & Ahmad, 2023). However, it is critical to recognize that there are individual differences and that not all conscientious people will react in the same way to AR advertising stimuli, emphasizing the need for further research. As a result, it is hypothesized that:

H3: There is a relationship between Conscientiousness and attitude toward AR advertisement.

For decades, researchers in consumer behavior and psychology have investigated the impact of personality traits on people's attitudes toward goods, brands, and advertisements (Hashim et al., 2023). Conscientiousness is one of the Big Five personality traits studied, along with organization, responsibility, and goal-directed behavior. Furthermore, Kim & Choo's (2023) research backs up this claim by arguing that conscientiousness functions as a predictor of consumer attitude by mediating the perception of products as trustworthy and dependable. These findings imply that conscientious people are more likely to favor brands and products that are perceived to be dependable and consistent (C.-H. Liu et al., 2022). However, the complexities of the relationship between conscientiousness and consumer attitude must be acknowledged. Conscientious people may prefer dependability and responsibility in their purchasing decisions, but their attention to detail may cause them to be more skeptical or critical of advertisements and products. So it is hypothesized that:

H3a: There is a relationship between Conscientiousness and consumer attitude.

Investigating the influence of personality traits on consumer responses to emerging advertising platforms has gained significant traction in the field of advertising psychology (Ahmad et al., 2023). Conscientiousness, a Big Five personality trait, is characterized by traits such as diligence, organization, and self-discipline (Fanea-Ivanovici et al., 2023). Its potential impact on individuals' attitudes towards AR advertisements is gaining attention. Scholars in the field have attempted to delve into this intriguing connection (Qadri et al., 2023). Furthermore, Tao (2020) has alluded to the role of consumer attitude as a mediating factor in this equation. Their findings suggest that conscientiousness may have an indirect impact on attitudes toward AR advertisements via consumer perception and evaluation (Erdmann et al., 2023). Conscientious people may perceive AR advertisements as more informative and credible, contributing to a favorable consumer attitude toward them. So it is hypothesized that:

H3b: Consumer attitude mediates the relationship between conscientiousness and attitude toward AR advertisement.

The dimension of Openness to Experience, within the framework of the Big Five personality traits, has increasingly become a focal point in understanding how individuals interact with the ever-evolving world of advertising, particularly in the realm of AR (Arya et al., 2023). Furthermore, the research of Zhang et al. (2023) supported this relationship by demonstrating that Openness to Experience significantly predicts positive consumer attitudes toward AR advertisements. The study found that individuals with a greater inclination for Openness to Experience tend to view AR ads as intellectually stimulating and artistically engaging, thereby fostering a more favorable disposition towards them (Zhang & Wang, 2023). However, it is essential to acknowledge that individual responses can vary, and not all individuals high in Openness will uniformly embrace AR advertising in the same way. So it is hypothesized that:

H4: There is a relationship between Openness to experience and attitude toward AR advertisement.

Exploring the intricate connection between an individual's personality traits and their consumer attitude is a prominent avenue of research in the field of advertising psychology (Choi & Choi, 2020). Among the five dimensions of the Big Five personality model, Openness to Experience stands out as a dimension characterized by traits such as creativity, curiosity, and a willingness to engage with novel ideas and experiences (Hoffmann & Mai, 2022). Moreover, Orús et al. (2021) have expanded on this insight by revealing that Openness to Experience can act as a predictor of consumer attitudes not only through its appreciation for novelty but also through a heightened receptivity to the emotional and aesthetic aspects of advertising. This dimension seems to foster an openness to new ideas and an appreciation for the imaginative qualities of advertising content, thus contributing to a more favorable consumer attitude. So it is hypothesized that:

H4a: There is a relationship between Openness to experience and consumer attitude.



Within the realm of advertising psychology, understanding the complex dynamics between personality traits and consumer attitudes toward contemporary advertising platforms like AR has gained substantial traction (Al-Ghazali et al., 2022). One such personality trait under examination is Openness to experience, a facet of the Big Five model characterized by a proclivity for novelty, curiosity, and a willingness to engage with unconventional ideas and experiences (Joo & Yang, 2023). In recent years, the research community has directed its attention toward deciphering whether a person's level of Openness to experience shapes their attitude toward AR advertisements and, if so, how this relationship is mediated by consumer attitude (Wang et al., 2020). However, it's worth noting the nuanced nature of these findings (Lavoye et al., 2021). Not all Open individuals may uniformly exhibit a favorable attitude toward AR advertisements (Daassi & Debbabi, 2021). Personal preferences and contextual factors can influence the strength and direction of this relationship (F. Liu et al., 2022). As such, the study of this intricate interplay between Openness to experience, consumer attitude, and AR advertising remains an evolving and captivating area for continued exploration. So it is hypothesized that:

H4b: Consumer attitude mediates the relationship between Openness to experience and attitude toward AR advertisement.

In the realm of advertising psychology, understanding how individual personality traits may influence consumer attitudes toward emerging advertising formats like AR has been a subject of significant interest (Hoffmann et al., 2022). Neuroticism, one of the fundamental dimensions of the Big Five personality model, has drawn particular attention in this context (Chen et al., 2023). Furthermore, the investigation by C.-H. Liu et al. (2023) reinforced the notion that neuroticism can indeed influence consumer attitudes toward AR advertisements, with high neuroticism individuals perceiving these ads as more overwhelming and potentially stress-inducing. However, it's essential to recognize that this relationship is nuanced, and not all high-neuroticism individuals respond uniformly (Smink et al., 2020). The unique blend of personality traits within each person can result in variations in their attitudes toward AR advertising. So it is hypothesized that:

H5: There is a relationship between Neuroticism and attitude toward AR advertisement.

The role of personality traits in shaping consumer attitudes has been a subject of profound interest among researchers and marketers alike (Eugene Yin-cheung et al., 2023). Neuroticism, one of the prominent dimensions within the Big Five personality model, is characterized by heightened emotional reactivity, anxiety, and a predisposition toward negative affectivity (Massa & Ladhari, 2023). It stands to reason that such individuals may approach various aspects of life, including their consumer choices, with a distinct perspective (Jiang et al., 2021). Conversely, the findings of a study by Nazir et al. (2023) proposed a somewhat nuanced view. While Neuroticism was linked to a more cautious approach to consumer behavior, it was also associated with a heightened responsiveness to advertising that offered emotional reassurance and safety. This suggests that Neurotic individuals might resonate more with advertisements that provide a sense of comfort and security, thereby influencing their consumer attitude positively in certain contexts. So that it is hypothesized that:

H5a: There is a relationship between Neuroticism and consumer attitude.

Exploring the intricate dynamics between individual personality traits and their influence on consumer behavior in the context of emerging advertising formats such as AR is a captivating endeavor (Ho Nguyen et al., 2022). Among the Big Five personality traits, Neuroticism, characterized by emotional instability, anxiety, and heightened reactivity to stressors, has recently gained attention in the realm of advertising psychology (De Canio et al., 2021). As AR advertising becomes more prevalent, understanding how Neuroticism may relate to consumer attitudes toward such advertisements has become a focal point of investigation (Bonnin, 2020). This implies that neurotic individuals' emotional predisposition may lead them to have a more favorable or unfavorable attitude towards AR advertisements, contingent upon their broader consumer attitude (J.-H. Kim et al., 2021). This mediation posits that the connection between Neuroticism and attitude towards AR advertising may not be a straightforward linear relationship but rather a multifaceted interplay involving individual disposition and general consumer perceptions. So that it is hypothesized that:

H5b: Consumer attitude mediates the relationship between Neuroticism and attitude toward AR advertisement.

The relationship between an individual's general attitude and their specific attitude toward AR advertisements is an important aspect of consumer behavior research (Chai et al., 2022). Understanding how these two factors interact is critical for advertisers attempting to develop effective marketing strategies. In this context, "attitude" refers to an individual's overall disposition or evaluation, whereas "attitude towards AR advertisement" refers to their specific perception of AR advertisements (Arora et al., 2023). However, it is important to note that the relationship between general attitude and attitude towards AR advertising is nuanced and complex (Park & Yoo, 2020). Additional factors, such as AR advertisement content and design, may have a significant impact. As a result, while general attitudes toward technology and prior AR experience can be used to predict attitudes toward AR advertisements, they are only one dimension of the complex web of variables influencing attitudes toward AR advertisements. So that it is hypothesized that:

H6: There is a relationship between attitude and attitude towards AR advertisements.

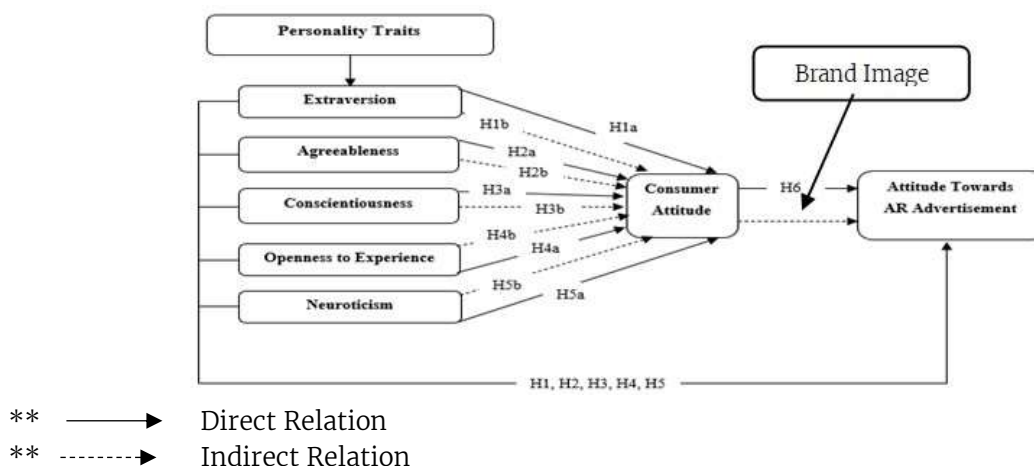
In the contemporary landscape of advertising, AR has emerged as a powerful tool for marketers, offering interactive and immersive experiences to engage consumers (Aw et al., 2023). AR advertisements have the potential to shape consumer attitudes and influence their purchase intentions (Nguyen, 2022). In the digital age, brand image can be influenced by online interactions and social media presence (Uhm et al., 2022). Consumers are increasingly exposed to brand-related content and discussions in digital spaces. Positive brand image can be reinforced or damaged through online brand communities and user-generated content (El-Said, 2020). Moreover, as consumers engage with AR advertisements on digital platforms, their brand image perceptions may evolve (Hameed et al., 2023). Positive experiences with AR advertisements can enhance brand image, while negative experiences can tarnish it (Lavoye et al., 2023). Hence, it is essential for marketers to actively manage brand image in the context of digital and AR advertising (Gatter et al., 2022). In the realm of AR advertising, consumer attitude toward AR technology plays a pivotal role in shaping attitudes toward AR advertisements (Blair et al., 2022). However, the moderating and mediating influence of brand image cannot be overlooked. A positive brand image can enhance the impact of consumer attitudes on AR advertisements, while a negative brand image can diminish it (Huang, 2022). Understanding the interplay between consumer attitude, brand image, and AR advertisements is crucial for marketers seeking to leverage AR technology effectively in their advertising campaigns. So that it is hypothesized that:

H7: Brand Image moderates the relationship between consumer attitude and attitude toward AR advertisement (Figure 1).

Conceptual Framework

Figure 1

A conceptual research framework for attitude toward augmented reality advertisement



Research Methodology

This study was guided by a comprehensive research design, taking into account the complex interplay between personality traits, consumer attitudes, brand image, and attitudes towards AR advertisements in



the Pakistani context. To ensure the validity and reliability of the research findings, a quantitative approach was adopted, supported by a random sampling technique. The choice of research participants was rooted in the study's objectives, which aimed to investigate the influence of personality traits and consumer attitudes on AR advertisements while also examining the moderating role of brand image. A structured questionnaire was methodically developed, serving as the primary instrument for collecting data. The questionnaire was thoughtfully designed to encompass all exogenous variables, including personality traits, consumer attitudes, and attitudes toward AR advertisements, based on established scales and previous research findings. To ensure the comprehensiveness and accuracy of the data collected, a 5-point Likert scale was utilized, with participants rating their responses on a scale ranging from 1, denoting "Strongly Disagreed," to 5, representing "Strongly Agreed." This choice was informed by the scale's recognized advantages in quantitative research, enhancing the precision and depth of data capture.

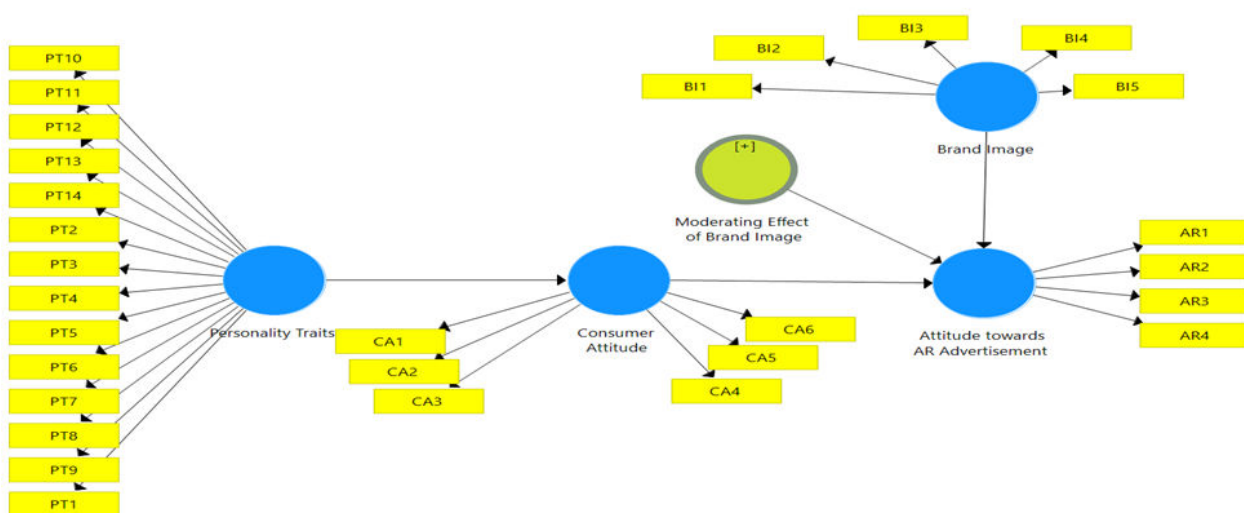
The target population for this study comprised Pakistani business graduates, in alignment with the research objectives. The sample size was strategically determined to achieve the research's objectives effectively. Out of a total study population of 550, 475 respondents formally participated in the analysis, representing an impressive participation rate of 86.36%. To assess the key constructs of the research model, items were carefully selected from reputable sources. Specifically, items evaluating AR Advertisement were adapted from the work of Venkatesh et al. (2003), while items measuring the Big Five personality traits were sourced from Sun, Wang, Gao, and Li (2018). In addition, consumer attitudes were gauged using items from Sun et al. (2018), and brand image was assessed through items borrowed from Cho and Fiore (2015). For the robust analysis of the collected data, the research utilized sophisticated software tools, specifically SPSS and SmartPLS. These software applications were chosen for their ability to address complex data-related challenges, ensuring the production of clear and dependable results. Structural Equation Modeling (SEM) was employed as the primary analytical technique, allowing for the estimation of causal and empirical models and the comprehensive examination of the intricate relationships between latent constructs within the research framework.

Results

As part of this investigation, a trajectory model was created, and the main tool for running experiments was SMART PLS 4.0, which was used extensively throughout. The partial least squares (PLS) method, also known as PLS, was used in communication and behavior research to investigate unstructured relationships. PLS is a subset of structural equation modeling, which is another name for structural modeling equations. The findings of this study were derived from the analysis of 475 distinct samples, bringing the total number of samples used in this study to 475. The measurement model, also known as the external model, was used to demonstrate how buildings interacted with their environments. This model is also known as the measurement model. The structural model (Figure 2), on the other hand, accurately represented how various building components were connected to one another. Previously, the measurement model was referred to as the external model.

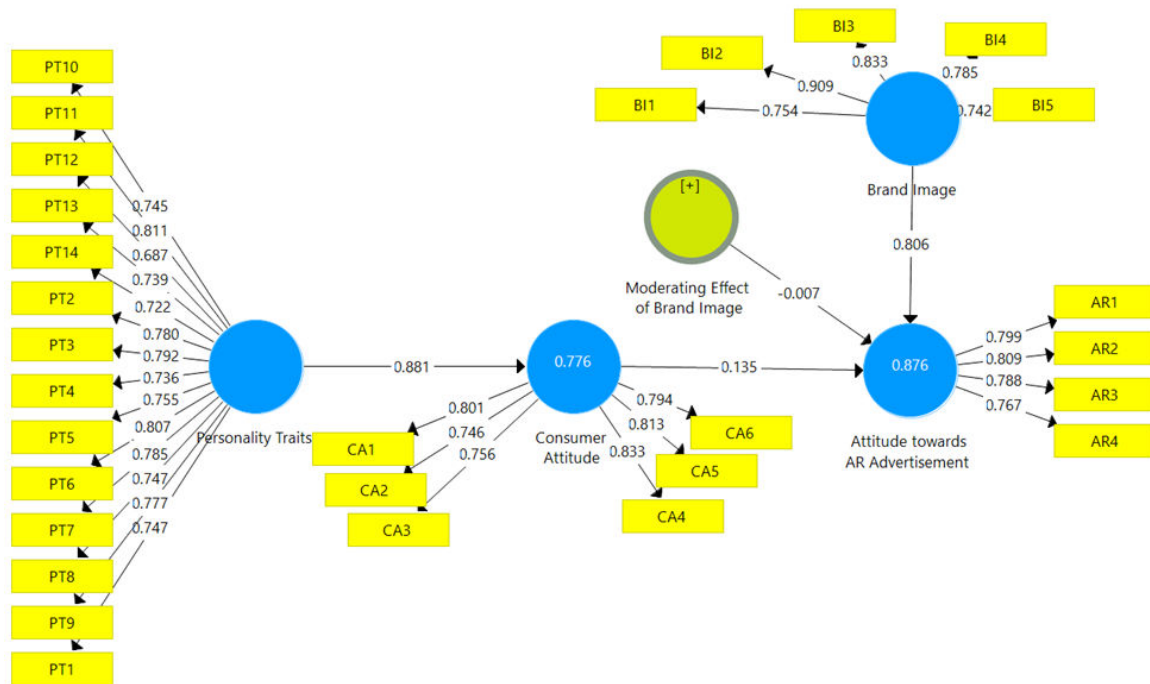
Figure 2

Variable structural model



The utilization of the questionnaire allowed for the collection of the data required for this investigation. The first step is to conduct research to determine whether or not the reflective models can be relied upon and whether or not they are valid. In this regard, we make use of the PLS algorithm (Figure 3).

Figure 3
PLS algorithm



All 29 metrics have 0.70 outer loadings. (Table 1) and (Figure 3). A total of 14 PT indicators were used, all of which have reliable outer loading (Table 1). In the CA, items were divided into six items. AR items were divided into four items. In the brand image, items were divided into 5, all of which are overloading above 0.70.

Table 1
The evaluation result of the measurement model

Constructs	Items	Loading	Cronbach's Alpha	Composite Reliability	AVE
Personality Traits	PT1	0.747	0.760	0.815	0.741
	PT2	0.780			
	PT3	0.792			
	PT4	0.736			
	PT5	0.755			
	PT6	0.807			
	PT7	0.785			
	PT8	0.747			
	PT9	0.777			
	PT10	0.745			
	PT11	0.811			
	PT12	0.687			
	PT13	0.739			
	PT14	0.722			
Consumer Attitude	CA1	0.801	0.872	0.907	0.662
	CA2	0.746			
	CA3	0.756			



Constructs	Items	Loading	Cronbach's Alpha	Composite Reliability	AVE
Brand Image	CA4	0.833	0.883	0.912	0.634
	CA5	0.813			
	CA6	0.794			
	BI1	0.754			
	BI2	0.909			
	BI3	0.833			
	BI4	0.785			
Attitude toward AR Advertisement	BI5	0.742	0.764	0.876	0.689
	AR1	0.799			
	AR2	0.809			
	AR3	0.788			
	AR4	0.767			

For the purpose of determining the calculation model's overall reliability, statistical measures such as Cronbach's alpha, factor loadings, and CR outcomes were utilized. Examining a model's convergent and discriminant properties can help one determine how trustworthy the model is. The degree to which AVE and CR both exceed 0.7 and 0.5, respectively, is the criterion that evaluates the convergence validity of the formula. Fornell and Larcker (1981) evaluated the model based on a predetermined set of criteria to determine how accurately it could differentiate between various entities.

The square root of the average variance extracted (AVE) was computed by the researchers to assess the discriminant validity of all variables. This was done by comparing the inter-correlation of the model developed with alternative forms to establish the discriminant validity, as suggested by Fornell and Larcker (1981) and Sander and Teh (2014).

Table 2

Discriminant validity

Variables	AR	BI	CA	ME	PT
Attitude towards AR advertisement	0.784				
Brand Image	0.850	0.800			
Consumer Attitude	0.910	0.832	0.814		
Moderating Effect	-0.857	-0.858	-0.885	1.00	
Personality Traits	0.942	0.825	0.812	0.796	0.732

Note: The square root of the extracted average variance is defined in the diagonal, and the rest of the records are values of correlation.

Based on these findings, we examined the structural model's output, focusing on the theoretical link between each construct. The predictive model's validity index was first used to assess the strength of each relationship. According to Hair et al. (2013), this method worked well for determining how two concepts were related. This result demonstrates that the model is extremely accurate at forecasting the future. Second, this model was used to describe Barber and Stewart's (2014) three-way conceptualization. They discovered that these ideas are linked and, as a result, can be viewed as a single concept. Third, when predicting outcome variables, we used hierarchical regression to see if all the variables in a model were linked to each other.

R² is a metric that can be used to evaluate how accurately the model can forecast future events. R² can also be interpreted in the sense that it demonstrates the extent to which the independent variables have an effect on the dependent variables as a whole. The value of this effect can be anywhere from 0 to 1, with one indicating that the prediction was spot on. R² is comprised of researchers from a wide variety of academic disciplines. They are forced to rely on general guidelines for acceptable R² values of 0.75, 0.50, and 0.25, which respectively explain significant, moderate, and weak levels of accuracy in making

predictions. These guidelines explain how significant, moderate, and weak levels of accuracy in making predictions are explained.

Table 3

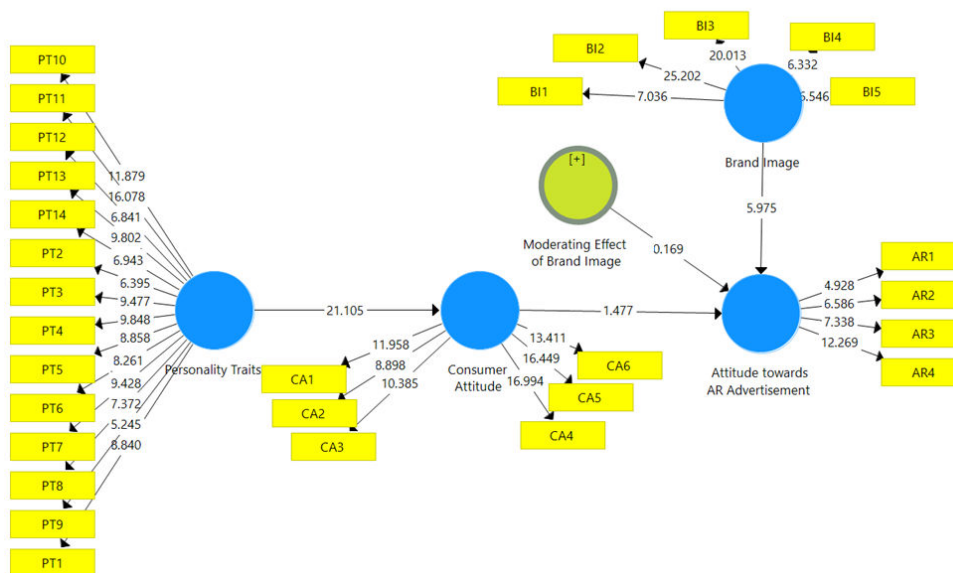
Model accuracy

Goodness of fit	R-Square (R ²)	Adjusted (R ²)
AR	0.876	0.872
CA	0.776	0.744

The results of PLS-Bootstrapping were observed (Figure 4). Path coefficients are considered significant at a certain level of confidence if the P value (p) is less than 0.05. According to Berkman et al. (2012), the path coefficients are statistically significant at a 0.05 level of confidence, so they are used in the stepwise regression model. We tested our hypotheses for both the dependent and independent variables during the regression analysis. To examine the significance and coherence of residuals, the PLS-bootstrapping method was used. PLS-bootstrapping was used to determine the importance of path coefficients; p-values less than 0.05 were considered significant (Hair, Black, Babin, and Anderson, 2010). When both the adjusted goodness-of-fit index (AGFI) and the improvement in the goodness-of-fit index (GFI) were greater than 0.90, the model was considered good. According to Bergman et al. (2012), the model fit well for all estimation equations that were accepted by SmartPLS 3.0 software and had values within an acceptable range of statistical significance during our regression procedure.

Figure 4

PLS-bootstrapping



We used the traditional bootstrap method to understand the robustness of our results. According to Sander (2014), mediation is a situation in which a mediator component in the PLS route model takes up some of the influence that would normally be exerted by an exogenous construct on an endogenous structure. This influence would normally be exerted upon the endogenous structure by the exogenous construct. Mediation is the influence of independent variables on the dependent variable in the PLS. Available, as our results suggest, all the variables have p-values below 0.005, so all our hypotheses are accepted.

Table 4

Hypothesis relationships

Hypothesis	Path coefficients	t-value	p-value	Result
H ₁	0.243	2.169	0.000***	Supported
H _{1a}	0.302	1.949	0.001***	Supported



Hypothesis	Path coefficients	t-value	p-value	Result
H _{1b}	0.132	2.418	0.001***	Supported
H _{1c}	0.120	1.415	0.000***	Supported
H ₂	0.216	2.551	0.000***	Supported
H _{2a}	0.295	2.326	0.003***	Supported
H _{2b}	0.134	2.455	0.001***	Supported
H _{2c}	0.234	3.438	0.001***	Supported
H ₃	0.242	1.550	0.000***	Supported
H _{3a}	0.124	2.143	0.000***	Supported
H _{3b}	0.134	5.352	0.002***	Supported
H _{3c}	0.343	2.443	0.001***	Supported
H ₄	0.133	3.541	0.001***	Supported
H _{4a}	0.122	1.432	0.000***	Supported
H _{4b}	0.212	2.245	0.000***	Supported
H _{4c}	0.293	5.245	0.001***	Supported
H ₅	0.112	2.355	0.001***	Supported
H _{5a}	0.153	1.134	0.000***	Supported
H _{5b}	0.224	1.453	0.000***	Supported
H _{5c}	0.292	5.943	0.000***	Supported
H ₆	0.134	2.443	0.001***	Supported

Notes: Path coefficients: ***p, 0.001 level, **p, 0.01 level, *p, 0.05. n.s. Non-significant. To simplify the illustration, control variables are not shown in the model.

The indirect effects of personality traits on AR advertisement through customer attitude as a mediator were observed (Table 5).

Table 5

Indirect effects of AR advertisement

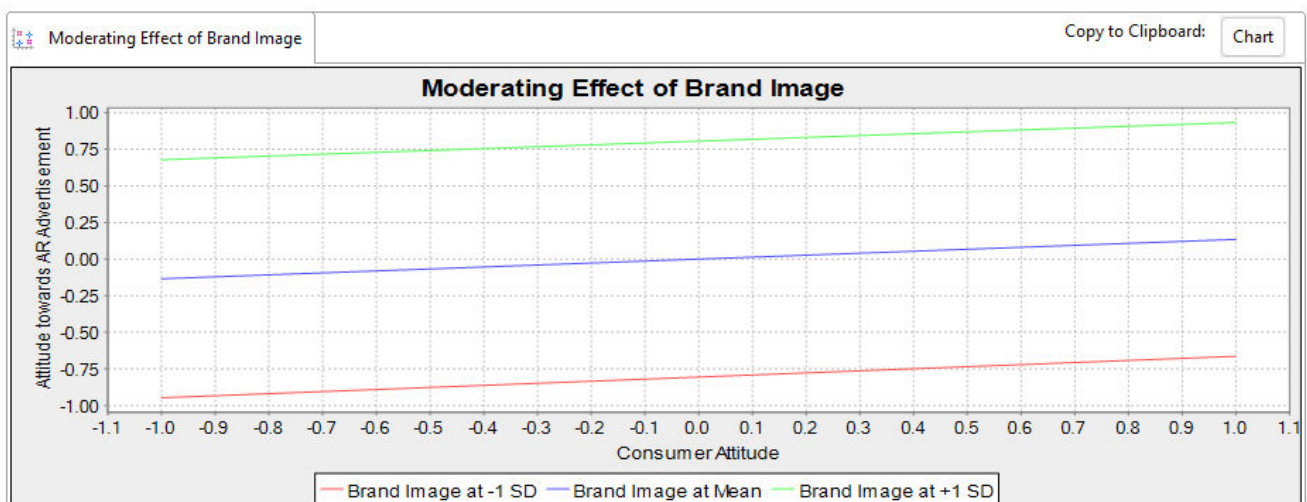
Constructs	B	Mean	(S.D)	t-values	p Values	Decision
PT -> CA -> AR	0.206	0.210	0.038	5.440	0.000	Partial mediation proved

Notes: AR (Augmented Reality); CA (Customer Attitude); PT (Personality Traits)

The indirect impact of personality traits on AR advertisement, the indirect impact of personality traits on AR advertisement through customer attitude (Table 5). The generated ($\beta = 0.206$; $t = 5.440$; $p < 0.000$) showed significant and partial mediation between PT and AR through CA.

Figure 5

Moderating effect



The moderating effect of brand image on the relationship between consumer attitude and attitude toward AR advertisements was examined rigorously in this study. Notably, the original sample value of -0.007 , in comparison to the sample mean of -0.012 , indicated a subtle deviation from the expected moderating effect. This deviation was further substantiated by the small t -value of 0.169 and a relatively high p -value of 0.866 . While the findings did not reveal a statistically significant moderating impact of brand image in this particular context, they provide valuable insights into the intricate nature of this relationship. The nuances of brand image dynamics in influencing consumer attitudes towards AR advertisements suggest that further exploration and refinement of marketing strategies may be necessary to harness the full potential of AR technology in the ever-evolving landscape of advertising (Figure 5).

Discussion

The findings of this study contribute valuable insights into the burgeoning field of AR advertising and its relationship with consumer attitudes and personality traits. Notably, our results align with prior research, underlining the critical role of perceived usability and utility in shaping consumer attitudes toward AR advertisements and the associated products or brands. The success of an AR advertisement hinges on its ability to resonate with consumers, ensuring a positive perception of the product's usability, practicality, and authentic portrayal. This suggests that AR advertisements should strive to strike a delicate balance between engaging creativity and practicality to captivate audiences effectively. Additionally, our study delves into the intriguing interplay between personality traits and the perception of AR advertisements. It was observed that individuals with a penchant for openness to new experiences and a certain degree of neuroticism exhibited a heightened appreciation for the perceived utility and simplicity of AR technology. This, in turn, had a tangible impact on their overall attitude towards AR commercials and products, including wearable computing devices. Such findings underscore the influence of individual personality traits in the adoption and acceptance of AR technology, which is vital for marketers seeking to tailor their strategies to specific consumer segments.

Furthermore, the inclusion of technical students in our study unveiled their particularly favorable disposition towards AR advertisements on various wearable computing devices. This finding underscores the potential for AR in the realm of technical education and its application in fields such as engineering, construction, and manufacturing. The nascent stage of wearable computing device development research presents opportunities for future integration with technical education. Age, as an influencing factor, also came to the fore in our investigation. Given that our study primarily comprised college students, it is plausible that their youth is associated with increased openness to new experiences, agreeableness, extraversion, and a predisposition towards social conformity or subjective norms. These traits are vital in shaping consumer attitudes and should be considered in the context of AR advertising strategies.

Moreover, the empirical evidence offered by our research substantiates the existing body of literature emphasizing the efficacy of AR strategies in driving consumer purchasing behavior. Contrary to the dominant notion of a positive moderating influence of brand image on the relationship between consumer attitude and attitude towards AR advertisements, our findings reveal a nuanced and, at times, negative facet of this dynamic. This counterintuitive outcome implies that a strong and well-established brand image may, in certain circumstances, eclipse or restrict the favorable impact of consumer attitudes. This highlights the need for a deeper understanding of the intricate interplay between brand image and consumer attitudes within the context of AR advertising. Such insights offer valuable guidance for marketers seeking to navigate the multifaceted landscape of AR adoption and enhance the effectiveness of their advertising endeavors.

Conclusion

In conclusion, the landscape of consumer engagement is undergoing rapid transformation as marketers shift away from traditional advertising and towards interactive strategies, AR in particular. This shift is most apparent in Pakistan, where both internet usage and literacy rates are on the rise. Although AR offers a promising avenue for personalized and interactive marketing, little attention has been paid to the moderating function of brand image in this developing context. In this study, the 'Big Five' personality



traits were examined in relation to the adoption of AR by potential consumers in Pakistan. Openness correlated positively with subjective norms, usefulness, and perceived ease of use, whereas neuroticism correlated negatively with these variables. In addition, extraversion demonstrated favorable associations with subjective norms. Notably, this study adds an important dimension by investigating the moderating function of brand image, which reveals that the anticipated positive influence of brand image on consumer attitudes towards AR advertisements is not always clear-cut and that there may be instances in which brand image dampens rather than strengthens the impact of positive consumer attitudes. These intricate dynamics highlight the need for a nuanced understanding of the evolving landscape of AR adoption in Pakistan and elsewhere.

Managerial and Practical Implications

According to research on the importance of students' openness to new experiences and extraversion, they favor commercials and businesses that are realistic, innovative, and instructive. Therefore, bearing these considerations in mind, companies and makers of wearable technology may develop methods to promote the dissemination of knowledge regarding AR technology with a diverse client base spanning various age groups, particularly among students and younger consumers. For instance, customers under 25 years old think that if they had looked at the logos of technology businesses, they would have known intuitively what to do (Arghashi, 2022; Lixandriou et al., 2021). Additionally, wearable device manufacturers and brands should consider the convenience of young customers if they intend to market their products to this demographic by easing the decision-making process, cutting down on time requirements, and providing a tailored experience. By implementing this approach, the brand's marketing efforts will effectively attain utilitarian value and specifically cater to neurotic and conscientious consumers who prioritize cost-effective and functional products rather than seeking hedonic value (Qadri et al., 2023). The findings of this study serve as a great resource for online marketers who employ AR in their efforts to enhance user experiences within digital platforms. AR technology has the potential to mitigate the cognitive risk associated with being unable to conduct tests on products or combinations of products. Furthermore, the preliminary virtual contact preceding the online purchasing procedure might offer insights into the desired products, akin to the knowledge acquired via physically examining the thing, emulating a more authentic portrayal of the product. This matter leads to a reduction in expenses associated with product returns.

Future Research Recommendation

The current study has some limitations, such as the possibility of common technique bias and the lack of control variables. Third, when posing the perception questions (usefulness, ease of use, and peer influence), we used the future tense. As a result, when extrapolating the study's findings beyond the settings that serve as its context, extreme caution should be exercised. Despite the limitations of the investigation, the findings of this study are significant. Although we only specifically targeted northern Pakistani postgraduate and graduate students, the research findings could be applied to a wide range of industries, from e-commerce to e-health. We have found a positive relationship between computer self-efficacy and the perceived usability of AR; for example, in future research, we plan to look at the effects of consumer self-efficacy and the Technology Readiness Index (TRI) on consumer attitude. Future research may also include a longitudinal investigation of how behavioral thoughts can change as attributes change over time. The current study has potential value for scholars working on technology adoption research because it provides a systematic approach to examining the impact of individual character traits on the adoption process while acknowledging the possibility of variation across individuals. The information in this article can also help industries design technical goods that take personality traits into account in order to increase adoption rates.

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