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UNDERSTANDING ONLINE SHOPPING EXPERIENCE WITH AUGMENTED REALITY(AR) MOBILE APPS: A GROUNDED THEORY APPROACH

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ABSTRACT

Following In the post-pandemic landscape, the resurgence of in-store shopping has caused a decline in online purchases. However, the retail industry has witnessed a surge in the adoption of augmented reality (AR) technology as businesses seek innovative ways to revitalize the online shopping experience and maintain a competitive edge. This study delves into the realm of customer experience with augmented reality, specifically focusing on mobile apps tailored for cosmetic products. The research methodology employed in-depth interviews to gather qualitative data, allowing for a nuanced exploration of consumer perceptions and preferences. The analysis reveals three pivotal dimensions crucial for the success and acceptance of AR mobile apps among online shoppers: hedonic experience, utilitarian experience, and immersive experience. The hedonic experience emphasizes the emotional and sensory gratification derived from using AR apps, providing customers with an enjoyable and engaging shopping journey. Simultaneously, the utilitarian experience underscores the practical benefits and functionality that AR technology brings, enabling users to make informed decisions about cosmetic products. Lastly, the immersive experience immerses customers in a digitally enhanced shopping environment, blurring the lines between the virtual and physical realms. For retailers to harness the full potential of AR in the cosmetic retail sector, a strategic fusion of these three experiential dimensions is imperative. This study contributes valuable insights for businesses aiming to leverage AR technology effectively, ensuring a compelling and satisfying online shopping encounter for consumers in the ever-evolving retail landscape.

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1.0 INTRODUCTION

The rapid development and widespread deployment of IR4.0, augmented reality technology seems to play an important role in the retail industry, crucially changing consumer behavior and retailers' strategies (Caboni & Pizzichini, 2022). Innovative augmented reality technology integrates virtual and reality to enrich customer experience (Xu et al., 2022). On top of that, most of the brands actively integrate augmented reality technology with mobile apps to add many practical functions to increase consumer interest and exposure to the brand (Chen et al., 2022). By systematically developing the concepts of augmented reality (AR) technology and customer experience, it can add value to customer engagement, purchase intention, and continuance intention.

Based on the Statista website (2021), the main reasons total consumers worldwide do not like shopping online is because they are unable to see products in person (47%), and not able to try out the things they like before purchasing them (43%), and not able to touch products (43%), respectively. The Malay Mail (2022) reported online shopping still strong among young Malaysians, however, it is sliding for those above 50 years old as the pandemic recedes as they prefer getting their goods from physical stores. The overall statistics show e-commerce usage is stable as physical retail reopens, but browsing an e-commerce platform in 2022 has declined to 72% compared to the year 2021 (75%). Besides, a consumer who purchased an e-commerce platform does not show a higher percentage of increment between 2021 and 2022 which is 45% and 46%, respectively. According to Riar et al. (2022), when assessing complex machines, large furniture, and especially products with high economic value, consumers often end up going to physical stores to acquire a more multifaceted understanding of the product as consumers may find it challenging to evaluate the values of products. For example, there are divergences in terms of product categories purchased after the pandemic such as a drop in online purchases of cosmetics, electronic devices, home appliances, and other pricier specialty items. Thus, traditional web-based online shopping platforms still have limitations in terms of product trial, product presentation, information richness, and multidimensional experientially (Riar et al., 2022).

In consequence, retailers and practitioners are looking for ways to address and resolve these online shopping dilemmas among their consumers. At the same time, they are hesitant to adopt augmented reality (AR) technology as it is still uncertain in terms of performance, how consumers will accept the technology, and enrich the online shopping experience. Moreover, retailers are skeptical of the time and cost of developing, marketing, sales performance, purchase conversion rate, continuous use, and customer loyalty due to a lack of empirical research and practical evidence is still unclear (Qin et al., 2021). However, the popularity of mobile applications and augmented reality (AR) as an immersive technology seems to provide new opportunities for increasing and sustaining the retail industry in the future. On top of that, the purpose of this study is to understand the online shopping experience with augmented reality (AR) mobile apps by generating Customer experience theory using Grounded theory approaches as evidence for retailers and practitioners to improve their strategies to enrich online shopping experience.

2.0 LITERATURE REVIEW

2.1 Augmented Reality (AR) in Retailing

Augmented reality (AR) integrates the digital world with the real world by enriching consumers with real-time experiences and immediate surroundings to become a learning platform. On top of that, augmented reality (AR) has become a focus of the retail industry to enhance online shopping experience among consumers as it is becoming increasingly popular to enable smart shopping when the move is on from offline shopping to online shopping (Sharma et al., 2022).

The potential of augmented reality (AR) mobile apps for virtually testing products in real environments (Butt et al. 2021) is fully expressed in this app. For example, the main elements of augmented reality (AR) mobile apps for cosmetic products are as follows, (1); the opportunity to test various of cosmetics product looks in real-time which is one of the main features of this technology via the front-facing camera of an individual's mobile device that functions as a virtual mirror, (2); the opportunity to test real cosmetics product by exploiting real facial features, (3); consumers can reach useful tips from a

beauty advisor via live chat to help identify the best colors for his/her skin tone, and (4): if consumers like the cosmetics product that they try, they can purchase it directly in the mobile apps to recreate the look at home.

By adopting augmented reality (AR) mobile apps, it can provide consumers a 'try before you buy' with the real feel of the product information in terms of fit, size, and performance that can improve online shopping experience (Baytar et al., 2020). Moreover, it also shows that positive customer experiences increased the students' willingness to share AR content on social media channels (Alamäki et al., 2021). Hence, the online shopping experience can be improved due to reducing decision-making uncertainty as well as increasing online purchase intention and customer loyalty towards facilitating consumer-brand relationships (Chen et al., 2021). Future studies on the impacts of augmented reality (AR) technology on retailing can provide practical implications for online retailers' interests in improving online shopping experience.

2.2 Customer Experience Theory

Measuring the Customer experience theory is considered difficult because of the extremely high level of the subjectivity of individual personality; thus it requires the appropriate model to avoid bias (Khotimah & Afif, 2016). Until now, the issue of constructing and shaping the concept or theory of the customer experience is still in development. According to Hilken et al. (2018), it seems current research has yet to provide a relevant or conceptually robust understanding of Customer experience theory and augmented reality (AR) technology that enabled to improvement of online shopping experience. Hence, the purpose of this study is to understand the concepts of Customer experience theory in the context of online shopping experience with augmented reality (AR) mobile apps for cosmetic products. In this study, Customer experience theory constructs are included in three dimensions which are hedonic experience, utilitarian experience, and immersive experience. Hence, the implication of this study is expected to further develop the model or concept measuring Customer experience theory to be fit for any issue concerning increasing online shopping experience that is useful for both academics and practitioners.

2.3 Online Shopping Experience

The rapid evolution in augmented reality (AR) has redefined the online shopping experience and created huge opportunities for the retail industry to interact with customers using virtual reality. Previous studies have shown the effectiveness of augmented reality (AR) technology to enhance online shopping experience among consumers. For example, a study by Alamäki et al. (2021), shows augmentation as a value-creating mechanism seems to create surprising emotional reactions as it is new and unexpected experiences for first-time consumers. Meanwhile, in the context of apparel products (Kim et al., 2022) have shown how AR-based product display can generate greater website quality, interactivity, and vividness than a picture-based product display leads to attracting customers with different haptic orientations.

Furthermore, a study by Zimmermann et al. (2022) also shows the overall quality of online shopping experiences in the concepts of usefulness, entertainment, informativeness, and irritation have positive impacts on the perception of brick-and-mortar online shopping experience. With the various findings of online shopping experience constructs, this study's purpose is to understand how online shopping experience with augmented reality (AR) mobile apps can be generating by Customer experience theory using a Grounded theory approach that provides an urgently needed framework for guiding in the future research.

3.0 METHODOLOGY

This study conducted qualitative research (inductive approach) by generating Customer experience theory using the Grounded theory approach (Glaser and Strauss, 1967). Grounded theory approaches have been used in previous studies to understand consumer shopping behavior (Sternquist & Chen, 2006).

3.1 Grounded Theory

Grounded Theory approach suggests generation of theory from data collected in social science (Mukrimaa et al., 2016; Glaser and Strauss, 1967). Besides, Grounded theory can be generated from data related to observed or reported activities (Sampatrao et al., 2011; Corbin and Strauss, 1990). The researchers have the flexibility to select participants and record activities from which potential phenomena can be identified and emerge the concepts integrated into a theory (Chakraborty & Su, 2017; Strauss and Corbin, 1994). Moreover, these approaches enable researchers to understand the issues from different angles and help to uncover the meanings that underlie action, for example, to understand how individuals respond to problems and their behavior to develop comprehensive explanations.

The data collected during the research process have emerged as the concepts upon which the theory is generated. The data collected from the interviews were then analyzed to gain the properties called constant comparison. From the process, data is separated into each pieces to compare the similarities or differences. To gain the conceptual heading, each piece of data is grouped into similar forms of core category. Hence, the structure of the theory can emerge through integration from the core category. In this study, each piece of the data was categorized into hedonic experience, utilitarian experience, and immersive experience to generate Customer experience theory.

3.2 Theoretical Sampling

To investigate the research questions, an empirical study was conducted using theoretical sampling as it allows to development of properties and concepts emerging from the data collected, coded, and analyzed (Chakraborty & Su, 2017; Strauss and Corbin, 1994). This study relies on interviewees’ subjective views which is common like study for interviews and accordingly, a sample size of approximately 5 to 25 participants was anticipated (Qu & Dumay, 2011; Kvale and Brinkmann, 2009). Furthermore, a study by Subedi (2021) describes the sample size in qualitative research are focused to explore in-depth information from the small number of participants and it can be added or removed during the research process rather than the prior determination. Moreover, the authors suggest the researchers select the participants in qualitative research and choose from a single to twenty samples that can be varied on the depth of the information required as well as the nature of the inquiry. In addition, one to twenty or more participants can be selected with justification while conducting the narrative inquiry. On top of that, to gather relevant participants, this study employed purposive sampling of young 6 female participants who was chosen according to the following criteria: they were regularly visiting physical stores to purchase cosmetics products, had purchased at least one cosmetics product within the previous three months, and aged between 15-30 years old considered as youth generation.

According to Malaysia Youth Policy (2019), the definition of youth is those who are between 15 and 30 years old. Besides, the chosen young generation of females are innovative consumers and have higher purchases of cosmetics products (Malay Mail, 2022). In general, the characteristics of early adopters of new technology are among younger populations, higher levels of education and incomes, and are more often female than male gender (Tobbin & Adjei, 2012; Ha and Stoel, 2004; Rogers, 1995; Goldsmith, 1995). On top of that, the participants were recruited using the researchers’ contacts at higher learning institutions in Selangor considered as urban areas and many shopping malls. The in-depth interviews were conducted at Universiti Teknologi Mara in Selangor, Malaysia from May 2023 to June 2023, among young students aged between 19 and 23 years old. Table 3.1 below shows the profiles of participants.

Table 3.1: Profiles of Participants

Participant	Age	Faculty	Shopping Platform
P1	22	Communication and Media Studies	Physical Store
P2	22	Communication and Media Studies	Physical Store
P3	19	College of Creative Arts	Physical Store
P4	23	Accountancy	Physical Store
P5	22	Applied Science	Physical Store
P6	22	Applied Science	Physical Store

3.3 Data Collection

In this study, two augmented reality (AR) mobile apps which is Shopee Beauty Cam and Lazada Magic Mirror were

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selected for four main reasons. First, it was necessary to select the augmented reality (AR) mobile apps that were available to the Malaysia market to be analyzed, so that the participants could download and use these apps on their mobile devices. Second, both augmented reality (AR) mobile apps were free of charge for use with Android and iOS. Third, both mobile apps were highly rated which is Shopee (4.3/5.0) for android and (4.6/5.0) for iOS, while Lazada (4.7/5.0) both for Android and iOS. Moreover, both mobile apps have reached 1 million reviews for Shopee and 22 million reviews for Lazada, respectively. This data was collected in Google Play Store and Apple Store in May 2023. Fourth, both mobile apps permitted their consumers to select several cosmetic products from different brands such as Maybelline, L'Oréal Paris, Estee Lauder, Bobbi Brown, Silky Girl, NYX, M.A.C and other top brands. Hence, the participants had the opportunity to experience and choose different kinds of preferred cosmetic brands by considering their monthly spending power for cosmetic products. Before the interviews sessions begin, each participant needs to experience augmented reality (AR) mobile apps between 10 minutes to 15 minutes. Most of the six participants stated that they preferred Shopee Beauty Cam to experience AR-mobile apps as usually they use the platform to purchase through online. However, only five out of six participants success to use Shopee Beauty Cam for this study. Meanwhile, one of the participants experienced Lazada Magic Mirror as the coverage issue happened while trying to use Shopee Beauty Cam at that time. The preferred online shopping platform is very important as it may affect the findings to make sure participants are comfortable with the platform that they use to give accurate opinions on the effectiveness of AR-mobile apps. According to Plotkina et al. (2022), consumer brand perceptions are more prone to impact from AR-mobile apps and the role of consumer innovativeness and shopping orientation in AR-mobile apps affects brand personality as well. The interviews were conducted face-to-face, then recorded and transcribed. The interviews lasted between 45 and 55 minutes.

The main questions that were asked to the respondents were:

1. Does AR-mobile apps help you in shopping? Do you prefer to use AR-mobile apps when shopping online? Why?
2. What are the factors that motivate you to use AR-mobile apps in shopping?

Based on the depth of responses, follow-up questions using a semi-structured interview approach were asked to get deeper insights on customer experience. The following questions were asked to gain more insights on customer experience relating to hedonic experience, utilitarian experience, and immersive experience:

1. How was your experience using AR-mobile apps for shopping?
2. Are you satisfied with the usage of AR mobile apps?
3. How can AR-mobile apps improve your shopping experience?
4. What concerns do you have in using AR-mobile apps? How can they be addressed?

In this study, the data collection was stopped once the interviewees mentioned similar themes multiple times, such as 'enjoyment, fun, convenience, ease of use, helpful, lost track of time, satisfaction related to their experience with augmented reality (AR) mobile apps. The themes were noticed after the sixth interviews, which is a similar outcome to that noted by (Guest et al., 2006) who discovered basic elements for their themes emerging as early as after six interviews. The sampling would stop when theoretical saturation is reached for example, the data collected information does not generate any additional properties and concepts (Mukrimaa et al., 2016; Glaser and Strauss, 1967). Conducting more interviews would not necessarily have led to new insights and there would be no further emergent patterns of concepts in the data (Törrönen, 2002; Gaskell, 2000). Once the interviews started providing collectively similar outcomes, the data had reached thematic saturation (Green and Thorogood, 2009). In other words, there are no new data supplies if the researcher continues expanding the sample size for the data collection in the interviews therefore, 6 participants is adequate for this study as no data emergence.

3.4 Data Analysis

Analysis of collected data was done in three stages which were open coding, axial coding, and selective coding (Strauss and Corbin, 1994). Analysis begins immediately from the first interview (Glaser and Strauss, 1967).

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3.5 Open Coding

The first stage of coding analysis is called ‘open coding’ where the recorded interviews were carefully listened to, and important properties were transcribed that could relate to an underlying theory or concept (Strauss and Corbin, 1994). The repetitive properties that reiterated the same concept were not transcribed. Each property was then examined carefully to understand the participant experience in using augmented reality (AR) mobile apps for online shopping. The properties identified through analysis were related to an activity or context in this study.

3.6 Axial Coding

During the second stage, the properties identified in open coding were grouped into categories based on similarities or differences of the context. This analysis is called the constant comparison method. The categories were created with respect to ease or difficulty in using augmented reality (AR) mobile apps, their satisfaction, and outcome of the experience.

Selective Coding

The categories created during axial coding were examined to determine the relationships between them through constant comparison method which helped to create core categories related to theory or concepts identified in Customer experience theory. Three categories were created, for example, hedonic experience, utilitarian experience, and immersive experience. Detailed coding stage analysis data is shown below and in the appendices.

Table 3.2 below shows coding stages for the concepts of hedonic experience. It shows properties from the participants such as have a great experience, customized solution, customized search, clarity in decision-making, capturing consumer imagination, more options toward products, meeting desirable expectations while using augmented reality (AR) mobile apps that led to enjoyable, delightful, fun, and exciting concepts.

Table 3.2: Hedonic Experience

Properties	Participants
Capturing consumer imagination	P1
Great experience	P1, P2, P3, P4, P5
More options	P2
Customized solution	P1, P4, P6
Customized search	P1, P2, P4
Meeting desirable expectations	P4
Clarity in decision-making	P2, P6

Table 3.3 below shows the coding stages for the concepts of utilitarian experience. It shows properties from the participants such as customized search, time-saving, customized solutions, ease of use, convenience, user-friendliness, clarity in decision-making, and technical competence while using augmented reality (AR) mobile apps that led to functional, helpful, practical, effectiveness, and necessary concepts.

Table 3.3: Utilitarian Experience

Properties	Participants
1. Customized search	1. P1, P2, P3, P4, P5, P6
2. Customized solutions	2. P1, P3, P4, P5, P6
3. Time saving	3. P1, P2, P3, P4, P5, P6
4. User friendliness	4. P1, P2
5. Clarity in decision-making	5. P2
6. Ease of use	6. P2, P3, P4
7. Convenience	7. P3, P5
8. Technical competence	8. P4

Table 3.4 below shows coding stages for the concepts of an immersive experience. It shows properties from the participants such as realistic experience, lost track of time, satisfaction of need, forget all worries, forget surroundings, and the future intention while using augmented reality (AR) mobile apps that led to consumers immersed, absorbed, satisfaction, complete, and trust concepts.

Table 3.4: Immersive Experience

Properties	Participants
1. Lost track of time	1. P1, P2, P3, P4, P5
2. Realistic experience	2. P1, P2, P3, P4, P5, P6
3. Satisfaction of need	3. P1, P3, P4, P5, P6
4. Forget all worries	4. P4, P5, P6
5. Forget surroundings	5. P5, P6
6. Intention	6. P1

4.0 FINDINGS AND DISCUSSION

Thematic Analysis

Thematic analysis of interviews was conducted by highlighting the themes connected with online shopping experience with augmented reality (AR) mobile apps.

Table 4.1: Thematic Analysis

Keywords Identification	Codes	Themes	Concepts
1. I enjoy playing with the filter.	1. Capturing consumer imagination	Hedonic Experience	The concepts of online shopping experience are enjoyable, delightful, fun, and exciting.
2. I feel like I have more options when choosing a product.	2. Great experience		
3. It was fun playing with the filter, and it's like playing a game around the features.	3. More options		
4. It was fun because it made me want to spend more time exploring and learning.	4. Customized solution		
5. I feel excited because I can see whether the makeup color suits my face or not.	5. Customized search		
6. It provides me with a new experience to try new colors that I have never tried before.	6. Meeting desirable expectations		
	7. Clarity in decision-making		

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	Keywords Identification	Codes	Themes	Concepts
Data Set Collection	1. It is very helpful to compare and choose products online.	1. Customized search	Utilitarian Experience	The concepts of online shopping experience are functional, helpful, practical, effective, and necessary.
	2. It takes me trial and error to test various cosmetic products without a physical tester.	2. Customized solutions		
	3. It is easy to use because the interface is not complicated.	3. Time saving		
	4. It is easy to find on the screen and does not consume so much time to set up the apps.	4. User-friendliness		
	5. It can reduce shopping efforts as it consumes less time and energy to search for products.	5. Clarity in decision-making		
	6. I am very satisfied with the detail of the product that appears when I click and place it to try the makeup.	6. Ease of use		
	I am satisfied with the apps, as they do not buffer or require other apps or extra usage of data.	7. Convenience		
		8. Technical competence		
	1. I lost track of time when playing with the filter to try on products.	1. Lost track of time	Immersive Experience	The concepts of online shopping experience are immersed, absorbed, satisfaction, complete, and trust.
	2. I forget my surroundings when using AR mobile apps.	2. Realistic experience		
	3. AR mobile apps increase my level of confidence in makeup.	3. Satisfaction of need		
	4. I will try all the products using these AR mobile apps.	4. Forget all worries		
	5. I need to feel the texture and quality of the product.	5. Forget surroundings		
	6. I'm skeptical of a certain product as it is not accurate and does not look realistic.	Intention		
	7. I hope AR mobile will be more realistic and neutral.			
	8. I am more satisfied shopping at the physical store compared with AR mobile apps.			

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Theme 1: Hedonic Experience

The concept of an online shopping experience can be defined as a hedonic experience such is enjoyable, delightful, fun, and exciting. For example, the participants stated they enjoy playing with the filter, feel like they have more options when choosing a product, feel fun playing with the filter, feel excited because they can see whether the makeup color suits their face or not, and they want to spend more time exploring and learning augmented reality (AR) mobile apps as it provides participants new experience to try new colors that never tried before. This is because augmented reality (AR) mobile apps allow participants to capture their imagination, have more options to choose a product, customize solutions, and search the products, helping participants meet desirable expectations by providing clarity in decision-making to purchase.

Theme 2: Utilitarian Experience

The concepts of online shopping experience can be defined as functional, helpful, practical, effective, and necessary. For example, the participants stated that augmented reality (AR) mobile apps are very helpful, in comparing and choosing products online, give trial and error to test various products without a physical tester, are easy to use because the interface is not complicated, easy to find on the screen and does not consume so much time to set up the apps, reduce shopping efforts as it consumes less time and energy to search products, and they are satisfied with the detail of the product appear when click and place to try the product as well as the apps do not buffer or require extra usage of data. This is because augmented reality (AR) mobile apps allow participants to customize searches and solutions, time-saving, user-friendliness, clarity in decision-making before purchase, ease of use, and convenience, and these apps have technical competence.

Theme 3: Immersive Experience

The concepts of online shopping experience can be defined as immersed, absorbed, satisfied, complete, and trusting. For example, the participants stated that augmented reality (AR) mobile apps make them lose track of time when playing with the filter to try on products, forget their surroundings, increase their level of confidence in makeup, and intention to try all the products using AR-mobile apps, and in the future participants hope the feature of this apps will be more realistic and natural. This is because augmented reality (AR) mobile apps make participants lose track of time, fulfill participants' satisfaction needs with realistic experience, and forget all worries and surroundings as they feel immersed and absorbed while trying the products through these apps.

Validation

The triangulation technique is a preferred validation in the Grounded theory approach which consists of using a mix of methods to examine the same theory or concepts (Creswell & Miller, 2000; Jonsen & Jehn, 2009). In this study, validation was done with the help of member checking from participants, peer debriefing from two academicians' experts, and validation with existing literature (Lincoln & Guba, 1985).

Triangulation Technique 1: Member Checking

Member checking is the process where the researcher checks the validity of the results by getting them received from the participants (Lincoln & Guba, 1985). In this study, initially, the transcriptions of interviews were made, and coding was done to create core categories. These findings were then shared with the participants through WhatsApp. Based on the convenience of participants, they interpret the data and confirm the core categories. The participants approved the results with certain clarifications.

Triangulation Technique 2: Peer Debriefing

Peer debriefing in the form of peer reviews continuously during the process of study is another method of establishing the credibility of research (Lincoln & Guba, 1985). For the peer review of this study, a panel of experts from academia which is two professors in marketing and consumer behavior studies were approached. Both experts provided their criticism, recommendations, and approvals periodically throughout the study which helped to validate the research.

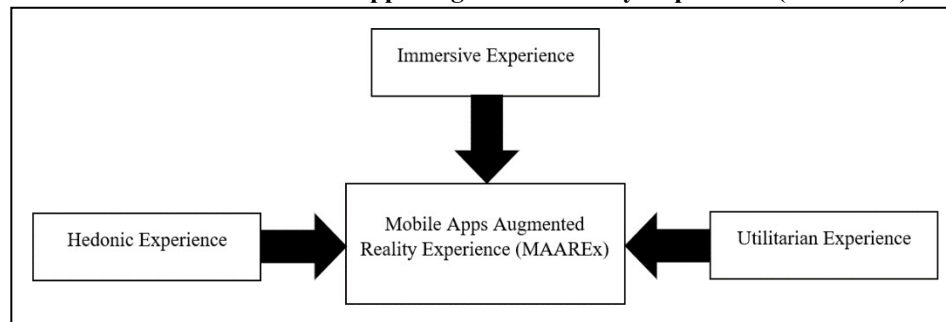
Triangulation Technique 3: Validation with Existing Literature

The results of this study were also validated with existing literature. First, the hedonic experience was derived from previous studies (Chang et al., 2023; Dang et al., 2021; Watson et al., 2020). The hedonic experience concept is fun, exciting, delightful, thrilling, and enjoyable. Second, the utilitarian experience was derived from previous studies (Chang et al., 2023; Riegger et al., 2021; Hamouda, 2021). The utilitarian concept is effective, helpful, functional, necessary, and practical. The third, immersive experience was done by previous studies (Nhan et al., 2022; Huang et al., 2022; Dağ et al., 2023). The immersive experience concept is losing track of time, forgetting surroundings, forgetting all worries, and feeling completely immersed, and absorbed.

Discussion

This study aimed to understand the online shopping experience with augmented reality (AR) mobile apps. Specifically, the purpose is to understand how online shopping experience with augmented reality (AR) mobile apps can be understood by generating Customer experience theory using a Grounded theory approach. Based on the above results, a theoretical framework for a mobile app's augmented reality experience (MAAREx) is presented in Figure 4.2. From the figure, researchers include mobile apps augmented reality experience (MAAREx) related to hedonic experience, utilitarian experience, and immersive experience.

Figure 4.1: A theoretical framework of Mobile Apps Augmented Reality Experience (MAAREx)



Hedonic Experience

The online shopping experience with augmented reality (AR) mobile apps can be understood by generating Customer experience theory using the Grounded theory approach in the concepts of hedonic experience. Early studies by Holbrook & Hirschman (1982), defined hedonic experience as consumption that emphasizes the fantasy, multi-sensory, and emotive aspects of a consumer experience with the shopping process. Meanwhile, Davis et al. (1992) referred to hedonic performance expectancy as the degree to which an individual believes that it is fun to use a technology-based service. Hedonic values definition also includes fun, fantasy, amusement, and sensory stimulation (Arnold & Reynolds, 2003).

Augmented reality (AR) simultaneously offers further digital information and hedonic experiences such as self-expression, enjoyment, and stimulation (Olsson et al., 2013). In a study by Kesari & Atulkar (2016), hedonic value is related to the satisfaction of mall shoppers in terms of entertainment, exploration, and place attachment. Consumers found that consumers feel satisfied and motivated when the shopping environment is attractive and comfortable with colors, lighting, and air-conditioning. However, social status was found not related to customer satisfaction. In addition, the important source of consumer hedonic experience is because of the relaxing and valuable environment of physical retailers (Atulkar & Kesari, 2017). The study by Jung et al. (2018), also found that aesthetics and enjoyment of augmented reality (AR) applications can be seen from the perspective of the hedonic information system. Aligned by Hult et al. (2019), also stated that consumers often experience hedonic value from shopping through multiple sensory experiences including scents, sounds, tastes, visual images, and tactile impressions. Moreover, hedonic benefits seem to generate a positive experience with a retailer's mobile application and are likely to generate rational and emotional responses.

In the context of smart retail technology, hedonic motivation plays an important role as new technologies may arouse customer curiosity as well as increase pleasant experiences for example composed of control, joy, focused immersion, and

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temporal dissociation (Chang et al., 2023). On the other hand, hedonic motivation is defined as customers having pleasant experiences when shopping in smart stores. Customers may make purchases because they seek fun, play, enjoyment, and experience, not just for goal-oriented shopping. Therefore, mobile app augmented reality experience (MAAREx) can be understood using the concepts of hedonic experience.

Utilitarian Experience

The online shopping experience with augmented reality (AR) mobile apps can be understood by generating Customer experience theory using the Grounded theory approach in the concepts of utilitarian experience. Utilitarian value is related to the satisfaction of mall shoppers in terms of monetary savings, selection, and convenience (Kesari & Atulkar, 2016). However, customized products were found not related to customer satisfaction. The findings by McLean & Wilson (2016) show customers are time-conscious during a goal-directed utilitarian search for online support information and services, then customers are not willing to spend longer than they perceive necessary searching on a support website.

In technology, productivity and task performance can be seen from the perspective of the utilitarian information system (Chang et al., 2019). According to Venkatesh et al. (2019), utilitarian performance expectancy is defined as the degree to which an individual believes that a technology-based service will help them perform more effectively in reaching goals related to a task. It includes personalization, shopping effectiveness, flexibility of use, perceived usefulness, relative advantage, extrinsic motivation, outcome expectations, and consideration of time and place. Meanwhile, Riegger et al. (2021) defines utilitarian motivation as customers completing the purchase task efficiently for example, customers may make purchases due to low prices, sales promotion, quality ratios, and the benefits of convenience.

Previous studies have focused on utilitarian motivation such as usefulness and ease of use of smart retail technology (Adapa et al., 2020; Nikhashemi et al., 2021). This is aligned with the study by Shaqman et al. (2022), where shoppers employ utilitarian shopping value when it is task-oriented and strive to achieve their goal with optimum efficiency. Moreover, Chang et al. (2023) describe perceived usefulness to explain that goal-oriented shopping is replaced by utilitarian motivation which is functional benefits such as merchandise price, merchandise quality, product recommendation, location convenience, and speed of shopping based on the situation of smart stores. Therefore, mobile app augmented reality experience (MAAREx) can be understood using the concepts of utilitarian experience.

Immersive Experience

The online shopping experience with augmented reality (AR) mobile apps can be understood by generating Customer experience theory using the Grounded theory approach in the concepts of immersive experience. Immersion is defined as a state of mind in which an individual is fully engaged with the activity, forgetting about the surrounding environment, and subsequently the existence of time (Csikszentmihalyi, 1975). Individuals will immerse themselves in a high degree of excitement and satisfaction because of spatial perception. Moreover, if the online experience is pleasant, the individual will inherently sense of entertainment and will be immersed in it for a long time (Novak & Hoffman, 1996). According to Sakhdari (2016), augmented reality environmental embedding not only improves consumer immersive experience but is also critical to understanding consumers with innovative technologies and services.

A study by Rodríguez-ardura & Meseguer-artola (2019), uses the expression 'user immersive experience' rather than 'customer experience' to mean the individual holistic, inner mechanisms to assign meaning and generate a response to online value propositions. Immersion is usually considered as important condition for enjoying a process and implying a good outcome of the experience (Corrêa et al., 2020). Aligning with the study by Tsai (2020), immersive experience refers to the sense of real presence in virtual reality arising from the design elements of the computer-mediated environment that characterizes spontaneity, enjoyment, liveliness, and controllability. Immersive experience also incorporates digital devices by providing additional sensory information such as sounds, objects, avatars, graphics, visual elements, tactile feedback, and tags into pre-existing environments besides, future developments seem planned to add additional types of haptic as well as olfactory feedback (Batat, 2021). A study by Huang et al. (2022) also defines immersion as an unconscious experience, mainly the internal experience in which individuals are fully engaged and able to enjoy everything in the context when watching a live stream.

The findings by Nhan et al. (2022) suggest that the traits of both the user (mental imagery, personal innovativeness) and the device (simulated physical control, environmental embedding) facilitate the immersive augmented reality (AR) mobile apps can enhance customer experience and identified it as a key driver of customer emotions, values, and behavioral responses. On top of that, immersive technology experiences include digital media phenomena and procedurally customized immersive technology environments (Kozinets, 2023). Therefore, mobile apps augmented reality experience (MAAREx) can

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be understood using the concepts of immersive experience.

5.0 CONCLUSION

The results indicate that the online shopping experience with augmented reality (AR) mobile apps can be understood by generating Customer experience theory. Mobile apps' augmented reality experience (MAAREx) might be hedonic, utilitarian experience, or immersive experience. Consumers prefer using augmented reality (AR) mobile apps that are enjoyable (hedonic experience), convenient (utilitarian experience), and absorbed (immersive experience). Mobile apps' augmented reality experience (MAAREx) can be enhanced by understanding customer hedonic experience, utilitarian experience, and immersive experience. Moreover, generating Customer experience theory using a grounded theory approach and validation of the results using the triangulation technique provides a better understanding of the theory and concepts as well as higher accuracy prediction (Heath and Cowley, 2004).

Managerial Implications

Retailers in Malaysia and developing countries can gather useful insights from global industries such as Shopee and Lazada which have implemented augmented reality (AR) mobile apps. Since the concept of augmented reality (AR) mobile apps is new in Malaysia, it will provide an interesting online shopping experience to consumers in terms of saving the time and cost of visiting physical stores to try and error the cosmetics product. Moreover, it also provides consumers with customized solutions and searches as well as more clarity in decision making hence, thereby providing a great experience to consumers.

For retailers, the benefits are reducing the number of product testers which will reduce the cost and physical space in the stores. By knowing positive customer experience towards augmented reality (AR) mobile apps, retailers can invest less in physical store design to reduce space and cost. Besides, retailers should invest more in marketing campaigns to encourage consumers to use augmented reality (AR) mobile apps. This technology already excited consumers as it can aid in customized search, customized solutions, and meeting desirable product options. However, since it is an emerging technology and may not be able to look realistic, there will still be a need for customer service representatives to build consumer trust when deciding to purchase online. On the retail front, augmented reality (AR) mobile apps are gathering consumer interaction and engagement to better understand consumer behavior towards innovative technologies. On top of that, to improve the online shopping experience, retailers need to understand more in this area to address customers' concerns and build trust as well as their satisfaction.

Limitations and Future Scopes

There are three limitations and recommendations in the future to improve the findings of this study. This qualitative study is the first attempt to understand the online shopping experience of augmented reality (AR) mobile apps in the retail setting in Malaysia. The findings of this study are based on the top two e-commerce brands in Malaysia which are Shopee and Lazada that provide AR-mobile apps related to the cosmetics product without comparing multiple different retail products. Hence, two types of AR-mobile apps may have given different experiences to the participants in this study. Therefore, future research needs to be extended to other retail products such as apparel, shoes, and furniture that can provide more generalizable findings of this study related to the online shopping experience with AR-mobile apps. Besides, each of the participants has used their smartphones to access AR-mobile apps thus, their experience might have different perceived realism depending on the camera used as well as the expected physical versus the visual effect of the try-on products (Plotkina et al., 2022). Subsequently, future researchers should identify the potential bias towards the brands and smartphones used by participants as it can explain the formation of attitudes towards AR-mobile apps.

Second, this study is limited to the online shopping experience of young female consumers in a higher learning institution, Selangor. Thus, a comparison with other generations of customer experience studies has not been done. Due to the limitations of the age and social group of the sample, future studies should consider consumers of other age and social groups. Besides, future research also can increase the average sample size to 25-30 interviews (Thomson, 2011) and 10-50 or more interviews (Subedi, 2021) using the Grounded theory approach to fully develop patterns, concepts, categories, properties, and dimensions depending upon the nature of the study and the information to be collected. In addition, this study uses Customer experience theory to understand online shopping experience with AR-mobile apps and it can be applied across different theories and consumer segments using qualitative and quantitative methodologies to help marketers understand consumers with mobile

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apps augmented reality experience (MAAREx). However, future research is expected to use another theory such as Consumer Acceptance Technology (CAT), Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT) to identify user acceptance of technology with augmented reality (AR) mobile apps. Therefore, there is no claim made regarding the advantage of Customer experience theory over other theories.

Third, the results of this study are based on the Grounded theory approach which is an inductive approach. Hence, alternate research methodologies (both inductive and deductive), need to be employed to strengthen the external validity and generalize the findings. For example, at the end of the interview session, the researchers asked participants whether they intended to buy cosmetics products online after experiencing AR-mobile apps however, the participants refused to purchase online as the AR-mobile apps did not look realistic even though they had a great experience with AR-mobile apps. On top of that, generalizations to understand the online shopping experience and how it influences online purchase intention need to be studied further in deductive methods to give huge outcomes for retailers. According to Plotkina et al. (2022), consumers do not have exposure to reality without the actual product as they can only see their mirrored and augmented reflection on the screen using AR-mobile apps. In other words, the experience and the expectations of the usage of AR-mobile apps are important thus, future research should include representations of actual products to eliminate bias towards try-on products using AR-mobile apps. In the future, understanding online shopping experiences with augmented reality (AR) mobile apps is crucial as it might lead to generating sales and profits for retailers.

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APPENDICES

Statements Taken from Interview of Participants

Items	Open Coding	Axial Coding	Selective Coding
Participant 1			
1. AR mobile apps makes me enjoy playing with the filter.	1. Capturing consumer imagination	1. Enjoyable 2. Delightful 3. Fun	Hedonic experience
2. Using AR mobile apps provide me new experience to try new colour that I never tried before.	2. Great experience		
3. AR mobile apps makes me fun playing with the filter.	3. Great experience		
1. AR mobile apps very helpful specially to choose cosmetic product through online.	1. Customized search	1. Functional 2. Helpful	Utilitarian experience
2. AR mobile apps probably can help people to learn makeup without going to physical store.	2. Customized solutions	3. Helpful 4. Practical	
3. AR mobile apps giving trial and error to test various cosmetic product without physical tester.	3. Customized solutions	5. Effective 6. Necessary	
4. AR mobile apps provides me a way to know the colour is suitable or not with the skin.	4. Customized solutions	7. Practical	
5. AR mobile apps very helpful when you want shopping with fast when don't have time go to physical store.	5. Time saving 6. Hygiene 7. User friendliness		
6. Using AR mobile apps makes me feel more hygiene of the product.			
7. AR mobile apps is ease of use and saving of time.			
1. AR mobile apps makes me lost track of time when playing with the filter of the various colour.	1. Lost track of time	1. Immersed 2. Absorbed	Immersive experience
2. AR mobile apps do not look realistic and should be improved.	2. Realistic experience	3. Satisfaction 4. Satisfaction	
3. I more satisfied shopping at the physical store compared with AR mobile apps.	3. Satisfaction of need		
4. I will not purchase using AR mobile apps as it is not realistic.	4. Negative Intention		
Participant 2			

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1. I'm enjoy using AR mobile apps as more options to choose product that I intend to buy.	1. More options	1. Enjoyable	Hedonic experience
2. AR mobile apps makes me want to explore all the available products and try one by one.	2. Great experience	2. Exciting	
3. I have a great experience using AR mobile apps.	3. Great experience	3. Delightful	
1. AR mobile apps is very helpful in the process of choosing the right product that I intend to buy.	1. Clarity in decision-making	1. Helpful	Utilitarian experience
2. AR mobile apps is convenience for who does not have a time to visit the physical store only to buy one item.	2. Time saving	2. Effective	
3. Using AR mobile apps is easy to click and place order.	3. User friendliness	3. Practical	
4. AR mobile apps are easier to search for another option of product.	4. Customized search	4. Functional	
5. Using AR mobile apps preferably when there is a good natural lighting.	5. Ease of use	5. Necessary	
6. AR mobile apps is convenience because its saves time.	6. Time saving	6. Effective	
7. I'm satisfied to find the right shades or certain type of product.	7. User friendliness	7. Practical	
1. I'm sceptical using AR mobile apps for a certain product as it not accurate and does not look realistic such as foundation.	1. Realistic experience	1. Absorbed	Immersive experience
2. Using AR mobile apps make me spent for more than one hour.	2. Lose track of time	2. Immersed	
Participant 3			
1. Using AR mobile apps, makes me feel fun like playing a game around the features.	1. Great experience	1. Fun	Hedonic experience
1. Using AR mobile apps is exciting as I can choose various types of products to try on.	1. Customized solution	1. Helpful	Utilitarian experience
2. AR mobile apps is easy to use because the interface is not complicated.	2. Ease of use	2. Practical	
3. Using AR mobile apps doesn't consume so much time to set up the apps.	3. Time saving	3. Effective	
4. AR mobile apps is very useful whenever I would like to try on the product without go to physical store.	4. Convenience	4. Necessary	
5. AR mobile apps helps comparing and choosing the product that I would like to buy.	5. Customized search	5. Helpful	
1. I prefer buying product in physical store because the filter seems different from actual product.	1. Realistic experience	1. Absorbed	Immersive experience
2. Using AR mobile apps, makes me feel fun playing around the features.	2. Lose track of time	2. Immersed	
3. I'm satisfied with the AR mobile apps, but it need improved such as the lagging issue.	3. Satisfaction of need	3. Satisfaction	
Participant 4			

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1. I'm enjoyed using AR mobile apps as there are many products can explore without go to physical store.	1. Customized solution	1. Enjoyable	Hedonic experience
2. I'm enjoyed using AR mobile apps because it saves more time.	2. Customized search	2. Enjoyable	
3. I have explored new experience using AR mobile apps.	3. Great experience	3. Exciting	
4. AR mobile apps is fun because make me want to spend more time exploring and learning.	4. Great experience	4. Fun	
5. I will visit online stores that enabled AR mobile apps.	5. Meeting desirable expectations	5. Delightful	
6. AR mobile apps excite me to buy more through online.	6. Meeting desirable expectations	6. Exciting	
1. Using AR mobile apps reduce shopping efforts as it less consumes time and energy.	1. Time saving	1. Effective	Utilitarian experience
2. Using AR mobile apps is convenience because it is very practical.	2. Ease of use	2. Practical	
3. AR mobile apps easy to use and it does not buffer while trying the product.	3. Ease of use	3. Effective	
4. AR mobile apps is convenience because don't need to try and error to check whether it suit or not.	4. Customized solution	4. Practical	
5. AR mobile apps is easy to be found in the screen and it is very convenience.	5. Customized search	5. Helpful	
6. I'm satisfied with the function because it does not require other apps or extra usage of data.	6. Technical competence	6. Functional	
1. AR mobile apps is unrealistic as it viewed virtually.	1. Realistic experience	1. Absorbed	Immersive experience
2. AR mobile apps made me feel to explore more product.	2. Satisfaction of need	2. Immersed	
3. Using AR mobile apps, experience me to finding and try all product virtually that not necessary to buy.	3. Lost track of time	3. Absorbed	
4. I'm satisfied with the usage of AR mobile apps and desired to but product online because it makes me relaxed.	4. Satisfaction of need	4. Complete	
5. Will likely to purchase more as AR mobile apps attracts me most with the function.	5. Forget all worries	5. Immersed	
Participant 5			
1. AR mobile apps make me feel exciting.	1. Great experience	1. Exciting	Hedonic experience
2. AR mobile apps make me feel fun.	2. Great experience	2. Fun	
1. AR mobile apps help me to choose makeup I want to buy.	1. Customized search	1. Helpful	Utilitarian experience
2. AR mobile apps have a good function as it suitable with introvert person to test product without go to physical store.	2. Customized solution	2. Helpful	
3. AR mobile apps can save time.	3. Time saving	3. Effective	
4. AR mobile apps is helpful to get suitable product based on what I need and want.	4. Customized solution	4. Functional	
		5. Necessary	
		6. Practical	
		7. Effective	

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5. I will try AR mobile apps before purchase any product.	5. Customized search		
6. I will not think twice to buy product after using AR mobile apps.	6. Customized solution		
7. AR mobile apps is effective to the people that did not like waste time to choose product at physical store.	7. Customized search		
1. I'm preferring to buy makeup at physical store compared with AR mobile apps as I need to feel the texture and the quality of the product.	1. Satisfaction of need	1. Satisfaction	Immersive experience
2. I lose a few minutes to try on product using AR mobile apps.	2. Lost track of time	2. Absorbed	
3. If I found many online stores provide AR mobile apps, I will try all the product using this apps.	3. Forget all worries	3. Satisfaction	
4. I lose track of time when using AR mobile apps.	4. Lost track of time	4. Absorbed	
5. I'm very satisfied with AR mobile apps.	5. Satisfaction of need	5. Satisfaction	
6. AR mobile apps increase level of confidence to makeup.	6. Satisfaction of need	6. Satisfaction	
7. I forget my surroundings when using AR mobile apps.	7. Forget surroundings	7. Immersed	
8. I hope AR mobile will be more realistic and neutral.	8. Realistic experience	8. Absorbed	
9. I prefer to buy makeup at physical store compared AR mobile apps.	9. Satisfaction of need	9. Satisfaction	
Participant 6			
1. Using AR mobile apps is exciting because I can see whether makeup colour suit my face or not.	1. Customized solution	1. Exciting	Hedonic experience
2. AR mobile apps make me feel good and enjoyable as it helps to make decision to choose product without regret.	2. Clarity in decision-making	2. Enjoyable	
1. Using AR mobile apps can save my time when shopping makeup without go to physical store.	1. Time saving	1. Effective	Utilitarian experience
2. I can choose makeup product that suit with me without spending much time.	2. Customized search	2. Functional	
3. Using AR mobile apps is easy to use everywhere to find best product to my skin.	3. Convenience	3. Helpful	
4. I'm very satisfied with AR mobile apps as the detail of the product appear when click to try the makeup.	4. Customized solution	4. Practical	

1. I lost track of time.	1. Forget surroundings	1. Immersed	Immersive experience
2. I can survey the product using AR mobile apps before purchase whether it worth it or not.	2. Satisfaction of need	2. Satisfaction	
3. I didn't really trust the colour of the product using AR mobile apps as it look fake for some product.	3. Realistic experience	3. Trust	
4. Certain product such as powder looks realistic and clearly.	4. Realistic experience	4. Absorbed	
5. Using AR mobile apps make me want to buy the product that I have try on it.	5. Forget worries	5. Complete	

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