ROLE OF AUGMENTED REALITY IN INFLUENCING PURCHASE INTENTION AMONG MILLENNIALS

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ABSTRACT

This paper investigates whether shopping apps that use Augmented Reality influences purchase intentions among millennials. Respondents were selected using a purposive sampling method whereby the respondents have to be users of shopping apps with Augmented Reality features and also snowball sampling where the respondents who used Augmented reality apps for shopping refer others whom they know have also used the same apps or different Augmented reality apps for shopping. A structured, self-administered questionnaire was used to elicit responses from these respondents.

Data gathered from 384 respondents primarily from India included age, gender as well as the augmented reality app or site used for shopping. Some results are expected, variables being highly correlated. The findings indicate that Credibility of the Augmented Reality marketing is shown to significantly affect purchase intention. In general Augmented Reality has an effect on customers purchase intentions.

Keywords: Augmented Reality, Purchase Intention, Credibility, Perceived Usefulness, Personalisation, Willingness to buy.

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1. INTRODUCTION

Augmented Reality technology is “a technology that combines visual objects or virtual world into the real-world view in real time” (Dorfmueller and Schmalstieg, 2001). Perceived usefulness refers to “the degree to which a person believes that using a particular system would enhance his or her activity” (Davis, 1989).

Purchase intention is “a situation where consumer tends to buy a certain product in certain condition” (Morinez et al., 2007). Credibility is “the believability of an organization’s intentions at a particular moment in time” (Herbig and Milewicz, 1995). Personalization refers to “the firm itself tailoring the marketing mix to the customer, based on available customer information” (Chung and Wedel, 2014).

Perceived Personalization refers to “the process that is customizing solutions according to consumers’ information” (Rodgers, S., Wang et al 2007). It is “the personal communication on the basis of individual preference” (Roberts, M.L., 2003). Control over personalization mechanisms can be crucial to their acceptance (Ur, B., Leon, P. G., Cranor, et al 2012). User control and customizability of advertisements “have significant influence on users’ perception of interactivity, which is a strong predictor of attitude toward advertisements” (Goldstein, P. and McAfee, S., 2013). Consequently the Attitude towards an ad plays a dominant role in the purchase decision of consumers and also helps them to decide if an emerging trend will be lost or not (Batra et al., 1996). Therefore the level of perceived personalization is a factor to be measured in Augmented Reality advertising.

Customers perceived personalization and perceived usefulness about advertisements have been shown to impact greatly on purchase intention. Studies have revealed that online purchase intention is positively and significantly related with perceived usefulness and perceived ease of use (Athapaththu et al., 2018). Advertisement content credibility is shown to significantly impact purchase intention (Nabeel, Ahmad., 2014).

Research shows that personalization yields a significant increase in purchase intention (Michael & Thies, Ferdinand., 2015). Studies have revealed that online purchase intention is positively and significantly related with perceived usefulness and perceived ease of use (Jayani Chamarika Athapaththu , D. Kulathunga., 2018)

This research therefore explores some of the issues highlighted by previous research around the influences (if any) of credibility, personalization and usefulness of the ad on customer purchase intent. The literature reviewed here has highlighted a major issue: that credibility, personalization and usefulness of advertisements online, on social media, print and television have shown to influence purchase intention, how much do these factors in Augmented Reality marketing and advertisements play a role in influencing the purchase intention. Therefore, the questions to be explored around these issues are:

- Does the usefulness of Augmented Reality influence consumer purchase intent?
- Does the credibility of the Augmented Reality experience influence consumer purchase decision making?
- Does the personalisation of Augmented Reality influence consumer purchase intent?

2. METHOD

2.1. Research Context

The research took place primarily in Bangalore, a cosmopolitan city in south India. The areas chosen to carry out the research were mainly through stores of home décor and furniture brands like Pepperfry that are known to have Augmented Reality applications. A sample of 384 customers (Krejcie & Morgan Table, 1970) who have experienced Augmented Reality technology in shopping applications were used.

Primary data is collected through survey questionnaire with the help of close-ended questionnaires. To increase the data reliability repeated attempts at measurement were made.

To measure the concepts of usefulness and ease of use, TAM (Technology Acceptance Model) is used. To measure credibility, there are two scales commonly used to measure

credibility: the Gaziano and McGrath (1986) and the Meyer (1988) scales. The Meyer modification of the Gaziano-McGrath scales “appears to validly and reliably measure credibility” (West, Mark, 1994). To measure personalization, the level of perceived personalization will be measured by questionnaire using Likert scale.

2.2. Participants

Respondents classified as millennials [according to William Strauss and Neil Howe’s definition, those born between 1982-2004] were given the questionnaires were targeted.

This age group of customers was targeted to allow for follow ups and longitudinal research with the same population. These respondents were asked to complete a questionnaire before answering whether they had used an Augmented Reality app, which looked to identify those who have experienced using Augmented Reality for shopping. All respondents were informed through that the purpose of the research was to assess the impact of Augmented Reality, that participation was voluntary, and that the results would be kept strictly confidential and for research use only.

2.3. Measures

Respondents were asked to answer a series of questions and a questionnaire. Questionnaire included a set of questions based on Likert scale for each of the independent variables. The questionnaire also included a set of background questions like age, gender, occupation and the Augmented Reality app used.

2.4. Procedure

Interviews and questionnaires were given at first to known identified users of shopping apps with Augmented Reality, who were then asked to forward the questionnaire to their known acquaintances who have also used shopping apps with Augmented Reality apps. The data collection was carried out online using google forms as well as manually. This overall data collection took about 3 months.

3. DATA AND EMPIRICAL MODEL

3.1. Empirical Model

The empirical model used for this research builds upon experiential learning theory (Kolb,1984) which states that “effective learning is seen when a person progresses through a cycle of four stages: of (1) having a concrete experience followed by (2) observation of and reflection on that experience which leads to (3) the formation of abstract concepts (analysis) and generalizations (conclusions) which are then (4) used to test hypothesis in future situations, resulting in new experiences”.

Since experiential marketing is linked to consumer purchase intention (Imran Khan, Zillur Rahman, 2015), the third stage of the cycle is Abstract Conceptualization involving thinking on the part of the customer before deciding on whether to act on what they have learned through the experience or not.

The fourth and last stage in the cycle is Active Experimentation where the learner applies their idea(s) to the world around them to see what happens which can be linked to intention to purchase and purchase behavior of the consumer after experiencing the Augmented Reality first hand.

Figure 1

Linear regression is used to estimate the following equation:

$Y = \alpha + bX$ where X is the explanatory variable and Y is the dependent variable.

3.2. Descriptive Statistics

Table 1 below provides descriptive statistics around the variables. A description of the variables used in the regression analysis is found in Table 2.

Table 1. Descriptive statistics of the data set.

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Credibility_	2.00	5.00	3.7180	1.15562	-.290	.130	-1.391	.260
Perceived usefulness	1.00	5.00	3.6195	.86066	-1.021	.130	1.402	.260
Personalisation_	2.00	5.00	3.5771	.57174	-.780	.130	-.273	.260
willingness	2.67	4.67	3.6162	.38392	.208	.130	-.014	.260
emotional_value	2.40	4.60	3.7331	.40849	-.428	.130	.895	.260
convenience_value	2.00	4.33	3.7286	.65630	-1.070	.130	.183	.260
epistemic_value	2.67	4.67	3.5752	.57974	-.388	.130	-1.017	.260
conditional_value	2.33	4.33	3.4752	.59382	-.625	.130	-.903	.260
perceived_quality	3.00	5.00	4.2362	.63993	-.430	.130	-.929	.260

It is observed that the majority of the participants cited Credibility, Perceived usefulness and personalization of the Augmented Reality app and major markers of experience and positive emotional, convenience and epistemic value, as well as positive perceived quality and increase in willingness to buy. Because all the dimensions have the mean values of 3.5 and above.

Table 2. List of variables.

Variable name	Label
Credibility	Credibility of the advertisement
P_usefulness	Perceived usefulness of the Augmented Reality function in the shopping app
Personalisation_	Personalisation of the Augmented Reality app
willingness	Willingness to purchase
emotional_value	Emotional value to measure purchase intention
convenience_value	Convenience value to measure purchase intention
epistemic_value	Epistemic value to measure purchase intention
conditional_value	Conditional value to measure purchase intention
perceived_quality	Perceived Quality to measure purchase intention

3.3. Data Reduction

As this dataset contained a relatively large number of variables, many of the background variables are likely to be highly correlated with each other. This type of multicollinearity can lead to erratic or spurious results, and needs to be dealt with using a data reduction technique, which ensures, as far as possible, that background variables are not highly correlated with each other. A data reduction strategy based on rotated principal factor analysis was therefore adopted, and this is described in more detail below.

The questionnaire included 48 items asking the customers on their experience of Augmented Reality apps, on a 5-point scale ranging from 1 ('strongly disagree') to 5 ('strongly Agree'). Exploratory factor analysis indicated that a five component model was appropriate. The table below shows rotated component matrix (Table 3).

Table 3. Exploratory factor analysis.

Rotated Component Matrix			
	Component		
	1	2	3
The advertisement was well-placed/well designed	.943		
The advertisement was complete	.942		
The advertisement was representative of product/service	.942		
The advertisement was concise	.942		
The advertisement was consistent	.942		
The advertisement was objective	.942		
The advertisement was no-spin (truthful)	.941		
I feel that smartphone advertising is credible	.941		
I feel that smartphone advertising is believable	.941		
The advertisement will have impact	.940		
I feel that smartphone advertising is convincing	.940		
The advertisement was accurate	.939		
The advertisement was expert	.938		

Rotated Component Matrix			
	Component		
	1	2	3
The advertisement was professional	.938		
The advertisement was believable	.938		
The advertisement was authentic	.937		
It would be easy for me to become skillful at using this app.		.955	
I would find the app easy to use.		.955	
I would find [this product] to be flexible to interact with.		.954	
Using this app would help me make purchase decisions.		.954	
I would find it easy to get the app to do what I want it to do.		.954	
I would find this useful.		.954	
Learning to operate this app would be easy for me.		.954	
My interaction with the app would be clear and understandable		.953	
Using this app would make it easier to make the purchases.		.953	
Using this app would enhance my effectiveness in making the right decision.		.953	
Using this app in my job would increase my productivity.		.953	
Using this app would enable me to accomplish tasks more quickly.		.953	
I feel that smartphone advertisements are tailored to me			.927
I feel that contents in smartphone advertisements are personalized I feel that smartphone advertising is personalized for my usage			.925
I feel that smartphone advertising is delivered in a timely way			.925

Table 3 presents the exploratory factor analysis (EFA) for the independent predictor items. The independent predictor items grouped as three dimensions. The first dimension contains 16 items. They are related to the credibility of the app. The same manner the second and third dimensions contain 12 and 3 items respectively. The second dimension has the items related to perceived usefulness of the app. The third dimension has items related personalization of the app.

4. RESULTS

4.1. Linear Regression Modelling Results

Linear regression was used to explore the research question:

How much variation in consumer purchase intention is seen as a result of credibility, perceived personalization and perceived usefulness?

Table 4, 5 and 6 show the results for linear modelling. In addition to the unstandardized coefficients (B) and robust standard errors (Std. Error) the table s show standardised beta values,

which indicate the number of standard deviations that a dependent variable will change as a result of one standard deviation change in the independent variable.

Table 4. Effect of usefulness of Augmented Reality on consumer purchase intention

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.908	.080		36.375	.000
	P_usefulness	.196	.021	.439	9.106	.000

R-square value:0.192

Table 4 shows the linear regression model with the predictor ‘perceived usefulness of the augmented reality app’ and dependent variable consumer purchase intention. On the basis of R-square value, consumer purchase intention 19% depends on the perceived usefulness of the app. If 1 unit increase in the perceived usefulness of the reality app, then 0.196 units will increase the purchase intention of the consumer.

Consumer purchase intention = 0.196 (Perceived usefulness) + 0.021

Table 5 Effect of the credibility of the Augmented Reality experience on consumer purchase decision making

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.736	.049		56.261	.000
	Credibility_t	.237	.012	.713	18.960	.000

R-square value:0.508

Table 5 presents the association between ‘credibility of the augmented reality app’ and consumer purchase intention. On the basis of R-square value, consumer purchase intention 51% depends on the credibility of the app. If 1 unit increase in the credibility of the reality app, then 0.237 units will increase the purchase intention of the consumer.

Consumer purchase intention = 0.237 (Credibility) + 0.012

Table 6 Effect of the personalisation of Augmented Reality on consumer purchase intent

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.868	.124		23.146	.000
	Personalisation_t	.209	.034	.311	6.115	.000

R-square value: 0.097

Table 6 shows the linear regression model with the predictor ‘personalization of the augmented reality app’ and dependent variable consumer purchase intention. The R-square value indicates that consumer purchase intention 10% depends on the personalization of the app. If 1 unit increase in the personalization of the reality app, then 0.209 units will increase the purchase intention of the consumer.

Consumer purchase intention = 0.209 (Personalization) + 0.034

The Sig. column shows the p-value associated with each predictor variable. If a p-value is less than .05, then that variable has a significant association with the outcome variable, therefore the results indicate that each variable (personalization, credibility as well as usefulness) has a significant association with willingness to buy.

4.2. Interpretation

Regarding the respondents, the linear modelling highlights the fact that credibility has a higher impact on purchase intention. The R-square explains the percentage of the total variance of the dependent variable which is Willingness to purchase. The tables indicate that credibility of the ad is responsible for 50% of the variance, whereas usefulness of the ad affects 19.2% of the variance and personalization only 9.7%. Therefore, it can be said that although there is a significant variance, personalization of the ad is less likely to affect willingness to purchase compared to usefulness and credibility of the ad.

5. DISCUSSION

The analysis of this data has helped to illuminate the type of factors involved in Augmented Reality advertisements that affect consumer purchase intent. This research set out to answer three questions:

- Does the usefulness of Augmented Reality influence consumer purchase intent?
- Does the credibility of the Augmented Reality experience influence consumer purchase decision making?
- Does the personalisation of Augmented Reality influence consumer purchase intent?

The following discussion considers each in turn. First, according to linear regression analysis 19% of consumer purchase intention depends on the perceived usefulness of the app. The literature agrees that purchase intention is positively and significantly related with perceived usefulness and perceived ease of use (Jayani Chamarika Athapaththu, D. Kulathunga., 2018)

Second, the linear regression shows that 51% of the consumer purchase intention depends on the credibility of the app. This is supported by literature stating that advertisement content credibility is shown to significantly impact purchase intention (Nabeel, Ahmad., 2014).

Turning now to the third research question, linear regression indicates that almost 10% of consumer purchase intention depends on the personalization of the app. This supports the literature that personalization yields a significant increase in purchase intention (Michael & Thies, Ferdinand., 2015).

6. RESEARCH IMPLICATIONS

It has become apparent that this research could be of major benefit to organizations looking to promote and market their products that they sell online or through mobile applications. Marketers could also seek to enhance their online and mobile based application marketing experience for customers. This can include enhancing the Augmented Reality experience by ensuring it is credible and accurate. For example, furniture brands can ensure the apps measure the customers spaces accurately through their mobile cameras and then position the selected furniture based on the dimensions and space available so the customer can get an accurate view of how the product fits after purchase. Secondly, improving the product information for customers to easily access through applications that focus on accurate Augmented Reality experiences will greatly benefit not just the customers but also organizations.

The results also imply that Increasing the ease of use and the usefulness of the shopping applications with Augmented Reality technology will increase usage as well as the willingness

to purchase. Also, enhancing the personalization of products to augment and enhance every individual customer's reality would also greatly impact their engagement with brands.

7. LIMITATIONS OF THE STUDY AND SCOPE FOR FURTHER RESEARCH

Although this research was conducted using only millennials as study subjects, this research highlights several interesting areas and therefore ways forward for this type of research. Further investigation could take place in determining the kind of products that consumers would prefer viewing in Augmented Reality applications. Future work in enhancing Augmented Reality based applications to cater needs based on consumer Psychology can be pursued as well.

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