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DETERMINANTS OF INTENTION TO USE AUGMENTED REALITY (AR) FOR CLOTHING TRY-ON ON MOBILE SHOPPING APPS AMONG MALAYSIAN GEN Z

BY

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A final year project submitted in partial fulfillment of the
requirement for the degree of

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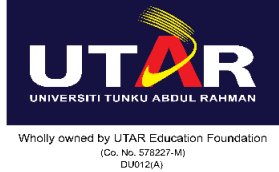DEPARTMENT OF MARKETING

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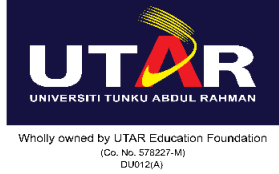
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ABSTRACT

This study investigates the determinant of intention to use augmented reality (AR) for clothing try-on on mobile shopping apps among Malaysian Gen Z by applying an extended model of the Technology Acceptance Model (TAM) as a theoretical framework. The framework consists of three independent variables (IVs) namely Perceived Usefulness (PU), Perceived Ease of Use (PEoU), and Perceived Enjoyment (PE), whereas Attitude (ATT) acts as the mediator variable, Behavioural Intention (BI) serves as the dependent variable (DV), and the IVs influences the DV through the mediating effect of ATT.

In addition, the online questionnaire was distributed to a total of 384 Gen Z respondents with AR experience and collected as data for this study. Partial Least Squares Structural Equation Modelling (PLS-SEM) was applied to analyse the data. The findings indicate that PU, PEoU, and PE have a significant relationship with BI to use AR clothing try-on through the mediating effect of ATT. Through this study, future researchers, retailers, marketers, and AR technology providers can gain valuable insights into Malaysian consumers' intention to use AR try-on on mobile shopping apps.

Keywords: Augmented Reality (AR), Mobile AR, Clothing-try on, Gen Z, Technology Acceptance Model (TAM).

Subject Area: HF5410-5417.5 Marketing. Distribution of products

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LIST OF ABBREVIATIONS

AR	Augmented Reality
ATT	Attitude
AVE	Average Variance Extracted
BI	Behavioural Intention
CR	Composite Reliability
DV	Dependent Variable
Gen Z	Generation Z
HTMT	Heterotrait-monotrait Ratio
iOS	iPhone Operating System
IV	Independent Variable
PE	Perceived Enjoyment
PEoU	Perceived Ease of Use
PLS-SEM	Partial Least Squares Structural Equation Modeling
PU	Perceived Usefulness
SEM	Structural Equation Modeling
TAM	Technology Acceptance Model
TRA	Theory of Reasonable Action
VAF	Variance Accounted For
VIF	Variance Inflation Factor

VR   Virtual Reality

DETERMINANTS OF INTENTION TO USE AUGMENTED REALITY (AR) FOR CLOTHING
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PREFACE

The global fashion retail market is rapidly evolving due to technological advancements and changing consumer behaviors, especially among the younger generation. This paper explores the integration of Augmented Reality (AR) technology in Malaysia's clothing retail market, focusing on Gen Z consumers. As digital natives, Gen Z is drawn to technology-driven shopping experiences, making AR a valuable tool for enhancing online shopping. While AR technology is reshaping retail in developed markets, its adoption in Malaysia remains in the early stages, with limited research on its acceptance among Gen Z. This study aims to investigate the factors influencing the adoption of AR for virtual clothing try-ons among Malaysia's Gen Z population, using the Technology Acceptance Model (TAM). The research focuses on key factors such as perceived ease of use, perceived usefulness and perceived enjoyment, while considering the mediating role of attitude. The insights gained will help fashion retailers and technology developers better meet the preferences and expectations of Malaysian Gen Z consumers. Therefore, the title of this research is "Determinants of Intention to Use Augmented Reality (AR) for Clothing Try-On on Mobile Shopping Apps among Malaysian Gen Z".

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

1.1 Research Background

Nowadays, with the Industrial Revolution 4.0 rapidly evolving and being
extensively used, augmented reality (AR) technology is playing an important part
in the retail industry, and businesses are proactively adapting their business
strategies with the technology to stay competitive, as consumer behaviour changes
with the technology (Caboni & Pizzichini, 2022). According to Statista (2023), the
global AR and VR market is forecast to reach 3,674 million users by 2028, while
user penetration is expected to reach 52.8% in 2024 and increase to 55.9% by 2028.

AR technology integrates virtual and reality, the principle of AR is to enhance
reality by bringing simulated computer-generated virtual information into the real
world, such as text, images, three-dimensions (3D) models, videos, etc. (Chen et al.,
2019). AR applications can be provided on different hardware, like mounted on
fixtures, mobile devices, or wearables, such as AR mirrors in retail shops,
smartphones, or smart glasses (Rauschnabel, 2019). Besides, AR enables
consumers to virtually try on clothing or use 360° and 3D product imagery to view
the product from all angles through their smartphone screens easily, thus retailers
improve user experience, consumer engagement and satisfaction concurrently
(Berman & Pollack, 2021).

Mobile apps are more popular today as smartphones have become an integral part
of daily life and people carry them everywhere they go (Lim et.al, 2021). Many
retailers are already using mobile shopping apps, whether exclusively or as a

complement to their physical shops (De Canio et al., 2021). Many brands are aggressively integrating AR with their mobile apps, incorporating interesting and useful features into the app to draw consumer interest and increase exposure for the brand (Chen et al., 2022). The traditional online shopping platform is still limited to product trial, product display, information enrichment, and multidimensional experience, thus, consumers will be more likely to go to the physical shop to buy (Jusoh et al., 2023). However, the online shopping experience can be enhanced through the adoption of AR mobile apps that provide consumers the chance to "try before you buy" by giving them a real sense of product information regarding fit, size, and performance (Baytar et al., 2020).

AR applications in Malaysia are still adapting in the e-commerce industry, but it is gradually taking a strong market position through furniture apps such as Ikea Place and Wayfair or beauty apps such as Sephora (Statista, 2023). Several brands in the market have applied AR virtual try-on in mobile apps, for example, Adidas' virtual try-on feature in the iOS app allows customers to select new footwear styles from anywhere, anytime (Perera, 2023). Another example, Zalando, a fashion retailer in Germany has launched a virtual try-on app using AR technology through Snapchat (Zalando, 2023). The retail industry has been quick to respond to this wave of the increasing popularity of "smart lifestyles" in consumer and business markets globally, with a growing number of retailers integrating "smart retailing" into their business models (Rauschnabel et al., 2019).

In this study, Gen Z was designated as the target group, they were born between 1997 and 2012 and are also known as "digital natives" because they grew up with constant access to the internet and other devices such as mobile phones and laptops (Dimock, 2019). They are a generation that has witnessed rapid technological improvements with the help of the Internet explosion. In contrast to other generations, they are more technology adopters and seek diversity (Pichler et al., 2021). Furthermore, Gen Z values ease of use, thus many of them prefer to shop on mobile apps because they can complete their purchases through simple actions such as mobile payment. In Afterpay's survey, 64% of Gen Z said they prefer to shop

online than instore because it brings them greater convenience, being able to search for desired items at any time and compare products by reading reviews (Square, 2024). Gen Z consumers are passionate for emerging trends and interested in the immersive shopping experiences offered by new technologies such as AR and VR, particularly virtual fitting apps for clothing, sunglasses, and cosmetics (Square, 2024). Thus, they are more potentially interested in discovering the virtual experiences offered by AR.

1.2 Research Problem

Online purchase returns and over-purchase issues are prevalent in the fashion industry as the consumers being unable to make confident decisions in sizing and fitting is a significant contributor to the problem. The issues also have been highlighted in past studies (Zak, 2020; Pozi, 2023; Jiang et al., 2022). According to the National Retail Federation (NRF), online returns are higher than pure bricks-and-mortar returns in the U.S. (Watts, 2023). In March 2023, the clothing category is the most returned online purchase in the United States with 26% (Dopson, 2023). To cater this, AR is expected to have strong growth in fashion retailing, the utilization of AR such as virtual try-on technology has the potential to improve the sizing problem of apparel in e-commerce then mitigate the high purchase returns (Wang et al., 2022; Smith & Linsell, 2022; Jiang et al., 2022). Gen Z is anticipated to become frequent AR users by 2025 and they show the most interest in AR shopping experience to try on clothes and accessories with the highest 92% (Akashah, 2021; Gelder, 2023). In the Malaysian context, 80% of Malaysian respondents mentioned that they agree to see more virtual try-on features offered in fashion brands (Statista, 2022). However, AR is relatively unpopular in Malaysia compared with the international market, and related research is focused on other fields, such as tourism and education (Lim, 2023). Therefore, it is important to understand the Malaysian Gen Z customers' attitudes (ATT) and intentions to use

mobile AR clothing try-ons (BI) in online clothing purchases to embrace this technology.

Besides, consumers have unsatisfactory online shopping experiences for clothing as consumers perceive the difficulty while choosing precise sizing and fitting clothes because they mostly determine the clothes purchased based solely on clothing images and sizing guides (Pozi, 2023). According to Statista (2023), people return their online purchased clothes due that the items don't fit well with 38%, followed by items that don't suit them with a portion of 15%. However, AR try-on technology is a useful and trendy tactic to improve consumers purchase ability the suit and fit issues in terms of size, fitness, and colour as the AR try-on trait of delivering details of products look better than solely photos (Jiang et al., 2022; Hwangbo et al., 2020). Park and Kim (2022) also classified the users' visions that delivered by AR virtual try-on (e.g., it is able to test clothes for fit effectively) as one of the factors driving AR virtual try-on adoption. According to the report from Deloitte Digital and Snap Inc., 78% of people consent that AR trials help evaluate products quality and facilitate confidence in purchase decisions (Akashah, 2021). Furthermore, AR try-ons benefits consumers with busy schedules and make their purchase become efficient as it frees consumers from waiting time in traditional fitting rooms, immediately observe how the apparel looks on them and reduces travel expenses to physical shops (Pozi, 2023; Wahab & Ronaldo, 2022; Ibrahim et al., 2024). In short, the perceived usefulness (PU) of mobile AR clothing try-ons will influence Gen Z's attitude towards mobile AR clothing try-ons.

Apart from that, when Gen Z finds it difficult to use AR technology, it will be the barrier to adopting AR imposed on apparel retailers (Park & Kim, 2022). Gen Z is famous as a tech-savvy group, as a digital native, they possess digital intuition (Yousey, 2023). The characteristics of Gen Z will influence their acceptance of mobile AR clothing try-ons. Past studies also mentioned that Gen Z demonstrated the attributes of interest in new technology and emphasizing ease of use influence their adoption of new technologies (Kim et al, 2022; Ng et al., 2021; Windasari,

2022). Thus, perceived ease of use (PEoU) will be a significant factor that impacts Malaysian Gen Z's attitude towards mobile AR clothing try-ons.

Lack of interaction and immersive experience in online shopping compared with physical shopping has also been mentioned in past studies as a factor contributing to customer dissatisfaction (Vongurai, 2021; Jiang et al., 2022; Pozi, 2023). In this aspect, clothing AR try-on will enhance customers' experience as it promotes a sense of enjoyment and participation as customers can interact with the products in real-time in the surrounding environment, and visually examine how the clothing looks on their bodies. They can even share the try-ons photo with friends. This also contributed to enhancing their online purchase decision-making as more immediate information was provided (Jiang et al., 2022). Park & Kim (2022) also stated that enjoyment is the driver for AR try-on adoption among Gen Z. While Gen Z expresses the most interest in using AR to improve their entertainment experiences among millennials and Gen X as 80% of Gen Z agreed on the point by the study from Snap (Shelley, 2022). Therefore, it is necessary to evaluate the attitude towards mobile AR clothing try-ons among consumers in terms of perceived enjoyment (PE) from the user's (Gen Z) perspective.

Even though AR try-on technology has massive potential to alter consumer behaviour and has been developed and employed in the retail sectors including virtual fitting rooms, virtual try-on cosmetics or glasses, however, there is limited research on mobile AR clothing try-on technology in Malaysia as past studies focused on AR try-on features to shop beauty products, shoes, and hijab (Vongurai,2020; Jiang et al., 2022; Pozi, 2023). There is a difference between those and clothing-try-ons. Empirical studies still lack studies on Malaysian Gen Z consumers regarding AR technology usage and the intention to use AR clothing try-on. Therefore, this research based on TAM, plans to discover the attitude and using intention of Malaysian Gen Z's towards mobile AR clothing try on to close the knowledge gap and embrace the market trend.

1.3 Research Questions and Research Objectives

1.3.1 Research Questions

- Does Perceived Usefulness (PU) affect Malaysian Gen Z's Attitude (ATT) to use mobile AR clothing try-ons?
- Does Perceived Ease of Use (PEoU) affect Malaysian Gen Z's Attitude (ATT) to use mobile AR clothing try-ons?
- Does Perceived Enjoyment (PE) affect Malaysian Gen Z's Attitude (ATT) to use mobile AR clothing try-ons?
- Does Attitude (ATT) affect Malaysian Gen Z's Behavioural Intention (BI) to use mobile AR clothing try-ons?
- Does Attitude (ATT) have mediating effect on the relationship between Perceived Usefulness (PU), Perceived Ease of Use (PEoU), Perceived Enjoyment (PE), and Malaysian Gen Z's Behavioural Intention (BI) to use mobile AR clothing try-ons?

1.3.2 Research Objectives

1. To investigate the impact Perceived Usefulness (PU) on Malaysian Gen Z's Attitude (ATT) to use mobile AR clothing try-ons.
2. To investigate the impact Perceived Ease of Use (PEoU) on Malaysian Gen Z's Attitude (ATT) to use mobile AR clothing try-ons.
3. To investigate the impact Perceived Enjoyment (PE) on Malaysian Gen Z's Attitude (ATT) to use mobile AR clothing try-ons.
4. To investigate the impact of Attitude (ATT) on Malaysian Gen Z's Behavioural Intention (BI) to use mobile AR clothing try-ons.

5. To investigate the mediating impact of Attitude (ATT) on the relationship between Perceived Usefulness (PU), Perceived Ease of Use (PEoU), Perceived Enjoyment (PE), and Malaysian Gen Z's Behavioural Intention (BI) to use mobile AR clothing try-ons.

1.4 Research Significance

This study on the determinants of intention to use AR try-on clothing on mobile shopping apps among Malaysian Gen Z bridges a gap in existing literature in the field of online shopping in Malaysia's clothing sector. Although there is some research regarding virtual try-ons in the Malaysia context, there is lacking research on clothing try-ons as there is research regarding young women's perception towards mobile Hijab try-on utilization (Zulkifli et al., 2020) and mobile AR beauty shopping apps (Lim, 2023). This research contributes to the theoretical frameworks related to technology acceptance models (TAM). This research also extended the conceptual frameworks by incorporating Perceived Enjoyment (PE) as another factor that influences Gen Z's attitude towards mobile AR clothing virtual try-on apart from Perceived Usefulness (PU) and Perceived Ease of Use (PEoU), and the mediation role of Attitude (ATT) to obtain fuller understanding of real world. Thus, academic researchers can enhance understanding in the insights generated from this study regarding the AR try-on dynamics among Gen Z who are massive potential users of the technology, and the factors that influence them to use it. Moreover, this study is significant to clothing brands and retailers. There is a rapid and accelerating change in AR clothing try-on and its improvement will have an immediate impact on retailers (Mcdowell, 2021). In addition, empirical studies indicated the use of AR technology in online shopping will assist consumers in their purchase decisions (Wahab & Ronaldo, 2022; Jiang et al., 2022). Thus, this research contributes to the brands and retailers in the Malaysia market to stay competitive by identifying the factors driving Gen Z's acceptance of AR try-ons in clothing, thereby tailoring their marketing strategies to enhance their mobile shopping apps to provide better

immersive and interactive shopping experience in the intense competition and help consumers to make decision more confidently. Ultimately, their sales and brand loyalty among Malaysia Gen Z customers will be positively influenced. According to Mcdowell (2021), AR clothing try-on is a long-term goal that technology firms are close to reaching. Therefore, this research benefits for AR technology providers to optimize their services and functions developed and provided by gaining insights from Malaysian Gen Z using intention on AR try-on clothing features. Eventually, this enhances the effectiveness of AR solutions developed for both businesses and consumers.

CHAPTER 2: LITRATURE REVIEW

2.1 Underlying Theories
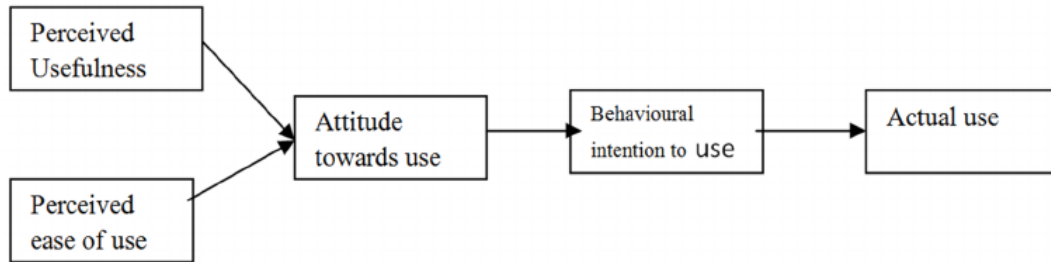
Figure 2.1 The original technology acceptance model TAM (Davis, 1989)

The Technology Acceptance Model (TAM) was developed based on Fishbein and Ajzen's Theory of Reasonable Action, rooted in social psychology (Alambeigi & Ahangari, 2016). This theoretical framework was created by Davis, to explain the determinants of computer or technology acceptance and was able to interpret user behaviour across a wide range of technologies and populations (Davis, 1985). TAM highlights how the features of a new technology can influence consumers' perception and eventual adoption of it (Davis, 1985; Venkatesh & Davis, 2000). The TAM consists of four main variables which are perceived ease of use (PeoU), perceived usefulness (PU), attitude towards technology use (ATT) and behavioural intention (BI) (Figure 2.1) (Davis, 1985). This model discusses that PEoU and PU have an immediate impact on ATT, which eventually influences BI with the mediation of ATT. PU is defined as the degree to which users believe that the technology will enhance the effectiveness or efficiency of their situation; while PEoU relates to the degree to which users perceive that it is easy or difficult for them to operate the technology (Davis, 1989). ATT in TAM is usually defined as the user's positive or negative feelings toward the use of the technology. BI determines the use of information systems and technology acceptance. (Ajzen & Fishbein, 1977).

In this study we extend the concept of TAM by adding perceived enjoyment (PE), we believe that AR try-on will bring a certain level of entertainment and enjoyment to the user, and this variable will have a direct impact on Gen Z's attitudes towards the use of AR try-on in mobile shopping applications. As today's information systems are more widely used for leisure and thus become a source of fulfilment for people's intrinsic needs (Davis et al., 1992; Deci & Ryan, 2000). Therefore, the TAM model has been extended to include the enjoyment factor, PE in the TAM model enables a better understanding of the inner motivations for technology use and aims to provide self-fulfilment for technology users (Van der Heijden, 2004). PE is defined as the degree of enjoyment associated with the use of the technology, regardless of any functional consequences of the technology (Köse et al., 2019). Based on previous studies, it has been shown that adding other variables to the TAM can explain the acceptance of mobile AR applications to a greater extent, it has also been found that PE plays an important part in the successful adoption of information and communication technologies (Koutromanos & Mikropoulos, 2021). In addition, according to Erra et al. (2018), virtual fitting rooms bring pleasure and entertainment to consumers.

2.2 Review of Variables

2.2.1 Behavioural Intention (BI)

According to Fishbein and Ajzen's theory of reasoned action (TRA) (1975), BI is the factors that motivate behaviour, and the strength of the intention would affect the willingness to engage in the behaviour. It also refers to the users' eagerness to perform behaviours (Flavián et al., 2021). Ibrahim et al. (2024) explained BI to use is the willingness to put out effort to perform target behaviour. Al Morabet, M (2021) defined the intention as an individual's willingness to use the technology in the future. Meanwhile, Oyman et al. (2022) also stated that BI is a rational indicator for the future use of an application or

technology tool. Thus, BI refers to Malaysian Gen Z's willingness to use mobile AR clothing try-ons in the future in this research. If a greater strength of intention to use the technology among Malaysian Gen Z, they are more willing to exert effort to use it in the future.

2.2.2 Attitude (ATT)

Ghaffarisadr and Sareban (2024) mentioned that ATT contains cognitive, emotional, and behavioural components that indicate the extent of liking or disliking of a person towards a thing. While Jiang et al. (2021) defined ATT as a consumer's sentiment and assessment of the product, which can be either positive or negative. ATT refers to the extent to which a person feels positively or negatively towards technology (Ibrahim et al., 2024). Pozi (2023) argued that users are more likely to use technology if they have a more positive attitude towards it. Hence, in this research, ATT is defined as Malaysian Gen Z's positive or negative feelings towards mobile AR clothing try-on technology. If they have more positive feelings towards mobile AR clothing try-on technology, they are more likely to adopt and use it.

2.2.3 Perceived Usefulness (PU)

According to Anifa and Sanaji (2022), PU encompasses all advantages, applications, or benefits that a user experiences and that may motivate them to engage with the application. The concept of PU refers to how someone views a specific technology as having the potential to increase the efficacy and efficiency of a person's duties or functions (Bolodeoku et al., 2022). PU refers to the projected benefits and improvements in the purchase process from new technology, which indicate the utility value of innovations (Ibrahim et al., 2024). This means that the use of AR technologies in the process of trying on clothing

is decided by weighing the trade-off between the perceived utility of the technology and the perceived difficulty of using it (Marikyan & Papagiannidis, 2023). Therefore, people are more likely to adopt technology when it is more beneficial (Tahar et al., 2020). In the context of AR technology for clothing try-on, when Gen Z believes that AR fitting technology can help them try on clothes more conveniently and quickly, reduce the chance of choosing the wrong size and purchase return, they are more likely to use this AR technology.

2.2.4 Perceived Ease of Use (PEoU)

According to Tahar et al. (2020), PEoU refers to the degree to which a user feels that utilizing a specific technology or system would be effortless and easy to use. PEoU defines the degree to which a person feels that a system is simple to understand (Basuki et al., 2022). PEoU is the term used to describe how simple a system is to use, how easy it is to grasp and comprehend, and how well it explains how to use technology and get the desired result (Chow et al., 2022). Within the framework of AR technology for clothing try-ons, PEoU refers to the subjective evaluation made by users regarding how simple it is to operate the technology. The Gen Z population is more likely to accept AR technology and use it to try on clothes when they believe it to be easy to use and intuitive.

2.2.5 Perceived Enjoyment (PE)

Davis et al. (1992) defined PE as the degree to which the activity of using the computer is perceived to be delightful in and of itself, independent of any performance consequences that may be expected. In the study of Oyman et al. (2022), PE can be viewed as the component that allows the user to have a pleasant time in the application. Besides, PE refers to the hedonic value of new

technology and expresses how enjoyable a subject experience its application. PE is presented as an intrinsic motivation of a user that further stimulates future adoption (Holdack et al., 2022; Ghaffarisadr & Sareban, 2024). Rese et al. (2017) stated that AR apps were to provide entertaining and playful momentary experiences. Past studies examined that perceived enjoyment can be improved by virtual try-ons' interactive nature and enabling consumers to enjoy immersing themselves in the virtual try-ons (Zhang et al., 2019). Hence, PE is one of the variables to understand the use and adoption of new technology including the mobile AR clothing try-on applications. In this research, PE is defined as the extent to which utilizing mobile AR clothing try-ons is perceived to be pleasurable in and of itself among Gen Z.

2.3 Conceptual Framework
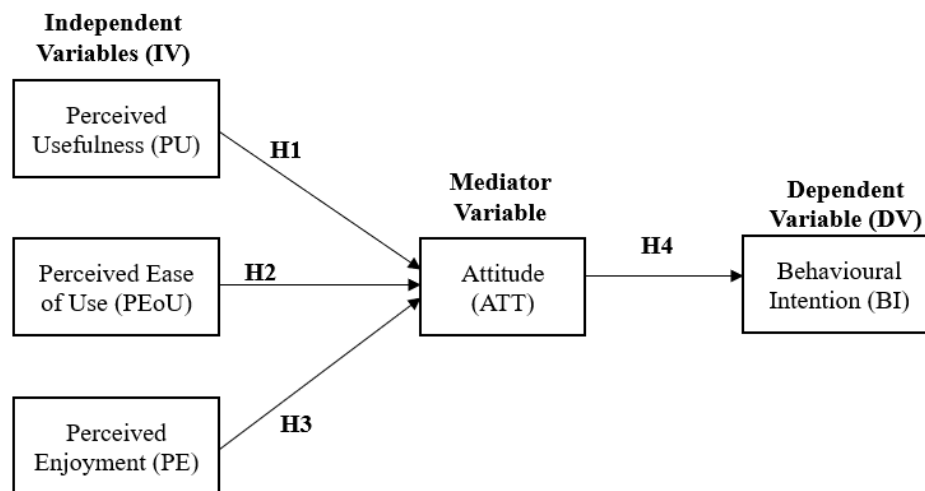
Figure 2.2 Conceptual Framework

Based on the review of relevant theories and literature, Figure 2.2 shows the theoretical framework of this study. The framework of this study consists of four IVs namely PU, PEoU, PE, and ATT as a mediator variable. BI is the DV, and this study will examine the relationship between all IVs and the intention to use AR for clothing try-on on mobile shopping apps among Malaysian Gen Z.

2.4 Hypotheses Development

2.4.1 The relationship between Perceived Usefulness (PU) and Attitude (ATT)

Many studies have shown that PU influences consumers' ATT in online apparel purchasing, and there is a path relationship between the two aspects, especially when considering disruptive technologies like virtual try-ons (Chidambaram et al., 2024; Jiang et al.,2022). Similarly, a study of virtual try-ons and related AR technology used in hijab has also confirmed that PU is influential on the usage attitude (Pozi, 2023). In short, these studies showed that increasing usefulness will attract Gen Z to develop a more positive attitude toward using AR technology in trying on clothing, thereby increasing their intention to use it. Therefore, the following hypothesis is proposed:

H1: There is a significant relationship between PU and ATT.

2.4.2 The relationship between Perceived Ease of Use (PEoU) and Attitude (ATT)

PEoU refers to when users can familiarize themselves with and master an AR technology without expending too much time and effort; it is more likely to be accepted and adopted. According to Jiang et al. (2022), When Gen Z use AR technologies, there is a path relationship between PEoU and ATT. Multiple studies in journal articles have supported this view (Ibrahim et al, 2024; Anifa and Sanaji, 2022). Many research results believe that PEoU influences usage intention in a positive way, including the case of Chinese consumers' adoption behaviour toward virtual fitting rooms (Li & Xu, 2020). Similarly, a study of virtual try-ons and related AR technology used in hijab has also confirmed that

PEoU is influential on the usage attitude (Pozi, 2023). Hence, based on the above arguments and theory, the following hypothesis is:

H2: There is a significant relationship between PEoU and ATT.

2.4.3 The relationship between Perceived Enjoyment (PE) and Attitude (ATT)

According to Davis et al. (2006) as cited in Ghaffarisadr & Sareban (2024), PE is considered as one of the internal factors influencing the acceptance of technologies. In addition, Holdack et al. (2022) stated that the application of AR technology is anticipated to create hedonic experiences and positively affect customers' satisfaction in studies empirically. According to Lee et al. (2019), hedonism, which displays the pleasure of using particular technologies will improve satisfaction when using AR. Thus, this research extended the TAM model by including perceived enjoyment. Previous study has shown that PE has a significant impact on the ATT towards educational mobile AR acceptance in teaching (Koutromanos & Mikropoulos, 2021). Existing studies regarding virtual try-ons and related AR technology used in sportwear and hijab also concluded that perceived enjoyment is influential on the usage attitude (Ghaffarisadr & Sareban, 2024; Pozi, 2023). Likewise, when the activity of using mobile AR clothing try-ons is perceived to be delightful among Malaysian Gen Z, they will have a favourable attitude towards using it.

Therefore, the following hypothesis is proposed:

H3: There is a significant relationship between PE and ATT.

2.4.4 The relationship between Attitude (ATT) and Behavioural Intention (BI)

ATT is concluded to have a significant impact on BI (Ajzen, 1991). ATT is widely employed to predict BI (Davis, 1989). And ATT is one of the basic constructs of TAM (Lee et al., 2019). According to Al Morabet, M (2021), Rogers (1995) and Moore and Benbasat (1991) support that a person's ATT to an innovation determines that they intend to use it. The relationship has been empirically tested. For instance, in the studies of Zhang et al. (2019) and Plotkina and Saurel (2019), consumers' ATT towards AR-based virtual try-on technology have a significant influence on purchase intention. Furthermore, existing studies on AR show ATT towards using particular technologies has a positive effect on BI to use it, such as AR smart glasses (Alam et al., 2021; Holdack et al., 2022). Likewise, if Malaysian Gen Z hold positive ATT towards mobile AR clothing try-ons, they will intend to use it.

Therefore, the following hypothesis is proposed:

H4: There is a significant relationship between ATT and BI.

2.4.5 Attitude (ATT) mediates the relationship between Perceived Usefulness (PU), Perceived Ease of Use (PEoU), Perceived Enjoyment (PE), and Behavioural Intention (BI)

ATT is anticipated to mediate the impact of other variables on BI as the TRA suggested attitude is the only antecedent of BI apart from social norms (Hale et al., 2002 as cited in Holdack et al., 2022). Moreover, ATT is found to play a mediating role in information technology acceptance such as the TAM framework (Davis, 1989). According to Petty et al. (1997) as cited in Lim (2023), individual and contextual factors, such as knowledge and experiences can influence the forming of attitudes towards technology adoption. Lim (2023) also mentioned that in the context of AR technology, if users have sufficient

knowledge and information about the system and the benefits it provides, they may have a favourable attitude towards the use. According to Venkatesh et al. (2003), ATT mediates the relationship between PU and BI. According to Alam et al. (2022), if an individual holds a positive attitude toward online buying using AR, the PU and PEoU will influence BI. In the study of Plotkina and Saurel (2019), hedonic value as PE has affected attitudes towards AR-based virtual try-on tools. While Pop et al. (2023) argued that users' attitude mediates the relationship between hedonic value and purchase intention. In addition, Li & Huang (2009) as cited in Pozi (2023) argued that users are more likely to have a favourable ATT toward new technology thereby enhancing their likelihood to use it if they are having fun while using it. Moreover, the previous studies also examined the mediating effect of attitude between PU, PEoU, PE, and BI to use AR technology in the retail context (Alam et al., 2021.; Holdack et al., 2022).

Therefore, the following hypotheses are proposed:

H5: ATT mediates the relationship between PU, PEoU, PE, and BI.

H5a: ATT mediates the relationship between PU and BI.

H5b: ATT mediates the relationship between PEoU and BI.

H5c: ATT mediates the relationship between PE and BI.

CHAPTER 3: METHODOLOGY

3.1 Research Design

In this study, quantitative research methods will be adopted to examine the proposed theoretical framework. Quantitative research is the procedure of collecting and analysing numerical data, the results can be examined through statistical techniques (Goertzen, 2017). The application of statistics and systematic measurement is a key element of quantitative research (Marczyk et al., 2005). Furthermore, in quantitative research methods, this study adopted a descriptive research design to investigate Gen Z's intention to use AR to try on clothing on mobile shopping apps. Descriptive research is a tool used to explain the present status of identified and measurable variables. Researchers can collect data through surveys, experiments, interviews, or observations to describe the phenomenon (Nassaji, 2015).

In addition, a cross-sectional study involves surveys conducted on a target group of people over a specific period, the main purpose is to collect and evaluate the characteristics of the population. It can be used to gather information about the characteristics, attitudes, and behaviours of a group of individuals (Kesmodel, 2018). Therefore, we believe that it is suitable to be applied in our research as our target population is only Malaysian Gen Z. Based on the theoretical framework, we designed a questionnaire to collect information about the characteristics, attitudes, and behaviours of Gen Z towards the use of AR.

3.2 Sampling Design

3.2.1 Target Population

The target population for this research was Malaysian Generation Z who have experienced using AR technology. Gen Z also includes teens between 12-17 years old, but our target population is Gen Z adults between 18-27 years old, this is because adults have developed their independent judgment and opinions, whereas the opinions of teens under 18 years old are still forming and have not matured, so the adults' perspectives are more appropriate to be included in the study and provide more valuable insights (Icenogle et al., 2019). Gen Z has grown up with rapid digital transformation, hence they are more receptive to new technology, and they are highly creative and self-expressive (Feger, 2024). According to a report by Deloitte Digital and Snap Inc, approximately 3 million Gen Z and millennials are frequent users of AR as of 2021, and this figure is expected to increase by 187% to 8.6 million by 2025 (Snap Inc., 2021). In a survey with Gen Z, 93% of respondents said they are interested in using AR for shopping, and 88% are interested in using AR for makeup or clothes fitting (Smith, 2022). The reason we chose Gen Z as our target population is because they are interested in AR technology and can adapt quickly, so we believe that choosing them as our target respondents will provide very useful insights for this research.

3.2.2 Sampling Frame and Sampling Location

A sampling frame is a list or collection of sample units used to identify the target population (Turner, 2003). The sampling frame is not applicable in this study due to the size of the Gen Z population in Malaysia and the

unavailability of their information (Tang et al., 2023). Besides, there is no sampling location as we will take advantage of the Internet to conduct the survey and collect information from the respondents by distributing the Google Form extensively.

3.2.3 Sampling Technique

In this research, a non-probability sampling technique will be applied to determine the sample and the sampling technique used is judgmental sampling. Judgmental sampling is a technique where the researchers select people with specific backgrounds as the sampling units based on their knowledge and judgement (Boeren, 2018). In this study, we will send Google Forms through different social platforms to the respondents who meet the standard to fill out the questionnaire. Some screening questions will be designed to ensure that the respondents match the sample criteria (e.g. respondents' age; whether respondents have experience with AR technology).

3.2.4 Sample size

According to Worldometer (2024), the total population of Malaysia reached 34.59 million by April 2024. As per DataReportal's statistics, 35.9% of the total Malaysian population is between the ages of 13 and 34 years old (Kemp, 2024). The previous data indicates that the population of Malaysia in 2019 was approximately 32.37 million, of which about 29% belongs to Gen Z (Department of Statistics, 2019).

It is important to determine an adequate sample size to avoid invalid results that may not represent the actual situation of the study population.

According to Krejcie and Morgan's table (Figure 3.1), a sample size of 384 is optimal for populations larger than 1,000,000 (Krejcie, & Morgan, 1970). The population of Gen Z in Malaysia is more than 1,000,000, therefore 384 samples will be collected for this research.

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—N is population size.   S is sample size.

Source: Krejcie & Morgan, 1970

Figure 3.1. Krejcie and Morgan's Table. (1970)

3.3 Data Collection Method

3.3.1 Primary data

Primary data is the data that is collected for the first time through personal experiences or evidence, particularly for research. It is also described as raw data or first-hand information (Admin, 2021). Primary data are data collected directly from the original source in a study. These data are obtained

through fieldwork, experimentation, observation, or direct communication, and are collected by the researcher himself or herself, independent of data previously collected by others (Streefkerk, 2023). Primary data are usually more reliable and accurate for research because they are collected specifically for the purpose of a particular study and because the researcher has control over the process of data collection. In this research, we will use the form of survey to collect the required information. In the context of primary data, survey refers to a method of data collection that involves administering a questionnaire or asking questions to a group of people to gather their opinions, beliefs or experiences on a particular topic or issue. The information collected from a survey is considered primary data. Surveys are a common and versatile tool for primary data collection in a variety of fields (including social sciences, business, market research, and public health), (Maione, 2024) due to the fact that they are relatively inexpensive to administer, can cover a large number of respondents allowing researchers to collect data from a representative sample, and additionally can be structured in a standardised way ensuring consistency in data collection and simplifying analysis,. And it can be adapted to a variety of topics, and question formats, such as multiple choice, open-ended or Likert scale questions (Lindemann, 2024). In this study, a questionnaire was created using Google Forms and distributed to 384 Generation Z respondents via social media platforms. The purpose was to collect their perceptions on the application of AR technology to trying on clothing.

3.3.2 Research Instrument

The survey will be conducted in the form of a questionnaire which will be distributed to 384 respondents. The questionnaire is divided into two sections. section A deals with demographic questions; section B deals with the conceptual framework constructs. In the questionnaire, a non-

comparative 5-point Likert scale was used in Sections B. The questionnaire
is based on a 5-point Likert scale.

Table 3.1:

Construct Measurement

Constructs	Indicator	Measurement Items	Reference
Perceived Usefulness	PU1	I can improve the online buying process with mobile AR clothing try-ons.	Alam et al. (2022)
	PU2	Mobile AR clothing try-ons will be helpful while buying online.	
	PU3	Mobile AR clothing try-ons will improve my ability while buying online.	
	PU4	My online buying process will be more efficient with mobile AR clothing try-ons.	
Perceived Ease of Use	PEoU1	I think using mobile AR clothing try-ons is easy.	Alam et al. (2022)
	PEoU2	I think it is very simple to learn how to use mobile AR clothing try-ons.	
	PEoU3	I think it does not require much effort to use mobile AR clothing try-ons.	
	PEoU4	I think the mobile AR clothing try-ons is clear and understandable.	
Perceived Enjoyment	PE1	I know using mobile AR clothing try-ons to be enjoyable.	Koutromanos and Mikropoulos (2021)
	PE2	I find the buying process through mobile AR clothing try-ons pleasant.	Alam et al. (2022)

	PE3	Shopping with mobile AR clothing try-ons would be fun for its own sake.	Plotkina and Saurel. (2019)
	PE4	Shopping with mobile AR clothing try-ons would be interesting.	Holdack et al. (2019)
Attitude	ATT1	I think using mobile AR clothing try-ons is a good idea.	Jiang et al. (2021)
	ATT2	I think mobile AR clothing try-ons is a good experiential online shopping technology.	
	ATT3	I have a favorable attitude toward buying online with mobile AR clothing try-ons.	Alam et al. (2022)
	ATT4	Given that I had access to the mobile AR clothing try-ons, I predict that I would use it.	Plotkina and Saurel. (2019)
Behavioral Intention	BI1	If there is an opportunity, I would like to utilize mobile AR clothing try-ons.	Hur and Lee (2021)
	BI2	I will consider mobile AR clothing try-ons while buying online.	Alam et al. (2022)
	BI3	I will use mobile AR clothing fittings regularly in future while buying clothes online.	

3.3.3 Pilot Test

A sort of software testing known as "pilot testing" is used to confirm a system's component or the system as a whole while it is working in real time. A research project's viability, timeliness, expense, risk, and performance are

all intended to be assessed during the pilot test. A pilot study is one of the important phases of a research project. Typically, it refers to a pilot test or experiment conducted on a relatively small scale. Pilot testing is an initial test or study to identify possible problems and deficiencies in research tools and programmes prior to conducting a large-scale study, with the aim of collecting feedback and data through small-scale experiments so that improvements or adjustments can be made prior to a full-scale roll-out. According to Omer et al. (2019), pilot testing is thought to be suitable for between 30 and 100 responses. Therefore, in this study, we selected 34 respondents for the pilot test to test the questionnaire's validity and reliability and to support the subsequent formal research.

The SmartPLS 4.0 was used to test the reliability after responses were collected. Based on the result on the table, all variables have achieved Cronbach's Alpha value greater than 0.81 which indicate a very good reliability.

Table 3.2:

Pilot Test

Variables	No. of Items	Cronbach's Alpha Value	Result
PU	4	0.894	Very good reliability
PEoU	4	0.881	Very good reliability
PE	4	0.913	Very good reliability
ATT	4	0.879	Very good reliability
BI	3	0.826	Very good reliability

3.4 Propose Data Analysis Tool

The model proposed in this research will be analyzed using SmartPLS 4.0 software. SmartPLS is an outstanding application in latent variable modelling with its user-

friendly interface and superior capabilities that enhance usability in reports and analysis (Hair, n.d.; Gaskin, n.d.).

3.4.1 Descriptive Analysis

Aggarwal and Ranganathan (2019) show that descriptive analysis is a sort of observational study design that enables researchers to study and describe the distribution of variables without considering causal or other hypotheses. Descriptive analysis is used to describe data in an orderly fashion by outlining the information and interpreting how the variables relate to one another (Kaur et al., 2018). descriptive analysis is often the first step in data analysis. This step is crucial as it provides researchers with an initial understanding of the data, helping them to identify patterns, trends, and any potential issues such as outliers or missing data (Starbuck, 2023). In this research, we will be using descriptive analysis to aid in the interpretation and evaluation of the data in a more structured manner, which can condense and simplify the data regarding Gen Z's BI toward adopting AR for clothes try-on on mobile shopping apps.

3.4.2 Inferential Analysis

Andereck (2011) states that generalizations about a large population are drawn via inferential analysis from a sample of the population. The use of inferential analysis relies upon a random sampling of members of the larger group of people one is interested in knowing about. The size of the sample and the degree of variability in the research data are closely correlated with the sampling error and confidence interval. Using sample data with inferential analysis is a potent technique to convey information about the population (Delaney, 2011). In this research, we will need to estimate the

population using sample data that we gathered from the respondent because there are too many members of Malaysia's Gen Z to study as a whole.

3.4.3 Structural Equation Modeling (SEM)

SEM is a useful technique for evaluating complicated theoretical relationships between numerous variables (Hair & Alamer, 2022). In this method, the concepts that are under consideration are usually unobservable and measured indirectly by numerous indicators. The measurement error in observed variables is taken into consideration in SEM. Consequently, SEM obtains a more accurate measurement of the theoretical concepts of interest (Hair et al., 2021).

3.4.4 Partial Least Squares Structural Equation Modeling (PLS-SEM)

The PLS-SEM approach will be used in this research to examine the hypotheses. PLS-SEM has drawn significant attention from a variety of research fields, such as marketing, operations management, human resource management, and so on (Ringle et al., 2016). PLS-SEM is suitable to be used when explanation and prediction are the main objectives in the structural model (Hair & Alamer, 2022). Two state analysis techniques are involved to test the model: (i) measurement model and (ii) structural model.

3.4.4.1 Measurement Model Assessment

In this research, the constructs are formulated as reflective. Thus, the reflective measurement model is employed.

In measuring this model, we examined the construct's reliability and validity. To measure construct reliability, indicator reliability and internal consistency reliability will be evaluated. Indicator reliability can be estimated by squaring the individual indicator loadings and a value of 0.50 is considered acceptable. While indicator loadings should have a value of at least 0.708 (Hair & Alamer, 2022). The internal consistency reliability is assessed by Cronbach's alpha (α) and Composite Reliability (CR). The rule of thumb for both measures should be above 0.70. Nonetheless, if the reliability is value of 0.9 or higher, indicates individual items are measuring the same concept and thus are redundant (Hair & Alamer, 2022).

Table 3.3:

Cronbach's Alpha Rule of Thumb

Alpha Range	Level of Reliability
0.60 and less	Poor reliability
0.61 to 0.70	Fair reliability
0.71 to 0.80	Good reliability
0.81 to 0.95	Very good reliability

Source: Sekaran and Bougie (2013)

To measure validity, convergent validity and discriminant validity will be assessed in this model (Hair & Alamer, 2022). Convergent validity refers to the degree to which items on a particular construct correlate positively and share a high degree of variance measured by Average Variance Extracted (AVE). The criterion for AVE is the value should be 0.50 and higher as demonstrating the mean values of items factor loadings are 0.708 or above, therefore indicating that the latent construct explains no less than half of the indicator variance (Fornell & Larcker, 1981). Discriminant validity refers to the extent to which the construct differs conceptually from other constructs in the research. It is assessed by the heterotrait-monotrait ratio (HTMT) (Hair & Alamer, 2022). The suggested HTMT threshold is at a value of 0.85 to ensure the discriminant validity (Hair et al., 2016). For Fornell-Lacker

criterion, the square root of each construct's AVE should be greater than the correlations with other latent variables (Hair et al., 2014).

3.4.4.2 Structural Model Assessment

Structural model is used to define the relationship between numerous constructs in the model (Analysis INN, 2020). First, examine the collinearity in the model using the Variance Inflation Factor (VIF). The VIF values between 5 and 0.25 can be acceptable, otherwise the multicollinearity is present, and items can be removed (CFI Team, 2023; Hair & Alamer, 2022). Next, the size and significance of the path coefficients will be evaluated. The values of path coefficients in the structural model are standardized and may range from +1 to -1 (Hair et al., 2020). The path coefficient values are weaker in predicting dependent (endogenous) constructs as they get closer to value of 0. In contrast, the stronger in predicting dependent constructs as they get closer to value of 1. R^2 as the coefficient of determination is used to measure of in-sample prediction of all endogenous constructs. R^2 value range of 0-1 and the higher value is equivalent to stronger explanatory power. The effect size, f^2, is the second measure of the predictive ability of structural model. The values above 0.02 to 0.15 are considered small; 0.15 to 0.35 are medium; and 0.35 and above are large effect (Hair et al., 2020). Moreover, a two-tailed test at a 5% level will be applied in testing the proposed hypotheses and structural model. It is suggested that p-values should be statistically significant at 0.05 or below (t-statistic of $\pm$ 1.96).

3.4.4.3 Testing the Mediating Effect of Attitude

In this research, the bootstrapping approach will be used to test the mediation effect of attitude which is recognized as one of the most powerful approaches to test the mediating effect (Hayes, 2009). Assessing the

significance of direct relationships is required before testing the mediating effects by bootstrapping. Then, assessing the significance of indirect effects and associated t-values by path coefficients (Wong, 2016). The result should be in two-tailed and indicate significance at t-values >1.96 and p-values <0.05 (Ramayah et al., 2018).

Variance Accounted For (VAF) approach will be used to conclude the mediation type. The rule of thumb is, if the VAF is below 20% indicates a nearly zero mediation; if the VAF is above 20% and below 80% indicates a partial mediation; if the VAF is above 80% indicates a full mediation (Ramayah et al., 2018). The formula for VAF calculation is as below:

$$\text{VAF} = \frac{\text{Indirect Effect}}{(\text{Indirect Effect}) + \text{Direct Effect}}$$

CHAPTER 4: DATA ANALYSIS

4.1 Data Collection

In this study, the researcher collected a total of 459 responses, and all the data collected were based on the basic perception of Malaysian Generation Z on AR clothing try-ons. However, 75 responses were excluded from data analysis due to being ineligible for research and filtered out during the pre-screening session. Therefore, only 384 responses were valid and used for the final data analysis. All participating respondents are Malaysian Generation Z between the ages of 18 and 27 years old and have experience in using AR technology. The demographic details of the respondents are shown in Table 4.1. Most of the respondents (52.34%) were female. Regarding the targeted location, since we contacted respondents through an online questionnaire distribution, the target respondents came from different states. There are 111 respondents (28.91%) were from the Perak area, 26 respondents (6.77%) were from Kedah, 8 respondents (2.08%) were from Perlis area, 52 respondents (13.54%) were from the Penang. Moreover, there were 46 respondents (11.98%) from Johor and 19 respondents (4.95%) from Malacca. Furthermore, there were 13 respondents (3.39%) from Negeri Sembilan, and 60 respondents (15.63%) from Selangor. Meanwhile, there were 16 respondents (4.17%) from Pahang, 5 respondents (1.30%) from Terengganu, and 13 respondents (3.39%) from Kelantan. Besides, there were 3 respondents (0.78%) from Sabah, and 12 respondents (3.13%) from Sarawak.

Regarding to ethnicity, most respondents were Chinese, which comprised 67.45%, followed by Indian (17.97%) and Malay (14.58%). Regarding respondents' highest education level, most respondents (62.76%) had a bachelor's degree, 16.93% had graduated from pre-university, 8.59% had graduated from diploma, 0.78% had

graduated from foundation, 6.77% had graduated from high school, and 4.17% graduated from Postgraduate. Moreover, 297 respondents were current students (77.34%). 48 respondents (12.5%) were full-time workers, 31 respondents were part-time workers (8.07%), and 8 respondents (2.08%) were unemployed. Since most respondents are either full-time students or unemployed (60.94%), they have no income. On the other hand, some respondents rely on part-time jobs and full-time jobs to earn money respectively; 24.22% of the respondents earn RM1500 and below, 8.85% of the respondents earn between RM1501 and RM3000, and 4.17% of the respondents earn between RM3001 and RM5000, 1.56% of the respondents earned between RM5001 and RM8000, and 0.26% of the respondents earned between RM8001 and RM10000.

Table 4.1:

Demographic Detail

	Frequency	**Percentage**
Gender		
Male	183	47.66%
Female	201	52.34%
Ethnicity		
Malay	56	14.58%
Chinese	259	67.45%
Indian	69	17.97%
Educational Level		
High School	26	6.77%
Pre-university	65	16.93%
Foundation	3	0.78%
Diploma	33	8.59%
Bachelor's Degree	241	62.76%
Postgraduate	16	4.17%
Employment Status		
Student	297	77.34%

Part time	31	8.07%
Full time	48	12.50%
Unemployed	8	2.08%
Income Level		
No Income	234	60.94%
RM1500 and below	93	24.22%
RM1501 - RM3000	34	8.85%
RM3001 - RM5000	16	4.17%
RM5001 - RM8000	6	1.56%
RM8001 - RM10000	1	0.26%
RM10001 and above	0	0.00%
State/Location		
Johor	46	11.98%
Kedah	26	6.77%
Kelantan	13	3.39%
Malacca	19	4.95%
Negeri Sembilan	13	3.39%
Pahang	16	4.17%
Penang	52	13.54%
Perak	111	28.91%
Perlis	8	2.08%
Sabah	3	0.78%
Sarawak	12	3.13%
Selangor	60	15.63%
Terengganu	5	1.30%

4.2 Inferential Analysis

4.2.1 Measurement Model Analysis

To examine the reliability of the constructs, the study used Cronbach's Alpha and Composite Reliability (CR) as well as the outer loading as indicators, the results are shown in Table 4.2.1. Table 4.2.1 shows the outer loadings of all the items were above the threshold value of 0.708, indicating that the indicator reliability was achieved at a sufficient level. Moreover, all the Cronbach's Alpha and Composite Reliability (CR) are higher than the threshold value of 0.70, indicating that all the constructs have high levels of internal consistency reliability (Hair & Alamer, 2022).

Besides, the construct's validity was assessed by establishing convergent validity and discriminant validity. The convergent validity is measured based on the AVE, Table 4.2.1 shows the AVE values for all the constructs are above the required minimum level of 0.5, thus, the convergent validity was established (Fornell & Larcker, 1981).

Table 4.2.1:

Outer Loadings, Reliability, Validity

Items	Outer Loadings	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
ATT1 <- ATT	0.806			
ATT2 <- ATT	0.792	0.824	0.825	0.654
ATT3 <- ATT	0.802			
ATT4 <- ATT	0.833			
BI1 <- BI	0.835			
BI2 <- BI	0.871	0.805	0.808	0.720
BI3 <- BI	0.838			

PE1 <- PE	0.782			
PE2 <- PE	0.837	0.824	0.831	0.654
PE3 <- PE	0.801			
PE4 <- PE	0.813			
PEoU1 <- PEoU	0.787			
PEoU2 <- PEoU	0.848	0.796	0.807	0.621
PEoU3 <- PEoU	0.714			
PEoU4 <- PEoU	0.798			
PU1 <- PU	0.820			
PU2 <- PU	0.855	0.834	0.845	0.666
PU3 <- PU	0.762			
PU4 <- PU	0.825			

Furthermore, the Fornell-Larcker criterion and Heterotrait-monotrait
(HTMT) ratio are used to measure the discriminant validity. As the result in
Table 4.2.2 indicates that the square-root of AVE for all the constructs is
larger than its correlation with all other constructs, so the discriminant
validity is established.

Table 4.2.2:

Fornell-Larcker criterion

	ATT	BI	PE	PEoU	PU
ATT	**0.809**				
BI	0.727	**0.848**			
PE	0.697	0.693	**0.808**		
PEoU	0.612	0.533	0.582	**0.788**	
PU	0.681	0.643	0.630	0.622	**0.816**

Note. The diagonal values (bolded) represent the square-root of AVE.

In addition, regarding the HTMT ratios, almost all the constructs had ratios
below the threshold value of 0.85, which implies that discriminant validity
was established between the two reflective measurement constructs (Hair et
al., 2016). The only construct that exceeded the threshold value of 0.85 was

ATT-BI. While the exact value of the HTMT threshold was debatable, according to Henseler et al. (2015), a threshold value of 0.9 is acceptable. Therefore, the results show that convergent and discriminant validity are supported for all constructs.

Table 4.2.3:

Heterotrait-monotrait (HTMT) ratio

Latent Variable	ATT	BI	PE	PEoU	PU
ATT					
BI	**0.890**				
PE	0.834	0.848			
PEoU	0.750	0.657	0.699		
PU	0.810	0.781	0.754	0.746	

Note. The bolded value exceeds the threshold of 0.85.

4.2.2 Structural Model Assessment
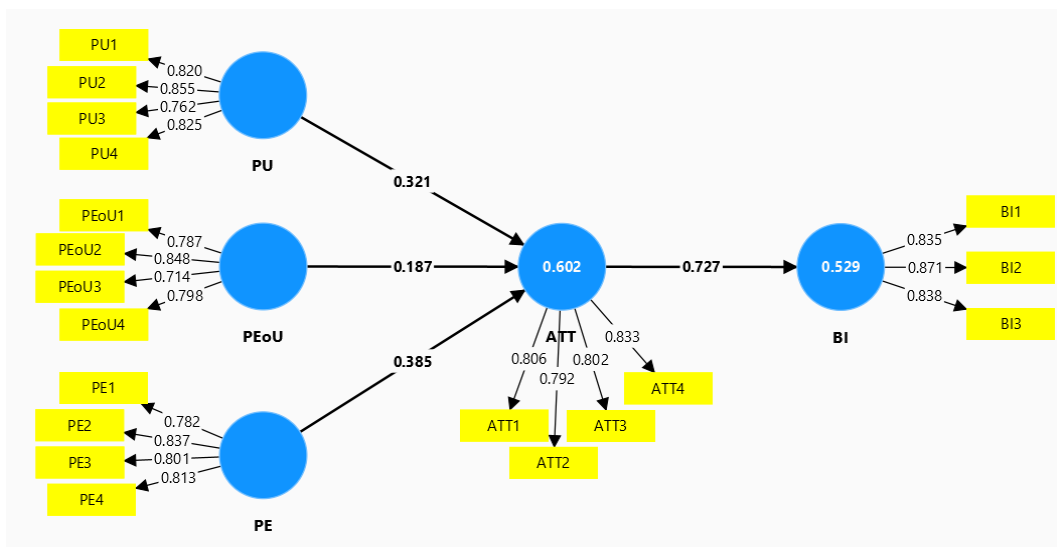
Figure 4.1 Partial Least Square (SMART-PLS 4.0)

VIF is used to evaluate the collinearity. The VIF inner values of the constructs (PU, PEoU, PE, ATT) range from 1.000 to 1.984 which are below 5. According to Hair et al. (2022), the VIF is preferably under 3. Hence, collinearity does not pose an issue at present study.

The value of path coefficients (β) among the endogenous and exogenous variables are demonstrated in *Table 4.2.4*, it ranges between -1 to 1. This study results confirmed there are significant relationships between PU→ATT, PEoU→ATT, PE→ATT, ATT→BI, as the path coefficients values of the variables are greater than 0.1 (Hair et al., 2022, p.101).

According to Hair et al. (2022), *t*-value greater than 1.96 and *p*-values less than 0.05 are prerequisites for two-tailed test. Hence, all the hypotheses are accepted as the t-statistics for all pathways ranged from 3.290 to 21.553 and *p*-values are less than 0.05. This study results confirmed significant relationship between PU (β=0.321, *p*=0.000), PEoU(β=0.187, *p*=0.001), PE(β=0.385, *p*=0.000), with ATT; and ATT (β=0.727, *p*=0.000) with BI. To

conclude, hypothesis 1 to 4 were all supported. The hypothesis testing result
is demonstrated in *Table 4.2.4*.

Table 4.2.4:

Hypotheses testing

	Hypothesis	VIF	Path Coefficients (β)	T statistics	P values	Evaluation
H1	PU->ATT	1.984	0.321	4.779	0.000	Supported
H2	PEoU->ATT	1.810	0.187	3.290	0.001	Supported
H3	PE->ATT	1.839	0.385	5.439	0.000	Supported
H4	ATT->BI	1.000	0.727	21.553	0.000	Supported

Table 4.2.5 presents the coefficient of determination (R^2), which used to
explain the independent variables' combined effects on dependent variables
(Hair rt al., 2020). Referring to Table, the adjusted R^2 values of ATT (0.599)
and BI (0.528) indicate that it has moderate predictive power (Hair et al.,
2013).

Table 4.2.5:

R^2 results

	R-square	**R-square adjusted**
ATT	0.602	0.599
BI	0.529	0.528

Cohen's f^2 used to calculate the effect size of each of the variables (Cohen,
1988). Referring to *Table 4.2.6*, according to Hair et al. (2020), PU (0.131)
and PEoU (0.049) have a small effect size in generating the R^2 for ATT. PE
(0.203) has a medium effect size in generating R^2 for ATT. Besides, ATT
(1.122) has a large effect size in R^2 for BI in the model.

Table 4.2.6:

f^2 results

	ATT	**Effect Size**	**BI**	**Effect Size**

ATT			1.122	Large	
BI					
PE	0.203	Medium			
PEoU	0.049	Small			
PU	0.131	Small			

As displayed at *Table 4.2.7*, results from bootstrapping yielded significant indirect effects of PU, PEoU, and PE on BI as β=0.122, β=0.072, and β=0.147, and *t*-values of 3.769, 3.128, and 3.408 indicated relationships are significant. PU, PEoU, and PE had significant indirect effects on BI (CI95%: PU: 0.068, 0.199; PEoU: 0.033, 0.124; PE: 0.079, 0.253). The presence of mediation is concluded as the CI does not contain 0 (Morera & Castro, 2013). Thus, the mediation effects of the hypotheses are significant.

Table 4.2.7:

Hypothesis testing on mediation

	Hypothesis	Std. Beta	STDEV	t-values	p-values	Confidence Interval (BC)		Evaluation
						LL	UL	
H5a	PU->ATT->BI	0.122	0.032	3.769	0	0.068	0.199	Supported
H5b	PEoU->ATT->BI	0.072	0.023	3.128	0.002	0.033	0.124	Supported
H5c	PE->ATT->BI	0.147	0.043	3.408	0.001	0.079	0.253	Supported

VAF was applied to conclude the mediation type in *Table 4.2.8*. Based on the rule of thumb (Ramayah et al., 2018), it can be concluded that ATT partially mediates the relationships between PU and BI, PE and BI, as the VAF values of 39.74% (H5a), 32.38% (H5c), were between 20% and 80%.

Besides, ATT fully mediates between PEoU and BI as the VAF value of
88.89

Table 4.2.8:

Mediation Analysis

	Effect	Confidence Interval (BC)		t-values	p-values	VAF (%)	Mediating Effect
		LL	UL				
PU→ATT→BI (p1·p2)	0.122	0.068	0.199	3.769	0	39.74	Partial
PU->BI (p3)	0.185	0.167	0.444	2.866	0.004		
PEoU→ATT→BI (p1·p2)	0.072	0.033	0.124	3.128	0.002	88.89	Full
PEoU→BI (p3)	0.009	-0.047	0.188	0.16	0.873		
PE→ATT→BI (p1·p2)	0.147	0.079	0.253	3.408	0.001	32.38	Partial
PE→BI (p3)	0.307	0.302	0.597	3.788	0		

4.3 Conclusion

This research has proven all the hypotheses. It also proved that there were partial
mediating effects between PU, PE, and BI, and a full mediation effect between
PEoU and BI.

CHAPTER 5: DISCUSSION, CONCLUSION, AND IMPLICATIONS

5.1 Summary of Statistical Analysis

Table 5.1:

Result of Hypothesis Test

	Hypothesis	Result
H1	There is a significant relationship between PU and ATT.	Supported
H2	There is a significant relationship between PEoU and ATT.	Supported
H3	There is a significant relationship between PE and ATT.	Supported
H4	There is a significant relationship between ATT and BI.	Supported
H5	ATT mediates the relationship between PU, PEoU, PE, and BI.	Supported
H5a	ATT mediates the relationship between PU and BI.	Supported
H5b	ATT mediates the relationship between PEoU and BI.	Supported
H5c	ATT mediates the relationship between PE and BI.	Supported

5.2 Discussion on Major Findings

H1: There is a significant relationship between PU and ATT.

The findings show that PU of AR has a significant impact on the ATT of
Malaysian Gen Z to use mobile AR clothing try-ons. This result is also
consistent with previous findings, according to Shin et al. (2022), which
showed that the PU of the technology played a critical role in the ATT
toward the adoption of modular structure. Furthermore, prior research has
also shown that PU has a significant impact on ATT for adopting e-payment
and Massive Open Online Courses (MOOC) (ElSayad, 2024; Wang et al.,
2022). This suggests that Malaysian Gen Z believe it may be more
convenient and time-saving to try on clothes using AR on mobile shopping
apps, as they can avoid queuing in physical stores. In addition, applying AR
to try on clothes can also reduce uncertainties such as the fit, details of the
design, and colour of the clothes, because AR can present a close-to-reality
model through the screen of the mobile device, so people will have a more
integrated perspective when choosing clothes. Moreover, when consumers
perceive the benefits that AR can bring to them in their shopping process,
they will have a positive ATT toward using AR.

H2: There is a significant relationship between PEoU and ATT.

The study found out that PEoU of AR has a significant impact on the ATT
of Malaysian Gen Z to use mobile AR clothing try-ons. This result is
consistent with previous research findings regarding AI-assisted e-learning
and information systems continuance intentions (Kashive et al., 2020;
Mishra et al., 2023). Moreover, according to Rahman et al. (2024), PEoU is

positively influencing ATT towards mobile wallets. Hence, it proves that the ease of use of AR features in mobile shopping apps has a significant impact on forming the ATT of Malaysian Gen Z, for example, by providing clear and easy-to-understand guidelines and simple operations. When people perceive the functionality of AR as having a higher ease of use, they are more likely to have a positive ATT toward using AR.

H3: There is a significant relationship between PE and ATT.

The findings indicate that PE of AR has a significant impact on the ATT of Malaysian Gen Z to use mobile AR clothing try-ons. This result is consistent with previous research on smart speakers and smart retailing technology, which found a significant relationship between PE and ATT (Aiolfi, 2023; Lacap et al., 2023). Besides, other studies indicate that higher levels of perceived enjoyment can positively affect attitudes towards chatbots (De Cicco et al., 2020). This suggests that Malaysian Gen Z believes that the sense of experience when trying on clothes using AR affects their ATT towards adopting AR, such as the momentary experience of entertainment and fun interaction that AR brings. Therefore, when users experience high levels of enjoyment when using AR for clothing try-ons, people will develop more positive ATT towards using AR.

H4: There is a significant relationship between ATT and BI.

The results showed that ATT had a significant impact on BI of Malaysian Gen Z to use mobile AR clothing try-ons. Moreover, this finding is in line with prior studies by Xi et al. (2024), Hasan (2022), and Oloveze et al. (2021). This suggests that Malaysian Gen Z will have a more positive attitude and will increase their intention to use AR when they perceive it to

provide benefits, be easy to use, and make them happy. When they have a more positive ATT towards using mobile AR clothing try-ons, their BI to use AR will increase.

H5a: ATT will mediate the relationship between PU and BI.

H5b: ATT will mediate the relationship between PEoU and BI.

H5c: ATT will mediate the relationship between PE and BI.

The result shows that ATT mediates the relationships between PU, PEoU, PE, and BI.

The PU of users was generated when consumers recognized that AR technology was useful and had improved their current performance (Arghashi & Yuksel, 2022). The finding is consistent with the prior studies that mentioned PU has influences on consumers' ATT and their BI in contexts such as social media attributes, AR technology, and Metaverse technology (Mulyani et al., 2021; Arghashi & Yuksel, 2022; Aburbeian et al., 2022).

The present research found that ATT fully mediates the relationship between PEoU and BI. Hence, making the mobile AR clothing try-ons easy for consumers' use will create a favourable attitude to consumers thereby facilitating their likely usage of the technology (Capasa et al., 2022; Aburbeian et al., 2022). The result is in line with past studies that indicated PE influences ATT, then ATT influence BI in a general technological context (Jang, 2021; Holdack et al., 2022).

Apart from that, PE of consumers in using technology including mobile AR clothing try-ons was determined by the process of using it as pleasurable, enjoyable, and hedonic. It led to consumers' positive attitudes and further using intentions towards the technology (McLean et al., 2020). These findings are demonstrated in other similar research contexts. (Kasilingam, 2020; Oyman et al., 2022; Widyastuti, 2024).

In sum, ATT can explain the influences of PU, PEoU, and PE on the BI.

5.3 Implications of the Study

5.3.1 Theoretical Implication

The conceptual framework in this study was based on Technology Acceptance Model (TAM). This research examine how Malaysian Gen Z's ATT can be influenced by the constructs including PU, PEoU, and PE, and further impacts the intention to use mobile AR clothing try-ons technology. This research has contributed to theory development as PE was included as an additional construct to cover the limitations of TAM, and further included the meditating effect of attitude that there is no mediating construct in TAM.

Furthermore, this research contributed to bridge the literature gaps as there are lack of insights regarding the mobile AR clothing try-ons technology among academicians from consumers' perspective especially from Gen Z in Malaysia. In sum, the extended PE construct and mediating effect help to explain the predictability of using intention towards mobile AR clothing try-ons in internal, external, direct, and indirect influence perspectives. This

extended model can be a guidance for future studies of similar context such as new technologies or functions in the clothing and apparels e-commerce.

5.3.2 Managerial Implication

This research findings provide several managerial implications for apparel retailers participating in e-commerce world. The results reveal that ATT is the strongest predictor of Malaysian Gen Z's intention to use mobile AR clothing try-ons. Thus, online retailers should consider the important constructs of PU, PEoU, and PE during developing and leveraging AR technology.

First of all, PU has a significant impact on the ATT. In other words, mobile AR try-ons need to pay attention to its usability from user's perspective to cater for the trend of consumer orientations. Companies should invest in improving the virtual try-on features that consumers can observe precisely if they are wearing the apparel. Consumers will be perceived as more credible when they obtain more products information from it compared to simple product visuals. The precise features also deliver benefits to consumers, such as time saved on fitting, in turn, enhances the effectiveness of online buying process. This will eventually improve customers' purchase experience by reducing their perceived risks thereby enhancing their confidence for purchase decision and reducing the purchase return.

Apart from that, PEoU is also proven to have an effect on the ATT towards mobile AR clothing try-ons. The simplicity of using the virtual try-on features will enhance consumers' favourable feelings for it. This indicates

that a user-friendly, easy-to-understand interface, simple navigation systems are the key considerations for online retailers while developing and designing the mobile AR clothing try-on application. Furthermore, brand retailers can achieve it by continuously seeking consumer feedback to improve it. As a result, it will improve users' experience as their learning costs will be reduced, thereby they will have a positive attitude towards the AR try-on applications and intend to use it.

Furthermore, the result also signified that PE has the strongest influence on ATT among the independent variables. In other words, Gen Z in Malaysia are seeking a joyful experience in the use of mobile AR clothing try-ons. Therefore, apparel online retailers are suggested to emphasize creating fun and playful user experiences when developing mobile AR clothing try-on applications in terms of interaction, entertainment, and creativity. For instance, the immersive and realistic real-time visuals, the gamification elements such as allowing consumers to share their try-on photos on social media, and/or incorporate emotional elements such as background music. These unique features or presentations are conducive to generating an enjoyable user experience while shopping with the mobile AR clothing try-on technology.

In short, our findings will give confidence to the managers who are concerned about the feasibility of mobile AR clothing try-on technology and provide them with accurate directions for investment and development

5.4 Limitation

This study analysed 384 questionnaires, but several limitations should be noted. The sample predominantly consists of Chinese respondents, with fewer Malay and Indian participants. Since the Chinese group generally has higher spending power (Husain et al., 2023), they may be more familiar with AR technology. This ethnic imbalance could affect the generalizability of the findings across different cultural contexts. Additionally, most responses were from economically developed regions, potentially limiting the understanding of perceptions towards AR technology in less developed areas. Moreover, the lack of familiarity with AR clothing try-ons in Malaysia posed challenges in collecting high-quality feedback. Many respondents might have misunderstood the questions, leading to straight-line responses and the elimination of numerous questionnaires, complicating the data screening process. Furthermore, based on TAM, the independent variables used to predict ATT and BI were limited in the present research. However, the framework can incorporate more variables to fully capture the factors influencing consumers' ATT and BI toward using AR technology for virtual fitting in future research.

5.5 Future Recommendation

As mentioned above, the results may be inclined towards certain race's values as each race has different cultures and may provide different feedback. Therefore, future research directions should broaden the population, not only in terms of age and race but also to ensure that the results are more generalizable to obtain a deeper comprehensive understanding of Malaysian consumers' intention to use AR technology for clothing. Furthermore, it is proposed to create a virtual simulation environment of the fitting platform for respondents to experience before answering the questionnaire. This will help respondents to better visualize the functionality

and operation of the AR garment fitting technology, thus improving the authenticity and quality of the feedback. In addition, it is recommended that open-ended and scenario simulation questions be used in the questionnaire to encourage respondents to think and express their detailed views and feelings about AR technology. Open-ended questions can reduce the likelihood of respondents providing straight-line answers and reveal their more profound understanding of the technology.

5.6 Conclusion

This study explored the influence of PU, PEoU, and PE on Malaysia Generation Z's decision to use AR technology clothing try-ons. A total of 384 questionnaires were used for analysis and hypothesis testing and TAM has been successfully used to explain consumer BI in the context of AR technology clothing try-on. It has ultimately proved the validity of all hypotheses and the significant relationships between constructs, successfully achieving all objectives.

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Appendices

Appendix 3.1: *Survey Questionnaire*

Please select the best answer based on the scale of 1 to 5 (1) - Strongly Disagree,
(2) - Disagree, (3) - Neutral, (4) = Agree, (5)= Strongly Agree

Perceived Usefulness							
	Indicator	Measurement Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11.	PU1	I can improve the online buying process with mobile AR clothing try-ons.	1	2	3	4	5
12.	PU2	Mobile AR clothing try-ons will be helpful while buying clothes online.	1	2	3	4	5
13.	PU3	Mobile AR clothing try-ons will improve my ability while buying clothes online.	1	2	3	4	5
14.	PU4	My online buying process will be more efficient with mobile AR clothing try-ons.	1	2	3	4	5
Perceived Ease of Use							
15.	PEoU1	I think using mobile AR clothing try-ons is easy.	1	2	3	4	5
16.	PEoU2	I think it is very simple to learn how to use mobile AR clothing try-ons.	1	2	3	4	5
17.	PEoU3	I think it does not require much effort to use	1	2	3	4	5

		mobile AR clothing try-ons.					
18.	PEoU4	I think the mobile AR clothing try-ons is clear and understandable.	1	2	3	4	5
Perceived Enjoyment							
19.	PE1	I know using mobile AR clothing try-ons is going to be enjoyable.	1	2	3	4	5
20.	PE2	I find the buying process through mobile AR clothing try-ons is pleasant.	1	2	3	4	5
21.	PE3	Shopping with mobile AR clothing try-ons would be fun for its own sake.	1	2	3	4	5
22.	PE4	Shopping with mobile AR clothing try-ons would be interesting.	1	2	3	4	5
Attitude							
23.	ATT1	I think using mobile AR clothing try-ons is a good idea.	1	2	3	4	5
24.	ATT2	I think mobile AR clothing try-ons is a good experiential online shopping technology.	1	2	3	4	5
25.	ATT3	I have a favorable attitude toward buying clothes online with mobile AR clothing try-ons.	1	2	3	4	5
26.	ATT4	Given that I had access to the	1	2	3	4	5

		mobile AR clothing try-ons, I predict that I would use it.					
Behavioural Intention							
27.	BI1	If there is an opportunity, I would like to utilize mobile AR clothing try-ons.	1	2	3	4	5
28.	BI2	I will consider mobile AR clothing try-ons while buying clothes online.	1	2	3	4	5
29.	BI3	I will use mobile AR clothing fittings regularly in future while buying clothes online.	1	2	3	4	5

Thank You.

Thank you for your time and patience