

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 to the success and acceptance of AR mobile apps among online shoppers: hedonic, utilitarian, and immersive experiences. 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 AR technology's practical benefits and functionality, 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 provides valuable insights for businesses seeking to leverage AR technology effectively, ensuring a compelling and satisfying online shopping experience for consumers in the ever-evolving retail landscape.

Keywords: *Augmented Reality, Grounded Theory, Mobile Apps, Online Shopping Experience, Malaysia*

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INTRODUCTION

The rapid development and widespread deployment of IR4.0 and augmented reality technologies seem to play an important role in the retail industry, significantly changing consumer behavior and retailers' strategies (Caboni & Pizzichini, 2022). Innovative augmented reality technology integrates virtual and real worlds to enrich the customer experience (Xu et al., 2022). On top of that, most brands actively integrate augmented reality technology into mobile apps to add practical features that increase consumer interest and exposure to the brand (Chen et al., 2022). Systematically developing the concepts of augmented reality (AR) technology and customer experience 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 are that they are unable to see products in person (47%), 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 that online shopping remains strong among young Malaysians; however, it is declining among those over 50 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 on an e-commerce platform does not show a higher percentage increase between 2021 and 2022, at 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 product categories purchased after the pandemic, including 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 experience (Riar et al., 2022).

As a result, retailers and practitioners are looking for ways to address these online shopping dilemmas among their consumers. At the same time, they are hesitant to adopt augmented reality (AR) technology, as performance remains uncertain, consumer acceptance is unclear, and ways to enrich the online shopping experience are not yet defined. Moreover, retailers are skeptical about the time and cost of development, marketing, sales performance, purchase conversion rate, continuous use, and customer loyalty due to a lack of empirical research and practical evidence (Qin et al., 2021). However, the popularity of mobile applications and augmented reality (AR) as immersive technologies seems to provide new opportunities to grow and sustain 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, providing evidence for retailers and practitioners to improve their strategies and enrich the online shopping experience.

LITERATURE REVIEW 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, thereby becoming 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 realized 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’ experience with the real feel of the product information in terms of fit, size, and performance that can improve the 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 by reducing decision-making uncertainty and increasing online purchase intention and customer loyalty, thereby facilitating consumerbrand relationships (Chen et al., 2021). Future studies on the impacts of augmented reality (AR) technology on retailing can provide practical implications for online retailers seeking to improve the online shopping experience.

Customer Experience Theory

Measuring the Customer experience theory is considered difficult because of the extremely high level of 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 remains under development. According to Hilken et al. (2018), current research has yet to provide a relevant or conceptually robust understanding of Customer experience theory and augmented reality (AR) technology that can improve the 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 organized into three dimensions: hedonic, utilitarian, and immersive. Hence, the implication of this study is expected to further develop the model or concept measuring Customer experience theory, making it applicable to issues concerning the enhancement of the online shopping experience and useful for both academics and practitioners.

Online Shopping Experience

The rapid evolution of augmented reality (AR) has redefined the online shopping experience and created significant opportunities for the retail industry to interact with customers through virtual reality. Previous studies have shown the effectiveness of augmented reality (AR) technology in enhancing the online shopping experience for consumers. For example, a study by Alamäki et al. (2021) shows that augmentation, as a value-creating mechanism, elicits surprising emotional reactions because it is a novel experience 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, leading to attracting customers with different haptic orientations.

Furthermore, a study by Zimmermann et al. (2022) also shows that the overall quality of online shopping experiences in the concepts of usefulness, entertainment, informativeness, and irritation has a positive impact 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 generated by customer experience theory using a Grounded theory approach that provides an urgently needed framework for guiding future research.

METHODOLOGY

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

Grounded Theory

The Grounded Theory approach suggests generating a theory from data collected in the social sciences (Mukrimaa et al., 2016; Glaser & Strauss, 1967). Besides, Grounded theory can be generated from data related to observed or reported activities (Sampatrao et al., 2011; Corbin & Strauss, 1990). The researchers have the flexibility to select participants and record activities from which potential phenomena can be identified and concepts integrated into a theory (Chakraborty & Su, 2017;

Strauss & 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 using the constant comparative method. In the process, data is broken down into individual components to compare similarities and differences. To gain the conceptual heading, each piece of data is grouped into similar forms of a core category. Hence, the structure of the theory can emerge through integration from the core category. In this study, each data point was categorized as hedonic, utilitarian, or immersive to inform the development of user experience theory.

Theoretical Sampling

To investigate the research questions, an empirical study was conducted using theoretical sampling as it allows for the development of properties and concepts emerging from the data collected, coded, and analyzed (Chakraborty & Su, 2017; Strauss & Corbin, 1994). This study relies on participants' subjective experiences and perspectives, as is typical in qualitative interview-based research. Consistent with methodological recommendations, a sample size of approximately 5 to 25 participants was considered appropriate to obtain rich, in-depth insights while allowing for comprehensive data analysis (Kvale & Brinkmann, 2009; Qu & Dumay, 2011).

Furthermore, a study by Subedi (2021) notes that, in qualitative research, the sample size is small and focuses on exploring in-depth information from a small number of participants, and that participants can be added or removed during the research process rather than being predetermined. Moreover, the authors suggest that researchers select participants in qualitative research and choose from a single to twenty samples, varying in the depth of information required and 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 six young 6 female participants who were 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 were aged between 15 and 30 years old, considered as the youth generation.

According to the Malaysia Youth Policy (2019), youth are defined as those aged 15 to 30. Besides, the chosen young female generation is an innovative consumer group and makes more cosmetic purchases (Malay Mail, 2022). In general, early adopters of new technology are younger, have higher levels of education and income, and are more often female than male (Tobbin & Adjei, 2012; Ha & Stoel, 2004; Rogers, 1995; Goldsmith, 1995). On top of that, the participants were recruited through the researchers' contacts at higher learning institutions in Selangor, which are considered urban areas with 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 19 to 23 years. 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
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Data Collection

In this study, two augmented reality (AR) mobile apps, which are Shopee Beauty Cam and Lazada Magic Mirror, were selected for four main reasons. First, it was necessary to select augmented reality (AR) mobile apps available in the Malaysian market for analysis, so that participants could download and use these apps on their mobile devices. Second, both augmented reality (AR) mobile apps were free to use on Android and iOS. Third, both mobile apps were highly rated with Shopee (4.3/5.0) for android and (4.6/5.0) for iOS, while Lazada (4.7/5.0) was highly rated for both Android and iOS. Moreover, both mobile apps have reached 1 million reviews for Shopee and 22 million for Lazada. This data was collected in the Google Play Store and Apple Store in May 2023. Fourth, both mobile apps allowed their users to select multiple cosmetic products from brands such as Maybelline, L'Oréal Paris, Estée Lauder, Bobbi Brown, Silky Girl, NYX, M.A.C., and other top brands. Hence, the participants had the opportunity to experience and choose among different cosmetic brands based on their monthly spending power for cosmetics. Before the interview sessions begin, each participant needs to use augmented reality (AR) mobile apps for 10-15 minutes. Most of the six participants preferred Shopee Beauty Cam for AR in mobile apps, as they usually use the platform to shop online. However, only five of the six participants successfully used Shopee Beauty Cam in this study. Meanwhile, one of the participants experienced the Lazada Magic Mirror coverage issue while trying to use the Shopee Beauty Cam at that time. The choice of online shopping platform is very important, as it may affect the findings and help ensure participants are comfortable with the platform they use to provide accurate opinions on the effectiveness of ARmobile 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 of the respondents were:

1. Do 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 were asked using a semi-structured interview approach to gain deeper insights into customer experience. The following questions were asked to gain more insights into 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 about 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 identified after the sixth interview, a similar outcome to that noted by Guest et al. (2006), who found basic elements of their themes emerging as early as six interviews. Sampling would stop when theoretical saturation is reached; for example, the data collected do not generate any additional properties or concepts (Mukrimaa et al., 2016; Glaser & Strauss, 1967). Conducting more interviews would not necessarily have yielded new insights, nor would there have been any further emergent conceptual patterns in the data (Törrönen, 2002; Gaskell, 2000). Once the interviews began to yield similar collective outcomes, the data had reached thematic saturation (Green &

Thorogood, 2009). In other words, there is no new data to be obtained by continuing to expand the sample size through interviews; therefore, 6 participants are adequate for this study, as no new data emerge.

1.2 Data Analysis

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

1.3 Open Coding

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

1.4 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 based on ease or difficulty of using augmented reality (AR) mobile apps, satisfaction, and the outcome of the experience.

Selective Coding

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

Table 3.2 below shows coding stages for the concepts of hedonic experience. It shows properties of the participants, such as having a great experience, a customized solution, a customized search, clarity in decision-making, capturing consumer imagination, more product options, meeting desirable expectations, and 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, Great experience More options,	P1 P1, P2, P3, P4, P5 P2
Customized solution,	P1, P4, P6
Customized search	P1, P2, P4
Meeting desirable expectations, Clarity in decision-making	P4 P2, P6

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

Table 3.3: Utilitarian Experience

Properties		Participants	
1. Customized search	1. 2. Customized solutions	2.	P1, P2, P3, P4, P5, P6 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. 6. Ease of use			P2, P3, P4
			P3, P5
		7.	P4
7. Convenience	8.		
8. Technical competence			

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 future intention while using augmented reality (AR) mobile apps that led to consumers being immersed, absorbed, satisfied, complete, and trusting concepts.

Table 3.4: Immersive Experience

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

2.0 FINDINGS AND DISCUSSION

Thematic Analysis

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

Table 4.1: Thematic Analysis

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

	Keywords Identification	Codes	Themes	Concepts
Data Set Collection	1. It is very helpful to compare and choose	1. Customized search	Utilitarian	The concepts of products online. 2.
	Customized solutions Experience online shopping			
	2. It takes me trial and error to test various cosmetic products without a physical tester.	3. Time saving	experience are	
		4. User-friendliness		functional, helpful, practical,
	3. It is easy to use because the interface is	5. Clarity in decision-	effective, and not complicated.	making necessary.
	4. It is easy to find on the screen and does not	6. Ease of use take so much time to set up the apps.		
	5. It can reduce shopping efforts as it	7. Convenience		
	8. Technical			
	consumes less time and energy to search competence for products.			
	6. I am very satisfied with the details of the product that appear when I click and place it to try the makeup.			
	I am satisfied with the apps, as they do not buffer or require other apps or excessive usage of data.			
1. I lost track of time when playing with	1. Lost track of time	Immersive	The concepts of the the filter to try on products.	
2. Realistic experience	Experience online shopping			
2. I forget my surroundings when using	3. Satisfaction of need	experience are		
AR mobile apps.	4. Forget all worries		immersion, absorption, satisfaction,	

3. AR mobile apps increase my level of 5. Forget surroundings completeness, and confidence in makeup. Intention trust.
 4. I will try all the products using these AR mobile apps.
 5. I need to feel the texture and quality of the product.
 6. I'm skeptical of a certain product because it's inaccurate and doesn't look realistic.
 7. I hope the AR mobile will be more realistic and neutral.
 8. I am more satisfied shopping at the physical store compared with AR mobile apps.
-

Theme 1: Hedonic Experience

The concept of an online shopping experience can be defined as a hedonic experience that 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, offer more product options, customize solutions, and search for products, helping them meet their desired expectations by providing clarity in purchase decisions.

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, are time-saving and user-friendly, provide clarity in decision-making before purchase, are easy to use, are convenient, and demonstrate 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 have the intention to try all the products using AR mobile apps, and in the future, participants hope the feature of these apps will be more realistic and natural. This is because augmented reality (AR) mobile apps cause participants to lose track of time, satisfy their needs for satisfaction with realistic experiences, and forget their worries and surroundings as they feel immersed and absorbed while trying the products through these apps.

Validation

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

Triangulation Technique 1: Member Checking

Member checking is the process in which the researcher checks the validity of the results by having participants review them (Lincoln & Guba, 1985). In this study, the interview transcripts were initially transcribed, and coding was conducted to develop core categories. These findings were then shared with the participants through WhatsApp. To accommodate

participants' convenience, 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 continuous peer reviews throughout the study process, is another method for establishing the credibility of research (Lincoln & Guba, 1985). For the peer review of this study, a panel of experts from academia, including two professors in marketing and consumer behavior, was convened. Both experts provided their criticism, recommendations, and approvals periodically throughout the study, which helped to validate the research.

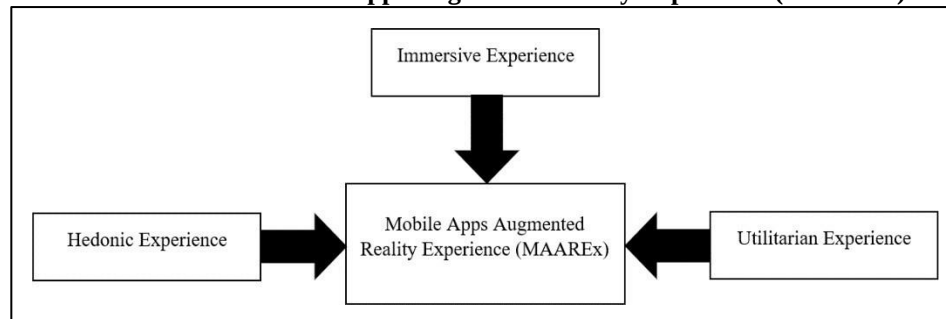
Triangulation Technique 3: Validation with Existing Literature

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 the 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. In the figure, researchers include the mobile app augmented reality experience (MAAREx) across hedonic, utilitarian, and immersive dimensions.

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 the 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) defined hedonic performance expectancy as the degree to which an individual believes using a technology-based service is fun. The definition of hedonic values 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 mall shoppers' satisfaction with entertainment, exploration, and place attachment. 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 to be related to customer satisfaction. In addition, an important source of consumer hedonic experience is 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. 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 foster a positive experience with a retailer's mobile application and are likely to elicit both 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 Temporal dissociation (Chang et al., 2023). On the other hand, hedonic motivation refers to 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, focusing on the concept of utilitarian experience. Utilitarian value is related to mall shoppers' satisfaction with monetary savings, selection, and convenience (Kesari & Atulkar, 2016). However, customized products were found not to be related to customer satisfaction. The findings by McLean & Wilson (2016) show that customers are time-conscious during a goal-directed utilitarian search for online support information and services and are unwilling to spend more time than they perceive is necessary searching on a support website.

In technology, productivity and task performance can be viewed through the lens 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 achieving task-related goals. 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) define utilitarian motivation as customers completing the purchase task efficiently. For example, customers may make purchases due to low prices, sales promotions, quality-to-price ratios, and the convenience they offer.

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), in which shoppers employ utilitarian shopping value when shopping is task-oriented and strive to achieve their goals with optimal efficiency. Moreover, Chang et al. (2023) describe perceived usefulness to explain how goal-oriented shopping is replaced by utilitarian motivation, characterized by functional benefits such as merchandise price, merchandise quality, product recommendations, location convenience, and shopping speed, in the context 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 a customer experience theory using the Grounded theory approach, focusing on the concept of immersive experience. Immersion is defined as a state of mind in which an individual is fully engaged in the activity, forgetting about the surrounding environment and, subsequently, the passage of time (Csikszentmihalyi, 1975). Individuals will experience a high degree of excitement and satisfaction through spatial perception. Moreover, if the online experience is pleasant, the individual will have an inherent 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 consumers' immersive experience but is also critical to understanding consumers' responses to innovative technologies and services.

A study by Rodríguez-ardura & Meseguer-artola (2019) uses the expression 'user immersive experience' rather than 'customer experience' to refer to the individual, holistic, inner mechanisms that assign meaning and generate a response to online value propositions. Immersion is usually considered an important condition for enjoying a process and implying a

good outcome of the experience (Corrêa et al., 2020). In line with Tsai (2020), immersive experience refers to the sense of real presence in virtual reality, arising from the design elements of the computer-mediated environment, and is characterized by 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 preexisting environments. Besides, future developments seem planned to add additional types of haptic and olfactory feedback (Batat, 2021). A study by Huang et al. (2022) also defines immersion as an unconscious experience, primarily an internal state in which individuals are fully engaged and able to enjoy everything in the context while 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, which can enhance customer experience and identify it as a key driver of customer emotions, values, and behavioral responses. On top of that, immersive technology experiences encompass digital media phenomena and procedurally customized environments (Kozinets, 2023). Therefore, mobile apps augmented reality experience (MAAREx) can be understood using the concepts of immersive experience.

3.0 CONCLUSION

The results indicate that the online shopping experience with augmented reality (AR) mobile apps can be understood by generating the customer experience theory. Mobile apps' augmented reality experience (MAAREx) might be hedonic, utilitarian or immersive. Consumers prefer augmented reality (AR) mobile apps that are enjoyable (hedonic experience), convenient (utilitarian experience), and immersive (hedonic experience). The augmented reality experience (MAAREx) in mobile apps can be enhanced by understanding customers' hedonic, utilitarian, and immersive experiences. Moreover, generating Customer experience theory using a grounded theory approach and validating the results through triangulation provides a better understanding of the theory and its concepts, as well as more accurate predictions (Heath & Cowley, 2004).

Managerial Implications

Retailers in Malaysia and other developing countries can gain useful insights from global platforms 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 consumers with an interesting online shopping experience by saving time and the cost of visiting physical stores to try and error cosmetics products. Moreover, it provides consumers with customized solutions and searches, as well as greater clarity in decision-making, thereby delivering a great experience.

For retailers, the benefits include reducing the number of product testers, thereby lowering costs and freeing up in-store space. By understanding positive customer experiences with augmented reality (AR) mobile apps, retailers can invest less in physical store design, reducing space and costs. Besides, retailers should invest more in marketing campaigns to encourage consumers to use augmented reality (AR) mobile apps. This technology already excites consumers, as it can aid in customized search, customized solutions, and the identification of desirable product options. However, since it is an emerging technology and may not seem realistic, there will still be a need for customer service representatives to build consumer trust when making online purchases. On the retail front, augmented reality (AR) mobile apps are driving consumer interaction and engagement, helping retailers better understand consumer behavior towards innovative technologies. On top of that, to improve the online shopping experience, retailers need to better understand this area to address customers' concerns and build trust and satisfaction.

Limitations and Future Scopes

There are three limitations and recommendations for 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, Shopee and Lazada, which provide AR mobile apps for cosmetic products, and do not compare multiple retail products. Hence, two types of AR mobile apps may have given different experiences to the participants in this study. Therefore, future research should extend to other retail products, such as apparel, shoes, and furniture, to provide more generalizable findings related to the online shopping experience with AR mobile apps. Besides, each participant has used their smartphone to access AR mobile apps; thus, their perceived realism might differ depending on the camera used and on the expected physical versus visual effects of the try-on

products (Plotkina et al., 2022). Subsequently, future researchers should identify potential bias towards the brands and smartphones used by participants, as this may explain the formation of attitudes towards AR mobile apps.

Second, this study is limited to the online shopping experience of young female consumers at a higher learning institution in Selangor. Thus, a comparison with other generations of customer experience studies has not been done. Given the sample's age and social group limitations, future studies should consider consumers from other age and social groups. Besides, future research can also 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

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, no claim is made regarding the superiority of the 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 cosmetic products online after experiencing AR mobile apps; however, the participants refused to purchase online because the AR mobile apps did not look realistic, even though they had a great experience with them. On top of that, generalizations about the online shopping experience and its influence on online purchase intention need to be studied further using deductive methods to yield meaningful insights for retailers. According to Plotkina et al. (2022), consumers lack direct exposure to reality without the actual product, as they can only see their mirrored and augmented reflections on the screen using AR mobile apps. In other words, the experience and expectations around using 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	Hedonic experience
2. Using AR mobile apps provide me new experience to try new colour that I never tried before.	2. Great experience	2. Delightful	
3. AR mobile apps makes me fun playing with the filter.	3. Great experience	3. Fun	
1. AR mobile apps very helpful specially to choose cosmetic product through online.	1. Customized search	1. Functional	Utilitarian experience
2. AR mobile apps probably can help people to learn makeup without going to physical store.	2. Customized solutions	2. Helpful	
3. AR mobile apps giving trial and error to test various cosmetic product without physical tester.	3. Customized solutions	3. Helpful	
4. AR mobile apps provides me a way to know the colour is suitable or not with the skin.	4. Customized solutions	4. 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	5. Effective	
6. Using AR mobile apps makes me feel more hygiene of the product.	6. Hygiene	6. Necessary	
7. AR mobile apps is ease of use and saving of time.	7. User friendliness	7. Practical	

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	Immersive experience
2. AR mobile apps do not look realistic and should be improved.	2. Realistic experience	2. Absorbed	
3. I more satisfied shopping at the physical store compared with AR mobile apps.	3. Satisfaction	3. Satisfaction	
4. I will not purchase using AR mobile apps as it is not realistic.	4. of need	4. Satisfaction	
Participant 2			
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-	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. making Time	2. Effective	
3. Using AR mobile apps is easy to click and place order.	3. saving	3. Practical	
4. AR mobile apps are easier to search for another option of product.	4. User friendliness	4. Functional	
5. Using AR mobile apps preferably when there is a good natural lighting.	5. Customized	5. Necessary	
6. AR mobile apps is convenience because its saves time.	6. search Ease of use	6. Effective	
7. I'm satisfied to find the right shades or certain type of product.	7. Time saving	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			
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. AR Great experience	1. Exciting	Hedonic experience
2. 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. to Customized search	1. Helpful	Utilitarian experience
2. AR mobile apps have a good function as it with introvert person to test product without go to physical store.	2. suitable 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	
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. Immersed	
7. I forget my surroundings when using AR mobile apps.	7. Forget surroundings	7. Absorbed	
8. I hope AR mobile will be more realistic and neutral.	8. Realistic experience	8. Satisfaction	
9. I prefer to buy makeup at physical store compared AR mobile apps.	9. Satisfaction of need		
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. I can choose makeup product that suit with me without spending much time.	1. Time saving	1. Effective	Utilitarian experience
2. Using AR mobile apps is easy to use everywhere to find best product to my skin.	2. Customized search	2. Functional	
3. I'm very satisfied with AR mobile apps as the detail of the product appear when click to try the makeup.	3. Convenience	3. Helpful	
	4. Customized solution	4. Practical	
1. I lost track of time.	1. Forget	1. Immersed	Immersive experience
2. I can survey the product using AR mobile apps whether it worth it or not.	2. Satisfaction	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. Trust	3. Trust	
4. Certain product such as powder looks realistic clearly.	4. Absorbed	4. Absorbed	
5. Using AR mobile apps make me want to buy the product that I have try on it.	5. Realistic experience	5. Complete	