The Relationship between Augmented Reality Apps and Electronic Word of Mouth

"An Empirical study on Augmented Reality Apps users in Egypt"

submitted by

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Raya International Journal of Business Sciences

volume (4), issue (13), april 2025
https://www.rijcs.org/

Publisher

Raya Higher Institute of Management and Foreign Trade in New Damietta

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ABSTRACT

This research aims to investigate the relationship between Augmented Reality Apps and Electronic Word of Mouth. Data were collected from 402 users of Augmented Reality Apps in Egypt.

Path analysis is utilized to test the research hypotheses using Warp PLS 7.0. Findings revealed that Augmented Reality Apps had a significant positive effect on Electronic Word of Mouth. Regarding implications, Companies that develop or use AR Apps should Encourage satisfied users to share their experiences through EWOM by

creating campaigns that incentivize sharing reviews, feedback, or experiences online. Limitations and conclusions were also provided.

Keywords: Augmented Reality Apps (AR Apps), Electronic Word of Mouth (EWOM).

1. Introduction

The proliferation of technology and its associated devices, such as the Internet, smartphones, and mobile applications, has significantly transformed the manner in which consumers engage with companies. One of these growing technologies is Augmented Reality which is an emerging technology that enables consumers to engage with brands in innovative ways (Schultz & Kumar, 2024). Consumers increasingly demand a more immersive experience in their daily lives, which has led to a growing interest in augmented reality as a means of satisfying these ambitions (Kumar et al., 2024).

An in-depth comprehension of AR Apps is crucial in current discourse, considering the significance of mobile applications as widespread channels for brand interaction (Khan & Fatma, 2024). Commonly referred to as the "brand in the hand," these applications provide consumers with unparalleled convenience and easy access to a wide range of items and services, typically at low prices (Khan, 2023). AR Apps, situated at the crossroads of virtual content and real-world situations, are powerful tools that enhance customer interactions with businesses. This marks a significant change in the retail industry (Lim et al., 2022).

In the past twenty years, electronic word of mouth has changed significantly and has had a significant influence on how consumers behave and how marketing is

done in various consumer and industrial markets (Liu et al., 2024). EWOM refers to the sharing of information about products, services, or brands through digital channels, including online platforms like social media networks, forums, blogs, and instant messaging programs (X. Hua et al., 2024). Consumers frequently exhibit a preference for depending on interpersonal recommendations from friends or peers, placing a higher value on these sources of information compared to company-sponsored advertising (Shahzad et al., 2024). Furthermore, individuals experience a feeling of belonging and satisfaction when they participate in community actions that conform to the prevalent standards of society (Jiang & Lyu, 2024).

Based on the above discussion, the current study aims to investigate how Augmented Reality apps affect Electronic Word of Mouth of Augmented Reality apps users in Egypt.

2. Theoretical framework

2.1. Augmented Reality Apps

Augmented reality is a technology that combines virtual aspects with the real-world environment using a display device (Lai et al., 2024). It enables users to manipulate and control these virtual items on the display device (Hilken et al., 2017). Augmented reality is commonly used in situations where products need to be shown remotely, such as in online shopping. It allows consumers to realistically experience how products would integrate into their environment by projecting product images into real-world situations (Caboni et al., 2024).

Augmented reality has four dimensions adopted by Nikhashemi et al. (2021) which are quality, interactivity, vividness, and novelty. The researchers

adopted these four dimensions as they are the most common dimensions used in literature.

2.1.1. Quality

Augmented reality enriches the actual environment by superimposing virtual material over it, creating personalized experiences that are customized to the user's specific requirements (Smink et al., 2020). The concept of augmentation quality, as defined by Rauschnabel et al. (2019), refers to the extent to which the augmented reality experience seems realistic. This is done by seamlessly integrating virtual and real aspects.

2.1.2. Interactivity

Interactivity is a noteworthy aspect of the influence of digital technology on the consumer experience (Yang & Lin, 2024). Within the realm of augmented reality, interactivity pertains to the degree to which consumers are able to manipulate virtual objects within their real-world surroundings and extensively inspect them by rotating them in a 360-degree manner (Kowalczuk et al., 2021).

2.1.3. Vividness

Vividness refers to the ability of a technology to provide a mediated world that is rich in sensory experiences (Söderström et al., 2024). Vividness in the context of augmented reality refers to the level of richness in the virtual world created by AR shopping applications. This encompasses elements like aesthetic appeal and the quality of product presentation (Nikhashemi et al., 2021).

2.1.4. Novelty

Tom Dieck et al. (2023) stated that novelty refers to the extent to which each response is viewed as "new, unique, and different." (Brannon Barhorst et al., 2021) defined novelty as the combined characteristics of stimuli that are new or uncommon.

2.2. Electronic Word of Mouth

With the advent of the Internet, businesses have had the opportunity to reach more audiences. In the mid-1990s, Internet advertising became a popular form of marketing. This method of marketing became known as e-marketing (Akbari et al., 2022). With the advent of e-marketing, marketers have found that word of mouth marketing can be done on the Internet with a variety of Internet-based platforms. In this way, Electronic Word of Mouth emerged (Belhadi et al., 2023).

Hennig-Thurau et al. (2004), stated that Electronic Word of Mouth refers to any positive or negative statement about a product or company made by potential, actual, or former customers. These statements are accessible to a large number of individuals and organizations through the Internet. This refers to all favorable or unfavorable information pertaining to a product or service, encompassing evaluations found on online platforms such as message boards, blogs, and others (Abdul et al., 2022).

After examining different writers' viewpoints on the dimensions of electronic word of mouth, experts have not yet come to a unanimous agreement on the exact dimensions of Electronic Word of Mouth. Thus, this study will utilize two dimensions of electronic word of mouth, namely opinion giving and opinion passing,

as defined by (Chopra et al., 2022; Chu & Kim, 2011; Gharib et al., 2019; Nagy et al., 2017). These dimensions have been chosen for their suitability to this study. However, the dimension of opinion seeking has been eliminated since it does not align with our objective of measuring users' willingness to share information about AR Apps.

2.2.1. Opinion giving

Opinion giving in the context of electronic word of mouth entails the act of expressing one's personal perspectives, assessments, or critiques regarding a product, service, or brand via online platforms. This aspect of electronic word of mouth focuses on individuals' proactive involvement in sharing information derived from their personal experiences (Gharib et al., 2019).

2.2.2. Opinion passing

Opinion passing refers to the action of disseminating or sending evaluations, remarks, or information that was initially generated by others via internet platforms (Chopra et al., 2022). It entails the dissemination of thoughts through a secondary channel and can greatly amplify the reach and influence of electronic word of mouth.

3. Literature review

3.1. The relationship between Augmented Reality Apps and Electronic Word of Mouth

Augmented reality is well recognized for its ability to boost emotional engagement and provide consumers with immersive experiences on social media

platforms (Sung, 2021). Augmented reality distinguishes itself from traditional media by offering visually captivating experiences that are more easily comprehensible and communicable (Heller et al., 2019). Users that find an augmented reality experience worthwhile are more likely to share it, resulting in higher levels of satisfaction, sales, and positive word-of-mouth (Madi et al., 2024).

Furthermore, Augmented reality marketing creates powerful impressions that might inspire users to share their distinctive experiences with their social circles and followers on social media platforms (Jiang & Lyu, 2024). Therefore, it is widely thought that Augmented reality has a substantial and favorable influence on the creation and sharing of positive electronic word-of-mouth (Gäthke, 2020). Thus, the subsequent hypothesis is put forward:

H2: There is a significant effect of Augmented Reality Apps on the dimensions of Electronic Word of Mouth.

This hypothesis is divided into two sub hypotheses:

H_{2a}: There is a significant effect of Augmented Reality Apps (Quality, interactivity, Vividness, Novelty) on Opinion Giving.

H_{2b}: There is a significant effect of Augmented Reality Apps (Quality, interactivity, Vividness, Novelty) on Opinion Passing.

4. Research Gap

Several studies have investigated the impact of augmented reality on the intention to recommend and word of mouth (Hilken et al., 2017; Mishra et al., 2021; Nawres et al., 2024; Patil, 2021). In addition, only two studies, conducted by Jiang and Lyu (2024) and Khasawneh and Rabata (2023), have explored the influence of

augmented reality attributes on electronic word of mouth intention. However, all these studies have focused on EWOM intentions rather than on actual participation. Given that these intentions may not translate into action, such as when people who indicate they intend to share their experiences with AR fail to do so, a greater understanding is needed of why people participate in EWOM communications.

Based on the points mentioned above, and to the best of the researcher's knowledge, no previous studies have investigated the relationship between augmented reality apps and electronic word of mouth, using the dimensions adopted in this study. Therefore, this study aims to address the gaps in existing literature and align with the current trends in marketing research.

5. Research Questions

RQ1: What is the nature of the relationship between the research variables dimensions (Augmented Reality Apps and Electronic Word of Mouth)?

RQ2: What is the effect of Augmented Reality Apps on the dimensions of Electronic Word of Mouth?

RQ3: what is the nature of the difference in the perceptions of Augmented Reality Apps users in Egypt about the research variables (Augmented Reality Apps and Electronic Word of Mouth) according to their different Demographic Variables (Gender, Age, Educational level, monthly income)?

6. Research Objectives

The current study aims to:

1) Determining the nature of the relationship between the research variables dimensions (Augmented Reality Apps and Electronic Word of Mouth).
2) Measuring the effect of Augmented Reality Apps on the dimensions of Electronic Word of Mouth among Augmented Reality Apps users in Egypt.
3) Scrutinizing the nature of the difference in the perceptions of Augmented Reality Apps users in Egypt about the research variables (Augmented Reality Apps and Electronic Word of Mouth) according to their different demographic variables (Gender, Age, Educational level, monthly income).

7. Research Hypotheses and conceptual framework

To achieve research objectives, the researcher developed the following hypotheses based on literature review:

H1: There is a significant relationship between the research variables dimensions (Augmented Reality Apps and Electronic Word of Mouth).

H2: There is a significant effect of Augmented Reality Apps on the dimensions of Electronic Word of Mouth.

This hypothesis is divided into two sub hypotheses:

H_{2a}: There is a significant effect of Augmented Reality Apps (Quality, interactivity, Vividness, Novelty) on Opinion Giving.

H_{2b}: There is a significant effect of Augmented Reality Apps (Quality, interactivity, Vividness, Novelty) on Opinion Passing.

H3: There is a significant difference in the perceptions of Augmented Reality Apps users in Egypt about the research variables (Augmented Reality Apps and Electronic

Word of Mouth) according to their different demographic variables (Gender, Age, Educational level, monthly income).

Based on the Literature, and the research hypotheses, Figure (1) shows the Conceptual Framework for the Relationships between Research Variables

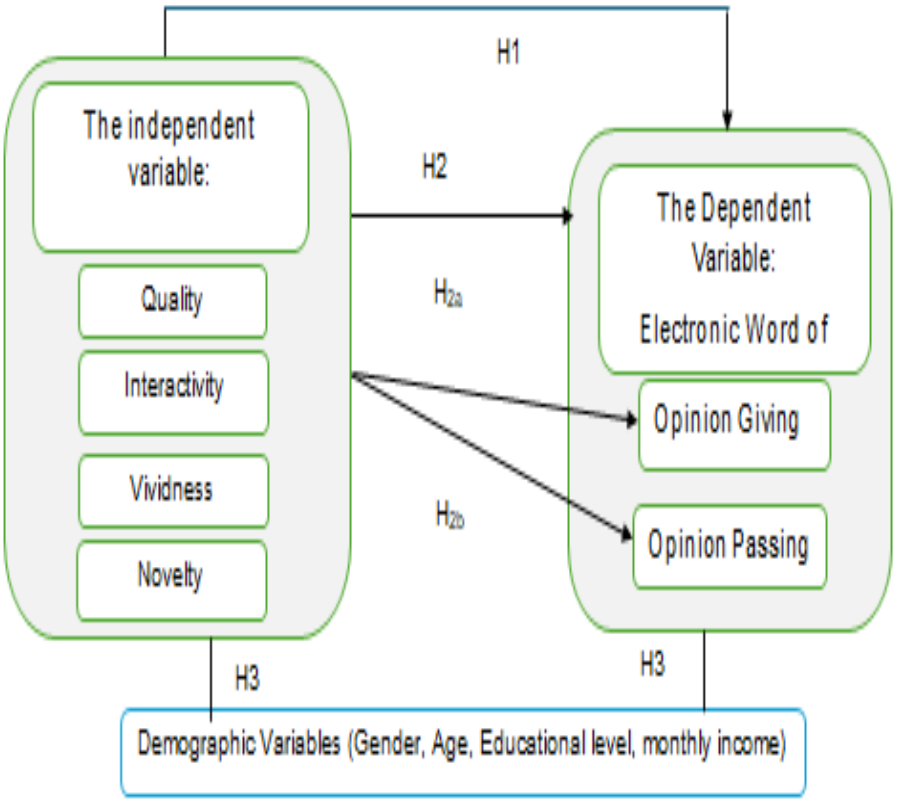

Figure (1): The Conceptual Framework for the relationship between Research Variables.

Source: Prepared by the researcher according to Literature Review.

8. Research Methodology

Sample and Procedures

The current study adopted the deductive approach, and the quantitative research method. The researchers collected data through an online questionnaire from 402 users of Augmented Reality Apps in Egypt.

Table (1): Description of the sample (N= 402)

Characteristics	Frequency	Percentage	Rank
Gender			
Male	217	54.0%	1
Female	185	46.0%	2
Total	402	100%	-
Age			
less than 21 years	60	14.9%	3
from 21 to less than 30 years	212	52.7%	1
from 30 to less than 40 years	91	22.6%	2
from 40 years or more	39	9.7%	4
Total	402	100%	-
Educational level			
Pre-university education	47	11.7%	3
University level	222	55.2%	1
Postgraduate studies	133	33.1%	2
Total	402	100%	-
Monthly Income			

Characteristics	Frequency	Percentage	Rank
Less than 5000	107	26.6%	3
5000 to less than 10000	160	39.8%	1
More than 10000	135	33.6%	2
Total	402	100%	-

Source: Prepared by the researchers according to statistical analysis results

9. Measures

All the constructs were measured with a 5-point Likert-type scale (5 = strongly agree to 1 = strongly disagree). Augmented Reality apps consist of (٢٣) items measure the four dimensions of Augmented Reality apps namely, Quality (6) items, interactivity (6) items, Vividness (6) items and novelty (5) items.

Electronic Word of Mouth consists of (12) items to measure the two dimensions of Electronic Word of Mouth, namely Opinion Giving (6) items and opinion passing (6) items.

10. Data Analysis and Results

The current study uses path analysis to test the research hypotheses through the structural equation Modeling (SEM) model using Wrap PlS7.

10.1. Measurement Model

Individual reliability, construct reliability, convergent validity and discriminant validity are evaluated using a measurement model to realize the appropriate degree of internal consistency that the measures hold. This analysis is based on statistics from a reflective measurement model of (Ringle et al., 2012).

Table 2 reveals that the factor loadings for the items were higher than the 0.70 recommended threshold (Henseler et al., 2009). Furthermore, Cronbach's alpha coefficient (α) and Composite Reliability (CR) for each of the constructs were above the norm of 0.70, indicating that the measures were reliable (Hair et al., 2010). Furthermore, Fornell and Larcker (1981) claimed that the average variance extracted (AVE) should be equal to or larger than 0.50 to evaluate convergent validity. Table 2 demonstrates that all conceptions have AVE values of more than 0.50, indicating appropriate consistency. Table 2 also includes the data for mean and standard deviation.

Table (2): Validity and Reliability.

	Item Code	Mean	Std. deviation	Factor Loading	Alpha	AVE	CR
Augmented Reality apps							
Quality	q1	4.55	.618	0.703			
	q2	4.61	.611	0.784			
	q3	4.59	.594	0.778			
	q4	4.50	.625	0.725			
	q5	4.58	.658	0.702			
	q6	4.55	.661	0.724			
		4.5643	.46185		0.831	0.543	0.877
interactivity	q7	4.52	.624	0.678			
	q8	4.43	.652	0.72			
	q9	4.52	.659	0.771			
	q10	4.54	.688	0.738			
	q11	4.53	.632	0.687			
	q12	4.52	.663	0.728			
		4.5091	.47087		0.814	0.52	0.866
Vividness	q13	4.43	.660	0.738			
	q14	4.50	.617	0.73			
	q15	4.46	.673	0.773			
	q16	4.51	.637	0.728			
	q17	4.57	.609	0.719			
	q18	4.49	.700	0.697			
		4.4921	.47449		0.825	0.534	0.873

Table (2): Validity and Reliability (Continued).

	Item Code	Mean	Std. deviation	Factor Loading	Alpha	AVE	CR
novelty	q19	4.55	.634	0.723			
	q20	4.48	.696	0.728			
	q21	4.54	.615	0.683			
	q22	4.59	.610	0.761			
	q23	4.50	.648	0.743			
		4.5318	.46657		0.778	0.53	0.849
Electronic Word of Mouth							
Opinion Giving	Q24	4.57	.649	0.696			
	Q25	4.56	.665	0.755			
	Q26	4.50	.663	0.774			
	Q27	4.48	.721	0.788			
	Q28	4.49	.648	0.711			
	Q29	4.52	.648	0.699			
		4.5182	.49135		0.832	0.545	0.877
Opinion passing	Q30	4.46	.643	0.708			
	Q31	4.48	.659	0.75			
	Q32	4.52	.678	0.741			
	Q33	4.51	.703	0.751			
	Q34	4.49	.718	0.799			
	Q35	4.51	.633	0.684			
		4.4959	.49769		0.834	0.547	0.879

Source: Prepared by the researchers according to statistical analysis results

Table 3 summarizes the AVE's square root of each construct, which is proven to be bigger than the inter-construct correlations to address discriminant validity. As a result, discriminant validity is attained.

Table (3) Factor Correlation Matrix with Square Root of AVE.

Sq. R. AVE	Qual	iact	Vivi	nov	O. G	O. p
Qual	0.748					
IACT	0.737	0.766				
Vivi	0.739	0.721	0.736			
nov	0.674	0.720	0.734	0.728		
O. G.	0.67	0.662	0.68	0.700	0.773	
O. p.	0.682	0.673	0.698	0.691	0.738	0.740

Source: Made by the researcher based on warp pls results

10.2. Structural Model Assessment

A structural model is characterized by causal relationships between latent variables. Structural analysis's aim is to examine the studied study model. To approximate the comprehensive fit of the model fit indices, four subsequent measurements were used: Average Path Coefficient **(APC)**, Average R-squared **(ARS)**, Average Variance Inflation Factor **(AVIF)** and the Global Goodness of Fit Index **(GoF)**. Henseler et al. (2009) proposed that APC and ARS were relevant if (P< 0.05), while AVIF must be less than 5. In addition, GoF levels of ≥ 0.1, ≥ 0.25, and ≥

0.36 indicate that the model has a goodness of fit respectively small, medium, and large (Tenenhaus et al., 2004). Hence, the measurement model fits the data collected from Augmented Reality apps users in Egypt.

Table (4) Model Fit Indices

Measure	Code	Estimate	P-Value	Acceptance Index
Average path coefficient	APC	0.190	<0.001	
Average R-Squared	ARS	0.663	<0.001	
Average block VIF	AVIF	3.961	if <= 5, ideally <= 3.3	
Tenenhaus GoF	GoF	0.598	small >= 0.1, medium >= 0.25, large >= 0.36	

Source: Made by the researcher based on warp pls results

10.3. Structural Model and Hypotheses Testing

	QUAL	IACT	Vivi	nov	O. G	O. p
QUAL	1					
IACT	.748**	1				
Vivi	.739**	.767**	1			
nov	.674**	.721**	.735**	1		
O .G	.669**	.663**	.683**	.699**	1	
O. p	.680**	.673**	.699**	.689**	.773**	1

Table (5): Pearson Correlation Matrix for testing the correlation between research variables dimensions.

Source: statistical analysis output.

To test hypophysis H2 path coefficients, its level of significance and the effect size were measured to examine the effect of Augmented Reality apps (Quality, interactivity, Vividness, Novelty) on Electronic Word of Mouth (Opinion Giving and Opinion passing).

Table (6) The Direct Effect of Augmented Reality apps on Electronic Word of Mouth.

H	Independent Variables	dependent Variables	Direct Effect			Results
			Path Coefficients	P-Value	Effect size	
H2a	Quality	Opinion Giving	0.055	0.135	0.037	rejected
H2a	interactivity	Opinion Giving	-0.012	0.402	0.009	rejected
H2a	Vividness	Opinion Giving	0.125	0.005	0.089	accepted
H2a	novelty	Opinion Giving	0.165	<0.001	0.12	accepted
H2b	Quality	Opinion passing	0.095	0.028	0.066	accepted
H2b	interactivity	Opinion passing	0.007	0.448	0.005	rejected
H2b	Vividness	Opinion passing	0.194	<0.001	0.141	accepted
H2b	novelty	Opinion passing	0.1	0.022	0.071	accepted

Source: Made by the researcher based on warp pls results

Table (7): differences test results for demographic variables of Augmented Reality apps users in Egypt.

	Gender		Age		Educational level		Monthly income	
	F- Test	P-Value	F-Test	P-Value	F-Test	P-Value	F-Test	P-Value
Quality	.743	.389	9.252	.000	3.622	.028	1.849	.159
Interactivity	9.966	.002	3.348	.019	3.689	.026	2.022	.134
Vividness	8.997	.003	3.981	.008	2.173	.115	.694	.500
Novelty	6.393	.012	3.253	.022	2.848	.059	.204	.815
Opinion Giving	10.037	.002	3.825	.010	1.830	.162	.828	.438
Opinion Passing	2.483	.116	4.307	.005	1.920	.148	.514	.599

Source: Prepared by the researchers according to statistical analysis results

11. Findings

Table (8): The Research Questions, Objectives, Hypotheses, and Results

Research Questions	Research Objectives	Research Hypotheses	Results of Testing Hypotheses
RQ1: What is the nature of the relationship between the research variables dimensions (Augmented Reality Apps and Electronic Word of Mouth)?	**RO1:** Determining the nature of the relationship between the research variables dimensions (Augmented Reality Apps and Electronic Word of Mouth).	**H1:** There is a significant relationship between the research variables dimensions (Augmented Reality Apps and Electronic Word of Mouth).	**Accepted**

Table (8): The Research Questions, Objectives, Hypotheses, and Results (Continued)

Research Questions	Research Objectives	Research Hypotheses	Results of Testing Hypotheses
RQ2: What is the effect of Augmented Reality Apps on the dimensions of Electronic Word of Mouth?	**RO2:** Measuring the effect of Augmented Reality Apps on the dimensions of Electronic Word of Mouth among Augmented Reality Apps users in Egypt.	**H2**: There is a significant effect of Augmented Reality Apps on the dimensions of Electronic Word of Mouth.	**partially accepted**
RQ3: what is the nature of the difference in the perceptions of Augmented Reality Apps users in Egypt about the research variables (Augmented Reality Apps and Electronic Word of Mouth) according to their different Demographic Variables (Gender, Age, Educational level, monthly Income)?	**RO3:** Scrutinizing the nature of the difference in the perceptions of Augmented Reality Apps users in Egypt about the research variables (Augmented Reality Apps and Electronic Word of Mouth) according to their different demographic variables (Gender, Age, Educational level, monthly income).	**H3**: There is a significant difference in the perceptions of Augmented Reality Apps users in Egypt about the research variables (Augmented Reality Apps and Electronic Word of Mouth) according to their different demographic variables (Gender, Age, Educational level, monthly income).	**partially accepted**

Source: Prepared by the researcher according to Literature Review and Statistical Analysis Outputs.

12. Discussion

H1: There is a significant relationship between the research variables dimensions (Augmented Reality Apps and Electronic Word of Mouth).

According to the findings of the current study, there is a significant positive correlation between the dimensions of Augmented Reality Apps (quality, interactivity, vividness, and novelty) and the dimensions of Electronic Word of Mouth (Opinion Giving and opinion passing). That means the attributes of augmented reality apps can lead to positive electronic word of mouth, where satisfied customers are more inclined to share their positive experiences online, influencing others' perceptions and behaviors. This result is consistent with Jiang and Lyu (2024) who found that AR app attributes lead to positive consumer experience, in turn, creating behavioral intention like EWOM intention and Patronage intention. Similarly, the results of this study agreed with Nawres et al. (2024) who concluded that the greater the consumer's satisfaction with the AR experience, the more positive their purchase intent is for the luxury product as well as the willingness to spread WOM for the AR application.

H2: There is a significant effect of Augmented Reality Apps on the dimensions of Electronic Word of Mouth.

This hypothesis is divided into two sub hypotheses:

H_{2a}: There is a significant effect of Augmented Reality Apps (Quality, interactivity, Vividness, Novelty) on Opinion Giving.

H_{2b}: There is a significant effect of Augmented Reality Apps (Quality, interactivity, Vividness, Novelty) on Opinion Passing.

The results demonstrated a nuanced relationship between the dimensions of Augmented Reality apps (Quality, Interactivity, Vividness, and Novelty) and their impact on Opinion Giving and Opinion Passing. While some dimensions show significant positive effects, others do not, leading to **the partial acceptance of both Hypotheses H_{2a} and H_{2b}.**

H_{2a}: There is a significant effect of Augmented Reality Apps (Quality, interactivity, Vividness, Novelty) on Opinion Giving.

Quality was found to have no significant effect on Opinion Giving. This suggests that the perceived quality of augmented reality apps does not directly encourage users to share their opinions. Although this finding contradicts with those presented by Hilken et al. (2017); Javornik (2016); Nikhashemi et al. (2021) who found that the quality of augmented reality has a positive effect on intentions to visit the site/app again and to talk about it to their friends. However, this difference could be due to the possibility that users may expect high-quality experiences from AR apps as a standard, thus reducing its impact on their motivation to give feedback. Similar findings in technology adoption research have suggested that quality, while essential for user satisfaction, may not always translate into proactive behaviors such as sharing opinions (Loureiro et al., 2018).

Additionally, interactivity also demonstrated a non-significant effect on Opinion Giving. Despite the general assumption that interactivity enhances user engagement, the results suggest that it may not be sufficient to stimulate users to

actively share their experiences. This aligns with Nikhashemi et al. (2021); Yim et al. (2017) who found that familiarity with the technology reduces the positive effect of interactivity on customer responses. It would appear that a repeat use of a shopping AR app reduces the customer's perception of utility facilitated by interaction that is two-way, controllable, and responsive to their actions.

Furthermore, Vividness had a significant positive effect on Opinion Giving, highlighting that users are more inclined to share their opinions when they perceive the AR experience as visually rich and immersive. This finding aligns with research suggesting that vividness enhances emotional engagement, thereby increasing the likelihood of users sharing their experiences (Yim et al., 2017).

Finally, Novelty also showed a significant positive effect on Opinion Giving. Novelty, as an essential factor in user engagement with innovative technologies, motivates users to share their experiences, particularly when the technology offers something unique or groundbreaking. The positive effect of novelty on Opinion Giving is consistent with studies that demonstrate how users are more likely to spread information about new and innovative experiences (Khasawneh & Rabata, 2023).

H_{2b}: There is a significant effect of Augmented Reality Apps (Quality, interactivity, Vividness, Novelty) on Opinion Passing.

Quality was found to have a significant positive effect on Opinion Passing, indicating that users are more likely to pass along opinions when they perceive the app as high-quality. This aligns with the idea that quality influences users' attitude

towards augmented reality apps and make them more satisfied (Poushneh, 2018). However, this contradicts with the finding in H_{2a} where quality did not influence opinion giving. This variation in outcomes could be attributed to the fact that, even if individuals are satisfied with the quality of augmented reality, this satisfaction does not necessarily translate into them sharing their opinions or writing about it online (opinion giving). However, if they come across someone else's opinion, they might be more inclined to share it (opinion passing), as this would require less cognitive involvement on their part.

Moreover, Interactivity showed no significant effect on Opinion Passing. This aligns with the findings in H_{2a}, where interactivity did not influence Opinion Giving either. It suggests that interactivity alone may not be enough to drive users to disseminate opinions or recommendations. This result is consistent with Nikhashemi et al. (2021) who found that familiarity with the technology reduces the positive effect of interactivity on customer responses which may result in a diminishing drive related to the particular need satisfaction, and thus the customer may lack the motivation to progress beyond a certain level.

Furthermore, Vividness had a significant positive effect on Opinion Passing, reinforcing the idea that visually engaging and immersive augmented reality experiences lead users to share their opinions with others. This is in line with previous literature suggesting that vivid, immersive experiences enhance emotional engagement, increasing the likelihood of information dissemination (Yim et al., 2017).

Finally, Novelty also demonstrated a significant positive effect on Opinion Passing, supporting the notion that new and innovative features in augmented reality apps encourage users to pass along their experiences. As novelty offers users something fresh and exciting, it increases the likelihood that they will share it with others, as novelty tends to stimulate curiosity and discussion (Nikhashemi et al., 2021).

H3: There is a significant difference in the perceptions of Augmented Reality apps users in Egypt about the research variables (Augmented Reality apps and Electronic Word of Mouth) according to their different demographic variables (Gender, Age, Educational level, monthly income).

1. **Gender**

The results indicated that gender plays a partial role in influencing users' perspectives on Augmented Reality apps. Specifically, the data suggests no significant statistical difference between male and female users regarding Quality and Opinion Passing. This could indicate that regardless of gender, users are consistent in their assessment of the overall quality of AR apps and their likelihood of passing along opinions.

However, the results also revealed significant differences in Interactivity, Vividness, Novelty, and Opinion Giving based on gender. These findings suggest that men and women may experience AR apps differently in terms of engagement with interactive features, the vividness of visual elements, and the novelty these apps offer. This aligns with existing research that highlights gender-based differences in

how individuals engage with digital and immersive technologies. For instance, studies have found that females appear to place greater importance on the role of innovation, believing that increased innovation enhances the perceived playfulness, perceived interactivity and perceived compatibility of virtual try-on apps. On the other hand, males seem to attach more value to the impact of knowledge and understanding. They believe that greater knowledge would improve the perceived playfulness and compatibility of virtual try-on apps (W. Hua et al., 2024)

The difference in Opinion Giving further underscores the idea that men and women might engage with AR apps differently when it comes to sharing their opinions about these applications. Women may be more inclined to share opinions when they perceive the app as reliable and engaging, whereas men might focus more on the technical functionality of the app.

2. Age

The results presented demonstrated that age plays a significant role in shaping users' perspectives on various dimensions of Augmented Reality apps. The significant differences in AR app perceptions based on age can be explained by varying technological familiarity, preferences, and expectations. Younger users, such as Millennials and Gen Z, are more accustomed to advanced technologies and immersive experiences, leading them to prefer novelty, interactivity, and vividness. They value dynamic, visually engaging, and interactive features. In contrast, older users prioritize content quality, focusing more on usability and reliability rather than innovation or visual appeal. Trust-building differs across age groups, with older

individuals needing more time and reassurance before sharing opinions or passing information, while younger users are quicker to engage in these behaviors.

3. educational level

The findings revealed that education level partially influences how users perceive different dimensions of Augmented Reality apps. While there were no significant differences in users' perceptions of Vividness, Novelty, Opinion Giving, and Opinion Passing across education levels, there were significant differences in perceptions of Quality and Interactivity. This suggests that education level affects how users engage with AR apps to some extent, particularly in terms of technical and interactive features.

Highly educated users are likely more critical of app quality, expecting higher standards in design, functionality, and interactivity. This aligns with studies showing that users with advanced technological literacy tend to demand richer experiences and better performance. In contrast, variables like vividness and novelty resonate similarly across all educational backgrounds, suggesting a universal appeal for immersive visuals and innovative AR features. It also implies that participation in EWOM (Opinion Giving and Passing) are largely consistent across different education levels. This could be due to the universal appeal of certain AR features, such as immersive visuals and the novelty factor, which resonate similarly across diverse user groups.

4. Monthly income.

The findings showed no significant differences across variables such as Quality, Interactivity, Vividness, Novelty, Opinion Giving, and Opinion Passing with respect to the monthly income of users. This indicates that users' perceptions of Augmented Reality apps remain consistent across different income levels.

The uniformity of perceptions across income levels suggests that AR apps are perceived similarly by users regardless of their financial background. This may be due to the broad accessibility of AR apps, which are integrated into widely used smartphones, making them available to users across various socioeconomic strata. As AR apps do not typically require high financial investment, users from different income groups may have similar experiences regarding quality, interactivity, and novelty.

The lack of income-based differences also extends to engagement in EWOM (Opinion Giving and Passing). Users across all income levels appear equally confident in sharing their experiences and recommendations. This implies a democratization of AR technology, with accessibility and usability being key drivers of consistent user engagement across financial categories.

13. Theoretical and Practical Implications

The study contributes to the body of knowledge of the current literature of augmented reality and electronic word of mouth. The significance of this study is found in the fact that it investigates the influence of augmented reality apps on electronic word of mouth with its dimension's opinion giving and opinion passing.

The study revealed that augmented reality apps affect positively on electronic word of mouth.

Additionally, by focusing on **AR app users in Egypt**, this study contributes to the limited body of research that examines AR and digital marketing in **emerging markets**. This addresses a geographical gap in the literature, offering insights into how consumers in developing economies perceive AR apps.

Furthermore, the current study provides significant practical recommendations as shown in table (9).

Table (9): The Research Practical Recommendations

Practical Recommendations		Notes for application
1- leveraging Positive EWOM for Marketing Campaigns	Who?	Marketing teams and customer service departments of businesses utilizing AR apps.
	How?	By creating campaigns that incentivize sharing reviews, feedback, or experiences online. For instance, companies can offer discounts or rewards for posting product reviews or AR experiences on social media.
	When?	Post-launch of new AR features or product updates, when user satisfaction is high, to capitalize on positive sentiment.
	Where?	On social media platforms, company websites, and e-commerce platforms where customers interact and share their feedback.
2- Customizing AR Experiences for Different User Segments.	Who?	Product managers and UX/UI designers in AR-focused companies.
	How?	Implement different levels of interactivity and visual complexity for various age groups or educational levels. For example, younger users may appreciate more interactive and visually dynamic AR experiences, while older users may prioritize simpler features like clear information and easy navigation.
	When?	This can be implemented in the app's user onboarding process, with tailored AR experiences introduced based on user demographics.
	Where?	In-app experiences, customer segmentation strategies, and marketing materials targeting specific user groups.
3- Expanding AR Adoption in Emerging Markets.	Who?	Business leaders and marketing strategists in industries such as retail, real estate, and tourism.
	How?	Conduct localized marketing campaigns that highlight the practical benefits of AR apps, such as improving decision-making through virtual product trials.

Table (9): The Research Practical Recommendations (Continued)

Practical Recommendations		Notes for application
3- Expanding AR Adoption in Emerging Markets.	When?	Launch these campaigns during periods of high consumer activity, such as major shopping seasons or technology rollouts.
	Where?	Through local social media influencers, local events, and partnerships with trusted local businesses in Egypt and similar emerging markets.
4- Creating a Feedback Loop for Continuous AR Improvement	Who?	Customers experience teams and product developers in AR-focused companies.
	How?	Establish mechanisms such as in-app surveys, reviews, and real-time feedback options. Ensure users are aware of updates and improvements based on their input, which encourages further engagement.
	When?	After major app updates or new feature launches.
	Where?	Within the app, and through post-interaction surveys via email or SMS.

Source: prepared by the Researcher based on Literature.

14. Limitations and Further Research

Although the current study has provided useful theoretical and practical implications, it also has some limitations that should be taken into consideration.

First, the current study addressed the relationship between augmented reality apps and electronic word of mouth. Further studies may examine the moderating role of **consumer technology anxiety, technology readiness, novelty seeking, and sensation seeking** in the relationship between augmented reality apps and electronic word of mouth.

Second, the study primarily focuses on AR app features like quality, interactivity, vividness, and novelty. Future research could explore other AR-related factors, such as informativeness, customization, or the role of social presence, to further enrich the understanding of how AR influences EWOM.

Third, in future research, scholars could extend this study by exploring the impact of other technologies that support AR features, such as smart glasses, AR-integrated websites, or virtual mirrors. These technologies offer immersive AR experiences beyond mobile apps and could provide deeper insights into how various AR-enabled devices influence consumer behavior and electronic word of mouth. By examining different AR platforms, researchers could better understand the broader application of AR features in enhancing customer engagement across diverse digital interfaces.

Fourth, the study focuses solely on Augmented Reality apps users in Egypt, which limits the generalizability of the findings to other regions or cultural contexts. Future studies could extend the scope by including AR users from other geographical areas to explore potential cultural influences on EWOM behavior.

Finally, the current study depended on cross-sectional data which limits the ability to observe how EWOM behavior evolves over time. Longitudinal studies are recommended to examine the long-term effects of AR experiences on electronic word of mouth behavior.

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