

The Adoption of Augmented Reality (AR) Advertising in Malaysia: A Foresight Perspective

Nurul Balqis Mohd Hairudin¹, Eta Wahab^{1*}

¹ Department of Management and Technology, Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400 Batu Pahat, Johor, MALAYSIA

*Corresponding Author: eta@uthm.edu.my

DOI: <https://doi.org/10.30880/rmtb.2024.05.02.015>

Article Info

Received: 30 September 2024

Accepted: 01 November 2024

Available online: 01 December 2024

Keywords

Augmented reality (AR), adoption, advertising

Abstract

Augmented reality (AR) advertising is the new method of marketing tools which focuses on the fact that able to change dramatically the way any brand communicates and interact with users in realistic way and help users to obtain good experience of the real product. Nevertheless, there is a dearth of study on the use of augmented reality advertising in Malaysia. Thus, the purpose of this study is to identify the key drivers of Augmented Reality (AR) advertising adoption and to determine the future trend of Augmented Reality (AR) advertising adoption among consumers in Malaysia. STEEPV analysis was used to determine the key drivers or issues of Augmented Reality (AR) advertising adoption among consumers in Malaysia. The analysis of STEEPV shows that technological factor is the most important driver in augmented reality advertising followed by values, economics, social, political, and environmental factor. 11 merged key drivers and issues had been found. The impact uncertainty analysis method was employed to determine the augmented reality advertising trend that Malaysia might face in the future. A total of 384 questionnaires were distributed to advertising company in Malaysia with response rate of 30.2%. The study found that privacy policies protection and AR technology interaction between virtual world and real life have the highest impact and the highest uncertainty. Four scenarios were proposed at the end of the study., low/sluggish capability, deficiency of technology and vulnerability.

1. Introduction

In the rapid technological development in today's world, emerging technology trend has reinforced the already growing trend of purchasing and has shifted the way consumer purchase things. Digital transformation is an attempt to increase competitiveness by utilizing digital technology to adjust to shifting market conditions (Cho & Lee 2018). Malaysia's consumer lifestyle has evolved because of rising affluence and education levels. In the modern world, customers want to be able to connect with brands at all times, have a variety of options in light of the present economic downturn, and have an engaging experience. It is clearly showing the importance to earn consumers' trust by considering adopted technology for consumer ease of use. In general, consumer behavior examines the economic, cultural, psychological, and social factors that influence consumers in a market segment. This relates to the consumer's activities and the motivations behind those actions. According to Hinsch *et al.* (2020), interactive and captivating features like virtual reality are essential for meeting customer demands in the modern day.

1.1 Research Background

Advertising has existed since the beginning of bargaining days and has grown into a billion-dollar industry over the years. As a result, augmented reality (AR) advertising, a new kind of advertising, seems to be taking off. In this context, the use of AR is a novel interactive tool (Poushneh, 2018). This interactive technology modifies the physical world by superimposing a virtual three-dimensional (3D) representation of a product. Users can move, rotate, and zoom in and out of the 3D model (Poushneh & Vasquez-Parraga, 2017). AR advertising offers various potential to consumers to dynamically interact with the products. The interaction allows consumers to choose products that suit with their preferences and meet their needs.

According to Mauroner *et al.* (2016), it is expected that Augmented Reality (AR) will improve advertising effectiveness by encouraging customers to concentrate on the attractiveness of the advertisement and enhancing their understanding and retention of the message or content. Increasing interactivity of an advertisement and the vividness of the medium could improve the activation power of an advertising message. In line with the point, the customers' good coping behavior is enhanced by an enhanced environment and dynamic visuals that elicit their sensory and affective reactions. (Qin *et al.*, 2021). This has been related to study conducted by (Pozharliev *et al.*, 2021) who stated that AR advertising, which is based on the processing fluency paradigm, facilitates customers' processing of information about the product, leading to more favorable emotional reactions to the brand or product.

1.2 Problem Statement

Malaysia's population estimated at 32.7 million people in 2020 and growing at a 1.29% rate. According to Department of Statistics Malaysia in August 2020, the current data showed that Malaysia's GDP contracted by 17.1% in the second quarter of 2020. Malaysia's growth rate has been the lowest since the fourth quarter of 1998, during the Asian Financial Crisis. This data reveals an indication that consumer behavior has changed significantly over the past year. To curb with this focal issue, augmented reality technology is indeed significant on determining consumer behavior with the potential of visualizing the product. Advertising plays a huge role in attracting customers. Traditional advertising offers less information communicated and is gradually losing its audience. AR is increasingly being touted to provide value and increase sales by allowing customers to interact with products, services, or brands (Bona *et al.*, 2018). Despite these innovative and highly effective instances, as well as optimistic income projections based on banner ad click through rates (Lacy, 2018), according to current market research, most buyers are still unsure about the utility of augmented reality. Despite significant investments in technology, the use of augmented reality (AR) is not widespread (Artillery Intelligence, 2019). In general, the emphasis of advertising has switched from sales to customer engagement, with the goal of creating long-term relationships with a consumer base (Kumar & Gupta, 2016). While conventional advertising has primarily focused on a one-way representation of products and services, a renewed focus on interaction is increasingly incorporating digital technologies into physical settings to promote interactivity of advertising activities. This has led to fragmentation, and old ways of advertising are rendered ineffective. Furthermore, Contextual customer involvement and its attainment through augmented reality advertising remain largely unexplored fields.

Besides, AR advertising is conceptually distinct from online and traditional media channels such as television, print, and radio that require higher price points where the need to pay thousands of dollars for the development of the commercials (Hilken *et al.*, 2017). Moreover, traditional advertising is lack of immediacy such as it requires time and additional production expense. According to Dacko (2017), consumers suppose that augmented reality will improve the service experience and reduces the uncertainty. Enhancing the consumer experience poses a significant challenge for many retailers. To address the identified need, it is progressively important to investigate how augmented reality affects consumer responses in advertising context. Therefore, the main objectives of this study were aimed at identifying the key drivers of augmented reality (AR) advertising and analyzing the future trend of augmented reality advertising in Malaysia.

2. Literature Review

2.1 Introduction

Conducting a literature review constitutes an essential component of any research project. A theoretical hypothesis can be strengthened even further by reviewing related material. This dimension is a procedure that begins with the creation of the title and ends with the preparation of the research report. In order to accomplish the research goals of this study, these sections will address the conclusions from earlier investigations. Furthermore, a thorough synopsis of the significance and essential idea of the study is included in literature analyses.

The purpose of the literature review is to determine the driving elements behind the study's topic and to establish a correlation between the issue and existing scholarly works., evaluate the impact and uncertainty of the most significant driver, and develop possible implementation scenarios for Augmented Reality (AR).

2.2 Definition of Augmented Reality (AR)

A real-time tool called augmented reality integrates artificially created sensory input to mediate perception of a real-world environment. Besides, the overlay of virtual three-dimensional items over one's physical environment is also known as augmented reality (AR) (Yaoyuneyong *et al.*, 2016). Based on Gartner's IT Glossary, Augmented reality (AR) is the real-time use of information in the form of text, graphics, sound, video, 2D virtual images or 3D objects.

2.2.1 Benefit of Augmented Reality in Advertising

Augmented reality has breath-taking prospect and is a mainstream reality where it can be triggered by an image, a location, or a combination of two. This technology able to provide benefits to brands and organization towards the future of Malaysia's retail sector. Augmented Reality advertisement is immersive which allowing marketers to develop emotional connection with customers by increasing customer engagement and interaction that provide a richer user experience (Pozharliev *et al.*, 2021).

Augmented reality can create spatial presence experience that benefit customers by helping consumers form more accurate opinions about the products they buy, and these opinions are reflected in better marketing KPIs like psychological ownership, engagement, buy intentions, and word-of-mouth (de Ruyter *et al.*, 2020). Besides, through highly exciting content offers by augmented reality, consumers are motivated to interact with the advertisement repeatedly (Kiu *et al.*, 2018). This will therefore lead to better brand knowledge.

2.2.2 Challenges of Augmented Reality in Advertising

The innovative technology known as augmented reality (AR) is poised to revolutionize the realm of digital marketing, particularly in the area of advertising. However, the information about augmented reality in advertising context is rather limited. Therefore, there are many occurred challenges of augmented reality in advertising.

The challenges of augmented reality in advertising are the hardware limitation. Customers are unlikely to enjoy using augmented reality with bad graphics. In terms of graphics capabilities, smartphones and smart glasses are no match for desktop computers. Besides, augmented reality is lack of privacy protection thus putting consumers data at risk. In order to personalize output, augmented reality (AR) systems ask users to exchange information with them, such as their locations and email addresses (Poushneh, 2018). This will also provide potential vulnerabilities for cybercriminals to exploit.

Consumers who are not familiar with AR based applications will find it hard to use without appropriate training. Hence, it will increase the costs and time involved. Furthermore, it can also lead to dangerous situations, such as car accidents and major health problems, such as psychological impacts.

2.3 STEEPV

For this study, secondary data from journals, publications, and websites will be gathered to learn more about the factors driving augmented reality in advertising. As per Nazarko and Kuzmicz (2017), the researcher use STEEPV analysis as a technique for conducting the foresight study. The secondary data forms the basis of this type of study. The study data that has already been acquired and is available to the researchers is known as secondary data. A few of the augmented reality advertising developer's articles will also be utilized as secondary data.. Additionally, future-focused data has been gathered from other websites, as the information provides an overview of future emerging technologies, specifically Augmented Reality (AR) in advertising. Table 1 displayed the secondary data's original source.

Table 1 Area of STEEPV drivers in the research

Driver	Related Area
Social	Factors that related to ways of life, including people, anthropology, families, education, beliefs and lifestyles, and habits.
Technological	Technological drivers significantly change how organization operating. It involves access rates of technological progress, research and development, people approach to technology, method of using technologies, level of utilization and risk associated with technology such as security and health problems.
Economic	Economic drivers focus highly on the level and distribution of economic growth, such as consumer affordability, the rate of inflation, industrial status and structures, wage and labor cost rivalry, and international trade.

Environmental	Factors that include are environmental regulations and protection of them, community attitudes towards the environment, such as pollution and natural disaster and welfare concerns.
Political	Political aspect involves the study of dominant political viewpoints or parties, Tax policy, employment laws, tariffs, rules and regulations, political engagement and the legal system, government policies and international organizations, and local and international responsibilities.
Values	The value component has to do with unchangeable and fixed concerns as well as attitudes about working life., such as preferences for leisure culture, social relations, conceptual and worldview framework, attitudes toward human, values governing labor relations and workplaces.

The main drivers behind the adoption of augmented reality in advertising were determined using STEEPV analysis. Table 2 shows the output of STEEPV analysis.

Table 2 Output of STEEPV Analysis for augmented reality adoption in advertising

Factors	Total
Social	14
Technological	33
Economic	15
Environmental	4
Political	5
Values	26
Total	97

2.4 Table with merged issues

This study has uncovered important issues for future trend of Augmented Reality and its technology in advertising in Malaysia. All merged issues, challenges and trends are shown in Table 3.

Table 3 Merging of Issues, Challenges and trends

No	Issues, Challenges and Trends	Key Drivers
1	Implementation of AR in advertising increase incremental purchasing due to advance technology and information system	Advance technology in advertising.
2	Utilization of modern technology such as AR especially in advertising enable connection between consumer with products and services	Enable connection between consumer, products, and services.
3	Smart advertising (AR) can save time and energy due to practicality to be implemented	Save time and energy.
4	Adoption of AR in advertising require strong privacy policies protection to protect consumer’s data	Privacy policies protection.
5	Combination of real and computer-generated digital transformation enhanced perceived ads effectiveness	Enhance on advertisement perception effectiveness.
6	Augmented Reality (AR) adoption allows transparent price and quality comparison	Allow transparent price and quality comparison.
7	AR in advertising create immersive consumer experience and improve decision making	Improve consumer decision making.
8	Integration of real and virtual world adding flexibility and convenience to consumers	Flexibility and convenience for consumer.

9	AR role can enhance communication between consumers and seller	Enhance communication between consumer and seller
10	Implementation of green advertising (AR) offer unprecedented and verisimilitude of merging virtual content	AR technology interaction between virtual world and real life.
11	AR can maximize effectiveness of advertising of products and services	Effectiveness of advertising.

3. Research Methodology

3.1 Research Design

This study used an exploratory research design. The quantitative method was used to describe what has been happening in relation to a specific policy issue. In line with this method, the questionnaire method was chosen for the data collection process. The researcher developed the questionnaire by using STEEPV analysis to determine the relevant drivers of augmented reality adoption in advertising. The questionnaire had been distributed to the potential respondent which is advertising company in Malaysia. The analysis of impact-uncertainty was conducted to develop various scenarios. This study also was conducted using two phases, first phase and second phase. The secondary data was used as a reference point for the first phase. Throughout this phase, STEEPV process was implemented to define key drivers and future trends of the foresight study on adoption of augmented reality in advertising.

3.2 Data Collection

The process by which data is prepared and gathered is known as data collection. This study examined the foresight study using main and secondary data. on adoption of augmented reality in advertising.

Primary data is original data collected first-hand by the researcher. Based on Ajayi (2017), primary data refers to data collected in real time through questionnaires, observations, surveys, and interviews, in which respondents contribute data that is unique to them but still relevant to the research. Primary data is the data that an organization will achieve because it was not collected and released in a publicly accessible site. The primary data had been collected through a survey method using a questionnaire designed constructed from the results of the STEEPV analysis. The STEEPV is an acronym to represent the Social, Technological, Economic, Environment, Political, and Values based on the factors as a starting point to discuss about future. The STEEPV analysis has been widely used to gain insight about a wide range of issues and drivers, policy recommendations, future projects, and key areas SPSS was used to analyze data collection and had been generated for impact-uncertainty analysis as well as to facilitate the creation of scenarios to achieve the goal of this study, which was to conduct a foresight study on the adoption of augmented reality technology in advertising in Malaysia. For the secondary data, it refers to data already collected for reasons other than the issue at hand. Secondary data processing is the study of data that other people gathered for a particular primary reason (Johnston,2014). For researchers with limited time and resources, making use of existing data is a viable option.

In the second phase, the quantitative method has been utilized. The key components of quantitative research methodology were the objective measurement and statistical, mathematical, or numerical analysis of the collected data (Muijs, 2010). In general, quantitative research has influenced western culture as a means to develop new understanding and meaning. The primary data has been collected via online survey using a questionnaire in Google Form.

3.3 Population

Research population is generally referred to as a specific collection of individuals or objects which is the central focus of a scientific question. According to Shukla (2020), the population is the set or group of all the units to which the research findings will be applied. The populations of this study were all advertising company in Malaysia.

3.4 Sampling

The act of choosing an appropriate sample, or a representative portion of a population, in order to ascertain the parameters or characteristics of that group, is known as sampling (Lindquist, 1940). The process of choosing and allocating the same number of population units is known as sampling. Respondents will be chosen using sampling. A total of 384 advertising company in Malaysia will be the respondent for this study.

3.5 Research Instrument

The main instrument that have been used in this research is a questionnaire. There are four sections in the questionnaire: Sections A, B, C, and D. The questionnaire's structure is displayed in Table 4.

Table 4 Structure of the questionnaire

Section	Item
A	Demographic information of the respondents.
B	The importance of factors/drivers towards adoption of augmented reality advertising among consumer in Malaysia.
C	The impact of factors/drivers towards adoption of augmented reality advertising among consumer in Malaysia.
D	The uncertainty of factors/drivers towards adoption of augmented reality advertising among consumer in Malaysia.

3.6 Impact Uncertainty Analysis

Impact-uncertainty analysis was conducted using descriptive analysis. Impact-uncertainty analysis consists of all impact drivers derived from STEEPV analysis. The reason for conducting Impact-uncertainty analysis is to determine the most significant drivers that will affect the adoption of augmented reality advertising in Malaysia. The variables having the greatest impact and uncertainty are the primary forces behind impact-uncertainty analysis.

3.7 Scenario Building

Scenario building was used to forecast possible outcomes, including future problems, patterns, occasions, tactics, and developments that are connected to the future. This method will be practiced during the brainstorming of the Impact-Uncertainty analysis stage. The uncertainty axes are used to define the spectrum of future uncertainties and potential outcomes. The conceptual thinking is needed at this stage. In particular, the discussion on the construction of 2 drivers will be discussed comprehensively to anticipate future outcome.

4. Results and Discussion

4.1 Results

For the targeted respondent, a total of 384 sample sizes were chosen for this investigation. Table 5 shows that 116 of the 384 valid questionnaires that were submitted had been gathered. There is a 30.2% response rate.

Table 5 Questionnaire Response Rate

Sample Size	Returned (Valid) Questionnaire	Response Rate (%)
384	116	30.2%

4.1.1 Reliability Test

Table 6 Result of Reliability Test

	Cronbach's Alpha	Number of items	Number of respondents
Pilot Test	0.91	33	15
Real Study	0.90	33	116

Table 6 shows that there were fifteen responses to the pilot test, with a Cronbach's Alpha score of 0.91. This value falls into the excellent category for data analysis. As a result, the study is trustworthy and applicable. With 116 total responses, the actual study's Cronbach's Alpha value is 0.90. Therefore, this study suggests that there is

validity to the research on augmented reality advertising.

4.1.2 Respondents' Demographic Information

The purpose of the demographic study was to provide context for the respondents' tabulation. It includes information on gender, age, race, education, employment history, monthly income, knowledge, and intention to use augmented reality. reality advertising in Malaysia. Table 7 shows the respondents' demographic information for this study.

Table 7 Demographic Analysis

		Frequency	Percentage (%)
Gender	Male	47	40.5
	Female	69	59.5
Age	Below 20	5	4.3
	20-29	60	51.7
	30-39	30	25.9
	40-49	19	16.4
	50 and above	2	1.7
Race	Malay	78	67.2
	Chinese	27	23.3
	Indian	11	9.5
Education Level	Secondary	2	1.7
	STPM/ Matriculation/ Diploma/ Foundation	20	17.2
	Degree	81	69.8
	Master	11	9.5
	PHD	2	1.7
Monthly Income	Below RM 1500	27	23.3
	RM 1501-RM3000	35	30.2
	RM 3001-RM 5000	29	25
	RM 5001-RM7000	13	11.2
	Above RM 7001	12	10.3
Working Experience	Below 3 years	45	38.8
	3 to 5 years	42	36.2
	6 to 8 years	21	18.1
	9 to 11 years	4	3.4
	Above 11 years	4	3.4
Have you ever heard about augmented reality (AR) for advertising?	Yes	104	89.7
	No	12	10.3
Have you considered using augmented reality (AR) advertising for advertising?	Yes	92	79.3
	No	24	20.7
Do you have any intention to implement augmented reality (AR) advertising for your advertising purposes?	Yes	90	77.6
	No	26	22.4

When do you think AR advertising will be implemented in the e-commerce app?	1-3 years	42	36.2
	4-6 years	58	50
	7-9 years	13	11.2
	10 years	3	2.6

A total of 116 respondents took part in this research. It is observed that the majority of those surveyed (59.5%) was female and from the age group between 20 to 29 years old or (51.7%). Malay (67.2%), and (69.8%) is holding a bachelor’s degree and had monthly income between RM 1501 to RM 3000 (30.2%). Furthermore, 38.8% of the workforce has worked for less than three years, making up the majority of employees.

Majority of the respondents (104) have heard about augmented reality advertising while the remaining of 12 respondents did not hear about augmented reality advertising and only 79.3% of the respondents agreed that augmented reality will be considered in advertising in the future. Majority of the respondents (77.6%) have intention to implement augmented reality advertising and half of the respondents which is 50% agree that it will be implemented in another 4 to 6 years.

4.1.3 Impact Uncertainty Analysis

Table 8 shows the corresponding mean for each driver in impact-uncertainty analysis.

Table 8 Mean of the leading drivers on level of impact and uncertainty

No	Drivers	Impact	Uncertainty
1	Advance technology in advertising	4.4914	4.2845
2	Enable connection between consumer and products and services	4.4828	4.3276
3	Save time and energy	4.6638	4.3276
4	Privacy policies protection	4.5948	4.5776
5	Enhance on advertisement perception effectiveness	4.5690	4.4310
6	Allow transparent price and quality comparison	4.6724	4.4138
7	Improve consumer decision making	4.5862	4.4483
8	Flexibility and convenience for consumer	4.5603	4.4914
9	Enhance communication between consumer and seller	4.4828	4.4483
10	AR technology interaction between virtual world and real life	4.5172	4.5776
11	Effectiveness of advertising	4.7328	4.4569

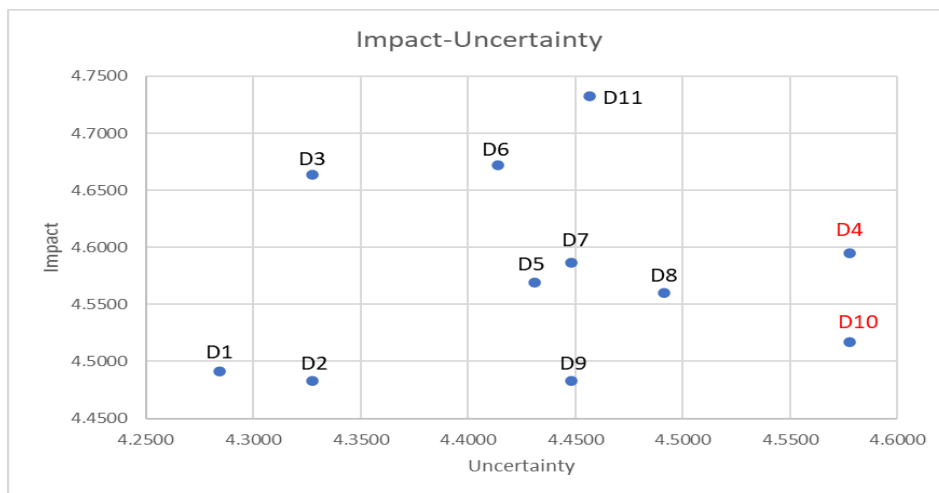


Fig. 1 Impact-Uncertainty Analysis

Utilizing all of the data, Fig. 1 presents the impact and uncertainty analysis. The top two coordinates with high impact and uncertainty were chosen which are D4 (4.5948, 4.5776) and D10 (4.5172, 4.5776). Both drivers have the highest level of uncertainty and highest level of impact for the future of augmented reality advertising to improve marketing activities in a more convincing way. These two drivers have been utilized to create in the following part and will be chosen as the best drivers.

4.2 Discussion Based on The First Research Objectives

This study's primary goal is to identify the main key drivers of augmented reality (AR) advertising in Malaysia that has been generated through STEEPV analysis. Based on STEEPV analysis, the technology factor is the most important driver for the adoption of augmented reality advertising in Malaysia followed by social, economic, political, environmental, and values.

4.3 Discussion Based on The Second Research Objectives

The second objective of this study is to identify the future trends of augmented reality (AR) advertising among consumers in Malaysia. The trend is achieved by generating scenario analysis to four different alternative scenarios based on the top two drivers selected from the impact-uncertainty analysis.

Strong privacy protection policies are the driver with the greatest impact and level of uncertainty when compared to the other factors. This driver got the highest value of 4.5948 and 4.5776 in the impact-uncertainty study. A strong privacy protection policy is much needed before implementing the technology as well as produce a range of ethical issues to prevent from the leakage of data privacy. The second highest of augmented reality's advertising in impact and the most uncertainty compared to the other drivers is the need of interaction and lifelike with virtual world. The value of the drivers is 4.5172 and 4.5776 out of 5.000 in impact and uncertainty respectively. Figure 2 shows the development of alternative scenarios.

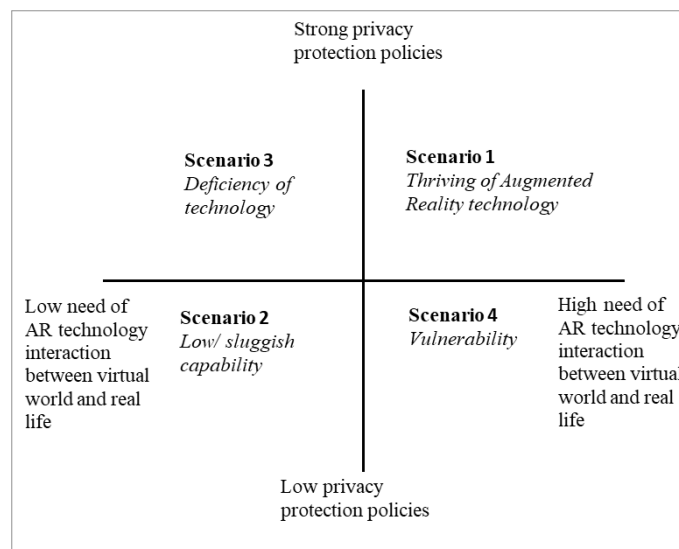


Fig. 2 Development of Four Alternative Scenario

(a) Scenario 1 (Thriving of Augmented Reality technology)

The first scenario, which is thriving of augmented reality technology happens when there are strong privacy protection policies and high need of AR technology interaction between virtual world and real life. A solid privacy protection policy can help safeguard consumer data from being stolen or hacked by unscrupulous third parties. While a high need of AR technology interaction between virtual world and real life from the consumers can utilize the effectiveness of advertising activities.

The act of preventing unauthorized third parties from gathering personal data and information about a communication entity is referred to as privacy. It is often associated with anonymity and can be considered as a form of security. According to Blodgett-Ford & Supponen (2018), laws, rules, and industry standards, governing privacy and data protection are already in place and play an important role whether in online or offline and it will be more crucial in virtual reality and augmented reality advertising, especially if there is the need to some action of collecting biometric data or geo-location.

As data is becoming one of the most precious assets in the marketing industry, it is critical for businesses to learn about navigating the data privacy landscape and avoiding costly and reputation damaging errors. Other countries' perceptions of Malaysia will evolve in the future due to the implementation of advanced technology, particularly in the new way of advertising activities. It will have a positive impact in the economy as AR advertising will become the primary marketing medium, displacing traditional and conventional advertising methods.

(b) Scenario 2 (Low/Sluggish Capability)

This second constructed scenario is the least expedient scenario. In this scenario, low or sluggish capability refers to the low privacy protection policies and low need of AR technology interaction between virtual world and real life. This is the worst-case scenario for AR advertising development, as business owners lack the knowledge to develop a new technology that can replace traditional advertising methods.

Low privacy protection policies can exacerbate privacy risks and give adverse consequences to an organization, especially on the personal data of users. Outsiders might readily utilize personal data for discriminatory use of inferred information by third parties if personal data is not secure and there is a potential for direct harm in the absence of safeguards mirror. Companies developing augmented reality, and those integrating AR with current technology must practice suitable, and organizational security measures to safeguard the substantial quantity of user data that could be communicated and stored (Cook & Llp, 2019).

Furthermore, a low need of AR technology interaction between virtual world and real life will make the advertisement unappealing with no interaction between the product or services. According to Todor (2016), it is challenging to target a certain customer base with conventional marketing strategies. Market groupings cannot be targeted however, individuals can be targeted. For instance, a commercial might target young women. Conversely, digital marketing tactics have the ability to track a viewer's areas of interest and suggest goods that are related to those. Traditional marketing frequently makes it impossible to engage an audience in any way.

(c) Scenario 3 (Deficiency of Technology)

The third scenario takes place when there are strong privacy protection policies while low need of AR technology interaction between virtual world and real life in implementing augmented reality (AR) advertising. This is the second-best scenario for augmented reality advertising, as new forms of augmented reality advertising may grow in the future. However, the researcher will need to make extra effort and a proper commercialization method in introducing AR advertising to gain society's attention and readability to implement the technology.

The implementation of augmented reality in an organization must be guided by rules and laws as it involves people's personal data, and it must also have a high level of security so that it is not easily breached. According to de Ruyter *et al.* (2020), The capacity of advertisers to contextualize AR content and the effect of contextualization on marketing KPIs are significantly influenced by privacy protection.

There are few drawbacks if there is a low need for interaction and lifelike with virtual world. For example, if using traditional methods of advertising, it will require time and cost than using modern techniques. Customers that lack creativity might not find it enjoyable to learn how to use the novel media formats and user interfaces that augmented reality offers, and some could find it difficult and time-consuming to install AP programs on their phones (Feng & Mueller, 2019).

(d) Scenario 4 (Vulnerability)

Lastly, the last scenario occurred when there are low privacy protection policies but there is a high need of AR technology interaction between virtual world and real life especially in the context of AR advertising. Generally, if there is a high need of AR technology interaction between virtual world and real life, it will provide users an enjoyable experience with this immersive technology in commercialization, but with lack of privacy protection regulations will result in a number of issues. to consumers especially their personal data.

AR ads provide context-sensitive information and allow consumers to interact using this technology in a fun way. The informativeness of using AR advertising refers to an advertisement's ability to properly convey useful information to users. According to Todor (2016), he stated that the number of active social media users and the number of hours people spent online is increasing steadily. One of the greatest efforts to increase visibility on the market and even just the novelty of augmented reality (AR) could raise brand awareness. for an organization is to combine two strategies, traditional and modern way of advertising.

However, the low privacy protection policies are vicious. Although the benefit of AR technologies cannot be deniable, the community for privacy and computer security has started to recognize and solve important security, privacy, and safety concerns. Privacy and security are one of the issues that affect the level of enjoyment of the technology itself. This could happen because AR technology is linked to GPS, which may detect a customer's current location, potentially causing criminal difficulties in society. When AR technology allows for a high level of engagement to display more information, there is a greater risk of personal information being leaked (Brohm *et al.*, 2018).

5. Conclusion

In conclusion, the aim of the study is to identify the issues and drivers of future trend of the adoption of augmented reality advertising in Malaysia. The research about foresight study on the adoption of augmented reality technology in advertising in Malaysia will provide a new trend of advertising activities in the next 5 to 10 years for this country. In addition, this study includes and provides new information and insight, as well as the respondents' perspectives on the evolution of augmented reality advertising acceptance in Malaysia. The top two drivers which were identified from impact-uncertainty analysis have been used to build scenario building analysis. Four distinct scenarios are analyzed in order to ascertain the anticipated future trend of augmented reality adoption in the advertising industry. Hence, the business owners of advertising companies should consider the negative impact which constructed in the scenario building analysis. A plan and solution should be created to solve the negative forecast made in scenario building to continue develop the advanced augmented reality technology and to improve consumer involvement and, ultimately, the efficacy of advertising which generate new chances for advertising activities.

Acknowledgement

The authors would like to thank the Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia and Technology and Innovation (TIM) Focus Group for their support.

Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

*The authors confirm contribution to the paper as follows: **study conception and design:** N.B.M.H. and E.W.; **data collection:** N.B.M.H. and E.W.; **analysis and interpretation of results:** N.B.M.H. and E.W.; **draft manuscript preparation:** N.B.M.H. and E.W.. All authors reviewed the results and approved the final version of the manuscript.*

References

- Ajayi, V. (2017). Primary Sources of Data and Secondary Sources of Data. 10.13140/RG.2.2.24292.68481.
- Artillery Intelligence (2019), "Mobile AR: Usage and Customer Attitudes, Wave II," Retrieved January 2020 from <https://artillery.co/artillery-intelligence/mobile-arusage-and-consumer-attitudes-2019/>
- Blodgett-Ford, S. J., & Supponen, M. (2018). Data privacy legal issues in virtual and augmented reality advertising. In *Research Handbook on the Law of Virtual and Augmented Reality*.
- Bona, C., Kon, M., Koslow, L., Ratajczak, D., & Robins, M. (2018). Augmented Reality: Is the Camera the Next Big Thing in Advertising? *Bcg*, 1–15. <https://www.bcg.com/publications/2018/augmented-reality-is-camera-next-big-thing-advertising%0Ahttps://www.bcg.com/publications/2018/augmented-reality-is-camera-next-big-thing-advertising.aspx>
- Brohm, D., Domurath, N., Chanos, G. V., & Grunert, K.G. (2018). Future Trend of Augmented Reality. *Augmented reality for food marketers and consumers*, 97- 103.
- Cho, C-H., & H. Lee. 2018. Digital marketing 4.0. Seoul: Green Pine Media. eMarketer 2018. US programmatic TV ad spending 2016–2020. Retrieved June 2019 from <https://www.emarketer.com/Chart/US-Programmatic-TV-Ad-Spending-2016-2020-billions-change-of-TV-ad-spending/223921>
- Cook, F. F., & Llp, S. (2019). *Augmented and Virtual Reality are the Same, right?* 3(c), 1–10.
- Dacko, S. G. (2017). Enabling smart retail settings via mobile augmented reality shopping apps. *Technological Forecasting and Social Change*, 124, 243–256. <https://doi.org/10.1016/j.techfore.2016.09.032>
- de Ruyter, K., Heller, J., Hilken, T., Chylinski, M., Keeling, D. I., & Mahr, D. (2020). Seeing with the Customer's Eye: Exploring the Challenges and Opportunities of AR Advertising. *Journal of Advertising*, 49(2), 109–124. <https://doi.org/10.1080/00913367.2020.1740123>
- Feng, Y., & Mueller, B. (2019). The State of Augmented Reality Advertising Around the Globe: A Multi-Cultural Content Analysis. *Journal of Promotion Management*, 25(4), 453–475. <https://doi.org/10.1080/10496491.2018.1448323>
- Hilken, T., de Ruyter, K., Chylinski, M., Mahr, D., & Keeling, D. I. (2017). Augmenting the eye of the beholder: Exploring the strategic potential of augmented reality to enhance online service experiences. *Journal of the Academy of Marketing Science*, 45(6), 884– 905. <https://doi.org/10.1007/s11747-017-0541-x>
- Hinsch, C., Felix, R., & Rauschnabel, P. A. (2020). Nostalgia beats the wow-effect: Inspiration, awe and meaningful associations in augmented reality marketing. *Journal of Retailing and Consumer Services*, 53(November 2019), 101987. <https://doi.org/10.1016/j.jretconser.2019.101987>

- Johnston, M.P. (2014) Secondary Data Analysis: A Method of which the Time Has Come, *Qualitative and Quantitative Methods in Libraries*: 3(3)
- Kiu, C. C., Andrew, K. W. N., Lee, W. L., & Chan, C. W. (2018). Augmented Reality Technology in Digital Advertising. Proceedings - 2018 4th International Conference on Advances in Computing, Communication and Automation, ICACCA 2018, 1-6. <https://doi.org/10.1109/ICACCAF.2018.8776686>
- Kumar, V., & Gupta, S. (2016). Conceptualizing the Evolution and Future of Advertising. *Journal of Advertising*, 45(3), 302-317. <https://doi.org/10.1080/00913367.2016.1199335>
- Lacy, Lisa (2018), "Can Augmented Reality Breathe New Life into Banner Ads?," Adweek April 20, Retrieved April 2019 from <https://www.adweek.com/digital/can-augmented-reality-breathe-new-life-into-banner-ads/>
- Lindquist, E. F. (1940). *Statistical Analysis in Educational Research*. Houghton Mifflin.
- Mauroner, O., Le, L., & Best, S. (2016). Augmented Reality in Advertising and Brand Communication: An Experimental Study. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, 10(2), 422-425.
- Muijs, D. (2010) Doing Quantitative Research in Education with SPSS. 2nd Edition, SAGE Publications, London. <https://doi.org/10.4135/9781849203241>
- Nazarko, Joanicjusz & Kuźmicz, Katarzyna. (2017). Introduction to the STEEPVL Analysis of the New Silk Road Initiative. *Procedia Engineering*. 182. 497-503. 10.1016/j.proeng.2017.03.143.
- Poushneh, A. (2018). Journal of Retailing and Consumer Services Augmented reality in retail: A trade-off between user's control of access to personal information and augmentation quality. *Journal of Retailing and Consumer Services*, 41(October 2017), 169-176. <https://doi.org/10.1016/j.jretconser.2017.12.010>
- Poushneh, Atieh, and Arturo Z. Vasquez-Parraga (2017). Discernible Impact of Augmented Reality on Retail Customers' Experience, Satisfaction, and Willingness to Buy, *Journal of Retailing and Consumer Services*, 34 (January), 229-34.
- Pozharliev, R., Angelis, M. De, & Rossi, D. (2021). The effect of augmented reality versus traditional advertising: a comparison between neurophysiological and self-reported measures. *Marketing Letters*, 0123456789. <https://doi.org/10.1007/s11002-021-09573-9>
- Qin, H., Peak, D. A., & Prybutok, V. (2021). A virtual market in your pocket: How does mobile augmented reality (MAR) influence consumer decision making? *Journal of Retailing and Consumer Services*, 58. <https://doi.org/10.1016/j.jretconser.2020.102337>
- Shukla, S. (2020). Concept of Population and Sample. *How to Write a Research Paper*, June, 1-6. https://www.researchgate.net/publication/346426707_Concept_Of_Population_And_Sample
- Todor, R. D. (2016). Blending traditional and digital marketing. *Bulletin of the Transilvania University of Brasov, Series I: Engineering Sciences*, 9(1), 51-56. <http://ezproxy.leedsbeckett.ac.uk/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=116699220&site=eds-live&scope=site>
- Yaoyuneyong, G., Foster, J., Johnson, E., & Johnson, D. (2016). Augmented Reality Marketing: Consumer Preferences and Attitudes Toward Hypermedia Print Ads. *Journal of Interactive Advertising*, 16(1), 16-30. <https://doi.org/10.1080/15252019.2015.1125316>