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DETERMINANTS OF AUGMENTED REALITY MOBILE APPLICATION USAGE AND ITS INFLUENCE ON CONSUMER BUYING BEHAVIOR

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Determinants of Augmented Reality Mobile Application Usage and Its Influence on Consumer Buying Behavior

Artırılmış Gerçeklik Mobil Uygulama Kullanımının Belirleyicileri ve Tüketici Satın Alma Davranışına Etkisi

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FOREWORD

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ABSTRACT

In today's world, digitalization, connected devices, the internet of things, 5G, augmentation and doubtless the artificial intelligence are the main drivers that trigger industrial revolution 5.0. The way of doing business is expected to change and several new approaches are expected to emerge in all areas of business. In light of these new developments, marketers need to understand the necessities of the new era in more depth and need to adopt old marketing tools to brand new ones. As one of the strongest tools, augmented reality lets users combine the physical environment with virtually generated digital information and lets it enrich the user experience in real-time, which gives a huge power to engage with the customer at anytime, anywhere. It eases the way to create an interaction with customers and virtually can be able to transfer any kind of brand, product, and service messages.

As a new trend of business, many industries such as Automotive, Retail have already started to implement AR-based tools, many marketers are assessing to use of AR as an alternative marketing tool but still not that much is known about the journey of consumers, the impact on shopping behavior, attitude towards mobile AR applications, perceived ease of use and perceived usefulness and if it triggers higher purchase intention or not.

The aim of this study is to understand more deeply the influence of mobile AR applications on consumer's decision-making process through purchase intention by taking into consideration experiences.

Keywords: Augmented Reality, Online Purchase Intention, Mobile Applications, Attitude Toward Mobile AR Application Usage, Mobile Shopping

ÖZET

Bugünün dünyasında; dijitalleşme, bağlantılı cihazlar, nesnelerin interneti, yapay zeka, 5G, artırılmış gerçeklik, endüstri devrimini 5.0 tetikleyen ana itici güçler haline gelmiştir. Tüm bu teknolojik gelişmelerle beraber iş yapma şeklinin değişmesi ve tüm iş alanlarında yeni yaklaşımların ortaya çıkması beklenmektedir. Bu yeni gelişmeler ışığında, pazarlamacıların yeni çağın gereklerini daha derinlemesine anlamaları ve bu yeni çağdaki yeni pazarlama araçları ile eski pazarlama araçlarını birleştirerek benimsemeleri gerekmektedir. En güçlü araçlardan biri olan artırılmış gerçeklik, kullanıcıların fiziksel ortamı sanal olarak üretilen dijital bilgilerle birleştirmesine olanak tanır ve kullanıcı deneyimini gerçek zamanlı olarak zenginleştirmeye olanak tanır, bu da müşteriyle herhangi bir zamanda, herhangi bir yerde etkileşim kurmak için büyük bir güç sağlar. Müşterilerle etkileşim yaratma yolunu kolaylaştırır ve her türlü marka, ürün ve hizmet mesajını sanal olarak aktarabilir. Otomotiv, Perakende gibi birçok endüstri AR tabanlı araçları yeni pazarlama trendi olarak uygulamaya başladı, birçok pazarlamacı alternatif bir pazarlama aracı olarak AR 'yi kullanmayı değerlendiriyor ancak konu ile ilgili olarak henüz tüketicilerin deneyimleri hakkında hala çok az şey biliniyor. Alışveriş tutumları üzerindeki etkileri, mobil AR uygulamalarına yönelik tutum, algılanan kullanım kolaylığı ve algılanan fayda üzerindeki etkisi ve daha yüksek satın alma tutumunu tetikleyip tetiklemediği gibi birçok konu ile ilgili akademik araştırmalar sayesinde müşteri davranışları daha net anlaşılabilecek hale gelecektir.

Bu çalışmanın amacı, deneyimleri dikkate alarak, satın alma niyetiyle mobil AR uygulamalarının tüketicinin karar verme süreci üzerindeki etkisini daha derinlemesine anlamaktır.

Anahtar Kelimeler: Artırılmış Gerçeklik, Çevrimiçi Satın Alma Eğilimi, Mobil Uygulamalar, Mobil AR Uygulama Kullanımına Yönelik Tutum, Mobil Alışveriş

INTRODUCTION

1.1. BACKGROUND

In today's world, technology is changing even every minute and people are enjoying being part of it. Being online, being mobile, and accessing the information anytime, anywhere is becoming more important than ever before. More people are switching from desktop to mobile, not only to smartphones but also tablets and wearable devices as well. Based on a well-known website, www.statcounter.com, global mobile market share has already surpassed desktop and reached 51.78% whereas desktop market share is 45.42%. In Turkey, the situation is more different in the favor of mobile, which represents 74.64% of the market while the desktop is representing only 24.43% As an expected result, global mobile penetration is rapidly increasing and GSM Association (GSMA) states at its latest "The Mobile Economy 2019" report that it is going to reach up to 71% in 2025 (2018 5.1bn to 2025 5.8bn). Also, mobile internet users are expected to increase to 5.0bn in 2025 (3.6bn in 2018) with a 61% penetration rate of the global population.

Penetration and usage are quite inline, according to the "Q2 2019 Total Audience Report" published by Nielsen, the time spent on mobile grew by 60% year over year in Q2 2019 based on the total US population and reached up to 4 hours 36 minutes per day through smartphone and tablet together. Considering the time spent on mobile, it becomes a new media for marketers that can be interacted with by customers and the very well-known marketing tools need to be adopted to the new area.

Once the topic is mobility, smart devices, usage, and penetration; even though the Turkish market is one of the fast-growing markets globally, there is still room to grow further by looking up to several European countries. Referring to the Turkish

Information and Communication Technologies Authority's (BTK) 2019 1st quarter Market report; the penetration of mobile subscribers; including M2M subscriptions; is reached 110.9% as of March 2019 (0-9 years old population excluded). In terms of mobile application usage, based on www.statistica.com data, Turkey is holding 10th position globally in countries that use Facebook most, and 6th position in the countries that use Instagram most.

Based on the Turkish Information and Communication Technologies Authority's (BTK) 2019 1st quarter Market report:

- Total penetration is 99% (to the total population) whereas Finland 190%, Portugal 154%, Denmark 153%, Austria 151%, Sweden 146%, Italy 146%, Greece 146%
- Mobile broadband penetration in Turkey is 74.5% while OECD countries average is 106.4%
- Monthly average mobile broadband usage increased from 1.6 GB in the 2016 1st quarter to 4.9 GB in the 2019 1st quarter and 47.7% of mobile customers consume more than 1GB on average.

As the mobile device penetration increases, the usage increases, the customer interaction tools for marketers on hand need to be reevaluated and the time spent on mobile needs to be evaluated and designed from scratch for maximum utilization. Augmented reality applications should be considered as one, and ready to go type, of the tools which let users combine physical environment with virtually generated digital information and lets to enrich the user experience in real-time.

Augmented reality is already embedded in our smartphones through built-in sensors such as GPS, Camera, Proximity, Microphone, Gyroscope, Accelerometer sensors, and ready to roll with the help of supported apps. This fact makes Augmented Reality one of the easiest and cheapest ways to approach customers and transfer brand, product information, and even increase the satisfaction of their journey.

Several top companies such as Microsoft, Apple, Alphabet (mother company of Google), Qualcomm, Nvidia, Facebook are heavily investing in Augmented Reality and marketers are adapting their strategies to this newly developing area.

The enhancement of AR increased during the last decade and with the help of 5G network penetration; which lets users transfer the data 10 times faster than a 4G network; it is not only going to transform the engagement of customers but also the whole pattern of product management. The AR business applications are expected to skyrocket. Gartner states that by 2020, "100 Million consumers will shop in Augmented Reality online and in-store." and it has to be monetized by marketers (Gartner, 2019).

In line with global interest in these new tools, the Turkish consumer's attention is increasing to augmented reality applications as well. Based on a study that aims to investigate AR applications in Turkey context, 8 categories and augmented reality were used through the most popular free apps. Music, Health and Fitness, Entertainment, Photo and Video, Medical, Utilities, Social Networking, Navigation apps are compared with augmented reality apps and augmented reality apps have the highest average score compare to the others (Pinarbasi, 2018).

As a finding of another study which was conducted to 14 female generation Y; by using AR apps, interactivity and personalization can be maintained which leads to customer satisfaction and hence brands can be able to create positive attitudes towards the brand. Augmented Reality apps are enjoyable and exciting which creates positive WOM and increases engagement (Eyüboglu, 2011).

Augmented Reality's high potential to develop marketing campaigns, programs, and strategies by developing spectacular user experience makes marketeers to design and leverage the plans considering "their communications objectives, target audience characteristics, content management strategies, triggers, and the social-physical context of consumers' lives" (Scholz, 2016, p.23) for customer satisfaction.

1.2. PROBLEM DEFINITION

In line with the technological enhancement, Augmented Reality apps are getting popular in several business areas such as entertainment, education, tourism, fashion, automotive, and marketers are utilizing this technology to showcase products or services to engage with their customers (Berryman, 2012). Even though there are several application examples in gaming, sports broadcasting, shopping, video conferencing, and even in security authorization such as face recognition, still there are not many pieces of research in the marketing literature that evaluates different dimensions of marketing.

Marketeers can be able to benefit with several positive outcomes by integrating augmented reality into their business routine such as lowering “try and buy” cost; save from inventory cost by the digitalization of their inventory; huge retail spaces can be replaced with digital stores and customers can be guided by augmented touring experience; printed materials can be replaced with digital brochures, enriched branding materials. Moreover, by embedding new technologies such as AR into the business, a positive brand image and WOM impact around the brand can be created. Moreover, by using AR technologies through applications, customers can assess and compare different product alternatives on several platforms, therefore, they can be able to save time and lower their shopping efforts, and more importantly, they can be able to compare prices simultaneously (Wakim et al. 2018).

Even though it is obvious that by augmented reality apps, businesses can be able to improve, there is still not much research on the experience dimensions and the experiential journey of the consumers which leads to purchase intention. For marketers, it is almost impossible to design an impactful AR-based engagement model without understanding consumers by using a well-designed framework and impactful user data (Li, 2014).

Previous studies have focused more on AR and its effect on behavioral outcomes of customers in developed countries while conducting the research with brand-included AR applications and many of them used websites as the primary platform rather than mobile AR platforms. (Wakim et al., 2018).

Therefore, this study aims to close the gap in the literature by focusing on the Turkish market as one of the fastest-growing developing countries through a mobile augmented reality app with no brand presence in the Turkish market to eliminate brand perception impact.

1.3. PURPOSE OF THE STUDY

Augmented Reality and the application ecosystem around it grow quickly and has become one of the most potential engagement tools in delivering big profits to the market (Mallory, 2012). However, few researchers have investigated how user experiences are influenced by the use of this technology, and what AR elements have contributed to these experiences by sampling through developed countries. Considering this gap, a necessity for further analysis of AR user experience for the Turkish customers; one of the fastest developing countries; became irresistible.

In this study, the main focus areas are experience of the consumers by considering some of the mediating variables which are subject to Technology Appetence Model (TAM), Telepresence Mediation Hypothesis Model (TMH) and aimed to discover the impact of augmented reality apps on product purchase intention through the journey by using smart devices as well as use and acceptance of the new technology.

2. SECTION

LITERATURE REVIEW

2.1. DEFINITION OF AUGMENTED REALITY (AR)

A well-known description of AR was proposed in 1994 by Milgram and Kishgino which is “The AR is allocated between the real and the virtual environments. As the AR interacts with each other, it creates a continuous chain between the real and virtual worlds whose boundaries tend to be ambiguous.” In 1997, a more solid and widely accepted description by Azuma shows that three main characteristics of AR are: “Combining real and virtual worlds, real-time interaction, registering real and virtual objects.”

Augmented reality bridges interactively the world that we are physical present with the one digitally created (Craig, 2013). AR technology has been increasingly used in everyday life in recent years. In 2001, based on Azuma’s description, augmented reality is the interactive innovation that overlaps and combines the digitally created virtual objects with a real-time environment (Javornik, 2016). AR is a method to integrate real and computer-based digital information into one based on Olsson et al (2013, p. 288) definition. With the help of a virtual layer which allows to add virtual images, texts or videos to the real time physical environment, AR is the bridge between virtually and reality (Carmigniani et al. 2011). With the help of smartphones, wearables, tablets, any kind of smart devices or interactive screens, AR users can experience creativity and innovation by capturing real-time data and

grabs attention by utilizing consumers to interact with virtually positioned products (Reitmayr and Drummond 2006 and McCormick et al. 2014). Augmented reality-based shopping experience empowers people to associate with virtual products smoothly, by improving visualization of products and the image of the brand and also purchase intentions of consumers (Jiyeon and Forsythe 2008; Bonetti, Wamaby & Quinn, 2017).

So far, several descriptions have been developed for augmented reality mainly around the same understanding as:

In terms of providing new possibilities for content delivery, AR is a tool which allows covering physical environment with virtual objects in real-time (Javornik, 2016), Augmented Reality combines computer-generated and real contents into user's view of their physical environment and still has room to grow in daily activities, education, marketing and entertainment (Adhani & Rambli, 2012), AR is a technology that allocated in among virtual and real environment (Milgram and Kishgino, 1994), AR technology allows computer-generated object to coexist in the real world and by AR, virtual contents can be integrated to real world smoothly (Azuma et al., 2001, 2011), AR technology lets virtual images combine with physical objects in real-time (Zhou et al., 2008), AR is an interactive technology can be applied to the smart devices such as smartphones, wearables, tablets, fixed interactive screens or projectors that modifies physical environment with virtual elements. It is an improved virtuality that can be combined with the real-time view of the environment (Carmigniani et al., 2011).

AR in marketing; can be stated as a key technological innovation in experiential marketing; has risen as a powerful innovative technology that has an impact on the experiences of customers. During the last decades, brands have been using and analyzing several augmented reality applications in different settings to analyze and determine the most appropriate one for themselves. Till until now, augmented reality utilized on smart devices and smart displays which creates a delightful

experience by overlapping physical environment and virtual elements (Huang and Liao, 2014).

As to understand and to analyze the reel needs in-depth, wishes and passions of consumers have become the main differentiator for brands that they are heavily investing in to create competitive advantage. Augmented reality, which gives customers a unique experience, is one of the rising trends in marketing to increase the quality of the journey of the customers, engage with them as well as to increase brand value in their minds which leads to purchase decisions, increase business opportunities which will drive them to higher revenues. Several industries such as cosmetics, entertainment, clothing, retail coffee, and snack store industry, ticket sales, furniture, automotive, FMCG, transportation have been using the technology for a while. Brands like Facebook, Sephora, L'Oréal, Topshop, Timberland, Starbucks, Hyundai, Mercedes, Pepsi, Uber, etc. are using this new media for marketing purposes such as to display products, information sharing, to increase engagement, and also to create WOM effects (Makarov, 2019).

2.2. MILESTONES OF AUGMENTED REALITY (AR)

Although AR's development has started in the late '90s, its penetration accelerated by the increase of the usage of smart devices through a variety of commercial applications. The first use of AR-based commercials was started with Mini Cooper in 2008 which lets consumers experience the exterior and interior design of the car, triggered by a marked paper in front of a camera. On-screen furniture applications, virtual try-on of clothes and accessories, breakthrough games are successful examples of augmented reality in marketing. Starting from the '90s and onwards, various applications of AR have emerged in marketing; virtual information given by wearables such as Google Glass, holograms, 3D mappings, augmentation of contents, try-ons are some of the developments so far (Javornik, 2014, 2016).

One of the first concepts of augmented reality was used by the British military in World War II which allows pilots to determine the information of the windshield on the radar while seeing if nearby planes are friends or not. In the ’70s and ’80s, augmented reality was studied at U.S. Air Force, NASA, and at the University of North Carolina (Berryman, 2012).

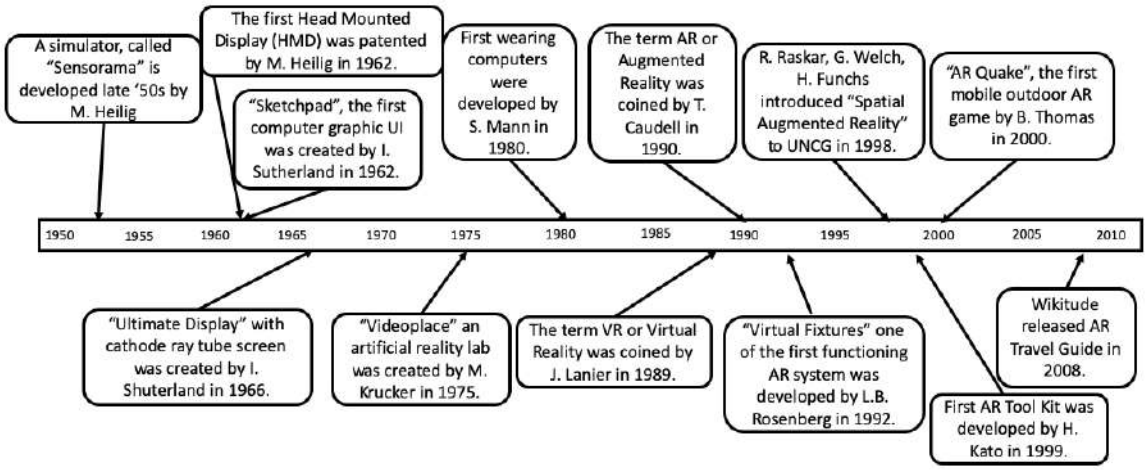

Figure 2.1: History of AR: Brief Timeline
(Source; Yuen, 2011, p122)

Figure 2.1 represents the history of AR adapted from Yuen (2011, p.122). Mobile AR has a history of more than 50 years, it has been evolving much faster for the last decade. In the literature, some sources accept Sutherland’s “Head Mounted Display System” as the first augmented reality device which was created in 1968, however, there is some more information about Augmented Reality prior to this date. In 1901; F. Baum, the author of “The Wizard of Oz” mentions a gift which is called “Character Maker” in the novel “The Master Key” and the description was quite similar to an Augmented Reality device (Corps, 2017; Arth,2015). In the 1950s, M. Heilig dreamed that cinema should take in all the senses effectively and described “The Future of The Cinema”, called “Sensorama” in 1955 and could be able to build the first prototype in 1962. In 1966, Sutherland came up with a device called “Head Mounted Display” and in 1968 he combined the device (Carmignianani, 2011) with the primitive firmware which can display only simple

drawings and a wired device (Beryman, 2012) due to the capacity of the computers at that time. In 1975, M. Krueger established the first augmented reality lab; "Video place"; that individuals can interact with objects virtually created. In 1980, Steve Mann invented wearing computers and stated his invention as: "My invention differed from present-day laptops and personal digital assistants in that I could keep an eye on the screen while walking around and doing other things." (Mann,1997, p.26). With the help of this invention, the way which leads to the mobilization of augmented reality started to take place and in 1982, the first laptop was released (Arth, 2015). Also, in the same year, D. Reitan created "RADAR" which creates virtual images for weather broadcasting on TV channels as the first interactive augmented reality application (Corps, 2017). In 1990, a head-mounted display designed by Caudell to help the workers wiring the aircraft for Boing (Berryman, 2012). In 1992, to refer to a combination of virtual computer designed materials and real-world, the terminology "Augmented Reality" was used by T. Caudell and D. Mizzel. In 1992, "Virtual Fixes" developed by L. Rosenberg was one of the first functioning systems that use augmented reality. In the same year, the knowledge-based AR system; "KARMA" was introduced by Steve Feiner which provides maintenance and repair procedures. In 1993, The first smartphone was introduced by IBM and Bellsouth. In 1997, R. Azuma conducted the first survey on AR and set the definitions. In 1999, H. Kato and M. Billinghurst presented "ARToolKit" which is still highly popular in the community. In 2000, popular computer game Quake's AR extension was presented as "AR-Quake"; which can be played with a wearable computer system; both indoor or outdoor. In 2001, a mobile and multi-user AR system was presented by Reitmayr and Schmalsteig. In 2003, "Human Packman" which is the real-life simulation of a very well-known computer game by utilizing GPS sensors of the device was presented by A.D. Cheock et al. and for the first time, an AR system for personal digital assistants (PDA) was presented. In 2004, AR started to be used on mobile phones. In 2008, "Wikitude" which is an application that combines entries with GPS was launched. In 2011, Qualcomm, which is one of the biggest chipset manufacturers, released its AR platform software

developer kit. In 2012, Google announced, “Google Glass” which is an optical version of old head-mounted displays. In 2015, Microsoft launched “HoloLens” which combines augmented reality and virtual reality with several lenses. In 2016, “Pokémon Go” which is an AR-based game hit the market, reaching up to 45 million daily users. In 2017, “AR Kit” by Apple, “AR Core” by Google announced which are AR-based apps that increased awareness and usage (Seal, 2020; Merel, 2017; Arth, 2015).

2.3. AUGMENTED REALITY (AR) IN MARKETING

In today’s world, with technological developments, innovation becomes an essential part of our lives and more importantly, an important part of the global economy. To react to all these developments in online and innovative interactive technologies, companies must adapt their way of doing business to provide a better experience to the customers and give up on existing go-to-market strategies by prioritizing consumer's expectations in this new and fully digitalized era.

2.3.1. Experiential Marketing

As in line with changes that have taken place, marketing is also shifting from traditional approaches to experiential ones, which aims to create experiences between brand and consumer. One of the pioneers of experiential marketing; Bernard Schmitt (1999) mentioned the main differences by emphasizing the characteristics of Traditional and Experiential Marketing as:

Table 2.1: Traditional Marketing vs. Experiential Marketing
(Source; Adapted from Schmitt, 1999, p.55-58)

Traditional Marketing	Experiential Marketing
Functions, characteristics, and satisfaction are the main concentration,	Individual's experience, holistic experience, consumption are the main concentration,
Definitions of product category and competition are narrow,	
Individuals make their decision based on rational facts,	Individuals are logical but emotional at the same time
Systematic, measurable, and articulated technics are used.	Broad and diversified technics are used.

Even though Traditional Marketing has contributed to the industry through several valuable strategies, tools, and methodologies; at the beginning of a new era which will be dominated by technological enhancements; now it is time and the necessity to shift focus to customer experience rather than functions, features, and benefits. Experiential Marketing makes consumers feel the excitement, joy, and remarkable experience while satisfying their moods (Schmitt, 1999).

The main focus of consumers is on the product and/or service as well as the experience at pre/post-purchase phases. Experiential Marketing represents the human interaction component of marketing which affects the purchase behavior of the consumers by generating experiences that are deeply rooted in their mind that leads to customer satisfaction by delivering emotional and functional values (Rambli, 2017).

2.3.2. Classification Schema for AR uses in Marketing

Javornik (2014), proposed a classification schema for Augmented Reality uses in marketing by analyzing 51 cases searched online, based on "intensity of the augmentation", "contexts of augmentation" and "marketing functions" in order to clarify which manner AR apps support marketing functions. Summarized findings are (Javornik, 2014, p.68):

Table 2.2: Augmentation Levels and Spaces
(Source; Adapted from Javornik, 2014, p.68)

		Public	Private Users
Augmentation Level	Low	Smartphones, tablets, wearables or fixed interactive screens are used for augmentation.	Image recognition is used to augment static content.
	Medium	Fixed screens are used to augment gamification and personalization.	Personal devices are used to augment gamification and personalization.
	High	Stores that virtually and interactively enriched, content that can be projected through 4D projectors.	Personalized content such as Ray Ban Mirror, IKEA catalogue with dynamic augmentation

The study also shows that the highest number of samples are addressing hedonic needs which represent 45% whereas utilitarian content is 27,5% and the combination of hedonic and functional content represents 27,5%.

Table 2.3: Customer Needs with AR Tools
(Source; Adapted from Javornik, 2014, p.68)

	Customer Needs		
	Utilitarian	Hedonic	Both
AR tools	Smart devices that augments content with functionally enriched information.	Advertising through augmented content, Gamification, Content that can be projected through 4D projectors.	Try-on experience with virtually enriched augmentation, Education with entertainment.

Technologies that allow interactivity and engagement in marketing such as Augmented Reality, let marketeers to establish a bridge between consumers and brands through innovative and enjoyable interactions, meanwhile expanding the possibilities of promotion, price, product, research as well as relationship management by creating a remarkable experience which is totally different than traditional ways of communication. As a result, AR marketing generally brings out WOW" effects (Javornik, 2014).

Table 2.4: Marketing Functions with AR Tools
(Source; Adapted from Javornik, 2014, p.68)

	Marketing Functions		
	Advertising / Promoting / Branding	Product Management	Customer Service
AR tools	Advertisements and promotions through augmented, gamified contents, 4D projections, Stores that virtually and interactively enriched.	Personalization, simulated augmentation such as virtual try-on, virtual stores, content that enriched by augmentation.	Technical support by using AR apps on wearable devices.

The cases which are subject to analysis show that often advertising, promoting, branding, product management and customer service are the most supported ones throughout all marketing functions by AR technology.

2.3.3. Augmented Reality Experiential Marketing (AREM)

Marketing campaigns; that focus on products and services as well as the overall experiences of consumers; which use Augmented Reality is accepted as an experiential marketing strategy (Ooi, 2015). The implementation of Augmented reality as a part of experiential marketing (AREM) started to increase as companies realized the benefits on both short and long terms and extended the usage to create customer satisfaction, loyalty, positive WOM and to trigger purchase intention rather than using AR as a promotion tool only. As the main focus for experiential marketing is not only product and services but also to create a holistic experience for the consumer, AR-based marketing campaigns are representing an impactful form of experiential marketing. Giant companies, such as P&G, Walmart have been

using AR in their marketing campaigns to promote their brands and products by creating an opportunity to try the products virtually and be able to test them. Consequently, the pre-purchase stage of a buying decision-making process in which consumers evaluate their choices becomes easier to be managed with AR technology (Bulearca, 2010).

The sole role of AR for Augmented Reality Experiential Marketing is to trigger a positive attitude through experience, which leads the ROI to be increased, to short/long term satisfaction, influence on purchase intention, repetitive purchase, and higher market share. Several companies have been using AR as a tool for experiential marketing to provide a different perspective to their customers such as: "… companies that use AREM includes Ray-Ban (FIT3D Apps (O'Brien)), Pokémon Go (Location-based AR game (Clark & Clark, 2016)), Jaguar Land Rover Virtual Reality Showroom (Lawson, Salanitri, & Waterfield, 2016), IKEA (IKEA Catalogue Apps (Baier, Rese, & Schreiber, 2015)." (Baharuddin, 2017, p.120).

2.3.4. Advantages of Augmented Reality Experiential Marketing

Ooi (2015) mentions the superiorities of Augmented Reality Experiential Marketing (AREM) as the high potential of "going viral" which creates a positive WOM; "unique and different" which creates an attractive tool to capture the targeted audience by fun and interactivity; "personalization" that leads to engagement; "accessibility" which the technology is already embedded into our mobile devices and ready to go; and "interactivity" (Ooi, 2015).

Singh (2014) stated that customers are looking for more interactivity and engaging type of advertisements to make a purchase decision referring to the findings of his research and mentioned the advantages of Augmented Reality for marketers as AR is a tool that can generate curiosity as a result of its uniqueness; it has the ability to personalize the message as the navigation is conducted by the user; unlike traditional media it allows user to be provided sufficient information; in terms of

interaction and engagement it gives enriched experience and once the user is satisfied AR advertisement has a big potential to go viral. Moreover, it increases the brand's perceived value by making the brand more innovative and responsive while the cost to the brand, compared to the traditional media, will be much lower. Also, consumer's journey can be monitored with very critical information of them such as; demographics, the time spent, which advertisements were scanned and which handsets were used and with the ability to follow and analyze all these information, the marketers can be able to understand their customer and deploy effective strategies (Singh, 2014) and AR helps marketers to gain competitive advantage on their competitors (Fatrisha, 2019).

Augmented Reality Marketing (ARM); as a part of Experiential Marketing; lets the users experience the product virtually, grab necessary information prior to purchase, and even virtually try them on by creating the environment to increase the interaction with the brand. Based on a focus group research (Bulearca and Tamatjan, 2010); AR applications are perceived as practical, convenient and timer saver on functional experience and emotional experience dimensions. Hidden Creative describes one of the critical benefits of ARM as a tool that helps to improve sales processes and strategies. Once the engagement with a customer increases with new tools such as virtual dressing rooms, interactive brochures; the brand experience increases which leads to loyalty (Yaoyuneyong, 2019). Moreover, Liao (2015) mentioned some informative data that he collected through several AR conferences that he attended; regarding the positive outcomes of AR usage in real cases; as:

"In the Inside AR conference program, Metaio claimed that after they implemented a point-of-sale AR experience in every Lego retail store in 2010, sales worldwide rose 17% in 2011, in what was considered a sluggish toy market. … Clients using AR also heralded the possibilities for the technology; as an IKEA representative explained, they have distributed 210 million copies of their catalogue, and last year they had 600,000 people use the AR feature in their digital catalogue to look at

furniture. One commonly cited report was a study done by a marketing research company called Hidden Creative demonstrating the benefits of AR. That report did a side-by-side comparison of a 2-dimensional display of a product versus AR marketing on consumers. The first measure was overall time spent: 1 minute 23 seconds in the AR condition, compared to only 12 seconds in the 2D condition. The second measure was whether people would consider buying this toy: while 45% said that they would when shown the 2D model, that number jumped to 74% in the AR condition. There was also a difference when they were asked to estimate the price they were willing to pay, £5.99 when shown a 2D ad, versus £7.99 when shown an AR ad." (Liao, 2015, p.316).

2.3.5. AR in Real World

Sandbox is the AR application, dynamic 3D, and interactive educational tool that users can be able to create topography models by using real sand in a box. Different layers are shown by different colors and by using different gestures, cloud and rain can be simulated by using a motion sensor and a software. It is highly addictive and fun (Beals Science, 2017).

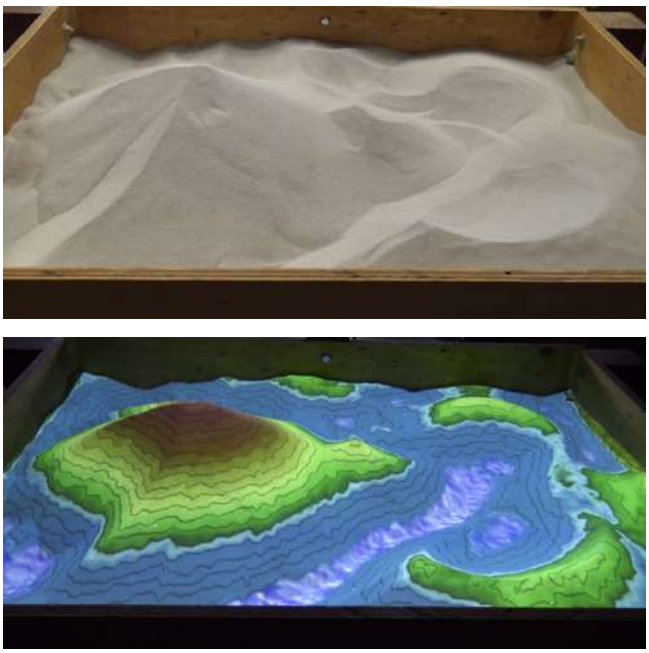

Figure 2.2: Sandbox AR

The AR application lets consumers see and replace the furniture in their homes prior to making a purchase decision. The IKEA 2014 catalogue gives customers a chance to place furniture virtually to their homes by scanning QR codes in the catalogue and even taking a picture of it in the rooms. All you need to do is just put the catalogue to the place where you want to put the furniture; this is called marker based augmented reality; and it will automatically trigger the digital content (Ikea UK, 2013).

Figure 2.3: IKEA AR

Pepsi launched a breakthrough OOH campaign for MAX brand with an augmented reality experience on London's New Oxford Street in 2014. There were several surrealistic scenes such as invasion of the city by a giant robot, UFOs or a giant octopus. People waiting for busses were not aware that the glass next to the bus stop is equipped with a camera placed on the outside, livestreaming to the inside of the bus stop by combining virtual images to the screen. People think it was a glass window and the reactions were amazing.

The campaign had 3 million views in the first 3 days and reached up to 8 millions reviews on YouTube, 95% of total impressions as well as PR coverage was earned media and sales were up 35% for the specific month that the campaign was on air. The campaign had over 20 awards as well as "Bronze Outdoor Lion" (AR Conference, 2014).

Figure 2.4: Pepsi AR Campaign

AR is a great tool that can be used to tell the story of a brand. The brand "19 Crimes" refers to the British prisoners who committed one of the legendary crimes of the time and sent to Australia to build new lives and futures for themselves in the 18th century. By brand's app; through augmented reality; the pictures of the criminals start talking and explaining about their unique stories in a way that can be linked with today's consumers (Shahen, 2018).

Figure 2.5: 19 Crimes AR

Even though coloring books boost the curiosity and creativity of kids and help them to increase their creativity, they don't have the same popularity as digital devices and engagement is far less. To overcome this, Disney created an augmented reality coloring book for kids that can combine real-world activities and the digital era. The AR app lets kids color characters in a printed coloring book and transfer an animated 3D version of it to the app simultaneously (Disney Research Hub, 2015).

Figure 2.6: Coloring Book AR

The Art Gallery of Ontario launched an AR app in 2017; called ReBlink; and reimaged some of the art pieces with a digital artist. By using tablets and smartphones, visitors could be able to see something unexpected; the paintings come alive and become a part of the 21st century. As a result, engagement with the

art increased up to 84% and 39% of the visitors looked at the images again once they used the app (ReBlink, 2017).

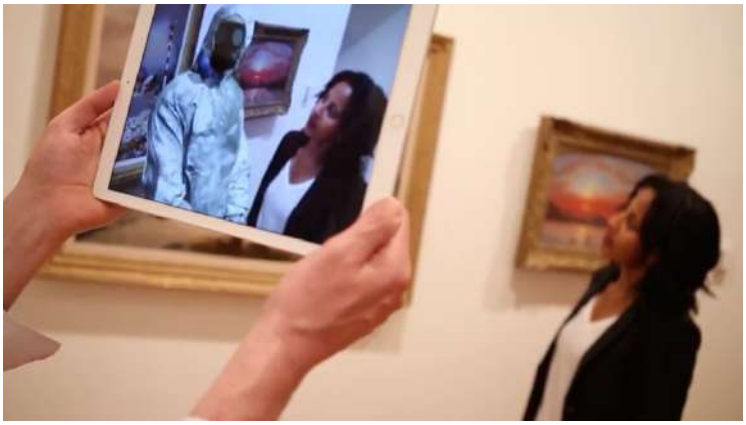

Figure 2.7: Art Gallery AR

An application called GAMMA AR is designed to monitor construction sites by using AR technology and combining building information models. It allows comparing the reality with the planned data in the models by using a smartphone or tablet. It helps to avoid errors before and during the construction so that adjustments can be done in the planning phase (Gamma AR, 2018).

Figure 2.8: Gamma AR

The US Army is testing AR technology for better spatial awareness by a glass which is connected to a tablet. Tactical augmented reality increases soldier's abilities by

providing navigation, 3D modeling of the surface, real-time information, and increases the operational abilities in the battlefield when soldiers are unfamiliar with that environment (The U.S. Army, 2017).

Figure 2.9: US Army AR

A virtual fitting room solution supported by AR; called FX Mirror; lets customers try on clothes virtually and conveniently without waiting for a physical fitting room. The app can also create the front and back photos by 3D modeling with the help of software (FX Gear, 2015).

Figure 2.10: FX Mirror AR

L'Oréal AR makeup try-on app; developed by Alibaba; has installed in some cities in China through devices called "Magic Mirrors" and become an important

platform for product experience and online shopping. Customers can be able to try on different types of makeups and products by just standing in front of the mirror and also order can be initiated through the device with just a simple click (CNBC International TV, 2019).

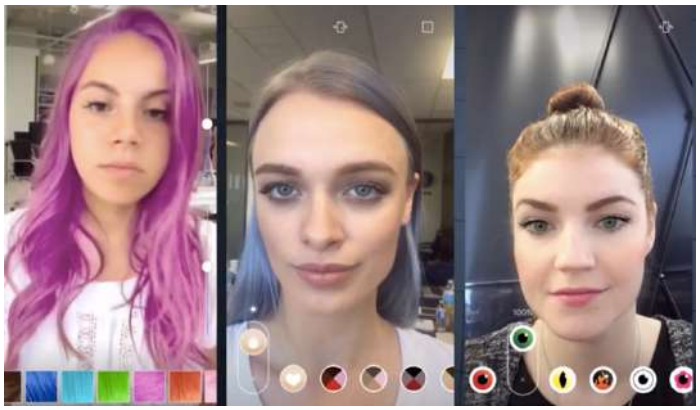

Figure 2.11: L'Oréal Makeup AR

As one of the commonly used AR addons is the filters that are used in social media. Companies like Snapchat, Facebook use AR for entertainment purposes which allow users to interact and lets them get socialized. Considering the fact of the number of social media users, AR has already penetrated our lives deeply (Racette, 2018).

Figure 2.12: Social Media AR

2.4. DEFINITION OF VIRTUAL REALITY

Even though Virtual Reality is a technology that has been in our lives starting from the late 60s, it has never become a commercial product till the early 90s, till the time it becomes to be seen as an outstanding component of computer games. Now; with the help of technological enhancement and increased mobility, and high penetration of mobile phones, tablets, and wearable technologies; VR has the potential to become one of the mainstream products.

Merriam-Webster Dictionary defines virtual reality as: “an artificial environment which is experienced through sensory stimuli (such as sights and sounds) provided by a computer and in which one's actions partially determine what happens in the environment.” It is a simulation that is created digitally and the experience can be either similar or different from the reality, based on the needs. The main and the most important determinant is the “presence” feeling that the individuals feel as if they are fully in that environment through the use of a display device that can be mounted to users head or face.

Gigante (1993) summarized the applications of VR as; the environments that are dangerous to work on-site such as radioactive/toxic places or remote places such as space; if there is a scientific study needs to be visualized by 3D, dynamic graphics which improves the quality of the research; if there is an architectural work needs to be visualized; can be applicable to many areas of 3D designs; can be used in education and training; entertainment; and space exploration.

Moreover, with the help of VR applications, marketers can be able to have the opportunity to deliver brand messages, a solid product or service experience without any physical location to increase customer engagement, and also many others like market researches, promotions, sales, and after sales services.

2.4.1. Virtual Reality Applications in Marketing

As Barnes (2016) stated, VR can be used to create awareness of the brand and to build solid relationships with the customers by engaging and educating them which results in increased loyalty which are the essentials of brand management. There are some brands from the automotive industry such as Nissan, Volvo, Honda that started to use VR for brand management purposes. You can create your own car, or you can navigate in an extremely futuristic conceptual car, or even you can drive it in the Indianapolis 500 race.

Most of the well-known retail companies spend a tremendous amount of money to understand their customers and invest on market researches. VR apps (virtual stores) will help to decrease the cost in terms of understanding their decision-making path. It will ease to figure out the ideal layouts of the shelves, ideal levels of the prices as well as the viewing time, navigation of the store and the products by providing more practical, pragmatic, precise, and holistic responses on their behaviors. Cadbury, Nestle, and Unilever have already started using VR applications and VR Stores to track all these topics and it has resulted in increased sales (Barnes, 2016).

VR applications allow users to design, view and even share the products that they customized through social media from their homes, with the same retail experience of being in the store. VR apps have a high potential to advance a generous, more attractive, and enjoyable retail atmosphere as well as result in higher levels of engagement.

VR applications let customers try and experience the products prior to their purchase decision. You can place furniture in an apartment and can be able to see all other related information about these items, you can test-drive vehicles of top brands such as Audi or Lexus, you can create virtual catwalks with the products of well-known apparel retailers such as Tommy Hilfiger or Topshop, or you can visit

the hotel through VR that you are planning to go, or you can buy a real estate by visiting the property by VR (Barnes, 2016).

Also, there are some VR examples that focus on public relations. The film "Displaced" focuses on the story of three refugee children, "VR Aleppo" that aims to raise awareness of barrel bombing are some examples of many that focus on creating higher levels of empathy with the viewers by taking them into the real stories through digitally created environments.

For the after-sales cases, VR provides support to the organizations to decrease the cost as meanwhile increasing customer satisfaction. By delivering the instructions through VR, instead of user manuals and PDF files, customers can feel more engaged (Barnes, 2016).

2.5. REALITY, AUGMENTED REALITY AND VIRTUAL REALITY

As stated earlier, the main difference between AR and VR is based on physical environment presence. While AR applications let users experience the environment with digitally created content that overlaps with the physical surroundings, VR is the representation of the real world digitally.

Steffen (2019) states the main advantages of physical reality, AR, and VR as; the physical reality, bounded by physical laws, give well-grounded structure, and with the help of multiple interactions that simultaneously provide inputs on many levels to the experience with all senses ; AR can help to enrich the physical world by the sense of presence with digitally created surroundings and VR can help to take the users into a world which is unreal and there is no physical law for it to be stick at. On the other hand, VR has a risk and disadvantage that users will lose the interactions with the real world, while AR has the disadvantage of potential

overload of information that may cause decreased familiarity of interaction and physical reality that has limits and bounded by physical laws (Steffen, 2019).

As a summary, the main differences of Physical Reality, AR and VR is (Farshid, 2018, p.658):

Table 2.2: The AR / VR Continuum
(Source; Adapted from Farshid, 2018, p.658)

Reality	Augmented Reality	Virtual Reality
The real, sensed world.	The real world overlaid by virtual data and information.	Completely digital representation of the real world.
A real environment.	An app that can give the details of a real environment.	A 3D image of real furniture. A virtual tour of a real environment.
Physical coexistence of people and objects.	Add benefit to physical coexistence.	Perceived presence enablement and full immersion.

2.6. THEORETICAL BACKGROUND

Several theories have been developed to explain the technology adoption process. One of the earliest ones is the Theory of Reasoned Action (TRA); which gives clear insights on the relationship of attitudes and beliefs that leads to intentions from a social psychological perspective; has been commonly used to predict intentions and behaviors. In TRA Theory, behaviors are explained and predicted through the integration of attitude components as well as subjective norms that may have an impact on the perception. Briefly, the Theory of Reasoned Action claims that actual behavior is impacted by all kinds of external variables that have an impact on the beliefs, and with the impact of attitude and subjective norms intentions of behavior comes up (Ajzen 1980, 1991).

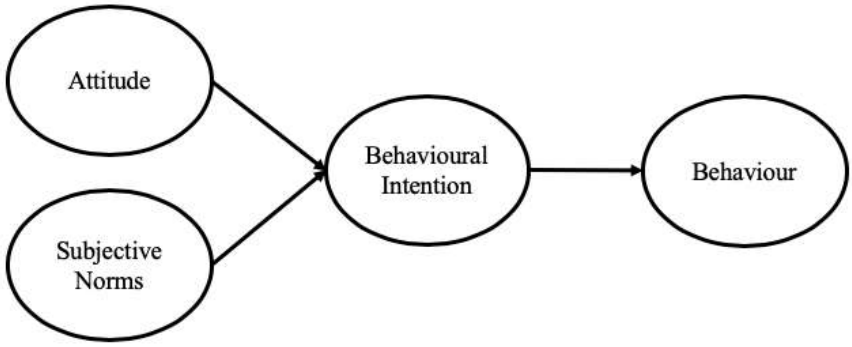

Table 2.13: Theory of Reasoned Action Path Model
(Source; Adapted from Davis, 1989, p.984)

As an extension to TRA, The Planned Behavior Theory includes an additional variable that leads to intention; perceived behavioral control; which represents the perception of individuals that is in or out of control. Davis states that TPB is the "person's performance of a specified behavior is determined by his or her behavioral intention to perform the behavior, and BI is jointly determined by the person's attitude and subjective norm." (Davis, 1989, p.983). Ajzen describes perceived behavioral control as: "perceived behavioral control refers to people's perception of the ease or difficulty of performing the behavior of interest." (Ajzen, 1991, p.183). There are two possible predicted effects of Perceived Behavioral Control (PBC) for behaviors. First, PBC reflects the factors that have motivational components and has an indirect impact on behaviors through behavioral intentions, and second, PBC has a direct impact on behaviors without mediating with behavioral intentions (Madden, 1992).

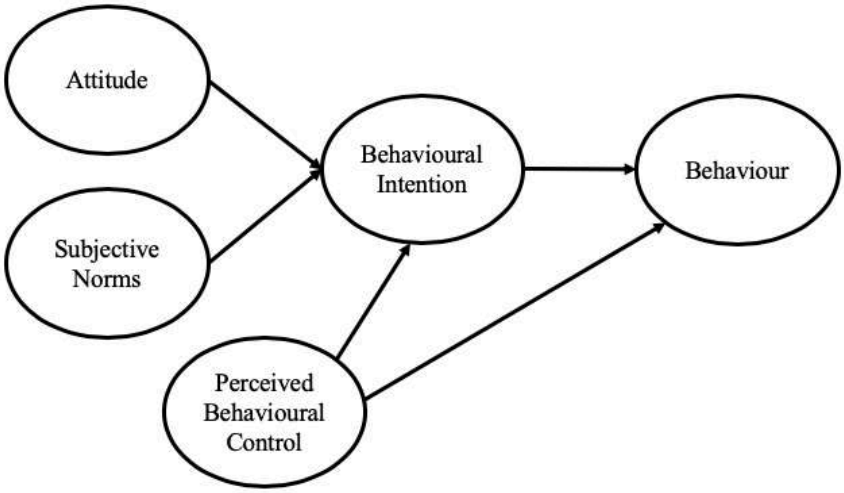

Figure 2.14: Theory of Planned Behavior Path Model
(Source; Adapted from Ajzen 1991, p.182)

Technology Acceptance Model (TAM), which is grounded in the TRA and TPB theories, has been one of the most frequently used models to define and understand how people embrace innovations and make them part of their lives.

2.6.1. Technology Acceptance Model (TAM 1 – TAM 2 – TAM 3)

Davis introduced TAM in 1986; an adoption of TRA; that aims to model the user acceptance by understanding the impact of external factors on beliefs, attitudes, and intentions from cognitive, affective, and behavioral perspectives to predict the acceptance of the new technology. Compare to the previous theories of behavior, TAM theory stressed the role of "perceived usefulness" and "perceived ease of use" to predict attitudes which lead to intentions (Chau, 1996), and explained perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" and the perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p.320).

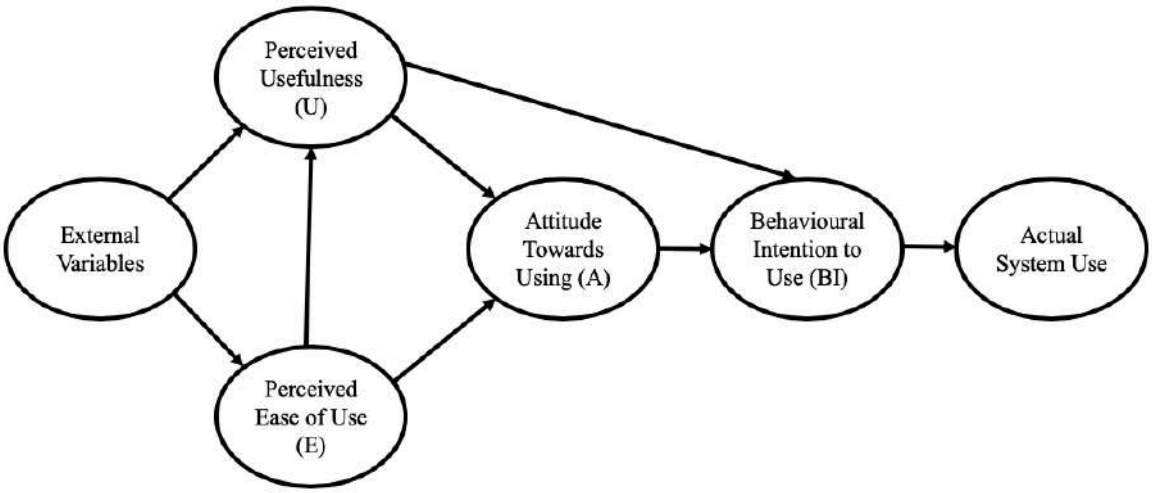

Figure 2.15: Technology Acceptance Model
(Source; Adapted from Davis, 1989, p.320)

Venkatesh (2000a) introduced the extended framework; TAM2; by using TAM as a starting point, and included more social and cognitive instrumental determinants such as subjective norm, experience, voluntariness, image, job relevance, output quality, result demonstrability to understand the impacts of these effects in terms of user experience.

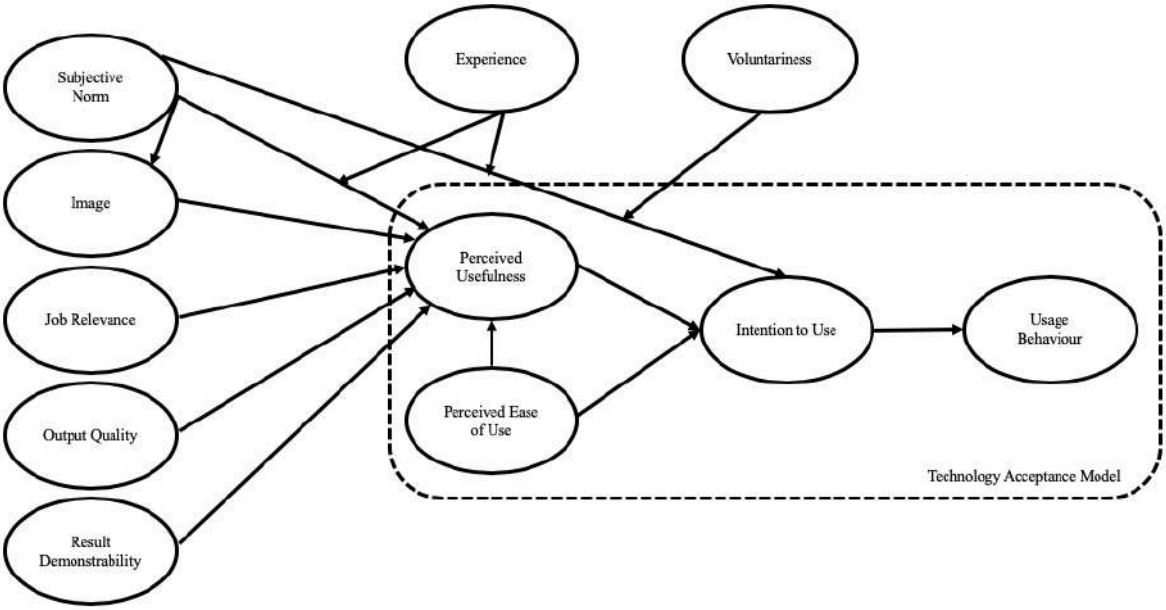

Figure 2.16: Technology Acceptance Model 2
(Source; Adapted from Venkatesh, 2000, p.188)

While the first developed TAM gives the opportunity to predict the acceptance of the users towards information technologies by focusing on "perceived ease of use" and "perceived usefulness" variables, and by theorizing the mediation towards the behavioral intention; accumulated studies over the years lead the extension of the model by adding several constructs and extended the model to TAM2. TAM2 explains the moderating variables, as well as perceived ease of use that affects perceived usefulness by additional anchors; experience and voluntariness; that have an impact on the ease of use as well as intentions.

An integrated model of technology acceptance; TAM3; is theorized by combining TAM2 and determinants of perceived ease of use such as: "computer self-efficiency, perceptions of external control, computer anxiety, computer playfulness, perceived enjoyment, and objective usability." that presents a whole set of determinants on information technologies acceptance by asserting that the determinants of perceived ease of use and perceived usefulness do not affect each other (Venkatesh, 2008).

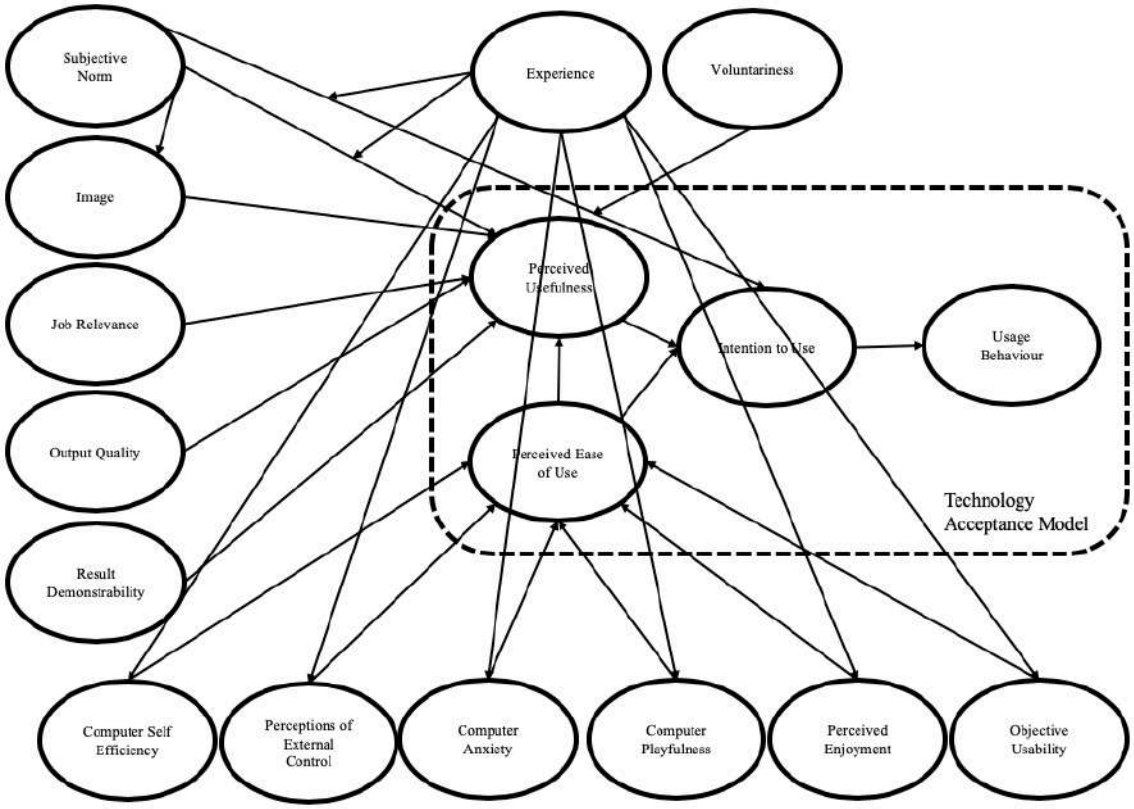

Figure 2.17: Technology Acceptance Model 3
(Source; Adapted from Venkatesh, 2008, p.280)

Like TAM1, TAM2 and TAM3; there are more other models developed around technology acceptance models by adding additional constructs. For example, Virtual Try-on Acceptance Model, proposed by Kim (2008) adds "entertainment" to the proposed model to cover the hedonic aspects which is grounded on TAM.

Kim theorized the Virtual Try-on Acceptance Model; adopted from the e-TAM model that is used to explain the role of the motivation; focused on the relationship between usage and usefulness; enjoyment as a strong influential variable and focused on understanding the moderating roles of each that may help to increase the power of predictions. Moreover, additional variables, that may have a direct impact on the intended use are also added to the framework such as technology anxiety and innovativeness (Kim, 2008).

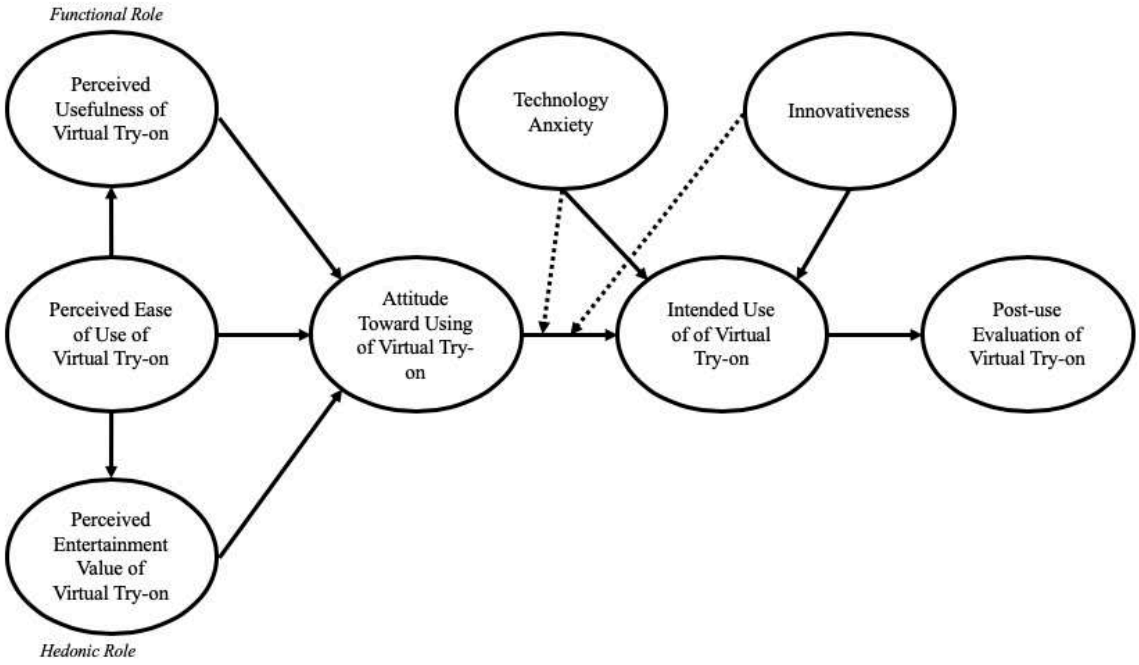

Figure 2.18: Virtual Try-on Acceptance Model
(Source; Adapted from Kim, 2008, p.47)

2.6.2. Telepresence Mediation Hypothesis Model (TMH)

Kim (2016) defines the variables of the TMH model as: “interactivity” which is a part of the independent variable "system quality" that refers to control or modify the form and the content by users through a mobile device in real-time; “vividness” as a part of the independent variable "information quality" which refers to screen size, quality of motion, color, sound and the image that lets the information to be sensed; and the overall journey that the experience and the technical evaluations are part of the independent variable "service quality"; mediating with telepresence that may be affected by the intense use of digital technologies and finally leading to the actual behavior (Kim, 2016).

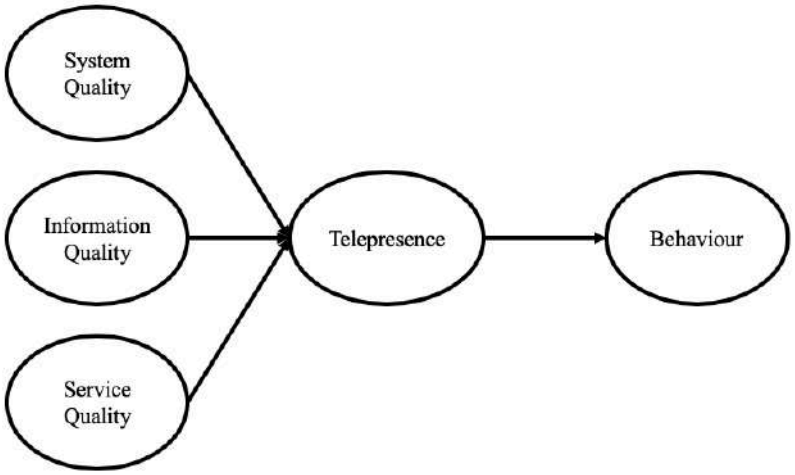

Figure 2.19: A Telepresence Mediation Hypothesis (TMH) Model
(Source; Adapted from Kim, 2016, p.30)

Kim (2016) also highlighted the similarities between TAM and TMH, as "vividness" and "interactivity" has a direct impact on usefulness and telepresence at the same time, and both independent variables have a critical impact and influence towards the purchase intention.

3. SECTION

RESEARCH METHODOLOGY

Research methodology consists of research objective, sample selection and data collection, research design, instruments, theoretical framework of the research.

3.1. RESEARCH OBJECTIVE

The primary purpose of this study is measure the effectiveness of AR mobile applications in consumer shopping behavior. For this reason, AR mobile application named “Wanna Kicks” is used to test research hypotheses. This research aims to examine the effects of technological enhancements on the consumers purchase decisions. First of all, functional, technical and hedonic factors of the AR mobile application is considered to explain the usefulness of the app. Then, the effects of usefulness and attitude toward using on purchase intention is tested.

3.2. SAMPLE SELECTION AND DATA COLLECTION

This study covers the consumers who have tendency to online shopping and can use mobile applications easily. Convenience sampling method, which is one most frequently preferred non-probabilistic sampling method, is used. The questionnaire is uploaded to Google Forms online survey tool. In the beginning of the questionnaire, details of downloading the application from both Apple Store and Google Play Store was mentioned. Data collection procedure covers two steps. The first step for each respondent is downloading and experiencing the AR mobile application. The second step is filling out the questionnaire afterwards. Data were collected during the Covid-19 pandemic period between June, 28 and July, 21. 281

respondents were participated to the study. Inaccurate forms were eliminated from the study and 269 suitable data were used for further analysis.

3.3. RESEARCH DESIGN

Wanna Kicks is a VR application for mobile devices developed by the company WANNABY, which develops mobile AR platforms; such as try on shoes, jewelry, and apparel that helps customers to increase the satisfaction of purchase. The app is available for both Android and IOS operating systems and can be downloaded through both stores.

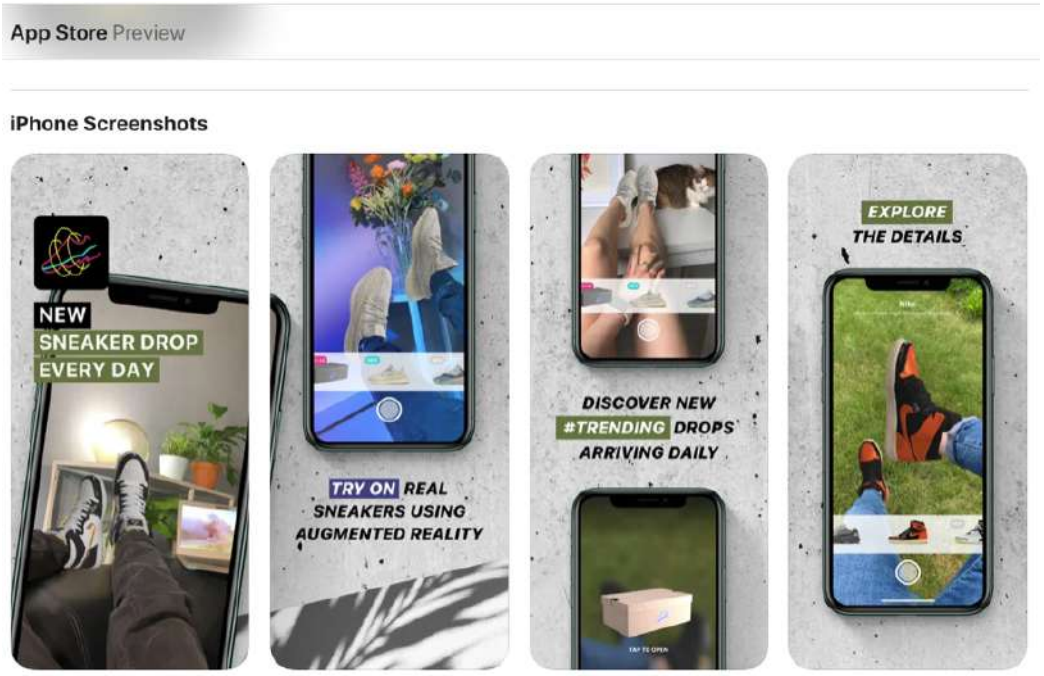

Figure 3.1: IOS App Store Appearance of Wanna Kicks App
(Source; Screenshots adapted from IOS App Store)

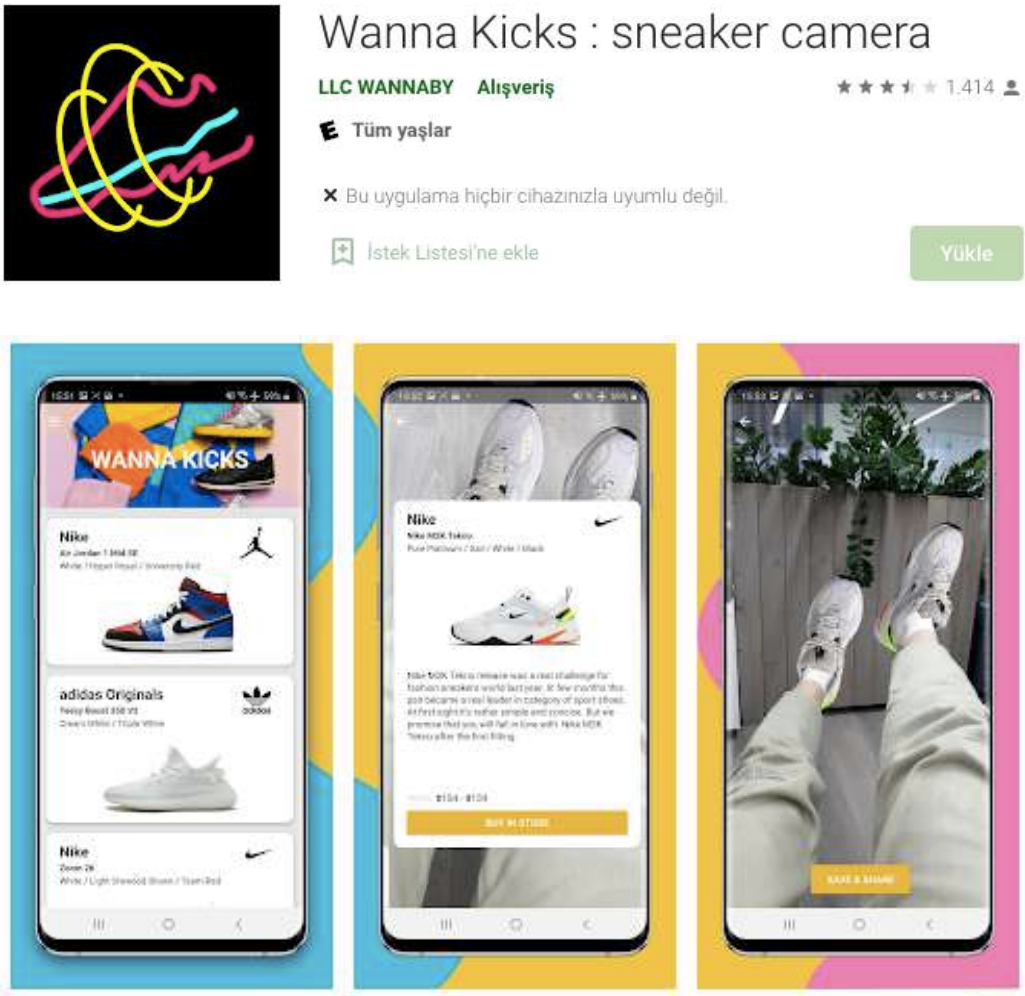

Figure 3.2: Android Play Store Appearance of Wanna Kicks App (Source; Screenshots adapted from Android Play Store)

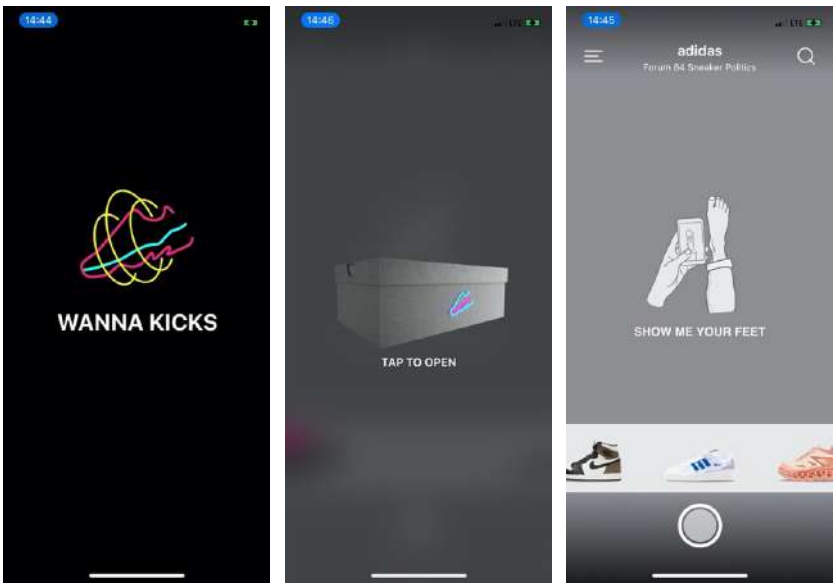

Figure 3.3: Step by step opening screen - new arrivals introduction and try on screens of Wanna Kicks app (Source; Screenshots adapted from Wanna Kicks App)

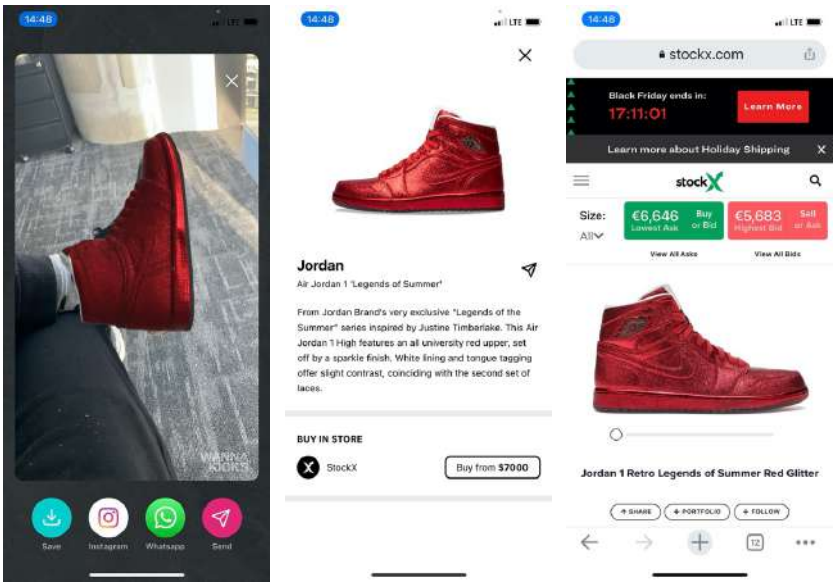

Figure 3.4: Step by step try on and share – product information and online purchase screens of Wanna Kicks App (Source; Screenshots adapted from Wanna Kicks App)

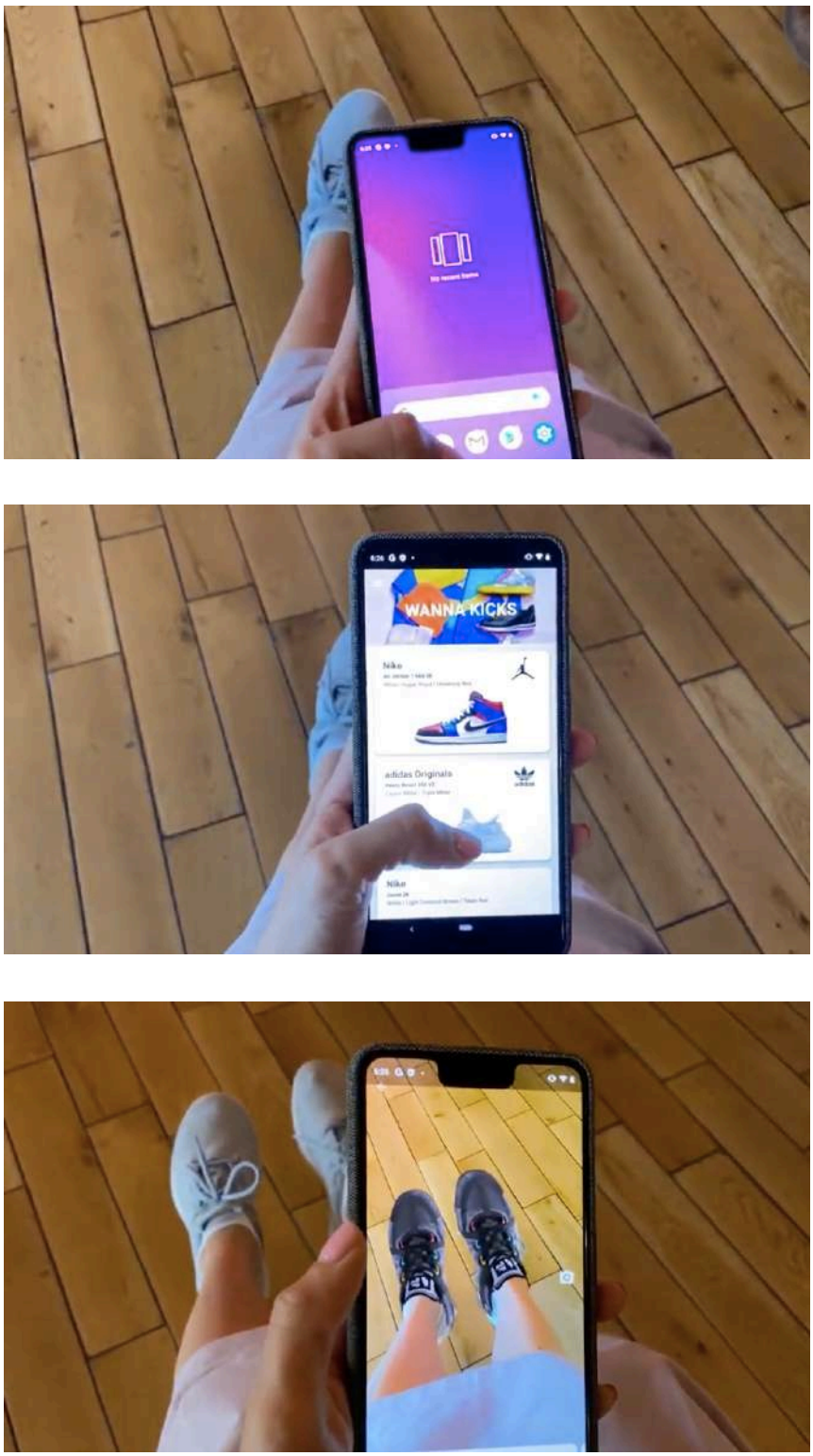

Figure 3.5: Screen shots of Wanna Kicks App (Source; Screenshots adapted from Wanna Kicks App)

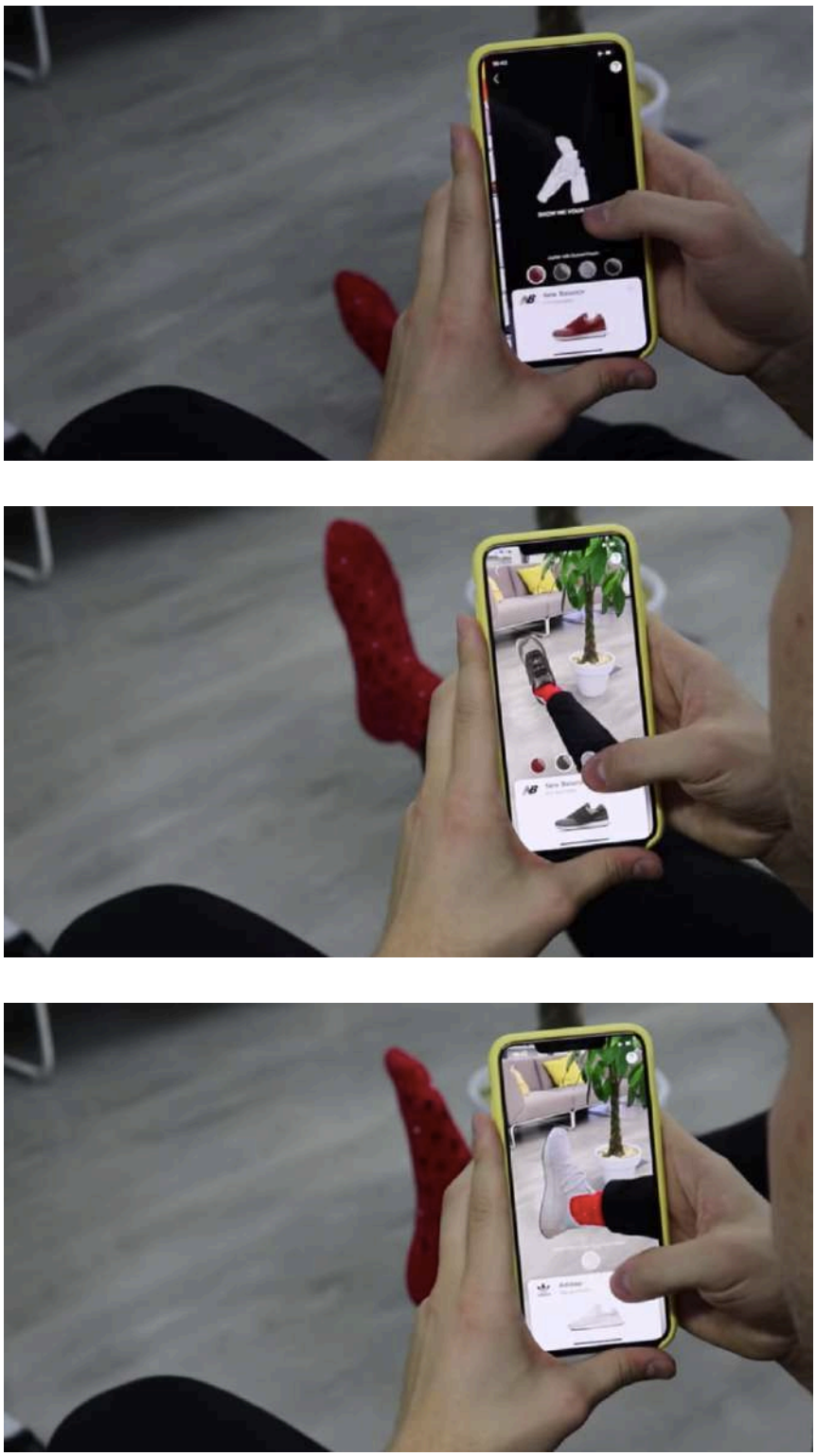

Figure 3.6: Screen shots of Wanna Kicks App (Source; Screenshots adapted from Wanna Kicks App)

3.4. INSTRUMENT

In order to test the hypothesis proposed in this study, a multi-item questionnaire, which covers the items of the constructs in the research model, is created. Total of 47 questions are placed in the questionnaire that have two major parts as the demographic questions and the perceptional statements of the respondents.

In order to reveal the demographic profile of the respondents, the questionnaire starts with gender, marital status, education level, income level and age questions. Second part includes the items related with Novelty, Interactivity, Vividness, Immersion, Informativeness, Ease of Use, Entertainment, Usefulness, Attitude Toward AR Application Using and Purchase intention. The Turkish version of the questionnaire can be seen in Appendix.

All items are asked with a five-point Likert scale ranging from 1 to 5 (1 = Strongly Disagree, 5 = Strongly Agree).

Novelty scale was adapted from the studies of Yim, Chu & Sauer (2017), Yim, Drumwright, & Cicchirillo (2012). This concept was measured with 4 items as "New", "Unique", "Different" and "Unusual" considering the Wanna Kicks application.

Interactivity scale was adapted from the studies of Yim, Chu & Sauer (2017) and Wu (2005). Interactivity was measured with 4 items, one of the item was placed in questionnaire as "I was in control of my navigation through the augmented reality application.".

Vividness scale was adapted from the studies of Babin & Burns (1998) and Yim, Chu & Sauer (2017) and measured with 6 items as "Clear", "Detailed", "Vague", "Vivid", "Sharp", "Well-defined". In the questionnaire each of the items are listed

as the statements. For instance, clear was phrased as “AR shoes are clearly visible on my feet.”.

Immersion scale was adapted from the studies of Duncan & Nelson (1985), and Yim, Chu & Sauer (2017) and measured with 3 items as “I was not absorbed while using the application.”.

Informativeness scale was adapted from Ahn et al. (2004), Hausman & Siepke (2009); Rese, Schreiber & Baier (2014) and measured with 4 items. “The augmented reality mobile application showed the information I expected.” can be given as an example of one of the informativeness’ items.

Ease of Use scale was adapted from Gefen et al. (2003); Rese, Schreiber & Baier (2014) and Venkatesh & Davis (2000) and measured with 4 items as “I found the mobile AR app to be very easy to use.”.

Entertainment scale was adapted from the studies of Ducoffe (1996) and McQuail, (1983) and measured with 4 items as “Viewing this AR app is entertaining.”. Usefulness scale was adapted from Kim & Forsythe (2008) and Yim, Chu & Sauer (2017) and measured with 5 items as “The AR technology enhances my ability to make shoe choices more effectively.”.

Attitude Toward AR Application Using scale was adapted from the studies of Ahn et al. (2004), Porter & Donthu (2006) and Rese, Schreiber & Baier (2014). This construct was measured with 5 items as “I am positive about the mobile AR app.”.

Purchase intention was adapted from Kim et al. (2008) and measured with 3 items as “After using this mobile AR app, I have a intention to purchase for the shoes.”.

All the constructs with measurement items and abbreviations are presented in Table below.

Table 3.1: Measurement Items and Sources of Constructs

Abbreviations	Factor / Item	Source
Novelty		Yim, Chu and Sauer, (2017); Yim, Drumwright, and Cicchirillo (2012)
Novelty_1	New	
Novelty_2	Unique	
Novelty_3	Different	
Novelty_4	Unusual	
Interactivity		Yim, Chu and Sauer, (2017); Wu (2005)
Interactivity_1	I was in control of my navigation through the augmented reality application.	
Interactivity_2	I had some control over the content of the augmented reality application that I wanted to see.	
Interactivity_3	I was in control over the pace to watch products.	
Interactivity_4	The augmented reality application had the ability to respond to my specific needs quickly and efficiently.	
Vividness		Babin and Burns (1998); Yim, Chu and Sauer, (2017)
Vividness_1	Clear	
Vividness_2	Detailed	
Vividness_3	Vague	
Vividness_4	Vivid	
Vividness_5	Sharp	
Vividness_6	Well-defined	
Immersion		Duncan and Nelson (1985); Yim, Chu and Sauer, (2017)
Immersion_1	Not deeply engrossed–Deeply engrossed	
Immersion_2	Not absorbed–Absorbed	
Immersion_3	My attention was not focused–My attention was focused	

Table 3.1: Measurement Items and Sources of Constructs (cont.)

Abbreviations	Factor / Item	Source
Informativeness		Gefen et al.(2003); Rese, Schreiber and Baier, (2014); Venkatesh and Davis (2000)
Informativeness_1	The augmented reality mobile app showed the information I expected.	
Informativeness_2	The augmented reality mobile app provides detailed information about the shoes.	
Informativeness_3	The augmented reality mobile app provides information that helps me in my decision.	
Informativeness_4	The augmented reality mobile app provides information to compare products.	
Ease of Use		Gefen et al.(2003); Rese, Schreiber and Baier, (2014); Venkatesh and Davis (2000)
Ease_of_use_1	I found the mobile AR app to be very easy to use.	
Ease_of_use_2	The mobile AR app was intuitive to use.	
Ease_of_use_3	It was easy to learn how to use the mobile AR app.	
Ease_of_use_4	Handling the scan function and its elements was easy.	
Entertainment		Ducoffe, (1996); McQuail, (1983)
Entertainment_1	Viewing this AR app is entertaining.	
Entertainment_2	Viewing this AR app is enjoyable.	
Entertainment_3	Viewing this AR app is pleasing.	
Entertainment_4	Viewing this AR app is exciting.	

Table 3.1: Measurement Items and Sources of Constructs (cont.)

Abbreviations	Factor / Item	Source
Usefulness		Kim and Forsythe (2008); Yim, Chu and Sauer (2017)
Usefulness_1	The AR technology enhances my ability to make shoe choices more effectively.	
Usefulness_2	Using the AR technology saves me time.	
Usefulness_3	Using the AR technology improves the quality of my search for shoes.	
Usefulness_4	The AR technology enables me to acquire information more quickly.	
Usefulness_5	Overall, I find the AR technology useful in my shopping experience.	
Attitude Toward AR App. Using		Ahn et al.(2004); Porter and Donthu (2006); Rese, Schreiber and Baier (2014)
Attitude_App_Using_1	I am positive about the mobile AR app.	
Attitude_App_Using_2	The mobile AR app is so interesting that you just want to learn more about it.	
Attitude_App_Using_3	It just makes sense to use the mobile AR app.	
Attitude_App_Using_4	The use of the mobile AR app is a good idea.	
Attitude_App_Using_5	Other people should also use the mobile AR app.	
Purchase Intention		Kim et al., 2008
Purchase_Intention_1	After using this mobile AR app, I have a intention to purchase for the shoes.	
Purchase_Intention_2	After using this mobile AR app, I will definitely want to purchase for the shoe.	
Purchase_Intention_3	After using this mobile AR app, I will definitely purchase the shoe.	

3.5. THEORETICAL FRAMEWORK OF THE RESEARCH

Telepresence is defined as “being there” (Yim, 2012, p.114), and refers to while physically being in a specific context, to feel like being immersed in another. The level of presence can vary based on an individual's perceptions, experiences as well as attention to the stimuli and also based on the individual’s characteristics that contribute to “being there”; such as vividness and interactivity.

Based on the definitions in the literature, presence/telepresence or being immersed have 2 main characteristics; (1) it is a construct that can vary based on an individual’s perceptions, (2) users should perceive and accept the virtual objects as if they are physically present for presence/immersion to be occurred. Once the content can be able to pull the individuals in and can be able to create a higher degree of presence, it will be resulted in higher knowledge of the product and will lead to positive attitudes towards the application, brand and definitely will trigger the purchase intention (Yim, 2012).

3.5.1. Novelty

Novelty refers to “rated as new, unique, and different” Massetti (1996, p. 87) and the combination of unusual and new stimulus which has strong power to draw the attention of the individuals.

Yim (2012) designed a research and conducted with glass and without glass studies to test the effectiveness of a stereoscopic (A technique based on a depth perception created by showing two different objects to two different eyes of the user at the same time) and flat type 3D advertising and hypothesized the impact of novelty on immersion as the presence will be moderated by the novelty at both cases, but higher in the stereoscopic 3D advertisements which the technology have several commonalities with VR and AR applications.

Another research, (Yim, 2017) designed and conducted two studies to assess the effectiveness of AR and Web-based product displays and the impacts on customer evaluations by a total of 801 college student participated in the U.S. and asked to choose a product (watch or eyeglasses) that they are more interested in or would like to buy.. Afterward, they were administered a questionnaire asking them about "interactivity, vividness, novelty, immersion, media usefulness, enjoyment, and previous media experience. Additional items measuring general attitudes toward the treatment medium used when shopping online (either AR or traditional web site), and purchase intention was included." (Yim, 2017, p.94). As a result, product demonstrations using AR resulted in significantly higher than web-based presentations and the results clearly showed that immersion is significantly enhanced by novelty.

Novelty is one of the key determinants that draw the user's attention leading to the level of being immersed and increase presence accordingly and once the users became more familiar with the stimuli, or frequently experience the technology, novelty impact will be reduced (Yim, 2012, 2017).

3.5.2. Interactivity

Interactivity refers to control or modify the form and the content by users through a mobile device in real-time; and the technological feature that lets and enables users to involve and interact easily (Yim,2017; Kim, 2016). Moreover, either as a technological outcome or as user perception, interactivity has a critical role in the AR effectiveness that enables individuals to involve and interact with the content (Yim, 2017).

Historically, the interaction was seen as communicating with each other in the context of interpersonal communication by some communication researchers, and some saw it as a result of perceptions of individuals of an experience. And finally; as a result of the acceptance of technological enhancement that enables it;

interactivity has been accepted as the outcome of technological properties (Yim, 2012). Considering all these definitions, and the conceptualization of the construct "interactivity" as an outcome and necessity of technology, it is relevant to take as one of the constructs to our study. Also, Wu (2005) stated that the construct interactivity contributes positively to desired outcomes of communication such as attitude towards the web site, brand and purchase intention which are some of the other constructs that the relations of each to each other is the subject of the study as well.

3.5.3. Vividness

Vividness is the presentation of a sensorial game-like environment through a certain technology that takes the consumer into it by combining sensory and non-sensory experiences that revives cognitive stimuli by enriched depth and breadth. By using several sensory tools such as screen size, quality of motion, color, sound, and the image that aim at multiple sense receptors at the same time higher vividness and higher levels of customer engagement can be ensured (Barnes, 2016; Yim, 2017).

In terms of cognitive elaboration, more vivid rendered products are more impactful as it is explicated as the quality of product representations that strengthens to recall the information for longer time and the confidence in consumption decisions (Yim, 2012).

Based on the research conducted by Yim (2017) significantly both "interactivity" and "vividness" affected media usefulness and enjoyment when mediated by immersion. In order to evaluate the impact of the vividness of the AR App that we are going to use in our study, the construct "vividness" is added to proposed research model to evaluate the impact on immersion.

3.5.4. Perceived Ease of Use

Perceived ease of use (EU) refers to " to the degree to which prospective user expects the target system to be free of effort" (Davis, 1989, p.985). Even if it is positioned as one of the main determinants of intentions in the Technology Acceptance Model, it generates many insights on predicting the behavior of usage (Venkatesh, 2000b).

3.5.5. Informativeness

The construct "informativeness" refers to the information that is generated through the AR app such as the detailed information about the shoes, necessary information to compare products, and the information that helps in the decision. Based on the Merriam-Webster dictionary, "informativeness" is described as the imparting of knowledge.

Based on Hausman's research (2009), results suggested that the human factors were influential on informativeness, and entertainment is likely to lead to a desired attitude toward the site by supporting the hypothesis: "Attitude the toward site is positively related to perceived informativeness." (Hausman, 2009, p.7) while in every site design, computer features should be considered primary to create a positive perception of informativeness and usefulness.

Rese (2014), conducted research with regard to AR applications, and integrated external variables to the TAM model such as "perceived informativeness" and "perceived enjoyment". Both variables have a positive influence on attitude toward a mobile device or a website referring to several empirical studies. He also has proposed that these variables have a positive impact on the perceived usefulness of an innovative system that fulfills the informational expectations of individuals by providing the product information and supports them at the phase of purchase

decision (Rese, 2014). As to examine the impact of information on perceived usefulness, the construct “informativeness” added to the proposed framework.

3.5.6. Entertainment

Entertainment / Enjoyment refers to “the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use.” (Vankatesh, 2008, p.279), and also refers to the excitement and pleasant emotions of users.

So far, in the context of online shopping and video gaming, entertainment/enjoyment is linked with interactivity and vividness as the more positive emotional experience the more leads to enjoyment. Once the interactivity in video games increases, the player’s tendency to feel greater enjoyment will be increased as well (Yim, 2017). Moreover, in a variety of studies explaining the relation between presence and enjoyment (a high sense of presence results in a more enjoyable and pleasant experience), enjoyment and attitude toward using (entertainment and informativeness lead to the value of advertising and positive attitudes toward ads.) have already appeared in the literature but little research has examined the impact of entertainment/enjoyment on perceived usefulness (Yim, 2012). By combining the scales of entertainment and enjoyments as they are almost the same, to understand the impact of entertainment/enjoyment over perceived usefulness, the construct added to the proposed framework.

3.5.7. Immersion

Immersion refers to the degree of absorption, involvement, and occupation of the user into the stimuli and the ability to keep them out of their physical environment. High interactivity and vividness result in a greater level of immersion and “it has been shown that the joint effect of immersion and interactivity and/or vividness

creates an increased real sense of being present in that image generated world, namely telepresence" (Yim, 2017, p.92).

Several studies assert that our cognitive and affective assessments to utilize a new technology are enhanced by interactivity and vividness, and also the mediating role of immersion is pointed out in terms of generating positive evaluations of users. As several scholars pointed out (Slater et al. 1996, Palmer 1995, Biocca and Delaney 1995, Schuemie et al. 2001, Lombard and Ditton 1997), immersion is the mediating variable in a set of virtual experiences that are inducted by AR capabilities such as vividness and interactivity and for the users to be felt immersed, there should be virtuality that makes individuals feel engrossed or a sense that blocks out of the physical world stimuli (Yim, 2017).

3.5.8. Perceived Usefulness

Perceived usefulness refers to "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context." (Davis, 1989, p.985).

"Perceived Usefulness" and "Perceived Ease of Use" are the beliefs of a new technology which may influence the user's attitude toward and the actual use; are the main determinants of Technology Acceptance Model (Davis, 1989).

Based on the conceptual relationship between interactivity, vividness, and novelty; it is widely accepted that gathering information such as color, functions, shape is more easy and effective. An experience like that leads consumers to participate in an efficient information processing progress that provides an improved search experience. Moreover, enhanced perceived usefulness leads the consumer journey through purchase decisions by capturing the information efficiently. A 3D virtual representation of a product or training, educations through these VR tools such as training of soldiers, pilots, or even doctors, gives higher opportunities to the users

to have in depth and improved knowledge compare to the traditional methods. Same as VR, AR applications are expected to function as a useful tool in terms of educating users for their shopping experience.

Based on the research results (Yim, 2017), it was clearly showed that perceived usefulness had a significant impact on attitude towards AR as well as on purchase decision.

Moreover, Hausman (2009) researched the attitude toward a web site, in the context of online shopping and website design and asserted that perceived usefulness impact both attitude toward the site and the online flow which is the experience of the navigation at the cognitive state that leads to more browsing and purchase.

3.5.9. Attitude toward AR Application Using

Attitude toward AR Application usage refers to "the positive feeling about AR. If AR users have a high level of positive feeling about AR, then they will be more likely to re-experience AR. Thus, higher attitude toward AR may lead AR usage intention." (Chung, 2015, p.593).

The perceptions or beliefs are the key determinants of innovation in the attitude development that result in the utilization of the behavior. TAM posits that the attitudes toward use have a direct impact on behavioral intention to use and use of the actual system. The attitude is determined by perceived ease of use and perceived usefulness (Ahn,2004). Considering the fact that TAM provides consistent results on the behavior of acceptance researches and the fact that several internet-oriented technologies acceptance is successfully adopted through TAM, "Perceived Usefulness", "Perceived Ease of Use", and "Attitude Toward Use" are adopted and selected as determinants of the proposed framework.

3.5.10. Purchase Intention

Purchase Intention refers to "a situation where consumer tends to buy a certain product in certain condition." (Mirabi, 2015, p.268).

In marketing literature, several studies address the relationship between service quality, customer satisfaction, and purchase intentions. Taylor (1994) designed research and collected 426 questionnaires data via personal interviews throughout the U.S. to test the interaction and relationship between service quality, customer satisfaction, and purchase intentions. The tested hypothesis leads to the conclusion that, for some industries, acting jointly the satisfaction and the service quality has an impact on the purchase behaviors, and high service quality and high satisfaction results in high purchase intention (Taylor, 1994).

Kim (2008) conducted a study to measure the impact of the influence of online product presentations on the individual's attitudes toward the product and the purchase intentions as well. To test these, several hypotheses were developed and as a conclusion, the significant impact of verbal and visual information on attitudes and verbal information on the purchase intentions were supported (Kim, 2008).

Telepresence and TAM Model have similarities with the researched models mentioned above. On one hand, service and system quality is part of the Telepresence Mediation Hypothesis Model; on the other, determinants of the TAM Model have direct interactions with customer satisfaction, the variable "purchase intention" added to the construct.

Based on to theoretical models discussed in the literature review and the need for a research design of a mobile application that measures the consumer's journey which leads to purchase intention, a research model is proposed in Figure 3.7 by adoption of TMH and TAM models by focusing constructs.

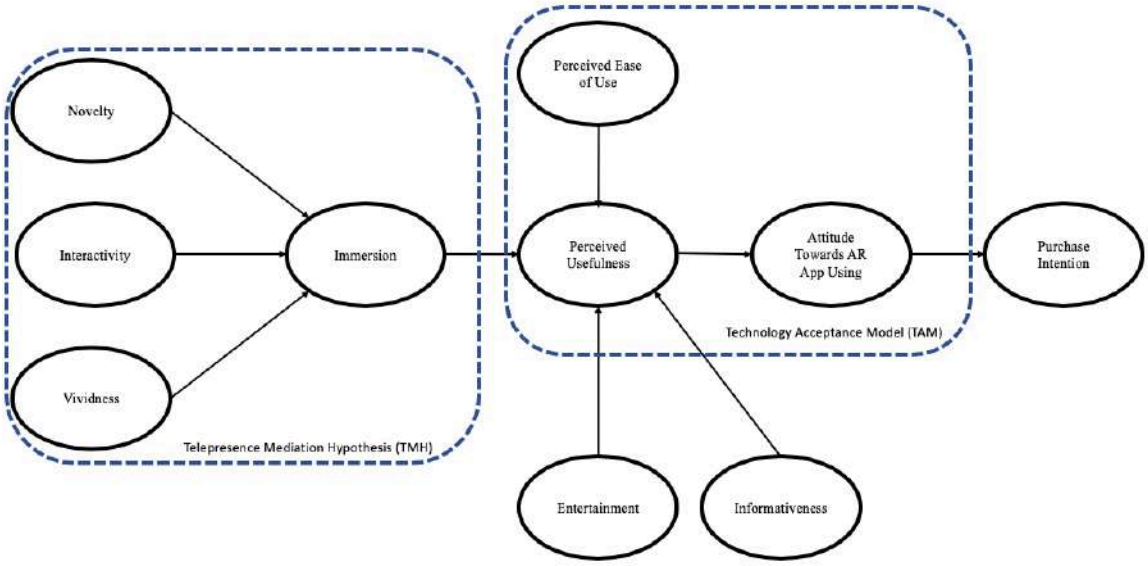

Figure 3.7: Research Model

The research hypothesis are which will be analyzed are listed below:

H_1: Novelty has an effect on immersion.

H_2: Interactivity has an effect on immersion.

H_3: Vividness has an effect on immersion.

H_4: Immersion has an effect on usefulness.

H_5: Ease of use has an effect on usefulness.

H_6: Informativeness has an effect on usefulness.

H_7: Entertainment has an effect on usefulness.

H_8: Usefulness has an effect on Attitude toward AR app using.

H_9: Attitude toward AR app using has an effect on purchase intention.

4. SECTION

RESEARCH FINDINGS

In this study both descriptive and inferential statistics were performed. SPSS 26.0 and IBM AMOS 23.0 were utilized for data analysis.

4.1. DESCRIPTIVE STATISTICS

The demographic characteristics of the sample is presented in Table 4.1. Descriptive profile of the sample is determined in terms of gender, marital status, education, level of income and age.

Table 4.1: Descriptive statistics of the sample's characteristics

		Frequency	Percentage
Gender	Female	127	47.2
	Male	142	52.8
Marital Status	Married	48	17.8
	Single	221	82.2
Education	High School	8	3.0
	Bachelor	214	79.6
	Master	41	15.2
	PhD	6	2.2
Income	Less than 2,500 TL	74	27.5
	2,501-4,500 TL	124	46.1
	4,501-6,500 TL	12	4.5
	6,501-8,500 TL	14	5.2
	More than 8,500 TL	45	16.7
Age	Mean	25.87	
	Standard Deviation	9.06	

Out of 269 respondents 47.2% of them were female (n=127) and 52.8% of them were male (n=124). Most of the participants were single (n=221) and had a bachelor degree (n=214). Majority of the respondents with 73.6% had an income level of 4,500 TL and less. The average age of the respondents was 25.87 with a standard deviation of 9.06 years.

4.2. EXPLORATORY FACTOR ANALYSIS AND RELIABILITY ANALYSIS

Exploratory factor analysis (EFA) was performed to evaluate the hidden structure of the data set. EFA is a data-driven method that is exploratory in nature. This method provides an empirical basis to extract independent factor sets by combining the items which are correlated. In other words, EFA is a dimension reduction method.

All variables were analyzed with EFA and reported in Table 4.2. Principal component analysis with varimax rotation was preferred. According to the findings ten factors, namely constructs, were extracted. Kaiser-Meyer-Olkin sampling adequacy measure was found as 0.943 which exceeds the threshold value of 0.50 (Durmuş et al., 2018). KMO measure confirms that sample size adequate for factor analysis. Bartlett's test of sphericity reveals whether sufficient amount of correlation between items exist to perform factor analysis. As a result of the analysis, we found certain amount of correlation between items ($p<0.01$). For both of the EFA assumptions, appropriateness of the data was found as satisfactory (KMO=0.943 $\chi^2_{Bartlett's\ Test\ of\ Spherecity}(666) = 9630.958$, p=0.000).

As a result of EFA, there found to be ten factors that has eigen value greater than 1 and these ten extracted factors explained 81.71% of total variance. In accordance with the literature, extracted factors were identical and named as "Vividness", "Attitude toward AR app using", "Novelty", "Interactivity", "Entertainment",

“Purchase Intention”, “Ease of use”, “Informativeness”, “Usefulness” and “Immersion”.

In order to test the internal consistency of the constructs, reliability analysis was performed. Cronbach’s alpha coefficient of the constructs ranged between 0.755 and 0.940, that were all above 0.70 threshold value (DeVellis, 2003). As a result, all the constructs were found as reliable.

Table 4.2: Exploratory Factor Analysis and Reliability Analysis Results

Factor Name	Factor Items	Factor loadings	Cronbach alpha	Variance explained
Vividness	Vividness_5	0.820	0.928	11.910
	Vividness_2	0.799		
	Vividness_4	0.796		
	Vividness_6	0.703		
	Vividness_1	0.673		
Attitude toward AR app using	Attitude_app_using_5	0.835	0.935	11.734
	Attitude_app_using_4	0.784		
	Attitude_app_using_6	0.782		
	Attitude_app_using_3	0.580		
	Attitude_app_using_2	0.579		
Novelty	Novelty_1	0.756	0.848	8.507
	Novelty_4	0.742		
	Novelty_2	0.714		
	Novelty_3	0.713		
Interactivity	Interactivity_2	0.721	0.897	8.341
	Interactivity_1	0.709		
	Interactivity_4	0.697		
	Interactivity_3	0.554		
Entertainment	Entertainment_2	0.721	0.940	7.959
	Entertainment_3	0.709		
	Entertainment_1	0.697		
	Entertainment_4	0.554		
Purchase Intention	Purchase_Intention_3	0.710	0.911	7.957
	Purchase_Intention_2	0.709		
	Purchase_Intention_1	0.689		
Ease of use	Ease_of_use_3	0.625	0.908	7.368
	Ease_of_use_4	0.835		
	Ease_of_use_1	0.603		
Informativeness	Informativeness_2	0.764	0.849	6.903
	Informativeness_3	0.669		
	Informativeness_1	0.650		
Usefulness	Usefullness_2	0.704	0.910	6.672
	Usefullness_1	0.640		
	Usefullness_3	0.597		
	Usefullness_4	0.559		
Immersion	Immersion_3	0.703	0.755	4.357
	Immersion_2	0.682		

4.3. CONFIRMATORY FACTOR ANALYSIS

Confirmatory Factor Analysis is used to confirm the underlying structure of the measurement with a new data set. CFA evaluates how effectively the measured variables represent the number of constructs. In order to validate the proposed constructs in EFA, and reveal the structure of dimensions we performed CFA via IBM AMOS 23.0.

Goodness of fit indices assess the performance CFA model. There are several of fit indices used in the literature for CFA. Chi-square test, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Incremental Fit Index (IFI) and Root Mean Square Error Approximation (RMSEA) were reported in this study.

According to Table 4.3 all the selected fit measures stated a good model. χ^2 test with 578 degrees of freedom (N=269) resulted as 1367.134 significantly ($p<0.01$). Since this test is sample size sensitive, to assess the model fit TLI, CFI, IFI and RMSEA was also used. TLI value was observed as 0.904, CFI as 0.917, IFI as 0.917, RMSEA as 0.071 and χ^2/df as 2.365. Threshold values for each index commonly used in literature is given in the same table. Consequently, all the aforementioned fit indices supported the proposed research model as fit.

Table 4.3 Goodness of Fit Indices Results

Indices	$\boldsymbol{\chi^2/df}$	p-value	RMSEA	TLI	CFI	IFI
Results	2.365	0.000	0.071	0.904	0.917	0.917
Acceptable Fit	<5	Significant	≤ 0.08	≥ 0.90	≥ 0.90	≥0.90

χ^2(578, N=269)=1367.134 df=degrees of freedom, RMSEA=Root Mean Square of Error Approximation, TLI=Tucker-Lewis Index, CFI=Comparative Fit Index, IFI=Incremental Fit Index

Estimated parameters for all the items are shown in Table 4.4. The factor loadings were found as significant at 0.01 level, stating that the range of the loadings were reasonable.

Table 4.4: Confirmatory Factor Analysis Results

Factor	Items	Factor Loading	CR	AVE
Vividness	Vividness_5	0.854	0.925	0.712
	Vividness_2	0.901		
	Vividness_4	0.798		
	Vividness_6	0.794		
	Vividness_1	0.865		
Attitude toward AR app using	Attitude_app_using_5	0.878	0.936	0.745
	Attitude_app_using_4	0.874		
	Attitude_app_using_6	0.906		
	Attitude_app_using_3	0.821		
	Attitude_app_using_2	0.832		
Novelty	Novelty_1	0.622	0.853	0.596
	Novelty_4	0.754		
	Novelty_2	0.780		
	Novelty_3	0.906		
Interactivity	Interactivity_2	0.813	0.897	0.685
	Interactivity_1	0.840		
	Interactivity_4	0.812		
	Interactivity_3	0.844		
Entertainment	Entertainment_2	0.934	0.938	0.792
	Entertainment_3	0.942		
	Entertainment_1	0.914		
	Entertainment_4	0.758		
Purchase Intention	Purchase_Intention_3	0.872	0.919	0.793
	Purchase_Intention_2	0.974		
	Purchase_Intention_1	0.814		
Ease of Use	Ease_of_use_3	0.845	0.908	0.768
	Ease_of_use_4	0.899		
	Ease_of_use_1	0.884		
Informativeness	Informativeness_2	0.841	0.892	0.734
	Informativeness_3	0.764		
	Informativeness_1	0.829		
Usefulness	Usefullness_2	0.808	0.905	0.705
	Usefullness_1	0.806		
	Usefullness_3	0.859		
	Usefullness_4	0.884		
Immersion	Immersion_3	0.743	0.760	0.614
	Immersion_2	0.822		

Convergent validity and discriminant validity of the constructs were displayed with Composite Reliability (CR) and Average Variance Extracted (AVE) measures (Fornell and Larcker, 1981). Composite reliability is used in CFA to measure internal consistency, likewise Cronbach's Alpha in EFA. For composite reliability 0.60 or above is acceptable (Bagozzi and Yi, 1988). Another measure of reliability is the variance extracted which reflects the overall amount of variance accounted for by the latent construct. Fornell and Larcker (1981) favor level of 0.50 or above.

Details of CR and AVE results were presented in Table 4.4. CR values of the constructs ranged between 0.760 and 0.936, AVE values ranged between 0.596 and 0.793 in line with the threshold defined in literature. Convergent and discriminant validity of the constructs were supported.

4.4. STRUCTURAL MODEL

Since purpose of this study is measure the effectiveness of AR mobile applications in consumer shopping behavior, Path Analysis followed by CFA was carried out as the last phase of Structural Equation Modeling (SEM).

Table 4.5 represents the fit values of the hypothesized model. The results of the path analysis expressed a good fit of the hypothesized model ($\chi^2(283)=726.306$ $p<0.001$; $\chi^2/df = 2.566$; TLI=0.922; CFI=0.932; IFI=0.932; RMSEA=0.076).

Table 4.5: Model of Fit Indices Results

Indices	χ^2/df	p-value	RMSEA	TLI	CFI	IFI
Results	2.566	0.000	0.076	0.922	0.932	0.932
Acceptable Fit	<5	Significant	≤ 0.08	≥ 0.90	≥ 0.90	≥0.90

χ^2(283, N=269)=726.306 df=degrees of freedom, RMSEA=Root Mean Square of Error Approximation, TLI=Tucker-Lewis Index, CFI=Comparative Fit Index, IFI=Incremental Fit Index

According to path analysis results shown in Table 4.6, 6 hypotheses out of 9 proposed in this research were accepted. Novelty ($\beta = 0.424; p < 0.01$) was found to be a significant predictor of Immersion. Interactivity ($\beta = 0.459; p < 0.01$) was also found to be a significant predictor of Immersion. Immersion ($\beta = 0.541; p < 0.01$) was found to be a significant predictor of Usefulness. Entertainment ($\beta = 0.448; p < 0.01$) was found to be a significant predictor of Usefulness. Usefulness ($\beta = 0.872; p < 0.01$) was found to be a significant predictor of Attitude toward ARR app Using. Attitude toward ARR app Using ($\beta = 0.688; p < 0.01$) was found to be a significant predictor of Purchase Intention.

Table 4.6: Path Analysis Results

Hypothesized Relationships	$\boldsymbol{\beta}$	t	Std. $\boldsymbol{\beta}$
H1: Novelty➔Immersion	0.557	5.194**	0.424
H2: Interactivity➔Immersion	0.470	5.953**	0.459
H3: Vividness➔Immersion	ns	-	ns
H4: Immersion➔Usefulness	0.498	7.373**	0.541
H5: Ease of Use➔ Usefulness	ns	-	ns
H6: Informativeness➔ Usefulness	ns	-	ns
H7: Entertainment➔Usefulness	0.410	7.410**	0.448
H8: Usefulness➔Attitude toward AR app Using	0.886	13.578**	0.872
H9: Attitude toward AR app Using➔Purchase Intention	0.947	11.276**	0.688

**p<0.01

Vividness was found to be an insignificant predictor of Immersion ($p < 0.05$). Ease of Use was found to be an insignificant predictor of Usefulness ($p < 0.05$). Informativeness was found to be an insignificant predictor of Usefulness ($p < 0.05$).

Visual representation of the research model with reference to path analysis results are displayed in Figure 4.1.

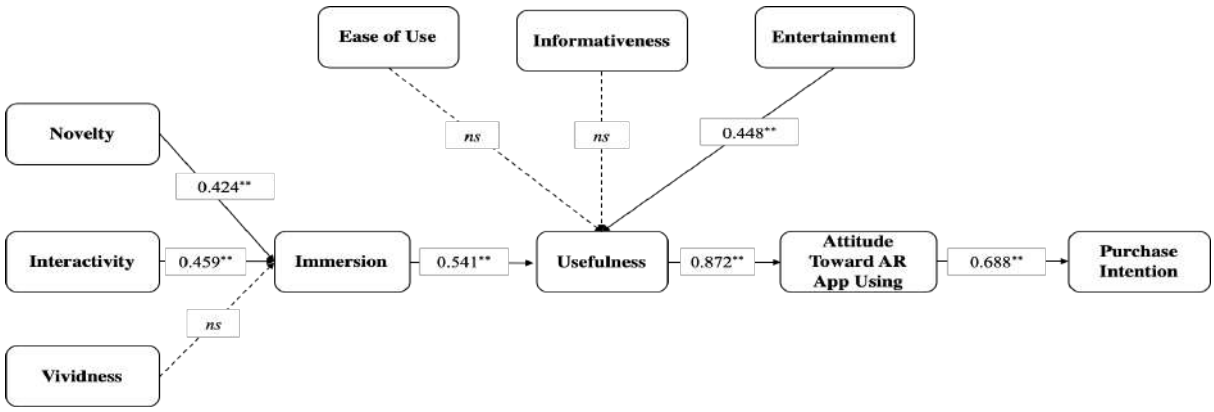

Figure 4.1: Path Model

4.5. HYPOTHESES RESULTS

The results of the hypotheses are summarized in Table 4.7.

Table 4.7: Hypotheses Results

Hypotheses	Results
H1: Novelty has an effect on immersion.	Accepted
H2: Interactivity has an effect on immersion.	Accepted
H3: Vividness has an effect on immersion.	Rejected
H4: Immersion has an effect on usefulness.	Accepted
H5: Ease of use has an effect on usefulness.	Rejected
H6: Informativeness has an effect on usefulness.	Rejected
H7: Entertainment has an effect on usefulness.	Accepted
H8: Usefulness has an effect on Attitude toward AR app using.	Accepted
H9: Attitude toward AR app using has an effect on purchase intention.	Accepted

5. SECTION

CONCLUSION

5.1. DISCUSSIONS ON RESULTS

In this study, the proposed conceptual model derived from the literature based on previous theories of the Technology Acceptance Model (TAM) and Telepresence Mediation Hypothesis (TMH) Model as well as previous researches on determinants of purchase intentions such as “entertainment” and “informativeness” was researched. In order to fulfill the stated purpose, a set of the hypothesis was identified:

H1: Novelty has an effect on immersion ➔ Accepted

“Novelty” refers to “rated as new, unique, and different” Massetti (1996, p. 87) and the combination of unusual and new stimulus which has strong power to draw the attention of the individuals, and “immersion” refers to the degree of absorption, involvement, and occupation of the user into the stimuli and the ability to keep them out of their physical environment.

Referring to the findings of another research (Yim, 2017), novelty significantly enhanced immersion, while novelty was significantly reduced by previous experience. Also, experience has both positive and negative impacts on a sense of immersion in that it reduces novelty, resulting in decreased immersion, but alleviates the potential negative impact of irritation on immersion. The results

revealed that the negative impact caused by a high level of familiarity is still more critical in reducing the sense of immersion in the AR condition.

Even though AR/VR is in our lives for a while, it can be stated that AR applications are relatively new and familiarity is not at a high level at this point of time for Turkish customers. In line with the statement, the current study has explored that "novelty" has a statistically significant impact on "immersion" and the hypothesis is accepted.

H2: Interactivity has an effect on immersion ➔ Accepted

"Interactivity" refers to control or modify the form and the content by users through a mobile device in real-time; and the technological feature that lets and enables users to involve and interact easily. Align with the findings of the previous researches (Yim, 2012, 2017; Wu, 2005), which is the interactivity's positive impact on customer evaluations resulted in increased immersion; the current study also approved that "interactivity" has an effect on immersion and the hypothesis is accepted.

H3: Vividness has an effect on immersion ➔ Rejected

"Vividness" is the presentation of a sensorial game-like environment through a certain technology that takes the consumer into it by combining sensory and non-sensory experiences that revives cognitive stimuli by enriched depth and breadth. Even though previous researches (Yim, 2012) asserts that the construct has a direct effect on immersion, our study explored that the relationship between vividness and immersion, Vividness was found to be an insignificant predictor of Immersion and the hypothesis is rejected.

H4: Immersion has an effect on usefulness ➔ Accepted

"Perceived usefulness" refers to "the prospective user's subjective probability that using a specific application system will increase his or her job performance within

an organizational context." (Davis, 1989, p.985). Based on the conceptual relationship between "interactivity, vividness, and novelty"; it is widely accepted that gathering information such as color, functions, shape is more easy and effective that increases the perception of "usefulness" (Swaak, 2009). In line with the statement, "immersion" was found to be a significant predictor of "usefulness" and the hypothesis is accepted.

H5: Ease of use has an effect on usefulness➔ Rejected

"Perceived ease of use" refers to " to the degree to which prospective user expects the target system to be free of effort" (Davis, 1989, p.985). Unlike to most of the previous studies (Porter, 2006; Ahn, 2004; Kim, 2008), the current study explored that "perceived ease of use" doesn't have an effect on "usefulness" and found to be an insignificant predictor and the hypothesis is rejected.

H6: Informativeness has an effect on usefulness ➔ Rejected

The construct "informativeness" refers to the information that is generated through the AR app such as the detailed information to compare products, and the information that helps in the decision. Rese (2014), conducted research in the context of AR applications, and integrated external variables to the TAM model such as "perceived informativeness" and "perceived enjoyment". Both variables have shown a positive influence on attitude toward a mobile device or a website referring to several empirical studies (Swaak, 2009, Hausman, 2009; Ducaffe, 1996). Unlike to the previous findings, "informativeness" was found to be an insignificant predictor of "usefulness" and the hypothesis is rejected.

H7: Entertainment has an effect on usefulness ➔ Accepted

Entertainment / Enjoyment refers to "the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use." (Vankatesh, 2008, p.279). Previous studies have discovered that "enjoyment" and hedonic value have a strong impact

on consumer behavior while the utilitarian does not have the same impact (Kim, 2008; Huang and Hsu Liu, 2014). With some similarities to the previous researches (Hausman, 2009; Rese, 2014; Yim, 2012; Kim, 2008; Ducaffe, 1996), the current study explored that "entertainment" has an effect on "usefulness" and found to be a significant predictor, and the hypothesis is accepted.

H8: Usefulness has an effect on Attitude toward AR app using ➔ Accepted

Attitude toward AR Application usage refers to "the positive feeling about AR. If AR users have a high level of positive feeling about AR, then they will be more likely to re-experience AR. Thus, higher attitude toward AR may lead to AR usage intention." (Chung, 2015, p.593). Based on the previous research results (Yim, 2017; Hausman, 2009; Rese, 2014; Porter, 2006; Ahn, 2004; Kim, 2008), it was clearly showed that "perceived usefulness" had a significant impact "on attitude towards AR" as well as on purchase decision. The current study explored that "usefulness" has an effect on "attitude toward AR app using" and found it to be a significant predictor, and the hypothesis is accepted.

H9: Attitude toward AR app using has an effect on purchase intention ➔ Accepted

Purchase Intention refers to "a situation where consumer tends to buy a certain product in a certain condition." (Mirabi, 2015, p.268). Similar to the previous researches (Ahn, 2004; Kim, 2008; Taylor, 1994; Porter, 2006), the current study explored that "attitude toward AR app using" has an effect on "purchase intention" and found it to be a significant predictor, and the hypothesis is accepted.

5.2. LIMITATIONS AND FUTURE RESEARCH

Since the AR application that was selected to be used for the study, Wanna Kicks, was created previously and might not be fully in line with the personal choices of some of the participants. That might have a negative impact on their journey while

interacting with the application. For example, some participants may not like sports shoes and any content related to these types of products might be out of their preference and that may cause a negative or biased impact on the AR application experience.

In addition, due to the COVID-19 Global outbreak, this study was conducted through online surveys. Participants were guided to download the application, link sent through an email, by following the instructions. Prior to the usage of the AR app, they were subjected to do an online survey. This situation limited to measure the responses to some constructs, such as “anxiety” as the participants which are not familiar with the technology haven’t done the test that has an impact in terms of diversity. This kind of constructs are taken out of the study as well as the framework. Moreover, the testing environment was not the same for all participants that eliminated to ensure to have the same experience while reviewing the application. Noise, brightness and the overall atmosphere might have either a positive or negative impact on the experience of the participants that can be linked to the “vividness” construct. Considering the limitations that are caused by the COVID-19 pandemic, a field study is recommended to be conducted in the future by adding additional constructs and the results should be compared.

As the awareness and familiarity with technology and with these types of applications are increasing day by day, it is not easy to assume which variables will take more portion in terms of influencing customer journeys. As a result; considering the time limitations of the study; to measure and assess current and new variable’s impacts, a longitudinal study is suggested.

The study is limited to a specific industry with specific product categories, it should be extended to other industries to examine the effects of AR technology on purchase intention of other product categories.

Finally, in terms of the impact on telepresence, revealing hedonic and utilitarian values in the most effective way, perception of ease of use, the smart device that

was used and the features of it is quite important on the experience. While some were using tablets, others used smartphones, and even within the ones that used smartphones, the overall experience might be different based on the screen sizes.

5.3. MANAGERIAL IMPLICATIONS

The world is evolving, changing each day and technological enhancement is one of the key drivers of this rapid change. With the help of innovations, possibilities moved beyond expectations and technology gained a great portion in almost all individual's life. Considering that as an indisputable fact, as well as to gain sustainable competitive advantage, almost all companies are restructuring, enriching, and diversifying their offerings and combining with new technologies.

On one hand, considering the expectations of today's customers, and on the other, realizing the importance of technologies on customer's journey towards purchase intentions, all stakeholders, all departments in a company have to catch up with the trend.

Augmented Reality applications: which is the subject of this study; are good examples of technological enhancement and the study proved that AR applications have a positive and influential impact on an individual's purchase intention, in line with the literature (Rose et al. ,2014).

As designing customer journey is one of the main responsibilities of marketing functions that includes advertisement, promotion, branding, product management, AR technology is one of the tools that can help to increase the interactivity and engagement of the customer and let marketers establish a bridge between consumers and brands through innovative and enjoyable interactions, meanwhile expanding the possibilities of promotion, price, product, research as well as

relationship management by creating a remarkable experience which is totally different than traditional ways of communication. As a result, AR in marketing generally brings out “WOW” effects (Javornik, 2014).

In terms of financial outputs, strategies that create the values mentioned above, help to increase customer base which leads to high market share and profitability at the same time which are the keys for a long presence of a company in the market.

The results of this study clearly showed that not only interactivity, novelty, and immersion or telepresence; but also, entertainment has a positive impact on the purchase decision. Consequently, marketers should take into consideration all these findings while they are designing the company’s go-to-market strategies.

Finally, based on the findings of the study, there is an opportunity for AR designers and developers to build an attractive AR application by considering customer’s needs, requisites, and expectations.

5.4. SUMMARY

The aim of this thesis was to clarify the customer journey with the usage of AR applications toward purchase intentions, and to address the research gap by exploring how mobile AR applications influences customer experience. The conceptual framework was built by us as there were quite limited researches on AR and customer experience that leads to purchase intention.

In sum, the research results showed that different, unique, unusual, and new things help to create immersion as well as being part of it through interactivity and indicated that “novelty” and “interactivity” has an impact on “immersion”. “Immersion” has an influence on “perceived usefulness” as well as the “entertainment”. “Perceived usefulness” has a positive influence on “attitude toward AR application usage”, and “purchase intention”.

As a final word, by the enhancement of technological developments, AR-applications have the capability to influence the customers in the best possible way. Moreover, during the Covid-19 outbreak and even during the post-pandemic, the shopping experience is/will be changed and AR applications will be one of the best ways to catch the demand for the companies and increase customer loyalty.

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APPENDIX

QUESTIONNAIRE

Cevaplarınızla katkıda bulunacağınız bu çalışmanın amacı Mobil AR uygulamalarına karşı tutum ve davranışların satın alma niyetine etkisini ölçmektir. Bu amaç doğrultusunda öncelikle sizlerden mobil cihazlarınıza Wanna Kicks adlı uygulamayı indirmenizi, uygulamayı kullandıktan sonra aşağıdaki anket sorularına cevap vermenizi rica ediyoruz. Bu amaç doğrultusunda değerli görüşlerinizle katkıda bulunduğunuz ve zaman ayırdığınız için çok teşekkür ederiz.

Telefonunuzun işletim sistemine göre aşağıdaki linklerden birini kullanarak uygulamayı indiriniz.

Google Play Store için indirme linki:

https://play.google.com/store/apps/details?id=by.wanna.apps.wsneakers&hl=tr

Apple Store için indirme linki:

https://apps.apple.com/us/app/wanna-kicks/id1444049305

Aşağıdaki ifadelere kullanmış olduğunuz Wanna Kicks uygulamasını düşünerek ne derece katıldığınızı lütfen işaretleyiniz. 1=Kesinlikle katılmıyorum, 2=Katılmıyorum, 3=Ne katılıyorum ne katılmıyorum, 4=Katılıyorum, 5=Kesinlikle katılıyorum	1	2	3	4	5
Yenidir.					
Benzersizdir.					
Farklıdır.					
Alışılmadıktır.					
Uygulamada rahatlıkla gezinebildim.					
Uygulamada istediğim içeriğe rahatlıkla ulaşabildim.					
Ayakkabıları denerken uygulamanın adımlarını takip edebildim.					
Ayakkabıları denerken hızlı ve kolayca farklı renk ve modelleri deneyebildim.					

Aşağıdaki ifadelere kullanmış olduğunuz Wanna Kicks uygulamasını düşünerek ne derece katıldığınızı lütfen işaretleyiniz. 1=Kesinlikle katılmıyorum, 2=Katılmıyorum, 3=Ne katılıyorum ne katılmıyorum, 4=Katılıyorum, 5=Kesinlikle katılıyorum	1	2	3	4	5
Ayakkabılar ayağımda belirgindi.					
Ayakkabıların detayları ayağımda görünüyordu.					
Ayakkabıların ayağımdaki görüntüsü bulanıktı.					
Ayakkabıların renkleri ayağımda net görünüyordu.					
Ayakkabılar ayağımda net görünüyordu.					
Ayakkabıların görüntüleri ayağıma oturuyordu.					
Ayakkabıyı gerçekten denediğimi hissettim.					
Uygulamayı kapattıktan sonra bile, denediğim ayakkabıyı ayağımda hayal edebildim.					
Denediğim sanal ayakkabılar tamamen gerçek gibiydi.					
Mağazada ayakkabıyı denemek daha gerçekçi olurdu. (R)					
Uygulamayı kullanırken kendimi kaptırdım.					
Uygulamayı kullanırken dikkatim dağılmadı.					
Uygulamayı kullanırken başka bir şey düşünmedim.					
Uygulama, seçtiğim ayakkabı ile ilgili isteğim bilgileri gösterdi.					
Uygulama, ayakkabılar ile ilgili detaylı bilgi vermektedir.					
Uygulama, ayakkabıyla ilgili sağladığı bilgilerle karar vermeme yardımcı oldu.					
Uygulama, ayakkabılar arasında karşılaştırma yapabilmemi sağladı.					
Uygulamayı kullanmak çok kolaydı.					
Uygulamayı içgüdüsel olarak kullandım.					
Uygulamayı kullanmayı öğrenmek kolaydı.					
Uygulamada ayakkabıları denemek kolaydı.					
Bu uygulamayı kullanmak eğlenceliydi.					
Bu uygulamayı kullanmak keyifliydi.					
Bu uygulamayı kullanmak memnuniyet vericiydi.					
Bu uygulamayı kullanmak heyecan vericiydi.					

Aşağıdaki ifadelere kullanmış olduğunuz Wanna Kicks uygulamasını düşünerek ne derece katıldığınızı lütfen işaretleyiniz. 1=Kesinlikle katılmıyorum, 2=Katılmıyorum, 3=Ne katılıyorum ne katılmıyorum, 4=Katılıyorum, 5=Kesinlikle katılıyorum	1	2	3	4	5
Uygulamadaki artırılmış gerçeklik daha etkin ayakkabı seçimi yapmamı sağladı.					
Uygulamadaki artırılmış gerçeklik zaman kazanmamı sağladı.					
Uygulamadaki artırılmış gerçeklik teknolojisini kullanmak, ayakkabı aramamın kalitesini arttırdı.					
Uygulamadaki artırılmış gerçeklik daha hızlı bilgi edinmemi sağladı.					
Genel olarak, artırılmış gerçekliği alışveriş deneyimimde yararlı buldum.					
Bu uygulama hakkında olumlu düşünüyorum.					
Bu uygulama o kadar ilginç ki, uygulama hakkında daha çok şey öğrenmek istiyorum.					
Bu uygulamayı kullanmak bana mantıklı geldi.					
Bu uygulamanın kullanılması iyi bir fikirdir.					
Başkaları da bu uygulamayı kullanmalıdır.					
Bu uygulamayı gelecekte de kullanmak isterim.					
Bu uygulamayı gelecekte düzenli kullanırım.					
Başkalarına bu uygulamayı tavsiye ederim.					
Bu uygulamayı kullanarak ayakkabı almaya niyetlenirim.					
Bu uygulamayı kullanarak kesinlikle ayakkabı almak isterim.					
Bu uygulamayı kullanarak mutlaka ayakkabı alırım.					

ETİK KURUL DEĞERLENDİRME SONUCU / RESULT OF EVALUATION BY THE ETHICS COMMİTTEE

Covid-19 salgını nedeniyle İstanbul Bilgi Üniversitesi İnsan Araştırmaları Etik Kurulu, 2020-2021 Güz döneminde teslim edilecek lisansüstü tezlerin onay yetkisini ilgili etik kurul alt komitelerine devretmiştir. / Due to the Covid-19 outbreak, Istanbul Bilgi University Human Research Ethics Committee has transferred its approval authority to the Ethics Board Sub-Committees organized within each graduate program. Thus, the graduate theses to be submitted in the fall semester of 2020-2021 should/must get the approval of the Ethics Board Sub-Committee within their own graduate program.

ETİK KURUL ALT KOMİTESİ DEĞERLENDİRME SONUCU / ETHICS BOARD SUB-COMMITTEE EVALUATION RESULT

Bu bölüm lisansüstü tez araştırmaları için ilgili Etik Kurul alt komitesince doldurulacaktır. / This part to be completed by the Ethics Board sub-committee responsible for graduate dissertation studies.

Başvuru Sahibi / Applicant: **Anıl Öztekin**

Proje Başlığı / Project Title: **Artırılmış Gerçeklik Mobil Uygulama Kullanımının Belirleyicileri ve Tüketici Satın Alma Davranışına Etkisi / Determinants of Augmented Reality Mobile Application Usage and Its Influence on Consumer Buying Behavior**

Değerlendirme Sonucu/ Result of Evaluation

1.Herhangi bir değişikliğe gerek yoktur. Veri toplama/uygulama başlatılabilir./ There is no need for revision. Data collection/application may commence : Uygundur.

2. Ret / Application Rejected : _____

~~Reddin gerekçesi / Reason of Rejection~~ : _____

Değerlendirme Tarihi / Date of Evaluation:

Unvanı, Adı, Soyadı / Title, Name, Surname:

Dr. Öğr. Üyesi Esra Arıkan

İmza / Signature:

Dr. Öğr. Üyesi Neşenur Altıniğne Ekici

İmza / Signature: