

**Assessment of Virtual Reality technology as a tool to enhance
beauty and skincare e-commerce targeting
Gen X, Millennials and Gen Z in Dubai, United Arab
Emirates**

تقييم تكنولوجيا الواقع الافتراضي كأداة لتطوير التسوق عبر الإنترن特 لمنتجات التجميل والعناية بالبشرة بين الجيل إكس، جيل الألفية وجيل زد في دبي، الإمارات العربية المتحدة.

by

SUZAN KEFAH ALMOMANI

**Dissertation submitted in fulfilment
of the requirements for the degree of**

MSc SUSTAINABLE DESIGN OF THE BUILT ENVIRONMENT

at

The British University in Dubai

March 2020

DECLARATION

I warrant that the content of this research is the direct result of my own work and that any use made in it of published or unpublished copyright material falls within the limits permitted by international copyright conventions.

I understand that a copy of my research will be deposited in the University Library for permanent retention.

I hereby agree that the material mentioned above for which I am author and copyright holder may be copied and distributed by The British University in Dubai for the purposes of research, private study or education and that The British University in Dubai may recover from purchasers the costs incurred in such copying and distribution, where appropriate.

I understand that The British University in Dubai may make a digital copy available in the institutional repository.

I understand that I may apply to the University to retain the right to withhold or to restrict access to my thesis for a period which shall not normally exceed four calendar years from the congregation at which the degree is conferred, the length of the period to be specified in the application, together with the precise reasons for making that application.

Signature of the student

COPYRIGHT AND INFORMATION TO USERS

The author whose copyright is declared on the title page of the work has granted to the British University in Dubai the right to lend his/her research work to users of its library and to make partial or single copies for educational and research use.

The author has also granted permission to the University to keep or make a digital copy for similar use and for the purpose of preservation of the work digitally.

Multiple copying of this work for scholarly purposes may be granted by either the author, the Registrar or the Dean of Education only.

Copying for financial gain shall only be allowed with the author's express permission.

Any use of this work in whole or in part shall respect the moral rights of the author to be acknowledged and to reflect in good faith and without detriment the meaning of the content, and the original authorship.

ABSTRACT

This paper explores whether a virtual shopping experience using immersive VR technologies can enhance and possibly substitute an in-store presence of a consumer shopping for beauty and skincare products.

Differences in age groups directly affect consumers' approach towards shopping and lead their shopping patterns while browsing for beauty and skincare products.

Three generational cohorts including Gen Z aged between (7-22 years old), Millennials aged between (23-38 years old) and Gen X aged between (39-54 years old) were selected for the purpose of this study. Each group consisted of 10 female participants, thus a total of 30 responses were analysed and studied.

VR experiment combined with survey research method was adopted to develop an understanding of how generational cohorts are unique in the way they perceive and engage with physical and online shopping.

MAC cosmetics hypothetical virtual store was designed in 3D using SketchUp program and launched as a VR experiment using a plugin called Enscape.

Three surveys in a 5-point Likert scale format were distributed among all participants to analyse the positive potential of introducing VR features into beauty and skincare e-commerce.

First survey collected general feedback about online shopping and VR, second survey gathered responses about MAC cosmetics current physical stores' design and the third survey was taken to record the feedback after undergoing the MAC cosmetics virtual store experiment.

This research found that generational differences affect the acceptance and engagement levels with novel technological advancements in retail. Millennials were observed to be the most educated about the progression of VR technology into retail in general. Overall, all participants had positive feedback about the virtual store experience, however Gen X had reported difficulties in navigation and needed more human assistance during the experiment. No motion sickness was reported and all participants were interested to shop in future virtual stores equipped with features like virtual mirrors and digital skin analysis with Gen Z being the most supportive and excited.

ملخص

يتناول هذا البحث ما إذا كانت تجربة التسوق الافتراضي باستخدام تقنية VR يمكن أن تحسن أو ربما تحل محل طرق التسوق التقليدية لمستحضرات التجميل و العناية بالبشرة.

تؤثر اختلافات الأجيال بشكل مباشر على سلوكهم الاستهلاكي في التسوق وتقود أنماط تسوقهم أثناء تصفح و اختيار منتجات التجميل و العناية بالبشرة.

ثلاثة مجموعات من الأجيال اختيرت لهذى الدراسة و تتضمن الجيل إكس الذين تتراوح أعمارهم بين (39-54 سنة) ، جيل الألفية الذين تتراوح أعمارهم بين (23-38 سنة) والجيل زد الذين تتراوح أعمارهم بين (22-7 سنة). و تتألف كل مجموعة من 10 مشاركات ، وبالتالي تم تحليل و دراسة مجموعة مكونة من 30 عينة.

تم تصميم واستخدام تجربة افتراضية بالإضافة إلى توزيع استبيان الاستبيان كوسيلة لدراسة طريقة تفكير الأجيال و تفاعلها مع التسوق التقليدي المادي و التسوق من خلال الإنترنط.

تم تصميم تجربة افتراضية ثلاثة الأبعاد لمتجر مستحضرات تجميل ماركة ماك باستخدام برنامج سكريتشاب و تم تشغيل التجربة الافتراضية باستخدام البرنامج المساعد لسكريتشاب المسمى بـAnskaip.

تم توزيع ثلاثة أنواع من الاستبيان مصممة على نموذج مقاييس ليكرت المكون من خمسة نقاط على جميع المشاركات لتحليل أهمية إدخال ميزات VR في قطاع للعناية بالبشرة و التجميل.

جمع الاستبيان الأول تعليقات عامة حول التسوق عبر الإنترنط ، و جمع الاستبيان الثاني إجابات حول التصميم الحالي لمحلات ماك لمستحضرات التجميل ، و تم إجراء الاستبيان الثالث لتسجيل ردود المشاركات بعد خصوئهن لتجربة التسوق الافتراضية باستخدام تقنية VR في متجر ماك الافتراضي لمستحضرات التجميل.

أكّدت نتائج هذا البحث أن اختلاف الأجيال يؤثّر على درجة تقبّلهم و تفاعلهم مع التكنولوجيا الحديثة في قطاع التسوق. وجد هذا البحث كذلك أن جيل الألفية هو الجيل الأكثر إماماً حول تطور تكنولوجيا الواقع الافتراضي قطاع التسوق بشكل عام. كانت لدى الأجيال الثلاثة ردود فعل إيجابية حول تجربة استكشاف المتجر الافتراضي، ولكن الجيل إكس وجد صعوبات في التجول عبر المتجر الافتراضي و عبر عن رغبته في الحصول على المزيد من المساعدة البشرية أثناء التجربة. لم يتم الإبلاغ عن الشعور بدور الحركة او الشعور بالدوخة بعد الانتهاء من التجربة الافتراضية، و عبرت جميع المشاركات عن رغبتهن في التسوق في المتاجر الافتراضية المصممة في المستقبل واستكشاف ما تكمنه من ميزات مثل المرايا الافتراضية وتقنية تحليل انواع البشرة الرقمية.

DEDICATION

This work is dedicated to my dear parents (Kefah Almomani and Elena El Junedzi), supporting and loving husband Asem Al Sobeh, the kindest grandmother Ludmila Lugovskaya and the rest of my family.

AKNOWLEDGEMENT

First and foremost, I would like to express my gratitude for my supervisor Professor Bassam Abu Hijleh, for his encouragement and believing in the importance and the potential of my research topic for my career development and personal passion. I was lucky to receive his guidance, constructive feedback and support to complete this thesis by simplifying and clearing the doubts occurred along the research process.

Special thanks to MAC cosmetics for allowing access to the store for the purpose of surveying and answering questions necessary for brand's evaluation and understanding.

I would like to thank my sister Eng. Darina Almomani for sharing her professional experience and her assistance in selecting the most realistic up-to-date virtual reality plugin for launching this experiment in the VR room at Aurecon's office in Dubai, United Arab Emirates.

I would like to thank all the participants that took part in the surveys and the virtual experiment for their patience, constructive feedback and suggestions.

This dissertation would not have been completed without the support and constant encouragement from my beloved father Kefah Almomani and mother Elena El Junedzi that always loved me and believed in me.

Special thanks for my husband Asem for sharing this journey with me and constantly encouraging me to complete this dissertation and always mentioning how he couldn't wait to see me a graduate with a master's degree.

Table of Contents

ABSTRACT.....	
ملخص.....	
DEDICATION.....	
AKNOWLEDGEMENT.....	
CHAPTER 2 INTRODUCTION.....	1
2.1 RESEARCH BACKGROUND ON VIRTUAL, AUGMENTED AND MIXED REALITIES	1
2.2 HISTORICAL OVERVIEW.....	2
2.3 VR PROGRESSION INTO RETAIL.....	3
2.4 BEAUTY AND SKINCARE CURRENT AND FORECAST MARKET ANALYSIS	5
2.5 SUSTAINABILITY IN RETAIL	8
2.6 MOTIVE OF THE STUDY	9
2.7 RESEARCH AIM AND OBJECTIVES.....	11
2.8 RESEARCH OUTLINE AND STRUCTURE.....	12
CHAPTER 3 LITERATURE REVIEW	14
3.1 THE LINK BETWEEN TELEPRESENCE AND ENJOYMENT IN VIRTUAL RETAIL	14
3.2 VIRTUAL AND AUGMENTED REALITY APPLICATIONS IN RETAIL	16
3.2.1 Virtual and Augmented Reality in Furniture and Department Stores	16
3.2.2 Virtual and Augmented Reality in Toy Stores.....	17
3.2.3 Virtual and Augmented Reality in Apparel Stores.....	18
3.2.4 Virtual and Augmented Reality in Automotive Industry	19
3.2.5 Virtual and Augmented Reality in e-commerce	19
3.2.6 Virtual and augmented reality in beauty, cosmetics and skincare retail.....	19
3.2.1 Cruelty-Free cosmetics and Veganism.....	23
3.3 DOWNTOWN DESIGN: DUBAI DESIGN WEEK LECTURE: THE FUTURE OF RETAIL DESIGN - 2019	26
3.4 FUTURE OF RETAIL SPACES.....	27
3.5 GENERATIONAL COHORTS	28
3.5.1 Consumer Behaviour of Gen X	29
3.5.2 Consumer Behaviour of Millennials	29
3.5.3 Consumer Behavior of Gen Z.....	29
3.5.4 Similarities between Gen X and Millennials	30

3.5.5	Differences between Gen X and Millennials.....	30
3.5.6	Similarities between Millennials and Gen Z	31
3.5.7	Differences between Millennials and Gen Z	32
CHAPTER 4	METHODOLOGY.....	36
4.1	REVIEW OF PREVIOUS PAPERS ON VIRTUAL AND AUGMENTED REALITY BASED METHODOLOGY	36
4.1.1	Literature Review Method	36
4.1.2	Pilot Studies and Survey Method.....	39
4.1.3	Computer-generated Experiment Method	41
4.2	CASE STUDY	47
4.2.1	MAC Cosmetics History Overview	47
4.2.2	Justification of Brand Selection.....	48
4.2.3	Methodology Used for The Purpose of this Study.....	50
4.2.4	Justification of the Selected Methodology	51
CHAPTER 5	VIRTUAL STORE DESIGN	53
5.1	DETAILED CHART WITH MATERIALS AND MEANS REQUIRED TO CONDUCT RESEARCH:	54
5.2	SELECTED METHODOLOGY'S EXPLANATION.....	55
5.2.1	Step One. Site Surveying “MAC cosmetics Mirdiff City Centre, Dubai, United Arab Emirates”	55
5.2.2	Participants.....	56
5.2.3	Pilot Studies (Surveys).....	57
5.2.4	Experiment Design	58
5.2.5	Experiment Procedure.....	65
CHAPTER 6	RESULTS AND DISCUSSION.....	66
RESULTS		66
6.1	SURVEY 1_PRELIMINARY / GENERAL SURVEY	67
6.1.1	VR Technology and e-commerce (Q.1,2,3).....	68
6.1.2	Testing and Hygiene (Q.4,5,6,7).....	68
6.1.3	The upside and downside of e-commerce (Q.8,9,10).....	69
6.2	SURVEY 2_MAC COSMETICS CURRENT IN-STORE SHOPPING SURVEY	70
6.2.1	MAC cosmetics current physical store attractiveness and creativity of display (Q.1,2,3,4,5).....	71
	Adequacy of	71
6.2.2	current in-store assistance (Q. 6)	71
6.2.3	Futuristic MAC cosmetics stores (Q.10).....	71

6.3 SURVEY 3_POST-EXPERIMENT SURVEY (COLLECTING FEEDBACK FROM PARTICIPANTS AFTER TRYING MAC COSMETICS VIRTUAL STORE EXPERIMENT)	72
6.3.1 Navigation in a virtual store (Q.1,2)	73
6.3.2 Virtual store appearance and future success (Q. 3,4)	73
6.3.3 The Human Factor (Q.5).....	74
6.3.4 Typical retail elements such as: (cash desk, mirrors, fitting rooms etc.) (Q.6).....	74
6.3.5 Realism	74
6.3.6 Motion Sickness – Dizziness.....	75
6.3.7 Games, scoring, virtual gifts, and giveaways	75
DISCUSSION	76
6.4 MILLENNIALS' SMART INTELLIGENCE.....	77
6.5 THE POSITIVE POTENTIAL OF VR IN BEAUTY AND SKINCARE RETAIL	78
6.6 SUSTAINABILITY AND HEALTH CONCERNS	79
6.7 FINANCIAL BENEFIT FOR RETAILERS AND CONSUMERS	80
6.8 ENHANCING STORE APPEARANCE AND CHARISMA.....	80
6.9 PREFERENCE OF SHOPPING STYLE BY GENERATION.....	81
6.10 GENERATIONAL ACCEPTANCE AND ENGAGEMENT LEVELS WITH VIRTUAL RETAIL	81
6.11 LIMITATIONS AND CHALLENGES FACED DURING RESEARCH	83
CHAPTER 7 CONCLUSION	85
7.1 RECOMMENDATIONS	88
7.2 FUTURE RESEARCH	89
REFERENCES	91
APPENDICES	103

List of Figures

FIGURE 1.1 GROWTH OF COSMETICS MARKET 2009-2019 (L'OREAL ANNUAL REPORT 2018).....	6
FIGURE 1.2 MAIN WORLDWIDE PLAYERS IN SALES (L'OREAL ANNUAL REPORT 2018).....	7
FIGURE 2.1. CHILD PLAYING LEGO HIDDEN SIDE (THE LEGO GROUP 2019).....	17
FIGURE 2.2. PUMA's AUGMENTED REALITY SHOE (VAN EVEN 2019)	18
FIGURE 2.3. EASTER BUNNIES, (JANE LEWIS 2018)	24
FIGURE 2.4. LUSH CAMPAIGN LOGOTYPE (2012)	25
FIGURE 2.5. ESTEE LAUDER'S TESTIMONY ON ANIMAL TESTING (2018)	25
FIGURE 2.6. INTEREST TOWARDS GENERATION Z IN ONLINE SEARCHES (GOOGLE TRENDS 2019)	34
FIGURE 2.7. GENERATIONS AND AGE (PEW RESEARCH CENTER 2019).....	34
FIGURE 2.8. ANNUAL CONSUMER SPENDING BY GENERATION (EPSILON 2019).....	35
FIGURE 3.1 MAC's EXPERIENCE CENTRE TARGETING GEN Z IN SHANGHAI, CHINA (PRANCE-MILES 2019).....	50
FIGURE 4.1 MAC COSMETICS STORE, MIRDIF CITY CENTRE UAE (ALMOMANI, 2019)	56
FIGURE 4.2 SKETCHUP 2017 MAC VIRTUAL STORE 3D MODEL SCREEN GRAB	58
FIGURE 4.3 MAC VIRTUAL STORE LAUNCHED WITH ENSCAPE PLUGIN IN FLY MODE	59
FIGURE 4.4 MAC VIRTUAL STORE LAUNCHED WITH ENSCAPE PLUGIN IN WALK MODE	59
FIGURE 4.5 ESCAPE'S NAVIGATION INSTRUCTIONS BAR.....	60
FIGURE 4.6 INTERNAL SCREEN GRAB 01	60
FIGURE 4.7 INTERNAL SCREEN GRAB 02- MIDFLOOR – EYE SHADOW	61
FIGURE 4.8 INTERNAL SCREEN GRAB 03- MIDFLOOR – BASE FOUNDATION	61
FIGURE 4.9 INTERNAL SCREEN GRAB 04-MIDFLOOR-LIP COLOUR STICKS	62
FIGURE 4.10 INTERNAL SCREEN GRAB 04- MIDFLOOR – EYE PENCILS AND LINERS.....	62
FIGURE 4.11 INTERNAL SCREEN GRAB 04- PERIMETER DISPLAY-LEFT	63
FIGURE 4.12 VIRTUAL ASSISTANT AND DIGITAL SKIN ANALYSIS PORTAL DESIGN.....	63
FIGURE 4.13 INTERNAL SCREEN GRAB 04- PERIMETER DISPLAY-RIGHT	64
FIGURE 4.14 VIRTUAL MAKEUP TRY ON AND TUTORIAL PORTAL DESIGN	64
FIGURE 4.15. PARTICIPANT EXPLORING MAC VIRTUAL STORE USING HTC VIVE	65
FIGURE 4.16. PARTICIPANT'S' VIEWPORT INSIDE MAC VIRTUAL STORE	65
FIGURE 5.1 RESPONSES OF EACH AGE GROUP TO SURVEY 1	67
FIGURE 5.2 COMPARISON OF AGE GROUP RESPONSES TO SURVEY 1	67
FIGURE 5.3 RESPONSES OF EACH AGE GROUP TO SURVEY 2	70
FIGURE 5.4 COMPARISON OF AGE GROUP RESPONSES TO SURVEY 2.....	70
FIGURE 5.5 RESPONSES OF EACH AGE GROUP TO SURVEY 3	72
FIGURE 5.6 COMPARISON OF AGE GROUP RESPONSES TO SURVEY 3	72
FIGURE B.1 PARTICIPANTS DURING THE VR EXPERIMENT AT AURECON OFFICE, DUBAI, UNITED ARAB EMIRATES ..	110

List of Tables

TABLE 2.1: AVERAGE ANNUAL DOLLARS SPENT BY GENERATION (EPSILON 2019).....	32
TABLE 4.1 LIST OF SOFTWARE REQUIRED TO COMPLETE RESEARCH	54
TABLE 4.2 LIST OF HARDWARE REQUIRED TO COMPLETE RESEARCH	54
TABLE B.1 AVERAGE AND STANDARD DEVIATION VALUES FROM SURVEY 1	107
TABLE B.2 AVERAGE AND STANDARD DEVIATION VALUES FROM SURVEY 2	108
TABLE B.3 AVERAGE AND STANDARD DEVIATION VALUES FROM SURVEY 3	109

Chapter 1 **Introduction**

1.1 Research Background on Virtual, Augmented and Mixed Realities

According to Mazuryk and Gervautz (2014), virtual reality is best defined as an immersive computer generated three-dimensional environment that replaces the real world with a synthetic one with the help of an interactive technology set. The term “virtual” is defined by Merriam-Webster's New Collegiate Dictionary as “being in effect but not in actual fact”. It can also be defined as a set of input and output devices that intensifies the stimulation of human's sensory receptive channels, for example by providing a wider angle of viewing or enabling auditory senses into a stereo format (Mandal 2013). The purpose of any virtual experience is to immerse the user into a synthetic three-dimensional world tailored to serve a specific purpose depending on the orientation of the experience e.g., medical treatment, education, social connection, e-commerce, rehabilitation, etc. (Loureiro et al. 2019).

On the other hand, according to Yim et al. (2017), augmented reality is defined as a superimposition of virtual reality elements on real environments. It is also described as an overlay of virtual objects on real environments or spaces. Spatial augmented reality is a term that describes a type of augmented reality in where images and scenes are projected on a large wall in the form of a three-dimensional video mapping. Augmented virtuality is the opposite of augmented reality, as in augmented virtuality; real objects are projected on virtual environments. An example of that is a projection of a human being into a virtual environment. Mixed reality, is an environment in where both real and virtual objects coexist in various combinations and scenarios. Virtual, augmented and mixed reality technology and applications have been intensely evolving and expanding with the help of the available information and internet technology (Flavián et al. 2019).

With the help of novel technologies developed specifically to support VR and AR function, immersive experiences can be equipped with head mounted devices (HMD) and gloves with sensory trackers or wireless touch remote controllers. With the availability of equipment as such, developers were able to further engage the users into imaginary worlds and facilitate their interaction with virtual items (Flavián et al. 2019). Immersive experiences may expand and be

adapted to best market for products' features including senses of taste and smell thus allowing the experience to be the closest it could to reality. The current available virtual and augmented reality experiences would either require going online by accessing a specific website or downloading and installing an application that launches the VR experience. As mentioned earlier, many industry sectors have adopted VR and AR applications into their businesses, therefore virtual environments or virtual worlds may serve different purposes and deliver messages appropriate to the type of the industry it is related to or tailored for. Virtual environments and cyber platforms are becoming the mediums to buy and sell various goods and services worldwide. They are also considered platforms for serving the commercial purposes and promotional activities. Brands like Ikea, Macy's, Superdry and Ray Ban have already introduced three-dimensional and immersive features to their websites and mobile applications. (Krasonikolakis et al. 2014).

Technological advancement in the field of virtual, augmented and mixed reality will re-direct the future of retailing into a new perspective (Cheng 2019). According to Cheng (2019, p.2), brand and experience strategist at FITCH Design Hong Kong "Beauty is not one size fits all", as consumers have become far more demanding and conscious about brand values. The physical store is nowadays a venue in where cultural and ethnical diversity is celebrated, animal cruelty is fought and the sustainable future is discussed. Therefore, with the emergence of e-commerce, most physical beauty and skincare stores have become placeholders to feed the consumer's curiosity and their sense of discovery.

1.2 Historical Overview

The discovery and thriving research on augmented and virtual reality dates back to 1990s with the invention of the Sensorama machine by Morton Heilig in 1962. Sensorama's components included a pre-recorded film superimposed with sound, scent, vibration and wind simulations (Javornik 2016). In 1965 an American computer scientist Ivan Sutherland presented the "Ultimate Display" as a concept of an integrated virtual reality experience containing smell, taste and interactive graphics. In 1971 the first force-feedback prototype called "Grope" was built and assembled at the University of North Carolina, US. "Videoplace" was created by an American

computer scientist Myron Krueger in 1975, simulating an artificial environment that allowed its users to interact with two dimensional objects with the help of a computer (Mandal 2013).

Thomas Furness had contributed to the development of virtual reality technologies by introducing the first flight simulator (VCASS*) in 1982. In 1985, VPL was the first company to manufacture the head mounted devices (HMD) also known as VR glasses and other hand tracking devices (Mazuryk and Gervautz 2014). CAVE model developed in 1992, projected images on room's walls and the users were asked to wear special glasses that enhance the quality of the images and widen the angle of the view in a tight room (Mandal 2013). The Sega VR-1 was launched in 1994 and shortly after another VR device was developed for a medical necessity to treat post-traumatic stress disorder for war veterans in 1997. Subsequently, in 2010 the launch of "Google maps" marked a crucial invention allowing the users to place themselves in their location of preference and view the surroundings in a 360 degrees' format. In 2012, the Oculus VR device was announced and in the following two years the social networking platform "Facebook" acquired Oculus; while companies like Sony, Samsung and Google had all announced the development and launching plans for novel VR technologies in the near future (Dormehl 2017).

Virtual and augmented reality technology continued developing and nowadays include computer workstations equipped with good graphics cards and RAM capacity, sensory displays with HMD devices, various motion and orientation detectors and trackers as well as a range of 3D modelling and VR simulation softwares (Onyesolu and Eze 2011).

1.3 VR Progression into Retail

The intensive development of VR technologies and their progression into retail is re-diverting the future of commerce by creating exciting opportunities to customize personal experiences for the consumer. Subsequently, these opportunities will further enhance brand's presence and recognition. The development of such technologies triggers economic growth by helping the brands to expand their business (Peukert et al. 2019). The advantage of immersive simulated virtual environment lies in the fact that it does not always require user's physical presence in the place where the experiment is conducted by giving its users the privilege to take part in

experiences with various orientations including design, construction, education, military, medicine, manufacturing and shopping (Loureiroa et. al 2019).

As the VR concept is no longer restricted to gaming and entertainment, it has been used nowadays by marketers in the retail industry to elevate the customer's cyber shopping experience into new levels. To stay on top of the business, marketers and retailers started investing into redesigning their business strategies and re-thinking the ways of handling the business by developing exciting customer journeys and shopping experiences. According to Farah et. al (2019), experiences provided by famous retailers are overall positively accepted by consumers. Furthermore, virtual reality applications are being liked and used by the consumers as an alternative or an enhancement for a more satisfying and enjoyable shopping experience. A comparison study between the user interface of online shopping and shopping in a virtual shopping mall showed that the consumers passively observed products in online stores, however in virtual stores they had expressed more engagement and enthusiasm by interacting with the visualized products (Speicher et. al 2018).

According to Huang and Liao (2015), the human's brain and psychology perceive the experience as more delightful when it is personalized and has a link to one's pleasant past experiences and history of use. The introduction of VR and AR technologies helped retailers to survive the competition amongst the retail giants in the fast-growing market as the technology contributed to satisfying demanding clients' expectations and helped elevating the total customer journey. The same research by Huang and Liao (2015) highlighted the positive potential of online shopping mediums and virtual reality applications and their role in increasing sales and generating further brand awareness among consumers.

The disadvantage or the downside of the retail re-formation is the cost of maintaining the condition of physical stores and supporting the traditional brick and mortar shopping method. These challenges and dilemmas have pushed both marketers and retailers to innovate and shift towards developing new strategies and techniques for the purpose of attracting more clients and generating more sales. Subsequently, virtual and augmented reality applications were introduced into retail and have been receiving since; a positive feedback and frequent engagement from users (Farah et. al 2019).

1.4 Beauty and Skincare Current and Forecast Market Analysis

The positive financial turnover of implementing virtual and augmented reality is forecast to reach \$29.5 billion U.S dollars by the year of 2020 (Statista, 2017). According to Loureiroa et al. (2019) virtual and augmented reality market size is expected to grow from \$27 billion U.S. dollars in 2018 to \$209.2 billion U.S. dollars by the year of 2022. The current market situation requires further intensive research about the smooth progression and integration of online shopping platforms into fully digitalized virtual stores. The research suggests that “realism” of the virtual shopping experience positively affects the intentions to purchase. A human intention to purchase is found to be driven by both affective and cognitive perceptions and emotions previously developed towards a specific product or service. Correct and realistic brand replication and representation in a three-dimensional virtual world will increase faster brand recognition and elevate users’ intentions to purchase (Navarro et al. 2019).

Beauty and skincare market is in continuous steady growth due to factors like the introduction of e-commerce, the inclusion of social media platforms as marketing and advertising tools, the expansion of urban fabric and the increase in the number of elderly population (Ketabchi 2018).



Figure 1.1 Growth of Cosmetics Market 2009-2019 (L’Oreal Annual Report 2018)

The above figure 1.1 shows the growth that the cosmetics market has been witnessing worldwide between the year of 2009 and 2019. According to the same figure 1.1 there has been a drop in the worldwide cosmetics recognition and growth between the year of 2012 and 2014 to rise again onwards and continue to grow towards the year of 2019. Online sales continue to grow by spreading worldwide at an annual percentage of nearly 25% contributing a share of 12.5% of total e-commerce in the overall beauty market (L’Oreal Annual Report 2018).



Figure 1.2 Main Worldwide Players in Sales (L’Oreal Annual Report 2018)

The figure above shows the leaders in the beauty cosmetics and skincare products worldwide according to their revenues in billions of US dollars as per the year of 2019. In reference to 1.2 the company “Estee Lauder”; the owner of MAC cosmetics is ranked the third largest main worldwide beauty retailer resulting in sales of 12.8 billion US dollars (L’Oreal Annual Report 2018).

According to Estee Lauder’s 2019 annual report (2019), the brand had successfully reached an approximate number of 1,500 freestanding stores operating under a single branded entity such as MAC Cosmetics, Origins, Jo Malone London and Aveda. In addition to that another 800 stores are being operated and permitted to sell Estee Lauder’s owned brands’ products through their authorized third parties in the Middle East, Europe and Africa. The marketing strategists at Estee Lauder recognize the role of technology in the future of beauty retail and foresee the opportunities available for seizing among the competitors in the field. Research had already been launched and funded to gather data analytics and employ new marketing capabilities that will stimulate higher consumer engagement and enhance the shopping experience by introducing immersive technologies into its retail channels. The same report by Estee Lauder (2019) argues that even though the majority of online sales generated in beauty and skincare sectors are located in the US, the UK and China, there is a promising opportunity to expand the e-commerce on a global scale.

1.5 Sustainability in Beauty and Skincare Retail

According to Arvidsson (2011) sustainability in retail is only achievable if both the brand and the consumer comply and commit to the ethics of sustainability. Marketing departments alone cannot be held responsible for spreading the awareness as the society at core, must oblige to the global mission of reducing non-recyclable waste. The term “sustainable” or “sustainability” was first created or used in 1990s (Caradonna 2014).

Sustainability is the new token for marketing by promoting the idea for standing for the planet’s well-being and the good of the international trading. A makeup brand Avon is aiming to reduce its waste production by 30% by the year of 2020. International famous brands are committing to a global mission of reducing the environmental impact and heading towards becoming “Zero Waste manufacturers”. Brands like Estee Lauder are contributing to the mission of saving the environment by using greener compositions and components for the creation of its products as well as reducing the packaging waste and the consumption of water and energy used in the production process (Venezia 2015).

According to Estee Lauder (2014) the brand has been complying with sustainability guidelines created by Green Chemistry in selecting the ingredients used in their cosmetics. Beauty and cosmetics industry is facing plenty of challenges when comes to diverting towards complete sustainability in its production chain. From manufacturing to packaging and reducing the toxins included and generated within products’ life cycle (Venezia 2015).

In 2019, beauty and skincare brand L’Oréal had announced its initiative to address the alarming climate issues and fight the emission of green-house gases through a program called “Sharing Beauty with All” which is designed to focus on sustainable innovation, sustainable production, sustainable consumption and sharing the sustainable growth with stakeholders and investors, as it announced a set of goals it is planning to achieve in the near future. By the year of 2025, all L’Oreal headquarters and manufacturing sites and locations were obliged to become green by complying with sustainability standards. By the year of 2030, the brand is intending to reduce its total carbon footprint by 25%. According to L’Oreal Annual Report (2018), L’Oreal had been praised by companies such as CDP (a UK based company that encourages corporations to

disclose their environmental footprint and impact) as one of the main global leaders in sustainable development for three years in a row (L’Oreal Annual Report 2018).

According to a study by McKinsey & Business of Fashion (2018), 66% of Millennials are ready to spend more on products and brands that support sustainability and fight animal-cruelty in testing and manufacturing beauty and cosmetics products. The rise of global environmental consciousness and consumers’ responsibility towards the sustainable future allows for the creation of new exciting opportunities for the brands to go completely green. According to a Sparknews report in collaboration with Cosmoprof Worldwide Bologna (2019), the overall beauty sector is expected to grow annually with a rate of 7.14% reaching to 805.61 billion US dollars in revenues by the year of 2023. The same report suggests that social and environmental behavior of organic beauty consumers is expected to keep on flourishing and the market for such products is expected to grow by 10% with each consecutive year.

1.6 Motive of the Study

The interest towards the research topic is driven from personal observations towards retail in general accompanied by the professional practice I have been involved in for the past 7 years focusing on enhancing commercial retail experiences and indoor environments. Having had worked for two worldwide recognised branding and retail design agencies, both Zebra and FITCH have their headquarters based in London. During my practice, the degradation of the traditional concept of brick and mortar retail had been a trending subject threatening and challenging the future practice of the business. With the recent wave of technological advancement, an interest towards designing the experience started taking over designing an attractive three-dimensional environment. There was a sudden shift in the way agencies started marketing themselves, putting an emphasis on the perception of a consumer in particular and coming up with terms such as “a customer journey” and “retail experience” that would suggest more entertainment and exploring into traditional off-the-shelf shopping method.

Retail design agencies; understand the research and effort they need to invest in to develop futuristic concepts and exciting commerce experiences to survive the thriving market

competition. Coming from an interior design background, with an experience and passion towards retail I was forced to conduct intensive research for every upcoming project assigned to myself to discover the latest trends and innovations in various retail channels and sectors. Having been assigned to work on multiple beauty and skincare department stores and standalone projects, I became interested in the future of beauty and skincare physical and virtual stores. With the re-direction of physical retail towards e-commerce (online shopping) the challenges that the users face while shopping for this particular product category drove the interest towards questioning the potential of implementing novel technologies such as virtual reality into beauty and skincare retail sector. With a hypothesis in mind suggesting that an implementation of such technology might add a playful sense of discovery and engagement into retail thus increasing the intentions to purchase, this research was designed along the experiment it contains to test the validity of such a claim.

The level of innovation and technology implemented nowadays in retail, in addition to business forecasts announced for upcoming years, indicates and confirms the re-direction of retail towards online and virtual platforms. A focus on linking an emotion into a brand is something that successful design agencies started to implement while re-branding new store concepts to implant an emotional connection into the experience of a consumer. An example of that is rebranding of “Adidas Predator” by FITCH which is a segment of comfortable footwear by Adidas with a label line saying “keeping the fear real”. The video commercial was designed and launched by FITCH, with an extreme attention to the brand’s essence and message. The movie content and the experience perceived from owning this product, in all its comfort and high-tech materiality predicted the design of the store as being intimidating and dark with high level of technology and activation points. Linking an animal feature to a product “predator” generated the emotion of fear subconsciously suggesting speed and accuracy in reaching the target.

FITCH is a world recognised retail design agency with fifteen studios across nine countries; the company realised the penetration of digital into retail and had invested into developing something called “PHD”, short for physical, human and digital interactions and components in retail. Designing the future is linked at FITCH with they the implementation of digital interaction and innovation into retail. Selling an experience became more valuable than selling a sole product, as

people tend to value emotions associated with a physical product more than when it doesn't have any sentimentality attached to it.

1.7 Research Aim and Objectives

Aim

The aim of this research is to prove the importance and the positive potential of integrating the latest VR technologies into beauty and skincare retail sector by evaluating, analysing and quantifying the numerical and descriptive outcomes of this research. This paper will focus on measuring (quantifying) acceptance levels from various generations (Gen X, Millennials and Gen Z) towards the integration of VR applications and technologies into current beauty and skincare retail channels in developing countries with fast growing industries such as Dubai, United Arab Emirates.

Objectives

The main objectives followed in this study to achieve its aim are listed below:

1. To highlight the success of leading beauty and skincare brands implementing the latest VR, AR and mixed reality technologies and applications into its physical and online retail channels.
2. To examine the range of available VR and AR devices and practices found in retail and identify current awareness of famous beauty retailers and consumers about the importance of integrating VR technologies into retail to further enhance the virtual shopping experience.
3. To outline commercial-financial business forecasts in the beauty and skincare market and record the positive economic impact of implementing various VR and AR technologies into their retail channels.
4. To study three generational cohorts that possess the majority of the buying power in present and the near future. The generations of interest were identified as: Gen X, Millennials and Gen Z.

5. To study and assess the acceptance and excitement levels among the three generational cohorts studied towards the introduction of futuristic virtual beauty stores.
6. To discuss environmental advantages as a result of fewer waste and energy consumption in beauty and skincare sector by mimicking a physical store environment using VR technology.
7. To identify limitations and challenges that beauty and skincare retailers might face in the current market as a result of the geographic location, hygienic and sanitary regulations, cultural values and social factors.
8. To contribute to knowledge by identifying and suggesting opportunities for future research in the related field.

1.8 Research outline and structure

This paper is structured to contain an abstract of the whole paper, followed by a detailed introduction with valuable definitions of virtual, augmented and mixed realities, a historic overview and development of VR technologies in general, the technology's progression into retail and a synopsis about the beauty and skincare current and forecast market share and revenues. Introduction contains general background information and short review of the relevant practices in retail, thus highlighting the validity of the proposed hypothesis that explores how different generational cohorts' approach technological advancements in the field of commerce.

Sustainability is linked to the topic as a result of further analysing generational cohorts and the change in consumers' behaviour as a result of embracing the global mission of creating a sustainable future for upcoming generations.

The motivation of this paper explains and backs up the concept behind this research and justifies the interest in the subject matter by showing its value to myself as a professional. Research aim and objectives follow and clearly identify the plan of this research by listing the objectives as individual bullet points. Research outline and structure at the end of this chapter explains the flow logic of this research in detail.

A detailed literature review of found relative scientific papers is conducted, highlighting relevant ideas and conceptual frameworks discussed. A section on the most recent applications of VR technologies in retail is included in literature review to draw further attention towards the continuity and the progression of the VR phenomena as more brands are being added into the spectrum of leaders in digitally innovative retail. The subject of fighting animal cruelty and veganism is briefly discussed and linked to consumers' shopping behaviour of younger generations.

The methodology chapter contains a detailed review of novel papers published with a relevant link to the subject of virtual and augmented reality in retail. The papers are classified and analysed based on the methodology followed in research and the advantages and disadvantages of each methodology are identified. Preferred selected methodology and its procedure is described in detail and contains a detailed chart with all the required materials and measures to complete this research. An introduction of the case study (MAC cosmetics) follows and includes a brief brand overview and a justification of brand selection for the purpose of this research.

All results and data gathered for this research is presented in the results and discussion chapter which includes descriptive and statistical analysis in addition to illustrative charts and tables.

The last chapter concludes the paper by giving an overview of the entire research, restating the most important findings and observations and linking them to research aim and objectives. At the end this chapter recommendations and opportunities for future research are listed.

Chapter 2 Literature review

This chapter contains a detailed review on found relevant literature within the field of virtual and augmented reality in retail design to understand the progression of the technology and suggest a concept that would complement and expand on the projected route for virtual reality in retail.

The chapter is divided into five sections mainly reviewing literature about the link between telepresence and enjoyment, VR and AR applications in various retail sectors, the trending concept of cruelty-free cosmetics and veganism, an inspiring lecture attended speaking on the future of retailing and FITCH's executive's talk on the future of retail spaces and the differences in consumer preferences and behaviour according to one's generation.

The retail industry is witnessing an increasing demand on the application of immersive VR and AR technologies in the retail space. Smart retailers are aware of the young generation's expectations and preferences in shopping; therefore, the brands are rushing into introducing creative immersive solutions into the design of their existing retail stores through the integration of audio-visual systems, interactive digital screens, virtual assistance and immersive try-on experience corners.

It is definite that immersive technologies help building and enhancing brand's presence and strengthens its image among competitors. Blending the physical shopping with e-commerce in order to come up with a holistic successful strategy is indeed challenging for the majority of the retailers (Farah et al. 2018).

2.1 The link between telepresence and enjoyment in Virtual Retail

Previous literature review on virtual and augmented reality technologies and applications suggests that the feeling of tele-presence is strengthened when the user loses the feeling of attachment to the real-physical environment by closely engaging with the synthetic experience. The level of enjoyment and satisfaction is elevated with the presence of strong imagery formations and vividness of products in a virtual environment thus stimulating more interaction with products on display and virtual try-on (Nah et al. 2011).

The concept of “enjoyment” is explained in the context of the affective perspectives of the shopping experience. Links found between tele-presence and enjoyment suggest that the main goal of introducing a VR feature into retail is to increase the overall quality of the experience by making it more pleasurable (Peukert et al. 2019).

Although virtual and augmented realities can be of a hedonic (pleasurable) and utilitarian (useful) value to consumer, the utilitarian considerations are reported as being of a greater value to consumers while making the final purchasing decision (Duffy & Scholz 2018).

According to Yim et al. (2017) a research by Klimmt, Hartmann and Frey in 2007, confirmed the existence of a positive relationship between interactivity and the feeling of being in control. In the context of retail, interactive technology that employ VR features such as trying on virtual garments and using an avatar to try various products, simulate the feeling of playfulness by interacting with vivid imagery and self-projections thus enhancing the levels of enjoyment.

Vividness is interpreted in the context of virtual reality and e-commerce as the richness of representing the quality of the product. In the context of technology, vividness is defined as the depth enriched by the high quality of image representation (Loureiro et al. 2019).

The interaction with products and objects imitated with high precision and accuracy in virtual environments stimulates a higher level of excitement and interaction than it would possibly generate in a physical store. As no time constrain is imposed and the presence of persuasive in-store sales representatives is eliminated, consumers tend to spend more time examining and interacting with products displayed in virtual stores (Nah et al. 2011).

Devices such as virtual interactive mirrors and other product try-on technologies generate a far more exciting consumer-product relationship than a simple 2D or 3D viewing format (Yim et al. 2017). According to Dacko (2017), females use mobile augmented reality applications for shopping more than males. Gender plays an important factor in designing a VR experience as differences in acceptance and engagement levels were reported across genders in previous research. Males have expressed better knowledge about navigational aspects of VR in general than females and the sense of presence was reported to be higher in males compared to females.

Subsequently, it is worth mentioning that females experience more excitement about the interactive virtual reality applications than males (Park et al. 2018).

They reported that the ability to closely preview the product before buying it significantly decreased the risk factor associated with buying products online. Since immersive VR and AR technology do succeed in driving the intentions to purchase these features must be used to strengthen the brand's image and tailor the messages associated with the products offered to trigger emotions in users shopping for the desired product using an online platform (Daugherty et al. 2013).

2.2 Virtual and Augmented Reality Applications in Retail

2.2.1 Virtual and Augmented Reality in Furniture and Department Stores

IKEA is a European multinational group specialised in furniture and homeware that had long realised the positive potential of integrating VR technology into enhancing its retail strategy. According to Åkesson (2016) IKEA's virtual reality experience was released on a gaming platform called "Valve" and the app is developed to be compatible with HTC Vive. In 2016, IKEA has launched a "Virtual Home Experience" in an app that allows the users to visualize their residence furnished and decorated with IKEA products (Barbaschow 2016). In IKEA Berlin, Germany an Oculus Rift device is available for instore use by IKEA walk-in customers. VR "Kitchen Visualiser" is an additional intervention launched by IKEA using the "Unreal Game" Engine that allows the users to customise their kitchen design by furnishing it with IKEA products as well as virtually cooking IKEA food (Fallon 2019).

John Lewis; a leading department store in the UK is dedicating an entire section on its website to advertising for virtual reality. The brand has long realised and adapted the immersive approach in its annual Christmas shopping advertisements. In 2016, John Lewis store in the UK, created two appealing experiences: The Oculus Rift experience which lets the users interact with the characters appeared in the ad and the 360 degrees video that can be viewed at home. The success of this intervention continued in 2017, as Jown Lewis had launched an app filter that allowed the users to

transform themselves into a friendly monster character and share their creations and ideas via social media (Benjamin, 2016).

A department store from US called Macy's, is another example of virtual reality intrusion into department stores (Peukert 2019). According to Marxent 3D Commerce (2018) Macy's announced the introduction of virtual reality immersive experience into its furniture sector by partnering with Marxent's 3D Cloud™ platform to develop their products. Along with previously mentioned experience Macy's had launched an app called "Visualize Your Space" for both iOS and Android operating devices. The inclusion of VR and AR features into Macy's stores has increased total sales by 60% and has reduced the refund process to less than 2%.

2.2.2 Virtual and Augmented Reality in Toy Stores

In 2017, LEGO had for the first time witnessed an incline in its revenues and had to downsize by letting go of approximately 1400 of its employees. As an initiative to fix this issue, the brand tried to enhance its business by launching "Lego Hidden Side" which is an immersive AR combination of physical Lego kit accompanied by an app for smartphones and tablets. The average cost of the kit is ranged between \$20 to \$130 US dollars. This AR augmentation is designed as a ghost city in eight various sets and allows the users to play the game and build relevant items like graveyards with or without necessarily having to buy the actual physical kit (Wilson 2019).



Figure 2.1. Child Playing Lego Hidden Side (The Lego Group 2019)

Hamley's is a multinational famous toy retailer that had launched a virtual playroom inside its physical stores. To enjoy the experience, the users are invited into a private room to try on a headset and controllers and immerse into experiences such as: cooking, martial arts and fighting, painting etc. (Attraction-Hamleys 2020).

2.2.3 Virtual and Augmented Reality in Apparel Stores

Sportswear brands like Adidas, Nike and Puma had dived into the world of augmented reality trying to enhance their sales. Adidas for example, tried benefitting from immersive campaigns in an event organised at a location called ComplexCon in California, US by launching an app that enabled the visitors to unlock the newest trends and features while shopping. Similarly, Nike has employed AR features to aid its customers with finding their best fit and correct shoe size (Alvarez 2018). According to Van Elvin (2019) Puma had launched its first augmented reality shoe called: the LQD Cell Origin Air designed with a 2D QR code mobile scannable pattern that unlocks various experiences including games and other fun filtered effects. The users must download the Puma LQD Cell app available on apple store and Google play to enjoy the expirience.



Figure 2.2. Puma's Augmented Reality Shoe (Van Even 2019)

2.2.4 Virtual and Augmented Reality in Automotive Industry

In 2015, Toyota Motor Corporation Japan had launched an awareness campaign to educate young drivers about the danger of texting while driving and engaging in other forms of distracting behaviour while controlling the vehicle. The experience had employed Oculus Rift and relied on a virtual reality driving simulator named TeenDrive365 to deliver its message (Dredge 2015).

American car manufacturer “Ford” had launched a VR app called Ford VR that presents the users with an opportunity to enjoy 360 videos of the latest Ford GT. The developers are promising consistent supply of new exciting content within the app to ensure users’ satisfaction (Pita 2016).

2.2.5 Virtual and Augmented Reality in e-commerce

According to Wu and Gereffi (2018), the success of online retailers such as Amazon and Alibaba is noticeable in the field of e-commerce; incorporating various techniques to increase their sales. Amazon has partnered with HTC to sell its products and VR apps. In 2018, Amazon had opened various VR experience kiosks across Delhi, India allowing virtual try on and examination of products sold on its website. Alibaba took the lead into adopting VR technology into its platform in 2016, by launching an app called Buy+ on the Singles’s Day that allowed the users of the app to shop in a virtual mall. However, the app did not substitute the original Alibaba website, as shortly after the event the customers resumed their regular shopping on the previously used Alibaba website (Sun 2018).

2.2.6 Virtual and augmented reality in beauty, cosmetics and skincare retail

Beauty and skincare sector is also affected by the sudden shift towards immersive applications in retail. Famous beauty and skincare brands are competing to win the attention of the consumers by introducing interactive technologies to help virtually try on products before buying them. This method of shopping marks the breaking point in beauty retail industry by allowing for a more hygienic approach when it comes to using testers for lips, eyes and face beauty products. It is also

more sustainable in the fact that no physical waste is generated on makeup removal products and empty testers (Utroske 2016).

Beauty and skincare market has been segmented into three sections based on the type of product, its form and its distribution channels. Skincare, haircare, perfumery and makeup are all considered a product type. Form comprises or describes the consistency and texture of the product that being in gel, cream, powder etc. Distribution channels are mainly the channels that contribute to distribute and sell the product such as supermarkets, department stores, e-commerce platforms (Market Research Report 2014).

2.2.6.1 Sephora

According to Duffy & Scholz (2018) it is important to establish trustworthy and sentimental connection with brand values and the consumer within their domestic space. Makeup, perfume, skincare and beauty brand Sephora was selected in their paper as a case study for further examination. Sephora's website and its latest immersive AR application "Virtual Artist" was analysed and studied.

A series of surveys and interviews was conducted to understand the AR related activities that the brand offers to its consumers outside the boundaries of its physical and online retail channels and the type of bonding that happens as a result of this intrusion.

In conclusion, this study found that the relationship between the brand and the consumer shall not be purely functional or transactional; on the other hand, the brand must offer personalised and tailored experiences that become valuable to the customer and are therefore linked to their emotions and personal events while shopping distantly.

Sephora is a leading beauty retailer that has long inspired many retailers and won the affection of multiple generations with the design of its current stores and the way the brand portrays itself by having a strong presence worldwide. The brand has decided to change two of its most famous New York locations into Sephora Beauty TIP (Teach, Inspire, Play) workshop concepts. The walking costumers have the option to experience a makeover or use gadgets and other devices to

interact with apps such as Sephora + Pantone Color IQ designed to help in selecting the shades that most suite their skin colour and type (O'Shea 2017).

Another intervention is the “Tap and Try” technology that helps with previewing lipstick colours and various eyelash enhancement products. In addition to the previously mentioned, InstaScent studio was invented to convert the fragrance sector into an immersive experience. Moisture meters are used to measure and examine consumers’ skin individually and be able to suggest a product best suited for their skin type (Laura McQuarrie 2017).

The curiosity of consumers and their eagerness to learn about their skin composition and the ingredients of the skincare and beauty products offered in store, has encouraged beauty and skincare brands to open flagship stores as campuses for the purpose of educating and re-connecting with potential buyers.

“Sephora’s Innovation Lab Head” Bridget Dolan announced that customers are more likely to buy products if they are completely aware of the products’ value and the instructions of use. Therefore, an app called “Sephora Virtual Artist” was developed as an experiential platform for Sephora lovers to be able to virtually try on the new releases and explore skin care and beauty products available across Sephora stores. The app allows customers to choose between trying Sephora’s products on an image of a model available on the website, or take and upload their own photo to the website and try the same (Naughton 2016).

2.2.6.2 L’Oreal

In 2018, another makeup giant L’Oreal had made a remarkable move by acquiring a Toronto based company called “Modiface”; which is considered to be one of world’s leading augmented reality development companies worldwide. Modiface has previously developed AR apps for brands like Sephora, Estee Lauder, Allergan and others. By doing so, L’Oreal is planning to stay on the top of the game when it comes to using virtual and augmented reality in the beauty and skincare industry, while controlling its competitor’s usage of VR and AR innovations (Agnew 2018).

According to L’Oreal Annual Report (2018), the brand had adapted a strategy of “Universalization” in delivering beauty solutions for nations worldwide respecting all genders, skin tone variations and cultural differences. The same report mentions that there could be a perfect mergence between digitalization and beauty industry. Digital platforms are recognized as perfect boosters for the beauty industry. The year of 2018 is marked as a record for being the best performing year in comparison to the last twenty years of L’Oreal’s performance. According to Jean-Paul Agon; the Chairman and Chief Executive of L’Oreal the digital component in retail is not an add-on factor, however it is an embedded infusion that is adapted in the strategic planning of brand’s excellence and the way it is targeting its consumers worldwide.

The digital lab is one of the departments that received the highest levels of attention and investment in many beauty companies including L’Oreal. Speaking of innovative VR technologies, L’Oreal is striving to maintain its control when it comes to being an entirely digitally augmented beauty company and have the biggest share of the estimated revenues valued more than 80 million US dollars by the year of 2021.

The brand is constantly experimenting and enhancing its e-commerce by conducting research and gathering feedback from its customers. To avoid unnecessary in-store visits and provide the best skincare advice to its customers it had introduced “two-way consultations” powered by AR in a form of video chat opportunity for one-on-one consultation. After brand’s decision to buy Modiface, the total sales revenues increased by 6.8% during the first nine months of 2018. The revenues were estimated as 20 billion euros out of which AR induced online purchases constituted 9.7%. In total online purchases have grown by 38.8% after introducing the AR features as a part of its digital online shopping experience (Kelly 2018).

2.2.6.3 Other beauty and skincare brands

NYX Professional Makeup is another example of pushing the boundaries in enhancing the virtual shopping experience. The brand had launched a virtual reality makeup tutorial in partnership with Samsung Electronics America. The experience was launched in 2018, in selected NYX stores and is scheduled to run across other forty-two stores worldwide. This experience allowed for a close virtual connection and interaction of NYX makeup fans with the world's most famous beauty ambassadors and influencers through three virtual tutorials recorded and designed specifically for the brand as a part of the immersive experience. The Vice President of digital innovation at L'Oreal USA, the owner company of NYX Professional Makeup played the major role in helping and supporting the formation of this experience by facilitating partnership with Samsung technology (Samsung Newsroom US 2017).

Coco Chanel has recently opened an experience centre called the Coco Game Center in Tokyo, Japan for consumers to try and discover its latest products in a playful exploratory manner (Tie 2018). Estee Lauder is another brand that partnered with Modiface offering free virtual makeup try on service for its shoppers on Facebook messenger (Fashion Network 2017).

2.2.1 Cruelty-Free cosmetics and Veganism

One of the trends spread in cosmetics retail as well as a standalone concept is promoting and fighting animal-cruelty. The previously mentioned is one of the reasons a significant amount of people have decided to go vegan after watching documentaries and understanding the not so ethical process that some food manufacturing companies follow in the process of preparing their edible and consumable products for export and sale. The increased awareness about animal rights and the global war against animal cruelty in general, have inspired many artists to create artworks and installations that disguise the consumption of animals for food and tests and portray it the other way around placing human beings in animals' position and imagining how would they feel or look like when they are about to be killed for food or used for testing (Hirsh 2019).

The figure 2.3 above is an example of vegan art by the artist Jane Lewis that portrays an Easter bunny being tested on in the cosmetics industry.



Figure 2.3. Easter Bunnies, (Jane Lewis 2018)

Famous beauty and skincare brands are adapting the trending concepts into their product line designs and strategic planning when it comes to advertising and marketing. The rising affection towards furred pets among the Millennials in specific, have made this generation highly sensitive to content that involves or approves testing products on animals or using them in any way in the production of skincare and beauty products (USA Today 2019). This marketing philosophy is proved successful as Millennials are willing to overspend on sustainable and animal cruelty-free cosmetics only because it helps them to express their sympathy and contribution towards creating a sustainable future for upcoming generations (Sustainability in the Cosmetic Industry 2019). Brands like L’Oreal, Cover FX skin care Inc, Lush cosmetics and INIKA Organic are recognized as the main ambassadors with leading Global Cruelty Free Cosmetics profiles. (Market Research Future 2019). Lush is a brand from the United Kingdom that had become popular for selling handmade organic beauty products. The brand promotes all natural and chemical-free products for hair and skincare in addition to being vegan friendly and free of animal cruelty (Lush Handmade Cosmetics Official Website 2020).

The Lush logotype shown in figure 2.4 below was designed and used for the marketing purposes and as an expression of brand's initiative towards fighting animal testing.



Figure 2.4. LUSH Campaign Logotype (2012)

However, arguing about this point and using it for one's advantage is challenging if the brand has not yet complied with the moral of eliminating animal testing on products unless required by law. MAC cosmetics is owned by Estee Lauder; a company which is known for their strong determination to stop animal testing in near future.

Even though, Estee Lauder as a company claims that it does not perform testing on animals and does not encourage other entities to do so on their behalf, consumers nowadays are educated enough to conclude that since the brand and its subsequently owned brands are being sold in China; a country that requires animal testing by law; it has not yet gone completely animal cruelty-free or vegan (Ethical Elephant 2018).

Animal Testing

The Estée Lauder Companies does not test on animals and we never ask others to do so on our behalf. If a regulatory body demands it for its safety or regulatory assessment, an exception can be made. Our consumers can be certain that we are committed to producing only the highest quality beauty products which meet our exacting efficacy, safety and ethical standards.

Figure 2.5. Estee Lauder's Testimony on Animal Testing (2018)

Vegan lifestyle which essentially means restraining from the consumption of meat at all means has been widely adapted and accepted among the Millennials as a form of a healthier lifestyle and acting better for the environment. As a result of that, veganism has extended into cosmetics and fashion. With the growing of that lifestyle at a large rate, the industries were forced to adapt and meet consumers' preferences by launching vegan friendly products and services. According to Grand View Research (2019), the vegan cosmetics industry is forecast to grow by the year of 2025 reaching a net worth of 20.8 billion US dollars.

Researching the brands above concludes that sending ethical messages during ads and marketing campaigns will help the brands to come across in a less commercial manner and appeal to the audience far more than the brands only promoting for quality and value while harming the environment in an indirect manner.

2.3 Downtown Design: Dubai Design Week Lecture: The Future of Retail Design - 2019

For the purpose of my research I have registered to attend a lecture at the Downtown Design week on the 13th of November 2019, organised by four speakers actively involved in the retail strategy and design industry discussing the predictions and forecasts of retail practices in the near future. The design talk featured: Rabih Geha the founder of Rabih Geha Architects who is also a “Commercial Interior Design Awards Winner 2019”, Doug Shaw: a director of Collison RTKL with 25 years’ experience in retail interior architecture and design, Dense Neri: retail architectural manager at Aesop: (Australian luxury skincare brand) and Natalie Holland: creative design manager at Chalhoub Group. The lecture took place at the Forum 2019 and had free entry admission with prior registration. The speakers initiated a discussion about the challenge their companies are facing while designing new physical stores upon the emergence of e-commerce to try and draw more people in-stores.

According to the speakers, the importance of implanting a positive and attractive brand image features into the mind-set of young generations will increase future sales and help premium fashion brands like “Burberry” for example to appeal and compete with other less expensive brands if marketed properly. All speakers agreed that tangibility and sensibility are incredibly

important when it comes to purchasing valuable products and goods. The previously mentioned is probably the main reason current physical stores are still operating and being re-opened despite the drastic drop in physical retail sales.

A large portion of shoppers nowadays visit the physical stores for the purpose of viewing and trying the products in real life and then proceed with ordering them online, thus saving up to 20% on their purchases. Even though, elimination of traditional brick and mortar does not sound realistic nor possible in the near future, the speakers agree that the future of retailing is heading towards the direction of creating focal experience centres for product try-on and seasonal releases displayed at selected locations as physical platforms and references for strengthening the brand's presence and image. The online retail channels will continue to grow and expand by introducing various immersive and experiential features into websites and mobile applications, thus generating more sales by providing convenience, time efficiency and enjoyment while shopping from home or during free time.

2.4 Future of Retail Spaces

Alasdair Lennox: executive creative director at FITCH discussed in his talk at the Retail Spaces on November 14th 2019 in Pasadena California, US the challenges that the retailers are presented with as a result of the fast growing internet industry and the solutions they need to come up with while designing the physical stores for a generation that is always heads down locked at their phones.

According to Timex Survey (2012) shoppers spend approximately six months of their lives queuing in lines in physical store either at fitting rooms or at POS stations for payment transactions. Busy schedules and lifestyles of the working-class professionals specially "Millennials" have forced the invasion and adaptation of online platforms into their daily routines to satisfy daily needs. Paying bills online and performing other transactions remotely suggested the possible inclusion of all the other sectors and retail channels into e-commerce. Fashion and beauty retail channels have realised the potential of building a proper digital foundation for their

stores and have been expanding on it to satisfy the desires of Gen Z by meeting their expectation from a regular shopping experience.

Retailers nowadays provide in-store live streaming through social media platforms with famous influencers coming into their stores to try and review the new product releases. “Push Notifications” features had been introduced to announce to the consumers that have downloaded the brand’s app the new releases and current in-store promotions by tracking their current location if enabled. An example to that is Sephora’s app initiative to drive consumers into their stores by pushing notifications announcing a free mini makeover promotion on-going in its stores claimable if the customer passes by within next fifteen minutes. As global mobile payment transactions are forecast to increase by 28% by 2022, marketers and retailers are encouraged to invest in research to establish a solid digital foundation for their brick and mortar and e-commerce channels by syncing the online and offline information, empowering various tracking features and educating their in-store staff to be more precise and smart oriented while advising the walk-in customers and those shopping behind screens.

2.5 Generational Cohorts

Demographic research centers, media and business development representatives, marketing agencies and many other sectors have been paying close attention and observing the consumer attitudes and preferences of Millennials also referred to sometimes as “Gen Y” and other generational cohorts within the fast-growing technology industry (Ordun 2015).

According to Pew Research Centre individual’s age and the generation they are born and raised within, play an important role in shaping their personality. When age is considered a variable, it can be used for measuring and understanding the differences in interaction, acceptance and engagement of people from different generations with the same experience.

Generation X (Gen X), Millennials and Generation Z (Gen Z) have been selected for further investigation in this research. These generations have the higher number of transactions per year suggesting that they mainly controlling the buying power in the current market (Epsilon 2019).

2.5.1 Consumer Behaviour of Gen X

According to Pew Research Centre (2019) people age between 39 and 54 years old are classified as Gen X. Gen X is described as the most educated generation that values financial independence and open communication. This generation has little loyalty to a certain company or entity and would rather prefer to express its loyalty to a person with authority. According to the Bureau of Labour Statistics (2018), Gen X spending far exceeds the following generations as this generation is less likely to do research before acquiring a product or a service and is more likely to shop in store rather than online to find deals. Gen X has been described as a hybrid generation that is difficult to define for marketers as it has often been misunderstood.

2.5.2 Consumer Behaviour of Millennials

According to Pew Research Centre (2019), Millennials is nowadays aged between 23 and 38 years old. Millennials are three times the size of Gen X, constituting the largest segment of the consumers' market. Millennials tend to have very stressful and busy working schedules. For the past decade there has been an obsession about how Millennials have been witnessing the invasion of technology into their world and have been successfully managing to adapt to it by becoming active users and members of the necessary applications and platforms. Studying and labeling generations is a valuable tool that helps researchers easily record data and conduct analysis while studying the differences across generations (Ordun 2015).

2.5.3 Consumer Behavior of Gen Z

According to Pew Research Centre (2019), Gen Z is the generation that follows Millennials. This generation is nowadays aged between 7 and 22 years old. According to Google Trends (2019), the term Gen Z has been used heavily in the search engine by various researchers while trying to retrieve the unique relevant information about Gen Z (Bedgood 2019).

The generation succeeding Millennials had been given few names including “Post-Millennials” and “iGeneration” however the term Generation Z or Gen Z had now become an official term added to Merriam-Webster and Oxford dictionaries that describes generational cohorts and helps to identify a certain age group for the purpose of analysis and research (Amsnews.tv 2019).

2.5.4 Similarities between Gen X and Millennials

Annual earnings of both Gen X and Millennials that had attended college and pursued a bachelor’s degree were recorded to be almost equal in 2001 according to Pew Research Centre (2019). Both generations value success and care about education believing that it is the main route towards achieving future goals (Pew Social Trends 2019).

2.5.5 Differences between Gen X and Millennials

Gen X prefer to remain unidentified as this generation was not given enough attention in research due to its size. This generation describes itself as “the middle child” as they felt neglected for being positioned in between two larger generations such as Baby Boomers and Millennials. Gen X have different attitudes compared to Millennials when it comes to shopping preferences and working style (Ordun 2015). Gen X is more likely to spend their money on groceries feeding their families; however, Millennials are more likely to order food or dine out (USA Today January 2018).

Gen X views the invasion of technology at workplace and their homes as a learned skill opposed to Millennials that have accepted the technological advancement instantly and view it as an integral skill. Gen X is more into working independently while Millennials encourage and promote teamwork and effort when it comes to workspace and productivity. There is a noticeable difference in the income rate between the two generations estimated at around 16,000 US dollars (Online King University 2020).

While Millennials prefer to shop online on platforms like Amazon, Gen X would place more value on enrolling in social events and clubs or various forms of sports. Millennials tend to delay settling down and starting a family as opposed to Gen X due to the lack of economic stability and security as well as a thriving shift in the cultural views about the traditional family generation and setup (Bedgood 2019).

2.5.6 Similarities between Millennials and Gen Z

Both generations are relatively young and highly connected to the internet. Millennials just like Gen Z appreciate social networking and have adapted and embraced the emergence of social platforms like Facebook, Instagram, Snapchat etc.

Millennials and Gen Z are both driven to make online purchases for further convenience. Both generations use their mobile devices as the primary tool for sharing and browsing on social media as well as shopping and online ordering. Both generations are more conscious about money than preceding generations due to the fact that Millennials were born during the economic downturn and recession and had experienced losing their jobs and have been through difficulties finding new ones in their country of residence (Bump 2019).

Even though Millennials are still in control when it comes to the possession of buying power as they constitute the majority at the workplace, Gen Z has started entering workplace with the beginning of 2018 and are now becoming equally significant as Millennials in terms of how they choose to spend and invest their income (Peter Economy 2019). Previous research indicates that Millennials are the only generation that relies equally on the two most famous retail channels such as shopping online as well as in-store (Gayle 2019). The table 2.1 below shows consumers' average annual retail spend according to generation.

Table 2.1: Average Annual Dollars Spent by Generation (Epsilon 2019)

Average annual dollars spent by generation

	Gen Z	Millennials	Gen X	Boomers	Silents
Automotive	\$1,176	\$978	\$1,034	\$950	\$735
Communications service providers	\$1,963	\$1,681	\$1,795	\$1,642	\$1,377
Education	\$124	\$174	\$169	\$183	\$248
Entertainment	\$939	\$840	\$887	\$761	\$624
Financial services	\$1,940	\$1,431	\$1,555	\$1,578	\$1,500
Food/convenience/drug store	\$3,431	\$3,017	\$3,133	\$2,978	\$2,645
Other retail	\$3,215	\$2,989	\$3,006	\$2,700	\$1,969
Restaurant	\$2,765	\$2,529	\$2,460	\$2,090	\$1,651
Retail	\$6,768	\$5,928	\$6,137	\$5,562	\$4,137
Services	\$245	\$218	\$234	\$245	\$214
Travel	\$3,827	\$3,112	\$3,414	\$3,431	\$3,000

2.5.7 Differences between Millennials and Gen Z

According to Bump (2019) despite the similarities between Millennials and Gen Z they are not the same when it comes to consumers' behavior. The amount of time they surf the internet and the platforms they choose to connect with the world are different. Based on this information, unique marketing tactics should be used to persuade each generation about a product, or a service and close research and attention are required from marketers and retailers to successfully engage the current and the future buying force into their industries.

Gen Z had been described as the loneliest generation in spite of the availability of all the cyber and physical means to connect and communicate with each other. Gen Z genuinely care and seek the truth behind everything while Millennials are more self-centered and do not accept the differences as openly as Gen Z (Francis and Hoefel 2018).

High stress levels have been reported amongst the Millennials as a result of making an extra effort to keep their jobs in current unstable economic conditions. Unlike the previous generations, Millennials travelled to other countries looking for jobs and have somehow lost the sense of

connectivity to their homelands. This generation is more self-dependent and relies less on the social support system and retirement programs. High competition in the professional industry created anxiety and insecurity among Millennials about their financial and family future.

Gen Z and Millennials are closely interconnected when it comes to using platforms such as Instagram, Snapchat and Youtube, however there are differences observed in terms of using Facebook as the primary social network. According to Business Insider (2018), Facebook is announced as the most used social platform among Millennials.

Both generations have similar attention spans when it comes to viewing video content. The main difference between Millennials and Gen Z is that Millennials have witnessed the emergence of technological advancement and innovation and were forced to adapt to it while Gen Z were exposed and immersed into it either at birth or at a very early child development stage (Online King University 2020).

According to The World Economic Forum (2019) Millennials spend slightly less time being logged in browsing a certain platform or website than Gen Z. Even though Gen Z spend more time than Millennials surfing the internet, the majority do not have the same buying power, therefore Gen Z tends to spend significantly less than Millennials on online purchases.

According to Ernst & Young 49% of Gen Z and 74% of Millennials complete online purchases more than one time per month. Gen Z care about the practicality of the product much more than its aesthetics and popularity. Millennials though, care about products and services that will make their lives easier by allowing more free time for self-care. Knowing these preferences can significantly help marketers and retailors to tackle the needs of each generation (Bump 2019).

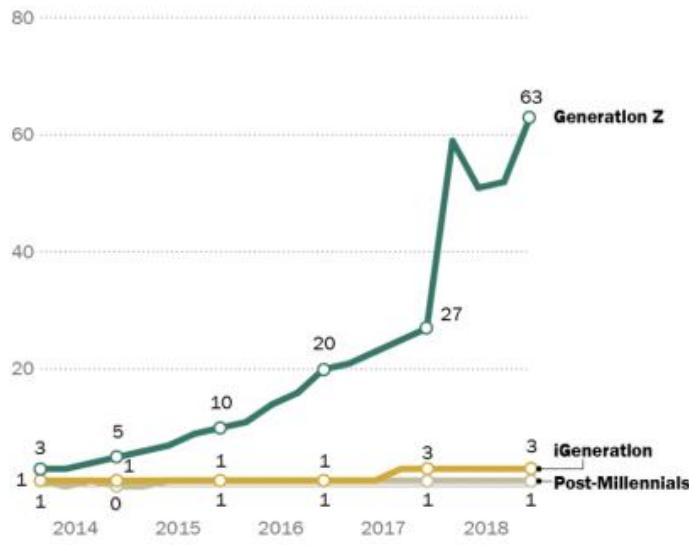


Figure 2.6. Interest Towards Generation Z in Online Searches (Google Trends 2019)

According to figure 2.6 Gen Z is classified as the most researched generation over the internet (Pew Research Center 2019).

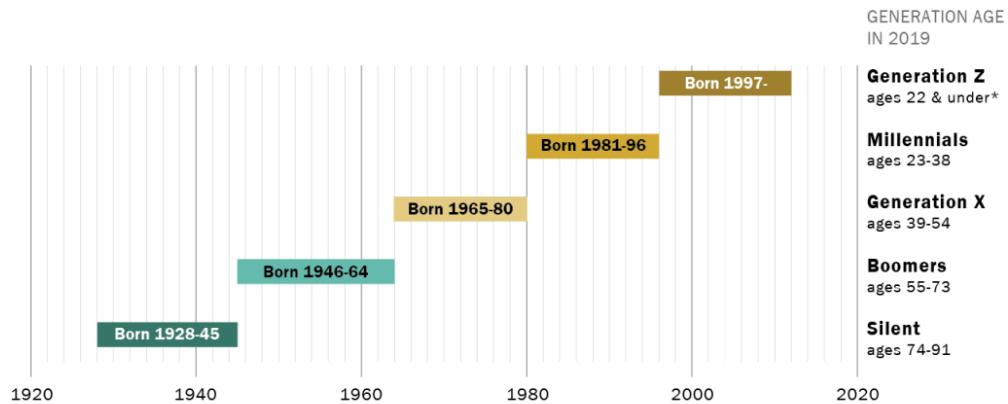


Figure 2.7. Generations and Age (Pew Research Center 2019)

Figure 2.7 above illustrates the generational cohorts by age according to the classification by Pew Research Center 2019.

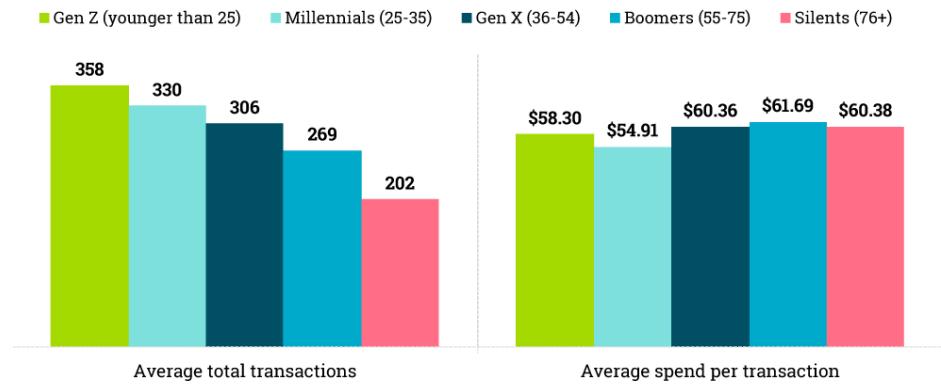


Figure 2.8. Annual Consumer Spending by Generation (Epsilon 2019)

Figure 2.8 above illustrates the annual average total spent by generation as per the year of 2019.

Chapter 3 Methodology

This chapter discusses the relevant papers that explored and tested various hypothesis related to the integration of virtual and augmented reality into retail channels. The majority of found papers has employed literature review methodology, survey methodology or a combination of computer-generated experiments and survey methodology to discuss the acceptance, satisfaction and enjoyment levels, perceived as a result of adding virtual or augmented reality technology into the shopping exploratory experience.

3.1 Review of previous papers on virtual and augmented reality based methodology

3.1.1 Literature Review Method

According to Demirkan and Spohrer (2014), increased unemployment rate, the rise in property prices, the decline in property buying power, urban sprawl and increased consumer's expectations and demands are identified as main factors threatening the future of physical retail spaces. Previously mentioned challenges have pushed marketers and retailers to broaden the thinking boundaries and develop new strategies that will enhance in-store footfall.

In this paper a systematic framework is proposed after conducting an in-depth literature review on the adaptation of self-service and mobile operated technologies into retail channels. The results of the study showed that the more service-oriented, organised and interconnected the shopping experience is; the more successful the perception and the purchase results will occur. This paper proposed a conceptual framework for intelligent self-service systems and a summary for a business value chain for designing and building a digital mall.

A paper by Basara and Buyukyilmaz (2015) investigated the impact of utilitarian and hedonic values on the enjoyment and acceptance levels of young consumers. It also compared the shopping patterns and behavioural variations while selecting between fast-food and fast-casual restaurants. The findings showed that satisfaction positively influenced behavioural intentions in fast-food sector however no substantial effect on behavioural intentions was observed in casual dining restaurants.

Primarily, hedonic and utilitarian factors are the main drivers behind most shopping journeys. On the other hand, studying and considering the two dimensions alone may not be sufficient to understand and evaluate consumers' shopping behaviour and intentions to purchase. Other factors such as cognitive and affective values influence user's decisions and selection while shopping online.

Utilitarian values are defined as task specific-oriented shopping that focuses mostly on the functional aspects of a product that fulfils a certain need. Hedonic consuming focuses on adding the fun and enjoyment factor to the shopping journey by looking for experiential, experimental and emotional values while shopping thus perceiving the consumption activity as fun. Research shows that interactive novel VR and AR try-on features introduced into retailer's websites are being reported as more enjoyable and useful than previously known 3D rotational product features or the simple product slideshow of images taken at several angles.

The level of acceptance of immersive VR and AR technology applications is observed higher among females compared to males. The inclusion of such features in e-commerce websites reduces the risk factor and eliminates the anxiety while shopping online (Basaran and Büyükyılmaz 2015).

A paper by Javornik (2016) defines the potential role of virtual and augmented reality technology in retail environments in influencing consumer's shopping behaviour by reviewing previous literature. A historical and theoretical background about AR and VR technologies is included in this paper in addition to the latest interventions observed in the related industry.

The paper reviews the performance characteristics such as: mobility, interactivity, virtual features detailing and geological accuracy as well as the synergy between the virtual and physical environments and their integration into VR shopping applications. After studying characteristics as such, the paper proposes a framework to be used as a platform for future research to further develop strategic marketing and retailing techniques. Academic literature review is used as the main methodology in this paper.

A number of articles were retrieved using keywords such as interactivity or virtual elements and five highly cited publications were selected to support the hypothesis of this paper. The papers

retrieved supported the hypothesis arguing that features like interactivity in the virtual worlds lead to elevated levels of enjoyment, loyalty and satisfaction. The paper proves its hypothesis by reviewing consumers' responses mentioned in other papers. It presents the data gathered and analyses the findings in the discussion part.

Advantages

The advantage of literature review method is that it allows the researcher to extract the data by simply reviewing literature on a certain topic and using this information to support the formed hypothesis by referring to previous most cited papers. This methodology is the promptest when it comes to collecting and synthesizing both quantitative and qualitative findings conducted on the relevant subject. Literature review when adapted as a methodology, can save time and be used to identify the framework for the research and highlight the validity of the topic while reading synopsis and abstracts of relevant papers at early stages of research. The advantage of literature review as a methodology lays in the simplicity and freedom to shape, organize and categorize the information into various conceptual models to help prove the hypothesis or answer a research question.

Disadvantages

Literature review as a methodology on itself contributing only by referring to previous work may not be a valuable piece of knowledge for future research if not backed up with distinctive contribution through conceptual models, experiments or survey data charts. The main challenge of selecting to use literature review as a methodology is finding novel articles relevant to the topic of the researcher's interest. Retrieving information about technology being in active development from outdated papers might be misleading in terms of identifying the areas of future research and being able to fill the gaps in that research. To accurately contribute to adding significant knowledge in the selected field the researcher is required to stay tuned with the latest trends in technology development. Failure to be updated with the current market situation in

correlation with the fast-growing cyber industry will result in irrelevant research findings that may not result in enriching research knowledge or validating a proposed concept.

3.1.2 Pilot Studies and Survey Method

A paper by Dacko (2017) relied on a survey methodology to assess the positive potential of integrating augmented reality applications using mobile phones to enhance their business.

A large-scale survey was conducted in the United States aiming to answer the hypothesis regarding usefulness, experiential values and positive returns on retailers as a result of implementing virtual reality technology in retail. Relevant terminology was used to download 272 augmented reality apps and the sample selected was paid with Google Play credit to answer the survey questions.

Results of the surveys showed positive feedback predicting a future success from further developing these applications to satisfy consumer demands and generate more sales.(Dacko 2017).

According to Lim et al. (2016), countries with maiden income rates such as Malaysia are more likely to re-divert from brick and mortar towards online shopping. The challenge for online retailers lays in the difficulty of decoding and recording the shopper's behaviour while browsing for products through a mobile device's screen.

A pilot study was conducted at the University of Malaysia Perlis, focusing specifically on consumer behaviour of Millennials. Participants of the study were aged between 18 and 34 years old. Copies of 800 surveys were distributed at the university, however only 662 sets were valid for further analysis containing proper answers. The purpose of this study was to understand the link between the subjective norms and the perception of usefulness that dictates the online shopping behaviour driven by the intentions to purchase. The data analysis revealed that purchase intentions positively affect the online shopping behaviour and the intentions to purchase.

A research by Ilias et al. (2015) aims to understand the effect of cognitive and affective perceptions on users' intentions to purchase online. A sample of 723 participants was selected for

this study, out of which only 582 participants were classified as frequent online shoppers with experience in using personalised online services.

A complexity theory was proposed in order to detect the various propositions and combinations of affective and cognitive emotions affecting online shopping behaviour. Qualitative comparative analysis helped explaining the results by studying the nine combinations or propositions of positive and negative cognitive and affective perceptions highlighting the validity and the strong influence of human emotions and the effect of personal affections on purchasing decisions.

According to this paper the services and products that are best tailored to fit the shoppers' personal traits and requirements are more likely to positively impact the shopping behaviour pattern. Positive online shopping experience is associated with the perception of "gaining" as in getting a good value for money and receiving the best quality service within the shortest time period.

A survey on demographics was carried out before launching the final survey questionnaire in a 7-point Likert scale format extending from "strongly disagree" to "strongly agree". Four types of emotions were introduced as strongly positive, weakly positive, strongly negative, and weakly negative and were also suggested as answers to the survey. The data was gathered and classified into charts and graphs with a discussion section expanding on the results and the data gathered.

Advantages

Most of the papers that examined the subject of virtual and augmented reality in retail did not rely on the survey method alone as the primary methodology for the study. Most cited papers mainly proposed a combined methodology to prove their hypothesis or answer their research question using a computer aided laboratory experiment followed by a questionnaire to collect the participants' feedback.

Disadvantages

The main challenge of survey methodology in research is effectively gathering responses from the targeted audience in a specific period of time. Not including questions on demographics or another pre-requisite information may result in the sample being randomly selected. The data gathered through the snowballing method might not be relevant or useful in answering the research question or proving a hypothesis if the answers were answered randomly or did not target the people of concern and interest. If the selected sample was not familiar with the subject surveyed, the answers might be random, and the results might be inaccurate thus announcing false information which is considered weak and fraud contribution to research. The disadvantage of conducting surveys digitally is the lack of control over the response time and inability to ensure that the participants have read and understood the questions.

3.1.3 Computer-generated Experiment Method

A study by Lau, K, Lau, H and Lee, P (2014) published at the Hong Kong Polytechnic University, examines the power of interactivity, vividness and tele-presence of the user and the virtual objects in artificially simulated environments. Virtual hypothetical store was designed, and 61 participants were asked to take a part at the experiment for a total of fifteen minutes while equipped with a head mounted device and hand motion controllers and a sensory device connected to their feet to help tracking their motion while immersing into a virtual experience.

The experiment allowed the participants to customize the appearance of the store by changing the surrounding according to their preferences. The feedback from the participants reported that some objects in the virtual experiment contained sharp and over simplified polygons and lines thus making the objects to appear unrealistic. Some participants reported difficulty of physical motion while wearing the VR equipped devices. This feedback suggested the need to improve and develop wireless motion trackers and design more comfortable VR-ware for the purpose of conducting virtual experiences.

The feeling of dizziness after finishing the experiment and the lack of human interaction integrated within the experiment made the overall experience rather poor and unsatisfying for most of the participants (Lau et al. 2014).

A study by Schnack (2018) was conducted to compare an experience of shopping in a physical store versus shopping in a virtually simulated store using immersive VR technologies. This study contains two similar virtual shopping experiments with differences in display technology used to navigate and launch the experience. A sample of 111 participants with previous experience in interacting with computers and smart devices was recruited from New Zealand University. In the first experiment the participants were presented with an experience using a conventional desktop monitor and a mouse. The virtual store was displayed on the screen monitor in where they were able to pick the products on display and place them into cart by double clicking on the mouse. They were also able to return products selected by accident by releasing the mouse button. The noise and sound interaction were kept to minimum in this experience as only fridges were emitting noises as well as the typing clerk.

In the second experiment the participants were presented with a head mounted device, handheld motions tracker and other body tracking devices. The participants were asked to complete the experiment by proceeding to a 4 x 4 meters room while being equipped with the VR devices and then engage in the shopping experience. No time limitation was set for the completion of this experiment. Both experiments allowed the participants to end the experiment by proceeding to the cash point to calculate their purchases.

At the end of both experiments participants were asked to complete a survey to report on their associations and findings. Charts and figures were then developed and studied to understand the factors affecting perceived tele-presence. It was concluded that high quality virtually stimulated environments with graphics developed closely to mimic realistic environments would drive more natural consumer shopping behaviours

This paper suggests that advanced navigation methods such as the head mounted device, motion trackers and controllers and other devices make the experience a lot more natural and enjoyable

for the users. Previous research findings highlighted the positive return potential of implementing high quality immersive VR technologies in simulated shopping environments.

A study by Park et al. (2018), is designed and carried out to evaluate and understand consumers' reaction to VR technology in the fashion industry. A lack of available research assets (papers) that adapt experimental methodology by using the truly immersive virtual reality input and output devices to find users acceptance, behaviour, engagement and shopping patterns is identified as an opportunity for future research. A clear research gap on estimated cost analysis of introducing VR into the fashion industry suggests the validity of this research. For the purpose of this study, an experimental methodology using VR technology was selected. A 3D modelling program "SketchUp" was used to build four hypothetical fashion stores with various general arrangements and design themes. To explore SketchUp models in VR format, they had to be converted to a parametric form by being exported into CAD format. Because the VR application reads the parametric data as a segmented mesh of polygons, the CAD data needed to be converted again to polygons. All surfaces appearing in this format can be successfully rendered using a VR engine converting the model into virtual reality mode. Complicated and curved surfaces that contain large number of polygons may slow down the VR rendering process.

The experiment was conducted at the Virtual Reality Design Lab with tablets and ipads located on campus at the University of Minnesota. The lab's room size is 25 x 25 foot, equipped with a head mounted device and motion controllers and trackers that detect and trace the user's motion and orientation. A total of 40 females aged between 18 and 40 years old participated in the experiment. The recruited participants were later contacted by email that contained details of the study and a link to a preliminary online survey. The experiment was scheduled for 7-10 days after completing the survey. Each participant took an hour to complete the experiment, after reading the consent form and receiving instruction from the researcher. Participants were presented with four headsets preloaded with various stores and the researcher randomly selected a headset and handed it to the participant.

After completing the experiment, the participants were asked to proceed to a private room and complete a survey. Results showed that the users spent an average of 80.53 s (SD = 38.50) doing

store exploration and only one participant felt extreme dizziness after the experiment and had to withdraw from the study.

A study was conducted in a computer laboratory by Vonkemana et al. (2017) on a total of 212 participants at the University of Netherlands to test users' reaction to various product presentation types while shopping online for fashion products. In the experiment 133 males and 79 females were recruited. The study selected Ray Ban sunglasses website as an example of a fashion category that is often purchased rather by impulse than pre-planned.

The participants were not made aware about the aim of the study as it was important to ensure that during this experiment the participants did not have a pre-set goal or target shopping item in mind. The participants were asked to navigate and browse through the given website and any attempt or interest in a certain product was recorded as impulsive behaviour.

Browsing for products was made available using three different methods such as: still product imagery, a 360-degree rotation function and by a virtual try-on mirror. The selection range of sunglasses was limited to five models and participants were randomly assigned to the three browsing methods on previously programmed and pre-set computers. First method allowed participant to browse thought pictures of the five Ray Ban sunglasses models, second method allowed participants to rotate each model in a 360 manner thus enabling close examination from all angles and the third method allowed the participants to take a photograph of their faces using the web cam virtual mirror available on their website.

The camera scans the participants face using face feature recognition system and superimposes the sunglasses model on their faces. This created a video footage of their motion by tracking their movement thus closely mimicking the real-life experience while shopping for accessories in a physical store.

The hypothesis of this study argued that the inclusion of better product presentation formats will result in higher levels of interactivity between the product and the user thus increasing the intentions to purchase. The hypothesis was proven to be valid after collecting all the data from the experiment. The results of the experiment showed that better product vividness and increased interactivity will affect impulse buying in online shopping mediums.

Watson et al. (2017) presented a paper showcasing a positive correlation between the integration of augmented reality applications into retail and consumers' intentions to purchase. For the purpose of this study a sample of 162 participants aged between 18-35 years old was recruited at Swiss University. As the participants were divided into two groups, they were asked to complete the experiment by undergoing a virtual makeup experience. The first group was presented with an augmented reality mobile application that allowed trying various make up looks using a virtual try on mirror. The second group was asked to undergo a virtual make up experience online by visiting a regular beauty brand's website and applying various make up products either on an image of a model available on the website or by uploading a photo of themselves.

The participants were asked to complete a questionnaire on demographics, followed by questions about their shopping motivations. The average time needed for the completion of the experiment was measured around fifteen minutes. After finishing the experiment, the participants were asked to answer the remaining relevant questions. The results of the experiment concluded that virtual reality positively affects purchase intentions and initiates positive responses from users. (Watson et al. 2018).

A study was conducted on 220 students at a University in Taipei, Taiwan. The students were sent a link containing a fashion online retailer's website and were asked to try on the clothes virtually using an augmented reality interactive technology feature also known as "ARIT". After the completion of this experiment they were provided with a separate link to answer a questionnaire. The sample consisted of 47 % male and 53 % female participants. In regard to age group 29 % of the sample was younger than 20 years old while 54 % were aged between 20 – 24 years old, and 17 % were older than 25 years old. The questions were tailored around the aesthetics of physical space, the sense of engagement, ecological and sustainability factors, playfulness and the level of cognitive and affective perceptions.

Prior to launching the final questionnaire an additional pilot study was conducted on 30 regular online shoppers to finalise and revise the questions format and language. The responses were recorded and analysed into charts and numerical data and provided answers to the research questions suggesting the acceptance of AR interactive technology in the field of online fashion shopping among the selected sample (Huang and Liao 2014).

Advantages

The advantage of using this methodology to answer a research question or prove a hypothesis related to computer industry or technology in general, is in the availability of various software and application programs for public use. Most papers that examine a certain proposition or test a hypothesis about virtual and augmented reality in retail viewed computer laboratory experiment through simulation as being the most suitable and practical methodology. Amongst all other methods used, the nature of this methodology enables the researcher to physically observe the participants' responses after going through the experiment thus backing up the statements argued throughout the research paper. Most simulating softwares provide a free trial version in addition to student and pro versions. This feature is utterly helpful at the stage of exploring and selecting amongst the various computer programs and digital applications or devices for conducting the desired experiment. Computer-generated experiment methodology can be a great tool for directly observing the behaviour of the participant and recording their level of interest and engagement with the experiment at all stages. These experiments can be customised and tailored to model and mimic an exact desired environment, a building or an area that is identified as the focus of the study.

Disadvantages

The disadvantage of this method may depend on the scale and on the nature of the experiment. The papers that proposed virtual experiments usually had to follow it up with a pilot study to understand and record the participants' feedback right after going through the experiment. Time constrain might be a factor that would discourage the proposition of this method due to the complexity of some simulating softwares and the lack of available tutorials and support to learn them as well as the hesitation of some participants to waste their time for free on something that is not in their area of interest.

A sort of an incentive of a monetary value is ideally proposed to encourage the participants to complete an experiment. This methodology would mostly require participant's physical presence to ensure that they have been thoroughly engaged in the experiment and were made aware of all hardware and software instructions of use in addition to any necessary safety measures required.

In order to collect accurate responses from the participant's proper sensor tracking and face scanning equipment might be needed. The inability to properly conduct the experiment due to factors such as cost hinder the success of the experiment as it fails to correctly imitate the real environment or simulate the virtual world in a correct format. Failure to comply with the required security measures may result in injuries therefore, risking the delivery of the main aim and objectives of a certain research.

3.2 Case Study

In order to suggest and argue the positive potential of implementing the latest technologies into beauty retail channels MAC cosmetics was selected as a case study for further research.

The purpose of this case study is to analyse the current situation and market position of MAC cosmetics in Dubai, United Arab Emirates. Subsequently, this case study will be used as an example to measure and predicting the success and positive potential of implementing innovative experiential technologies and features into its current physical and online stores.

3.2.1 MAC Cosmetics History Overview

MAC cosmetics brand was found in 1985 by two Canadian entrepreneurs; a makeup artist Frank Angelo and a photographer Frank Toscan (Clair 2014). The concept behind the creation of MAC cosmetics was bridging the gap between the makeup industry and photography. The photographer Frank Toscan observed how uneven application of makeup reflects in photographs. The unevenness and imperfection resulted from applying makeup products might not be as noticeable in real life as opposed to when captured by a camera lens, thus a desire for investigating and developing the now famous MAC makeup products was initiated (Schiro 1997).

MAC started creating the products that makeup artists have longed for, with the creation of MAC cosmetics and the launching of long-lasting products with maximum coverage that are designed to last for as long as 9 hours straight, various makeup artists became obsessed with this highly professional makeup product line.

As stage makeup had become accessible for the use of wider public, the industry started to grow and expand since makeup artists have highly adapted and celebrated the creation of cinematic makeup made available for general public. Having the MAC brand closely linked in its background to entertainment makeup artistry, it has striven to employ the world's best makeup artists to participate in ads and campaigns to market and represent the brand in the most appealing way.

Using a celebrity preferred makeup sends a subconscious message towards the audience saying that wearing this brand is associated with fame and class. MAC became particularly famous in the 80s when the famous American singer Madonna appeared wearing MAC's "intense matte red lipstick" on one of her famous photo-shoots. Since its creation, MAC cosmetics has been contributing to humanity by openly declaring its contribution towards investing in research and technology development for fighting AIDS/HIV by allocating all the profit generated from selling the goods from a product line called Viva Glam for that specific purpose (Jacques 2015).

MAC cosmetics is owned by a larger US cosmetics brand called Estee Lauder, which had first shown an interest towards the MAC cosmetics in 1995 by purchasing 51% of company shares followed by a total ownership after the death of one of MAC's founders in 1998 (Morgan 2015).

Estee Lauder as a company was found in 1946 by Estée and Joseph Lauder in New York focusing on developing high quality skincare, hair care, makeup and fragrance products. Estee Lauder nowadays is considered of the main leaders in manufacturing and marketing beauty and skincare products. The brand has expanded its presence to 150 countries worldwide by selling its products through other beauty and skin brands such as: Clinique, MAC, Origins, Bobbi Brown, La Mer, Aveda, Too Faced and Jo Malone London (Estee Lauder Companies 2020).

3.2.2 Justification of Brand Selection

MAC cosmetics has a striking, young and colourful spirit. Seasonal launches and campaigns are aimed to surprise the audience, including a large spectrum of skin shades suitable for both sexes, making this brand attractive to a wider range of consumers. Paying an increased attention to Gen

Z in their way of thinking and accepting the drastic changes in the society structure, direction and gender related trends, it has adapted a motto on its official websites saying “All ages. All races. All sexes.”(Chesters 2011). This is an interesting approach playing on the social aspect by validating, celebrating and embracing the differences within the society by giving a chance for all to be beautiful. MAC cosmetics has long been famous for having an in-house makeup service counter, made available for reservation by appointment. To encourage in-store customer visits, MAC cosmetics has started investing in research and technology that would elevate the in-store shopping experience. In 2017, MAC has launched a virtual try-on mirror in its U.S stores, giving the opportunity for the visitors to try on 29 various eye makeup looks by looking into a mirror that scans their face thirty times per second (Gaitan 2017). The introduction of the virtual mirrors in its U.S store, indicate brand’s awareness and affirmation to develop and tailor its existing stores into futuristic inspiring concepts. The technology was expected and forecasted to roll out globally in all MAC stores; however, a significant slowdown has been witnessed in its predicted business and retail strategy implementation. Sephora and MAC are observed to be as the leaders in young makeup retail industry, each by adopting a different business strategy in achieving desired sales. Sephora as a brand had decided to host a selection of world famous brands under its roof in addition to its own products branded under “Sephora” thus becoming the ultimate offer for those purchasing makeup, perfumery and personal care products or simply looking for inspiring gift ideas. After conducting research on Sephora as a brand and the latest trends and technologies it implements; a clear picture about brands’ understanding of the future retail transformation is identified.

Few competitors were identified as similar in the level of professionalism and charisma with MAC being on top of the list. MAC cosmetics is a standalone brand with an artistic initiative and passion towards fashion runways, cinematic projections and the general public.

An example of MAC’s cosmetics initiative and desire to appeal to younger audience by keeping up with the technological advancements in retail is its newly opened store in Shanghai (Prance-Miles 2019). MAC cosmetics innovation and research department focuses intensively on Gen-Z and targets them as its primary customers. As a result of that, they have launched an experience centre in Shanghai, after conducting market research to carefully choose a location and create an

environment with digitalized activation points, screens and mirrors. The visitors of the store are allowed to scan their phones and faces to become connected and socialize using WeChat. The users are allowed to try various lipstick shades using a virtual try-on mirror in-store. This innovation by MAC shows the eagerness of retailers to gather as much personal data about its consumers as possible to target them in future in a more personalised manner.



Figure 3.1 MAC's Experience Centre targeting Gen Z in Shanghai, China (Prance-Miles 2019)

The absence of innovative technology in current MAC cosmetics store in United Arab Emirates, had raised an interest to investigate the success and the acceptance of such innovative technologies in this region. The decline in in-store footfall indicates that most purchases are made online which suggests the necessity to re-think current physical MAC cosmetics store designs and appearance.

3.2.3 Methodology Used for The Purpose of this Study

For completing this research, a combined methodology including survey research method and laboratory experimental method is selected.

Computer Laboratory Experimental Method will compliment this research's theoretical part (qualitative) with a practical component by replicating, enhancing and 3D simulating an existing

beauty and cosmetics retail store (MAC cosmetics) using a computer and allowing the participants to undergo an experiment tailored specifically to evaluate participants acceptance and feedback. Survey research method will help in understanding consumer's perception, awareness and knowledge regarding the subject of virtual reality discussed in this paper. Furthermore, this combined methodology will help to analyse the answers and feedback collected from the selected and previously identified three generational cohorts including (10 Gen Z participants, 10 Millennials and 10 Gen Y participants, therefore a total of 30 participants. The results of this experiment will contribute to recent knowledge by filling the gaps and drawing conclusions related to this research. Survey research method is identified in the research proposal and Investigations of Built Environment's second assignment as one of the most preferred methodologies due to its ability in monitoring the characteristics of the sample chosen to be interviewed or questioned. This methodology has its own challenges in getting access to the selected desired age and gender groups.

3.2.4 Justification of the Selected Methodology

A thorough literature review on the subject of incorporating virtual and augmented reality technology into various retail segments and the predicted future following the application and implementation of these technologies was conducted during this research. The papers that adapted computer laboratory experiments equipped with VR technology and other motion and sensory tracking systems followed by a survey to document the responses; appeared to be the most successful in terms of drawing attention and interest towards the subject studied.

An experimental aspect in research tends to add value to a hypothetical statement or conceptual model by supporting ideas and arguments with action and testing the hypothesis on the spot to eliminate any false statements thus preventing the waste of time in future on examining a subject that had already been studied. The availability of the real time rendering plugin called "Enscape" in a free six months student version and the provision of intensive support from a team of professionals on behalf of the software developer facilitated the process of exploring and mastering the software. The software requires a good graphics card to run smoothly and display high quality realistic products and environment. "Enscape" is a user-friendly software with a

simple interface and plenty of available online tutorials. Using Enscape as a plugin for SketchUp have resulted in simulating a realistic MAC cosmetics virtual store after including the design features suggested by the responses from the preliminary survey about what they would expect to see in the store of the future. A combined methodology of conducting a VR experiment in addition to a series of surveys, helped assessing and measuring the acceptance and excitement levels of the targeted audience towards the incorporation of VR and AR technologies into beauty and cosmetics retail sector to enhance the shopping experience for the three age groups studied.

Chapter 4 Virtual Store Design

SketchUp program was used to model a hypothetical store in 3D, with the same merchandise and packaging available and displayed at current MAC cosmetics stores. The aim of this experiment is to mimic the reality as closely as possible to increase the immersion level of the participants. As studies suggest, the level of tele-presence corresponds positively to the level of personal immersion into the virtual world and therefore the more a customer feels immersed in the virtually simulated store, the closer his purchasing decisions and behaviour are to that in a real store environment (Schnack et al. 2018). A software called “Enscape” was used to animate the experiment using proper illumination, reflections, realistic graphics and product display.

4.1 Detailed Chart with Materials and Means Required to Conduct Research:

Table 4.1 List of Software Required to Complete Research

Software	Justification	Cost (AED)
SketchUp	One of the most user-friendly 3D modelling programs popular for accuracy and simplicity of operation	Free for student version
Enscape	Real time rendering plugin that creates photo realistic environments exportable in standalone modes for the purpose of launching VR experiences.	6 months free for student version

Table 4.2 List of Hardware Required to Complete Research

Hardware	Justification	Cost (AED)
Computer or Laptop	A device with a good graphics card such as NVIDIA GE FORCE is needed for modelling and rendering the virtual three-dimensional experience. Lenovo laptop with advanced graphics card was used to design this experiment	Approximately: 10,930 AED
HTC VIVE 1.5 Virtual Reality Set	Virtual Reality Head Mounted Device with Hand Controllers	AED 3,699.00 AED (free at Aurecon Dubai)
Designing and modelling the virtual store with merchandise	This will include modelling the real products and mapping them with the exact textures and branding observed in the real store environment	NA – this was done by the researcher (Suzanne Almomani)

4.2 Selected Methodology's Explanation

4.2.1 Step One. Site Surveying “MAC cosmetics Mirdiff City Centre, Dubai, United Arab Emirates”

For the purpose of site surveying and brand observation, a visit to MAC cosmetics branch at Mirdiff City Centre, Dubai, United Arab Emirates was scheduled and carried out on the 19th of August 2019 after obtaining permission from store management. A close observation of the branch was made, including taking photographs that focus on stores' interior design features, fixtures and fit out. The overall interior was mostly dark with black walls and repetitive perimeter fixtures. Signage band is black with white front illuminated letters containing the brand's logo.

The overall size of the store is relatively small, fitting only four mid-floor display gondolas in the centre, showcasing various MAC makeup range of products. The mid-floor fixtures are finished in shiny black laminate or spray paint with drawers finished in light natural oak laminate. The ceiling is made of stretched fabric in a parasol with directional track lighting fixed around its parameter. First mid-floor fixture (gondola) placed at entrance is wrapped with seasonal product advertising graphics displaying the latest collections. The perimeter display design is repetitive with front illuminated dividers and stacked shelves. Each perimeter bay has a header marking the category of the product on display.

The store has three live makeup stations for walk-in customers. User's engagement with products is possible by self-exploring, testing and using staff's assistance and advice during shopping. The store is lacking the inclusion of digital screens and innovative interactive self-service technologies present in other MAC cosmetics locations.

A site visit was carried out to examine the footfall and observe the interaction between staff and customers as well as the interaction between customers and products. Analysing MAC's current store design and marketing strategies will help to identify the strengths and weaknesses of the brand. Subsequently, a virtual experiment will be designed and developed specifically to evaluate the aim and prove the hypothesis of this research.



Figure 4.1 MAC Cosmetics Store, Mirdiff City Centre UAE (Almomani, 2019)

4.2.2 Participants

A sample of 30 unpaid female participants aged between 7-54 years old were recruited. Selected participants were made aware about the purpose of this experiment and few gave permission to use their photographs in this paper for record. The participants were assured that their anonymity will be preserved. A brief introduction about the subject of virtual reality in retail was verbally communicated to the participants before trying to explore MAC Cosmetics virtual store.

The females were recruited based on the age group “Generational Cohort” selected for this study such as “Gen X” aged between 38 – 54 years old, “Millennials” aged between 23-38 years old and “Gen Z” aged between 7- 22 years old. Each age group comprised of 10 females, therefore 30 females in total were recruited.

All participants had previously interacted with computer or mobile games and applications in the past six months. Subsequently, most of the participants had good knowledge about various mobile shopping applications. Most participants are carrying at least a bachelor’s degree and pursue an understanding about the importance of technology in developing the future of retailing industry.

4.2.3 Pilot Studies (Surveys)

Three surveys were prepared to be conducted in sequence on a sample of thirty females aged between 7-54 years old with prior exposure to VR technologies and applications.

The first two surveys were written and shared with three females, each belonging to one of the age groups studied (Gen X, Millennials and Gen Z) as test drafts to get their feedback on the clarity of the questions. The participants made notes about the questions and terminology they found to be unclear, and the questions were revised and regrouped accordingly.

The first survey is a preliminary survey tailored specifically to collect general feedback and opinions regarding the re-direction of future retail shopping from the traditional brick and mortar method towards online shopping. It also contains few questions on the subject of incorporating virtual reality applications into beauty and skincare retail sector.

The second survey requires the participants to have at least once visited one of MAC cosmetics physical stores to better understand the strength points and weaknesses in the current design. This survey will help in developing and enhancing the MAC virtual store experience, strategies and design.

The answers and the suggestions received from the participants after undergoing the VR experience will not only record the outcome however also contribute to future research on developing future virtual beauty stores and enhancing the features in current physical store.

The third survey was conducted after the participants had been immersed into MAC's virtual experience to record their feedback and comments on the aspects of the experience. The purpose of conducting the experiment and the surveys is to investigate and measure the success of such an elevation in distant shopping and whether it can become the future of beauty and skincare retail industry.

All three surveys are designed in a 5-point Likert scale format with answers ranging from the highest score to lowest as such: (5) Strongly Agree, (4) Agree, (3) Neither Agree nor Disagree, (2) Disagree, (1) Strongly Disagree). In addition to one multiple choice question included in the 2nd survey to analyse the variances in participant's preferences towards future retail features.

4.2.4 Experiment Design

A hypothetical virtual MAC cosmetics store is designed using a 3D modelling program called SketchUp in 2017 version. The virtual store design principles match the design guidelines and the overall look and feel of MAC cosmetics existing physical stores visited in person and found online. The experiment immerses the participants into the MAC virtual store environment using HTC Vive headset and hand operated remote motion controllers. The participants are asked to navigate and explore the store for few minutes after receiving verbal instructions.

MAC's virtual store design is enhanced as per the constructive feedback collected from the participants in the second survey. The store environment is not an exact replica of an actual MAC cosmetics store surveyed earlier (MAC Mirdiff City Centre). The store visualized is larger in size for the purpose of easier navigation. The hypothetical virtual store follows the branding colour scheme, design key features and elements, perimeter fixtures and midfloor display fixtures. No time restriction is imposed on the participants as they are encouraged to explore and investigate the various features and products visualized inside the virtual store.



Figure 4.2 SketchUp 2017 MAC Virtual Store 3D Model Screen Grab



Figure 4.3 MAC Virtual Store Launched with Enscape Plugin in Fly Mode



Figure 4.4 MAC Virtual Store Launched with Enscape Plugin in Walk Mode

Pressing space bar alters the modes of navigation between Fly and Walk Mode. Using the scrolling button on the mouse disables the walk mode and enables Fly Mode. Using walk mode allows eye-level sight similar to reality. Fly mode changes the eye level and allows the user to walk over and through walls and furniture and enables bird view which might be useful for some architectural and urban project presentations.



Figure 4.5 Escape's Navigation Instructions Bar

The figure 5.6 above illustrates the navigation bar displayed by default after launching Enscape. These navigational instructions explain how to move inside the virtual store with the help of a mouse or keyboard. Pressing “H” on keyboard will result in hiding the instruction bar.

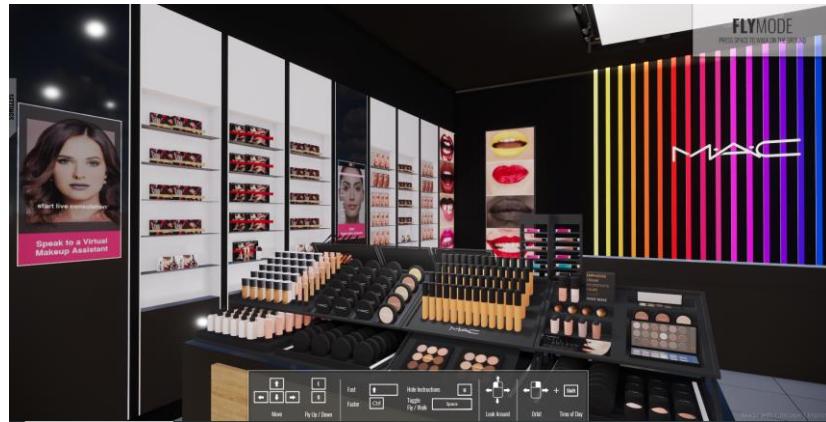


Figure 4.6 Internal Screen Grab 01

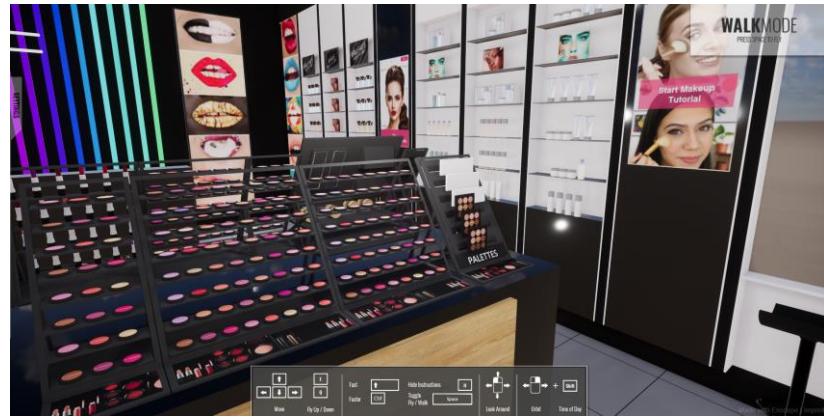


Figure 4.7 Internal Screen Grab 02- Midfloor – Eye Shadow

Figure 5.7 shows the left side of the virtual store and figure 5.8 shows the right side of the store observed at shop front.

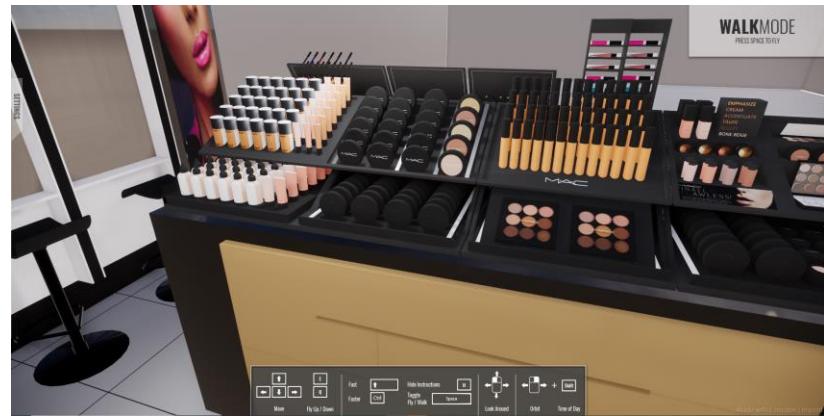


Figure 4.8 Internal Screen Grab 03- Midfloor – Base Foundation

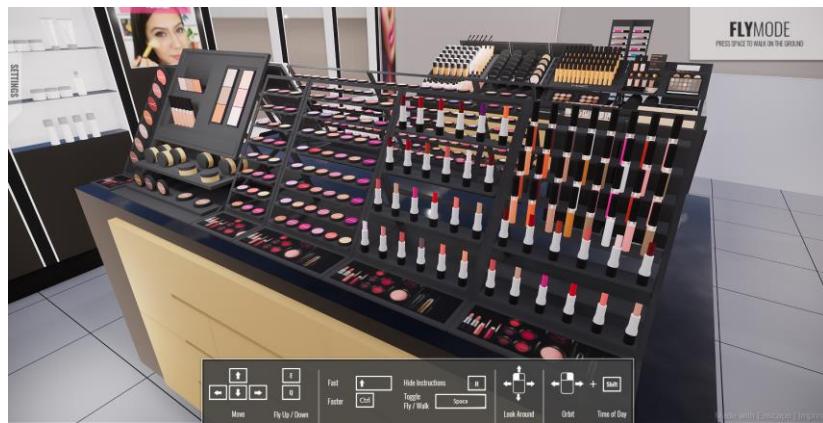


Figure 4.9 Internal Screen Grab 04-Midfloor-Lip Colour Sticks

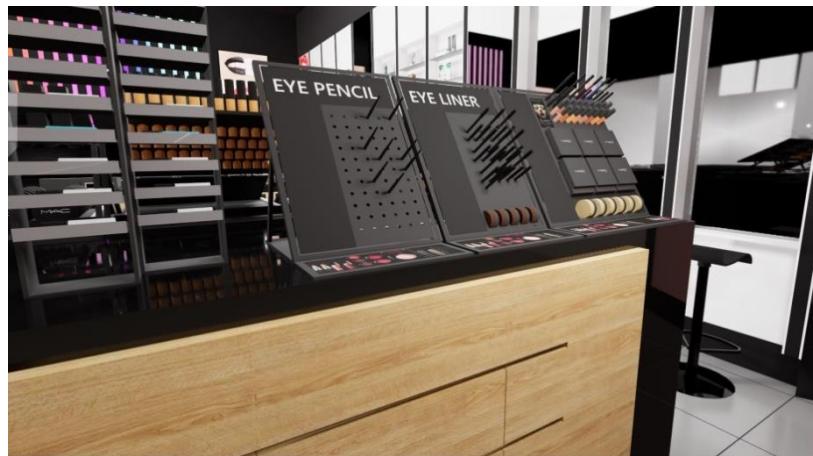


Figure 4.10 Internal Screen Grab 04- Midfloor – Eye Pencils and Liners

Figures above show the various products available for display on the midfloor gondolas.

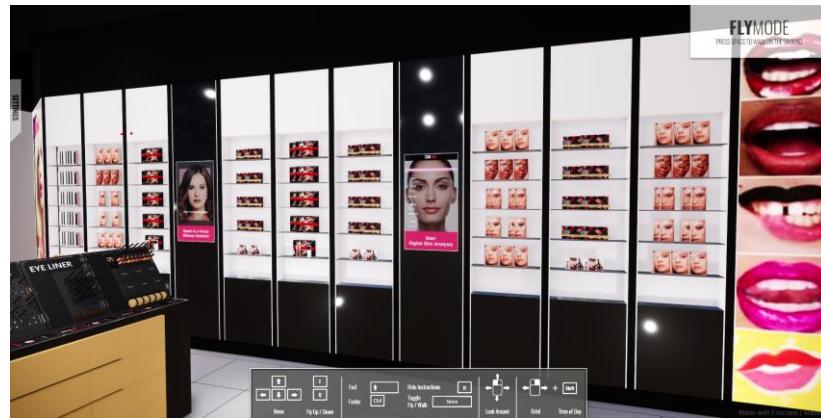


Figure 4.11 Internal Screen Grab 04- Perimeter Display-Left

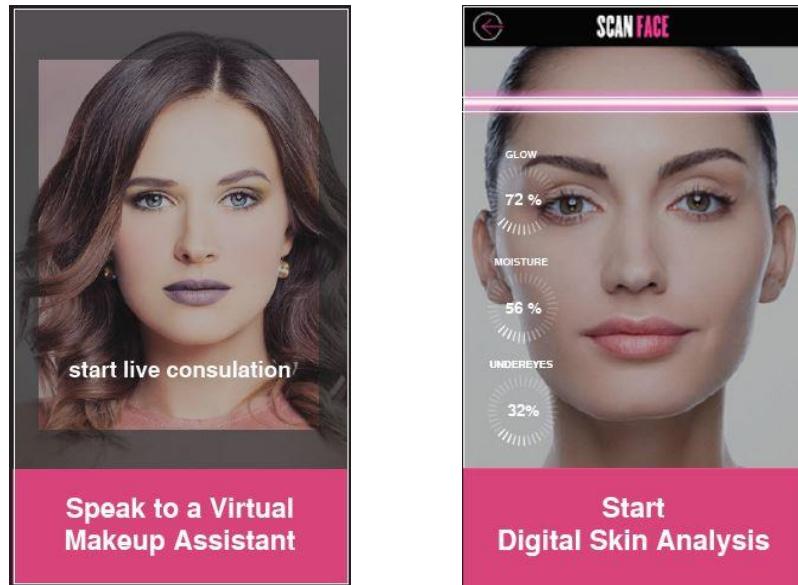


Figure 4.12 Virtual Assistant and Digital Skin Analysis Portal Design

Figure 5.12 shows the left side of the store perimeter display and the integration of Live Virtual Makeup Assisted Consultation and Digital Skin Analysis portals instead of the usual full height mirrors in a virtual store. Figure 5.13 shows a zoomed in view into the design of Virtual Assistant and Digital skin analysis portals.

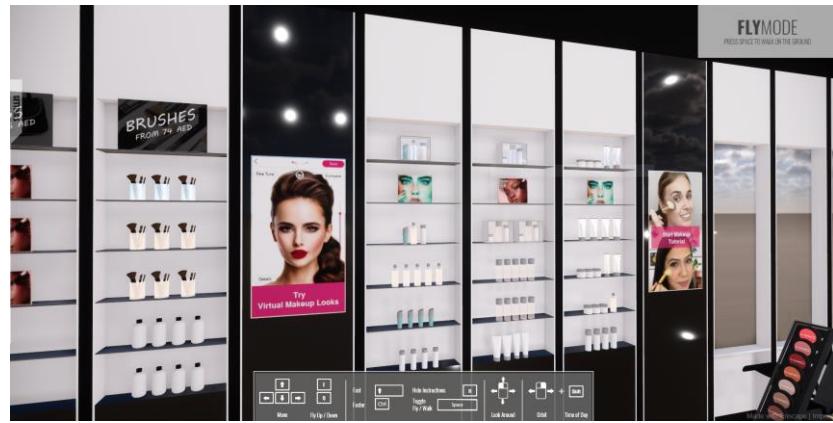


Figure 4.13 Internal Screen Grab 04- Perimeter Display-Right

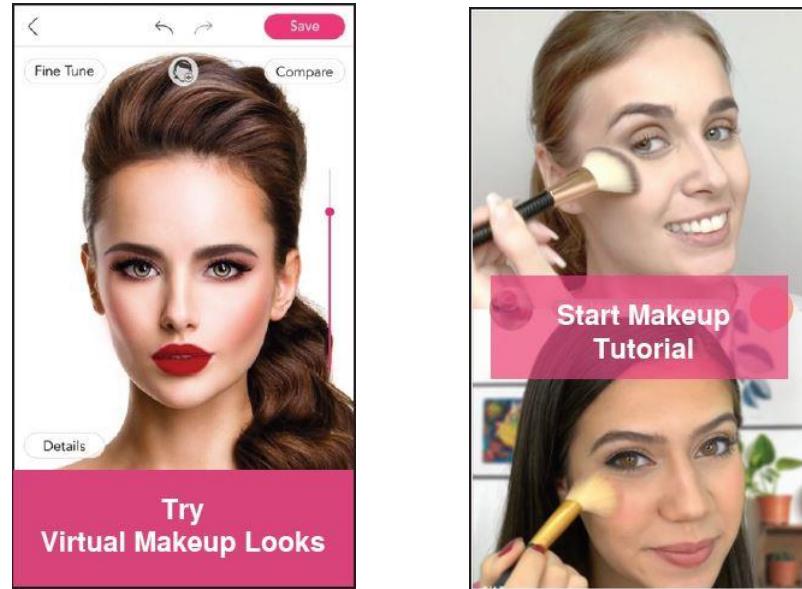


Figure 4.14 Virtual Makeup Try on and Tutorial Portal Design

Figure 5.14 shows the perimeter display on the right side of the store and the integration of Virtual Makeup Try-on and Makeup Tutorial portals. Figure 5.15 shows a zoomed in view into the design of Virtual Makeup Try on and Tutorial portals.

4.2.5 Experiment Procedure

Participants were asked to proceed to a VR Room at Aurecon Office, Dubai, United Arab Emirates, previously preloaded with the MAC cosmetics virtual store on Enscape for SketchUp. An HTC Vive device was connected to “Alienware” laptop. No time restriction was imposed on the participants, however the average time spent exploring the store was around 2 minutes. Some participants needed to look again at the virtual store while completing the post experiment survey to gather participant’s feedback and impression about the experiment. The responses were gathered either by Survey Monkey or on a hard copy available for record.



Figure 4.15. Participant Exploring MAC Virtual Store Using HTC Vive

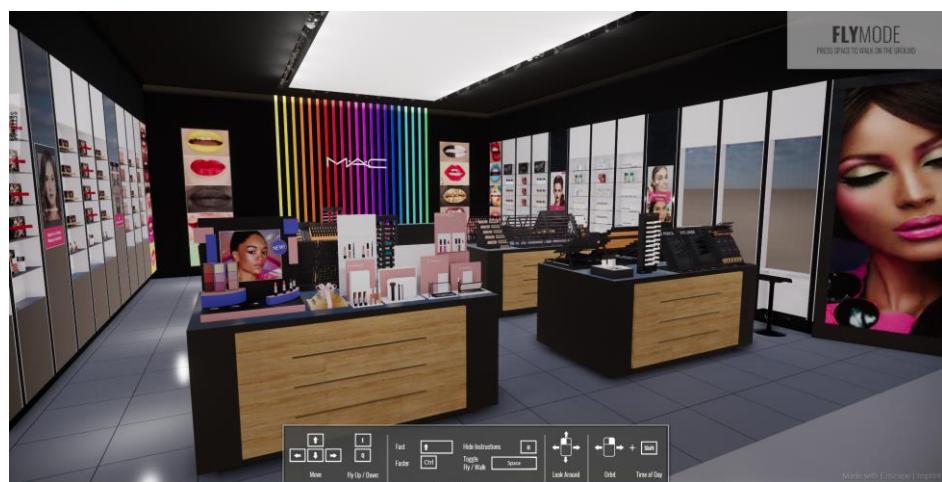


Figure 4.16. Participant’s Viewport inside MAC Virtual Store

Chapter 5 **Results and Discussion**

Results

This chapter is going to showcase the results from the three surveys designed and conducted for the purpose of studying the role of VR technology in enhancing skincare and beauty retail channel. It will categorise and summarise the responses into categories for the purpose of analysing and discussion. The responses of the three age groups are compared in terms of the average score and the standard deviation calculated per question using the standard deviation formula for a sample studied. The responses of the three surveys are graphically illustrated using Microsoft Power BI software for visual comparison and analysed in depth in the same chapter.

5.1 Survey 1_Preliminary / General survey

Purpose: to collect general feedback and knowledge from the participants about the rising issue on the re-direction of retail from the traditional brick and mortar towards online shopping.

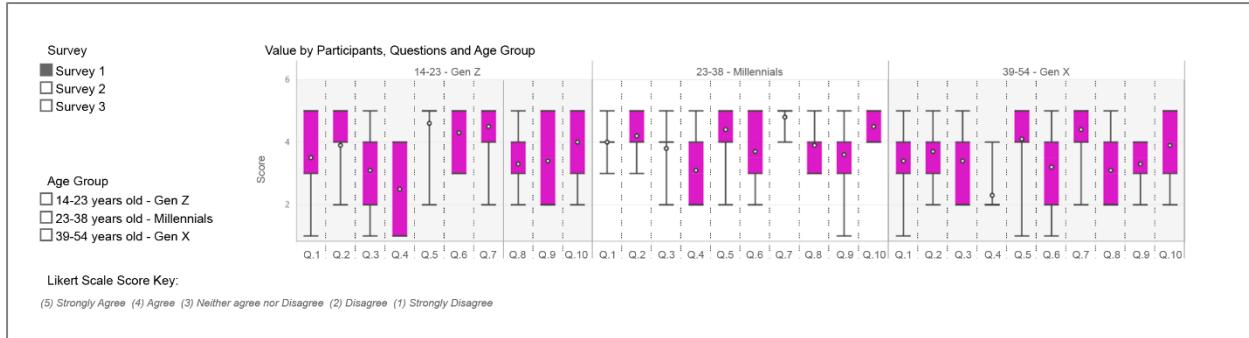


Figure 5.1 Responses of each Age Group to Survey 1

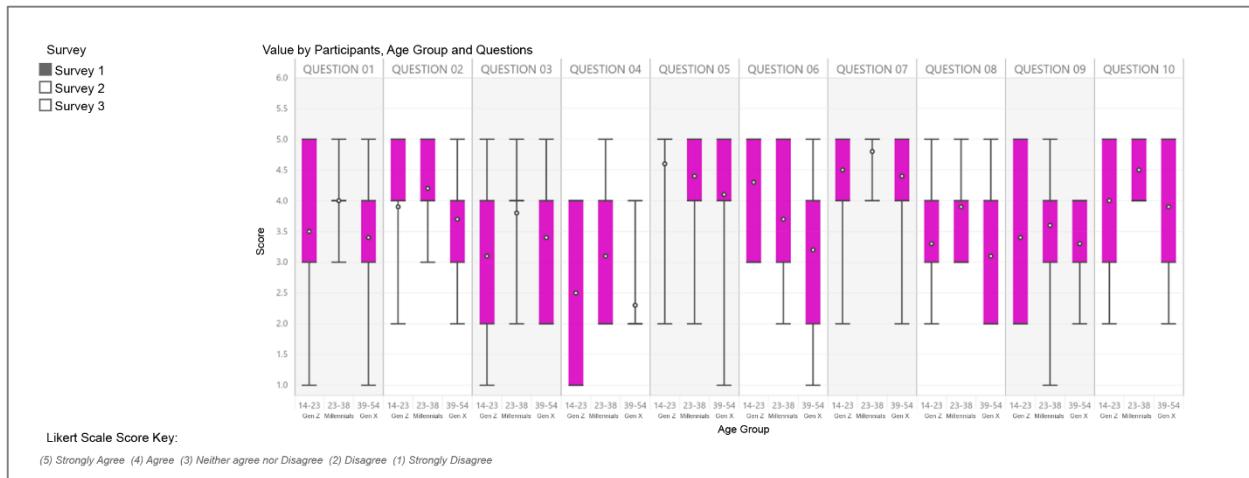


Figure 0.2 Comparison of Age Group Responses to Survey 1

5.1.1 VR Technology and e-commerce (Q.1,2,3)

Among the three generations, Millennials (AVG=4, SD=0.66) are the most aware about the progression of virtual reality into various retail channels. Responses of both Gen X (AVG=3.4, SD=1.429) and Gen Z (AVG=3.5, SD=1.35) indicate lacking in understanding the difference between conventional online shopping and the existence of virtual stores.

All three generations support the introduction of virtual reality into retail and agree that it can be used as a valuable tool to enhance the shopping experience.

A question regarding an eventual integration of all brands in e-commerce has showed interesting results as the opinions of Gen X (AVG=3.4, SD=1.07) and Millennials (AVG=3.8, SD=1.032) had varied around this topic with the majority agreeing with the statement. Gen Z (AVG=3.1, SD=1.37) did not all agree that the establishment of online presence is a future must for all brands and the contrasting responses have resulted in a neutral average with a high standard deviation value.

5.1.2 Testing and Hygiene (Q.4,5,6,7)

Gen X (AVG=2.3, SD= 0.674) and Gen Z (AVG=2.5, SD=1.269) did not agree that shopping for beauty products online is the same as shopping for other categories. Millennials (AVG= 3.1, SD= 1.197) had a wide range of opinions as their answers split between agreeing (score=4) and disagreeing (score=2) resulting in an average of 3.1 (neither agree nor disagree).

All three generations agree that product tactility and testing is an absolute necessity while shopping for makeup and beauty products before completing the final purchase. Skincare products on the other hand, are colourless after direct application and come in cream, gel or oil forms. Furthermore, written product ingredients and effective advertising are key to selling this category. Since anti-aging, moisturizing and sun blocking products do not have a direct effect on one's skin, testing may only be required as an allergy precaution.

Gen X (AVG=3.2, SD=1.398) did not agree that it is necessary to test skincare products before buying them. Millennials (AVG=3.7, SD=1.251) and Gen X (AVG=4.3, SD= 0.948) had various responses agreeing in average on the importance of testing skincare products before buying them.

All three generations almost equally agree that hygiene plays an important factor while testing makeup products in store. This point suggests that the concept of virtual makeup is expected to be met with acceptance if marketed using the previous statement as a strategy to prevent direct and indirect disease transition through physical contact with testers available in-store.

5.1.3 The upside and downside of e-commerce (Q.8,9,10)

Online shopping as many other interventions has advantages and disadvantages. Millennials (AVG=3.9, SD= 0.737) think that shopping online can be misleading, deceiving and disappointing containing a risk factor of choosing a wrong item or buying a fake product. On the other hand, Gen X (AVG=3.1, SD=0.994) and Gen Z (AVG=3.3, SD= 0.823) did not agree nor disagree that online shopping contains a deceiving factor.

Long delivery schedules were seen mostly by Millennials (AVG=3.6, SD=1.264) as a discouraging aspect while ordering products online.

Online exclusive special offers and promotions are considered powerful strategies among Millennials (AVG=4.5, SD= 0.527) as the majority of answers agree to strongly agree that marketing strategies as such will enhance online sales. Gen X (AVG=3.9, SD= 0.994) and Gen Z (AVG=4, SD= 1.054) also have a positive opinion about the addition of online exclusive deals and special offers on certain products offered by the brand.

5.2 Survey 2_MAC cosmetics current in-store shopping survey

Purpose: to understand strengths and weaknesses of MAC cosmetics current physical stores in order to enhance the virtual store experience.

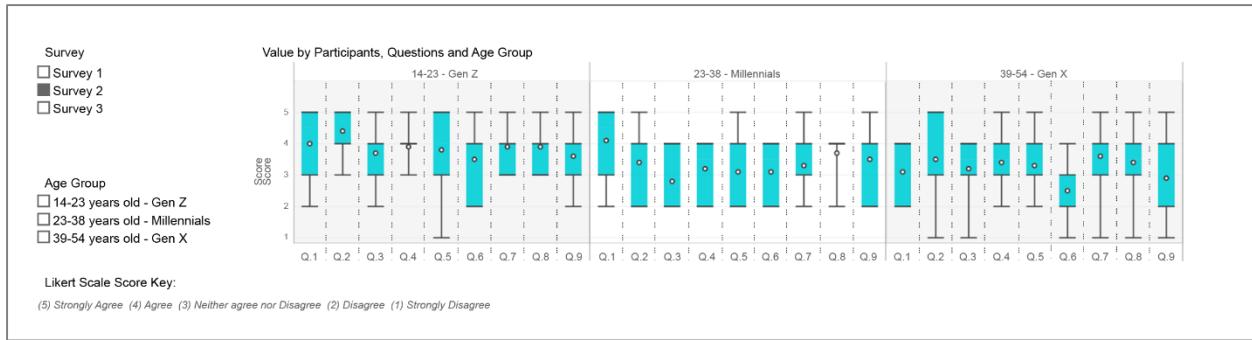


Figure 0.3 Responses of each Age Group to Survey 2

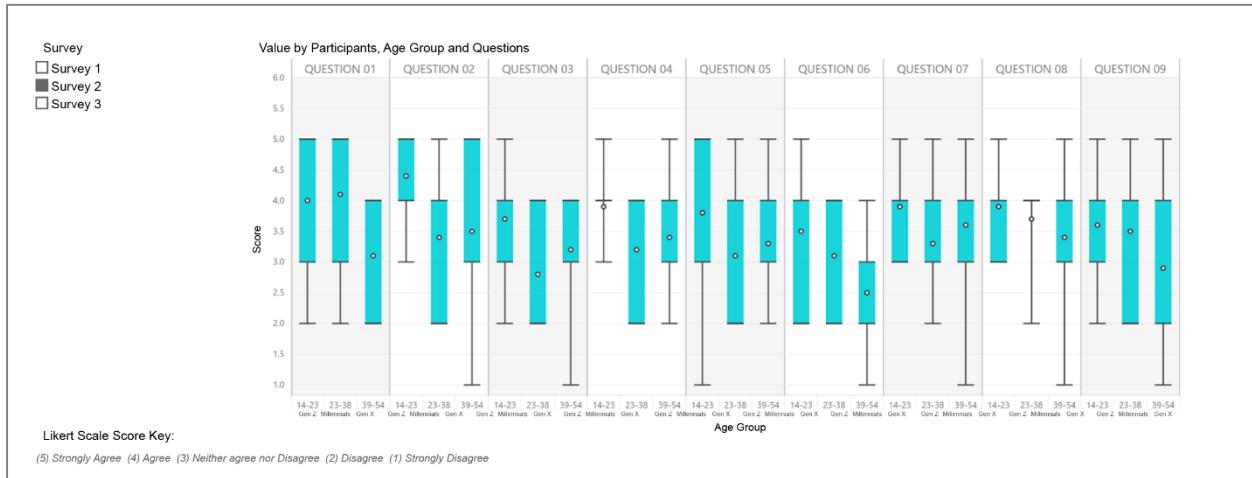


Figure 5.4 Comparison of Age Group Responses to Survey 2

5.2.1 MAC cosmetics current physical store attractiveness and creativity of display (Q.1,2,3,4,5)

Gen X (AVG=3.5, SD=1.269) and Millennials (AVG=3.4, SD= 1.074) did not agree nor disagree on the overall attractiveness of current MAC cosmetics store design. Gen Z (AVG= 4.4, SD=0.843) in average agreed to strongly agreed on the statement saying that MAC cosmetics store design is overall attractive.

Creativity of product display and presentation was not highly appreciated and noticed by Gen X (AVG=2.9, SD=1.197) as the majority of the answers disagreed or had neutral responses about the adequacy of creativity in the display and presentation of product ranges available in current MAC cosmetics physical stores. Millennials (AVG=3.5, SD=1.08) and Gen Z (AVG=3.6, 1.074) mostly agree that current MAC cosmetics stores have enough creativity in the way they design their fixtures and promotional feature display elements.

5.2.2 Adequacy of current in-store assistance (Q. 6)

In store assistance can come across as pushy and disturbing if the salespeople insist on accompanying walk-in customers without allowing them the time to explore products on display and notice the on-going promotions on their own. When gathering responses from the participants about in-store assistance at current MAC cosmetics stores, 5 out of 10 Gen X (AVG=2.5, SD=1.08) participants disagreed that in-store assistance at MAC is adequate, Millennials (AVG=3.1, SD=0.994) have mixed opinions and the majority of Gen Z (AVG=3.5, SD=1.178) agreed that the level of assistance is adequate.

5.2.3 Futuristic MAC cosmetics stores (Q.10)

The participants were presented with five futuristic conceptual features such as: a) Virtual Mirrors, b) Virtual Assistants, c) Video-based private consultation booths, d) Pick and collect counters (from online shopping) and e) Digital skin analysis technology.

They were asked to vote for the feature they would like to see the most in future MAC cosmetics stores. Gen X voted the highest for Digital Skin Analysis, Millennials voted the highest for Virtual Mirrors and Digital Skin Analysis and Gen Z voted the highest for Digital Skin Analysis and Virtual Mirrors.

5.3 Survey 3_Post-experiment survey (collecting feedback from participants after trying MAC cosmetics virtual store experiment)

Purpose: to analyse the success of the experiment and suggest improvements. To record the outcome and contribute to future research on developing virtual stores.

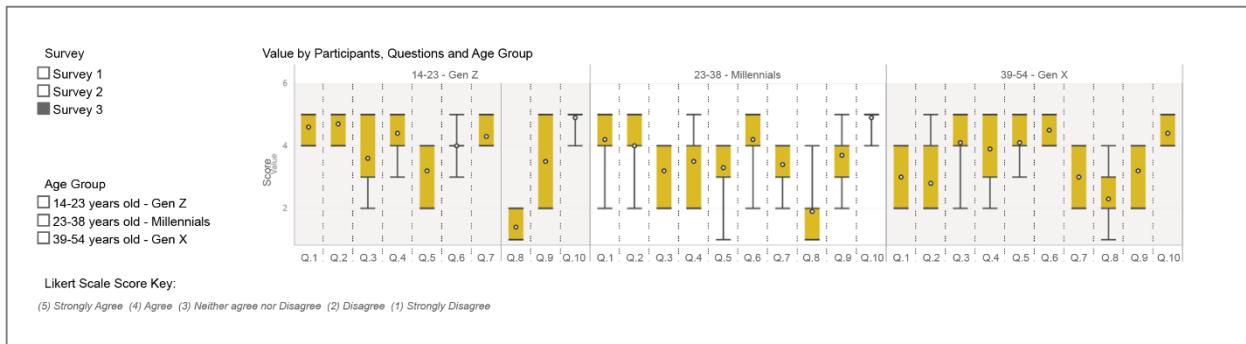


Figure 0.5 Responses of each Age Group to Survey 3

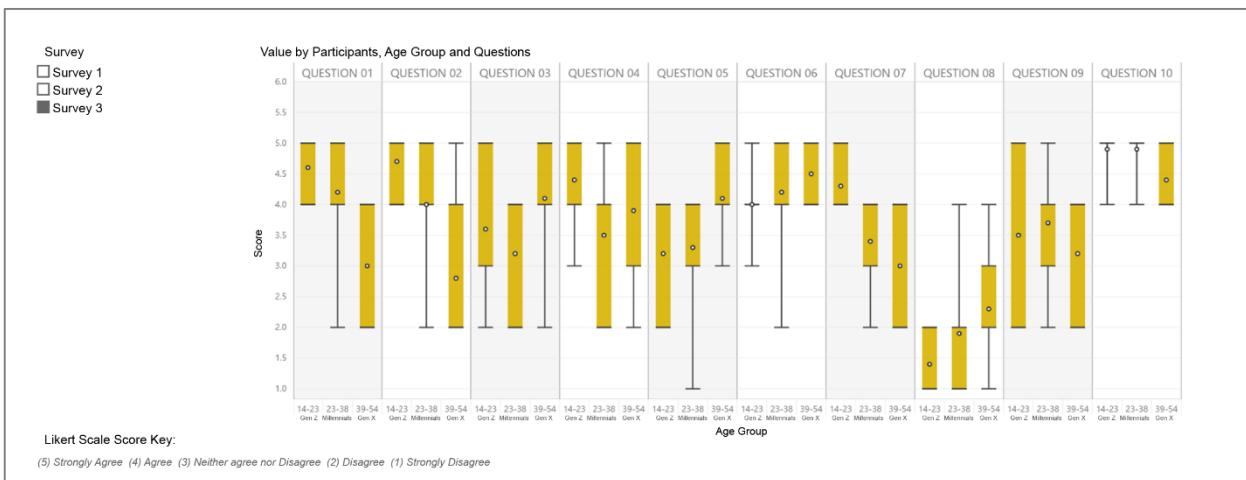


Figure 0.6 Comparison of Age Group Responses to Survey 3

5.3.1 Navigation in a virtual store (Q.1,2)

In terms of the clarity of navigational instructions, the opinions were split in half among Gen X (AVG=3, SD=1.054) between agreeing and disagreeing resulting in an average score of 3. (Neither agree nor disagree) with high SD value.

Among Millennials (AVG=4.2, SD=1.032) 8/10 participants found the instructions on navigations to be easy and clear and all Gen Z (AVG=4.6, SD=0.516) participants found the instructions on navigations to be easy and clear.

Gen X (AVG=2.8, SD= 1.135) 6/10 participants found it difficult to navigate inside the virtual store and the rest had various opinions. Millennials (AVG=4, SD=0.942) 8/10 participants Millennials agreed that it was easy to navigate inside Mac's virtual store and Gen Z strongly agreed that it was easy to navigate inside Mac's virtual store and all Gen Z (AVG=4.7, SD=0.483) participants (agreed – strongly agreed) that it was easy to navigate inside Mac's virtual store.

5.3.2 Virtual store appearance and future success (Q. 3,4)

The majority (8 out of 10) Gen X (AVG= 4.1, SD=0.994) participants have found MAC virtual store design as being more exciting than its current physical store design.

Half of Millennials (AVG=3.2, SD=0.918) agree that the virtual store design is more exciting than the current physical store design and the rest of the opinions varied resulting in an average of neither agree nor disagree.

Half of Gen Z (AVG=3.6, SD=1.074) participants neither agree nor disagree that MAC's virtual store design is more exciting than its current physical store design, and the rest of the opinions were scattered between agreeing and disagreeing resulting in an average score of 3.6.

All generations expressed an interest in shopping in an officially released virtual store by MAC cosmetics in future.

5.3.3 The Human Factor (Q.5)

Gen X agree in average that virtual stores must contain some sort of a digitalized human operated virtual assistance to make the experience more human-friendly, Millennials and Gen Z despite the neutral average, 50-60% agree on the importance of the human factor in a cyber environment to make the experience more humane.

5.3.4 Typical retail elements such as: (cash desk, mirrors, fitting rooms etc.) (Q.6)

When designing virtual stores, the design elements and requirements may not exactly match those used while designing a physical store. While a cash desk for example is a very important component in a physical store, its existence may be questionable in a virtual store as you don't have to queue in order to pay for the products you have selected to purchase.

Mirrors and fitting rooms are important elements mainly used at a pre-buying stage to test the appropriateness of the product. As this feature is not applicable in a literal form during online shopping, a replication of try-on is possible in virtual stores by introducing virtual mirrors/ face scanning and detecting technology that may facilitate and enhance the distant shopping experience. Gen X agree to strongly agree that exact replication is not necessary in virtual stores and that some typical elements can be removed from virtual stores due to their dysfunctionality. Millennials and Gen Z also agree that elements like cash desk and mirrors are no longer functional in MAC cosmetics virtual stores and can be substituted with other exciting features.

5.3.5 Realism

Gen X (AVG=3, SD=0.942) opinions on the ability of the virtual store experiment to closely replicate reality are widely spread, 60% of Millennials agree that the experience was relatively close to reality and Gen Z compared to other participants agreed the most that the experience had succeeded to closely mimic reality.

5.3.6 Motion Sickness – Dizziness

None of the participants reported motion sickness or feeling dizzy after the experiment.

5.3.7 Games, scoring, virtual gifts, and giveaways

All participants agree to strongly agree that the introduction of game aspects including scoring, virtual gifts, competitions and giveaways would enrich and encourage overall virtual store experience.

Discussion

A detailed discussion will interpret the responses and further explain and highlight the main findings based on the similarities and the differences found among the responses of the three generations studied.

This chapter discusses and interprets the results of the surveys and the experiment according to the researcher's personal observations and knowledge acquired during research on issues related to the topic selected.

It will also group the findings into categories for easier discussion directly linking the observations to the research aim and the points mentioned as objectives that help to achieve the aim.

5.4 Millennials' smart intelligence

Despite that it is in brands' best interest to keep up with the latest technological advancements to meet the customers' expectations and equally engage all customers, this research has observed that not all generations are equally aware of retailer' initiatives in introducing VR features into their stores.

As mentioned during literature review, retailers of various sectors are investing in the development of immersive platforms to appeal to a wider range of potential shoppers belonging to different generational cohorts.

The responses of the first survey showed that Millennials have the most knowledge about the development and evolution of virtual reality technology in general and understand the main difference between traditional online shopping process versus shopping in a virtual store. The same survey observed that Millennials are more aware than Gen X and Gen Z of the latest advancements in e-commerce and the redirection of future retailing industry towards e-commerce.

These findings can be explained by the fact that Millennials comprise about two thirds of the entire workforce (Peter Economy 2019). Millennials are employed by various sectors, constantly investigating the current market conditions and are involved in planning future strategies to enhance profitability.

The previously mentioned observation could be further explained by the fact that the generation of Millennials is actively involved in the current market shaping both the retailer and the consumer simultaneously. They are employed at various industries that encourage research on latest trends in retail and are forced to become familiar with them throughout the process.

This research had thoroughly highlighted through literature review the range of available VR and AR devices and applications adapted by leading beauty and skincare brands as well as brands from other retail sectors. However, the virtual store experiment designed as a part of the methodology required to complete this research has revealed that the brands do not receive the same amount of attention thus do not have the same exposure levels across generations as some participants were not familiar with terminology like virtual stores or virtual assistants.

Since the concept of VR is relatively new and futuristic to a certain extent in the field of commerce and is expected to grow according to previously discussed forecasts and annual financial reports prepared by giant beauty and skincare brands such as L’Oreal for example, it is still in the process of gaining more audience and engaging more consumers.

It is expected that general public residing in this region that have not carried intensive research to be unfamiliar with most VR innovations in retail. For instance, even for a professional like myself, that has long been involved in the field of designing commercial retail for international brands; this research helped in discovering the global innovations in retail that I have previously been unaware of. It has undoubtedly enriched my knowledge and helped me widen my area of expertise for designing projects won in future.

5.5 The positive potential of VR in beauty and skincare retail

This research observed through surveys conducted that Gen X, Millennials and Gen Z do all agree to a certain extent that virtual reality is a valuable tool that has a positive potential to enhance beauty and cosmetics retail business in general. However, they insist that an existence of a physical store is still important to provide reassurance for the consumer about brand’s presences and willingness to connect with customers by maintaining their standards of quality and service.

An experiential physical space dedicated to enriching customers’ journey is highly valued by consumers and could become the right solution for those retailers entirely evolved into online platforms by acknowledging the value of physical retail. In summary, an establishment of a strong online platform is seen as an additional value to the brand instead of a confine evolvement that will eventually substitute the existence of physical retail according to the data collected from surveys.

All generations studied think that testing and trying beauty products is an integral part of the customer journey. The necessity of testing skincare products does not have the same level of importance for Gen X as it is for Millennials and Gen Z.

Since Gen X is the older among the generations studied, it has the longest track record of using beauty and skincare products compared to Millennials and Gen Z therefore, they understand that testing skincare products cannot ensure immediate observable effect. As a result of that, testing skincare products in store is not as significant for them as it is for Gen Z who believe that is essential to physically or virtually try various skincare products before buying them. Since this is technically and practically impossible to replicate in a virtual store environment; the category of skincare needs to be taken into consideration while designing its future virtual stores.

Special marketing campaigns and design strategies need to be tailored and laid out to deliver the message about the value of introducing VR technology in beauty and skincare retail channels.

5.6 Sustainability and health concerns

Organic ingredients and fighting animal testing by adapting the animal cruelty-free approach; are few marketing strategies that the retailers might use to capture the attention of the younger generations in specific due to the observations of increased concerns about issues as such to acquire more sales.

Overall, the Millennials as a generation had affirm solid opinions towards issues concerning online shopping, such as: delivery schedules and the mismatch between the expectation and reality of the product purchased. Products that are shipped from overseas and arrive in multiple shipments all contribute to air pollution and consumption of energy resources that can be avoided if consumers had the opportunity to shop locally for their preferred brands.

Studying the integration of VR into retail from the angle of sustainability was a part of the objectives required to complete this research and the questions tailored to address this issue had confirmed that the younger generations are concerned when it comes to decisions that would better benefit the environment and their wellbeing.

5.7 Financial benefit for retailers and consumers

The concept of gaining and winning best deals and the value of online exclusive offers and campaigns is highly appreciated among the participants of the three generations based on their feedback regarding the introduction of systems that support scoring and collecting points to be redeemed as vouchers while shopping over the internet.

This observation leads to the conclusion drawn as the introduction of game aspects will definitely increase the level of interaction in virtual stores especially among the young consumers. As financial analysis and forecasts described earlier in literature review are promising to generate more profit from online sales, the adaptation of futuristic VR concepts is considered among the most effective strategies for retailers to enhance the performance of their current businesses.

5.8 Enhancing Store Appearance and Charisma

The fact that Gen Z found the design of current MAC cosmetics stores to be more attractive than other generations studied, suggests that designers and brand strategists had possibly researched the preferences of Gen Z and are trying to make a presence among young consumers.

The variation in the opinions of Gen X and Millennials about overall store attractiveness in terms of layout and design could mean that design and personal preferences are of a subjective nature and that some consumers are more open minded towards innovative designs than others who prefer more classic and traditional approach to the design of physical and virtual retail.

These observations need to be taken into consideration by retailers designing future stores for existing and upcoming generations noting the elements and services that the customers appreciate the most as well as the features they dislike in the current stores.

Since the three generations studied are all potential consumers for beauty and skincare products, the retailers are advised to understand the differences between generational cohorts and do better store planning to create designs that would equally attract the targeted consumers.

The research on generational cohorts in general during literature review had helped to acknowledge the main attitudes that differentiate between them. The experiment designed had

confirmed that taste vary according to generation and that the stores of the future must embrace the differences and aim to design physical and virtual environments that would equally attract the desired layer of consumers.

5.9 Preference of shopping style by generation

Personality traits of a shopper regardless of age group could dictate the level of engagement they would like to receive while entering a physical store. Therefore, opinions varied on the adequacy and appropriateness of staff assistance levels at current MAC cosmetics physical stores.

In-store assistance and staff engagement with customers is an aspect that has been recently receiving attention and identified as a concern by retailers and consumers reporting on the satisfactory levels of the overall shopping experience. As a creative initiative addressing the issue discussed, Sephora had introduced a color-coded shopping basket into their physical stores that would indicate the shopper's desire to either be assisted or have the freedom to shop alone (Prinzivalli 2019).

In addition to the previously mentioned, a personal observation about sales assistants' behavior especially at makeup, beauty and skincare stores had raised an interest to research other people's opinions on the level of assistance at the case study selected (MAC cosmetics).

The variation in opinions among the participants indicate that in-store assistance needs to be further studied and improved. The walk-in customer must not feel intimidated by the excess level of attention received upon entering the shop as this can initiate a negative experience and may serve the opposite purpose than the one it was initially intended for.

5.10 Generational acceptance and engagement levels with virtual retail

Excitement towards the introduction of innovative technologies in the future beauty retail channels was observed among the three generations studied, suggesting that the inclusion of features such as virtual mirrors, digital skin analysis and virtual assistance is a successful strategy to follow in the near future.

The exposure to a virtual store experiment had pleasantly motivated the participants to take a part in this study especially for Gen X that found the idea of virtual stores to be innovative and promising after they have succeeded to navigate and explore the store in a digital format.

Despite the difficulties that Gen X had reported at the beginning regarding navigation, they have succeeded to digitally explore MAC cosmetics virtual store and have reported on their feedback accordingly. For Gen Z and Millennials navigation instructions and principle was clear as no difficulties were observed while trying to complete the experiment. Few Gen Z participants have suggested the introduction of game replicating techniques for easier navigation while using mouse or keyboard only apart from the hand controllers to further enhance the overall experience.

The accuracy in replicating reality in a virtual store was highly appreciated among Gen Z, as they found the brand features represented in a virtual store to carefully follow the brand language communicating brand's message and the variety of products offered.

The presence of typical retail elements was agreed to be dysfunctional at virtual stores designed in future and are expected to be replaced with other exciting features equipped with immersive technology to further enhance the experience. This finding means that the acceptance levels of innovative features such as virtual mirrors and digital skin analysis will be a success for virtual stores designed in future.

No issues of dizziness and discomfort were observed by the end of the experiment suggesting that the development of novel VR technology is on the right track and have already addressed previously reported issues of motion sickness and have enhanced the performance of its latest releases of VR devices.

Measuring acceptance and engagement levels was listed as one of the major objectives of this research to understand whether virtual reality technology can be used as a tool to enhance e-commerce for beauty and skincare brands. This research had successfully showed that virtual reality is generally perceived as a positive feature and has generated curiosity and interest among the participants to try on the VR set and explore the idea presented in this research.

Even though aging, may affect the level of acceptance, interaction and effort an individual is willing to make to become familiar with a software or a device, it is still possible to grab the attention of potential consumers towards the value of using a certain feature.

When the brand is well integrated, has a strong presence and gives enough attention to customers' preferences, it is likely to gain popularity, receive public's affection and therefore succeed financially.

5.11 Limitations and challenges faced during research

During this research a number of factors were identified as challenges that would have hindered the process of this research and were therefore avoided or replaced with alternative solutions.

At first a program called "Unity" was nominated as the preferred 3D modelling software after approaching a company called Virtual Worlds in Dubai, United Arab Emirates specialized in creating virtual reality applications and games. to buy a ready experiment or get a customized store experiment using an external professional company was found to be expensive and an alternative solution was to learn the process of modelling virtual environments at affordable means.

Since Unity is a gaming software used to design mobile applications and standalone games, the majority of the features provided by this software do not satisfy the intended purpose of this research. Even though this software is compatible with SketchUp and models can be imported from SketchUp into Unity, it was observed that this is mostly done for the purpose of importing already modelled objects such as cars, buildings and other elements to design a game.

More research was conducted and a fellow professional had suggested trying "Enscape" a plugin developed specifically to support designers and architects as a tool for creating fancy presentations for their projects in a virtual reality format to excite clients.

The availability of online tutorials and an attentive software development and educational support team have made the process of downloading and learning this software easy and relatively

smooth. This software is free for student version with all software features enabled and is valid for six months extendable as long as enrolled as a student.

MAC cosmetics virtual store experiment was made possible with the aid of Enscape and had in general succeeded in replicating reality according to brands' standards and its overall look and feel.

Millennials and Gen X could not all agree that the experience was totally realistic, as they have found that the software was limiting their interaction with products especially when they were unable to closely examine products on display. The product selection feature with enabled rotation and zooming was suggested by Gen Z for better viewing and examination inspired by most gaming softwares.

An observation was made stating that the younger the generation is, the more disengaged they felt when faced with unrealistic motion such as passing through furniture and walls therefore software developers are advised to keep revising their programs by addressing the feedback suggested by software users.

The concept of realism in terms of accurate product and brand presentation was appreciated among Gen Z participants that have said that the products on display looked exactly the way they do in reality, and the overall store atmosphere successfully replicated physical reality.

Chapter 6 Conclusion

The progression of virtual reality in retail has undoubtedly introduced a new dimension into the future of e-commerce and succeeded in redefining the unlimited possibilities of such intervention to better communicate brand's values and offers to consumers shopping distantly for the desired products. Acceptance and excitement levels towards virtual beauty and skincare stores varied among the three generations studied. However, the results of the experiment positively supported the main aim of this research which was to prove the positive potential of integrating the latest VR technologies into beauty and skincare retail sector from a consumer, retailer and environmental perspective.

This paper includes a historical overview of the development of VR and AR technologies in general and identifies the leading beauty and skincare brands with highest revenues in the current market.

The first three objectives of this research had been achieved by conducting literature review and studying the reasons behind the success of the brands that have embraced the latest innovations in retail as their preferred business strategy. Literature review has highlighted the main advancements in the development of virtual and augmented reality in various fields and mentioned successful examples of leading brands adapting such technology as their primary marketing and innovation strategy.

Three most active generational cohorts possessing the highest buying power (Gen X, Millennials and Gen Z) were selected for further investigation in terms of acceptance levels of VR technology in the field of beauty and skincare retail sector. Each generation was studied in terms of personality traits, consumer behavioural patterns and interaction and adoption of technological advancements into their daily routines.

A conclusion was drawn mentioning that designing spaces while keeping in mind generational differences will help researchers and retailers to approach each generation according to their preferences and values.

In addition to that, this research confirmed that virtual reality is seen as a valuable tool by the three generational samples studied as well as retailers researched in this study, as more brands are adapting this strategy and are experimenting with software developers to enrich their cyber platforms.

Research papers with various methodologies were examined to answer research questions and to select the most suitable research method to test the formulated hypothesis. Literature review methodology, survey research methodology and virtual reality experimental methodology using computers and relevant devices, were reviewed to evaluate and accurately select a preferred methodology that will tackle the topic selected effectively.

Among the methodologies studied, a combined method containing a VR experiment with survey method was identified as the most appropriate for studying the appreciation and acceptance levels of virtual reality in beauty and skincare sector by the three generations studied. The methodology is appropriate in nature and timeframe allocated to complete this research.

MAC cosmetics is an example of a vivid beauty and cosmetics brand selected for replication and development in the virtual store experiment. All store aspects were interpreted using a 3D modelling software at first and then launched as a VR experiment using a real time rendering plugin called “Enscape” that supports the VR function.

Since, space confinement and size restriction are eliminated in virtual environments, virtual stores can be enlarged to allow better navigation and inclusion of more product variety. A hypothetical MAC cosmetics store was modelled using a 3D software following brands’ guidelines and the design language of current MAC cosmetics physical stores.

A sample of 30 female participants, belonging to three different age groups were asked to visit and assess a physical store of MAC cosmetics by answering two short surveys about the design attractiveness of the current store. A third survey was distributed to the participants after completing the VR experiment to evaluate their acceptance of the concept of a virtual store.

Surveys conducted confirmed that generational cohorts must be taken into consideration while designing the stores of the future as the opinions had varied among the three age groups significantly. The results showed that the younger the generation is, the more it is inclined

towards accepting technological interventions. Issues like navigation in virtual stores and enjoyment levels are interconnected with the user's familiarity and ease of engagement.

This paper had managed to examine the topic from the angle of sustainability and proved the advantages of VR technology for both retailers and consumers.

The migration of some physical stores into virtual platforms will undoubtedly contribute to sustainability by satisfying the following:

1. Less money to be paid towards renting space, regular maintenance, storage of products and staff wages.
2. Less energy to be wasted on operating and powering the stores in terms of air conditioning, illumination and proper ventilation.
3. Smaller in size locations may shift functions towards creating experience centres specialised in promoting and testing new releases, receiving technical support on product defects and following up on personal complains or other customer service-related issues.

Despite the obvious advancement in the size of retail in Dubai, United Arab Emirates the approach and procedure of designing new stores is still very traditional. The fit-out process of most franchised retail brands starts with leasing the space and upon receiving the needed documents from the landlord, space planning and interior designing begins with respect to the budget allocated for project's completion.

As a result of budget restrictions, the physical retail mostly cuts on corners when it comes to strategic planning and local market research. At maximum, a brand manual is shared by brand representatives and the design agency is advised to follow the design guidelines to obtain brands' approval on the design and move to fit-out. Until this moment, Dubai is lacking the integration of VR technology in retail as the current beauty and cosmetic brands are mostly relying on physical and online ordering and have barely advertised the entertainment aspects such as virtual mirrors and other types of immersive technology.

The idea of this research seems to address the missing features in current e-commerce by introducing an innovative concept that may grab the attention of the consumers.

6.1 Recommendations

According to Retail Trends research (2018), retail strategies that focus on customer experience and smart technology employing artificial intelligence will most likely become the future of retailing.

Based on the research conducted on generational cohorts, several suggestions for future beauty and skincare retailers and designers that aim to embrace the generational differences are summarized below:

- All beauty and skincare brands are advised to establish an online platform that contains immersive features such as virtual mirrors, digital skin analysis and virtual assistants.
- Allocating budget for innovative research by organizations and brand's executives to study the importance of integrating novel technologies such as VR into retail and to develop and acquire those technologies after acknowledging their positive potential and financial turnover.
- Hygiene and safety measures are easier to tackle in virtual environments, therefore stores of such nature can greatly function in times of pandemic or other circumstances that disable an actual visit to a physical store.
- Educational and positive marketing campaigns need to be created to spread an awareness about the benefits of using virtual beauty and cosmetics stores.
- Personality traits such as an introverted or extroverted personality might affect the levels of interaction one would like to receive from instore assistants, therefore retailers are advised to make this feature optional.
- Sustainability needs to become the main token when it comes to designing marketing campaigns. The main brand mission must mention brand's concerns regarding the sustainability of its products when it comes to the ingredients, the materials used for packaging and the recycling strategies of the product waste after use.
- Using organic products in product manufacturing when possible and promoting the battle against animal cruelty will help to market for Millennials as researches had shown their increased obsession and concern about pet-friendly environments and products (USA Today January 2018).

- Gender equality is another form of sustainable development that the new generation values, therefore future advertisements and virtual and physical store environments must become as gender neutral as possible to avoid disengagement and protests from Gen Z who are the most conscious about the importance of self-expression and the freedom of choice of gender orientation in the modern society (Francis and Hoefel 2018).
- Realism of the virtual store is an important factor contributing to store's success that can be enhanced by investing in high quality graphics and modelling techniques. Compromising on some virtual features may accidentally disengage the users when faced with an unrealistic action such as passing through walls and furniture; therefore, developers are advised to keep in mind that maximum immersion guarantees better results.

In future, virtual stores have the potential to become live translating stations to actual stores in a mall for example, as the participant will be allowed virtual access to stores to explore ongoing promotions and local store offers. This way of shopping is similar to gaming; containing an aspect of entertainment which is expected to engage young audience to obtain brand loyalty and a sense of belonging.

Issues like human rights, gender equality, vegan and keto diet programs, fighting animal cruelty, consumption of organic products and sustainability traits are observed during this research as the most trending controversial topics across generations often discussed in podcasts, talk shows and addressed in most marketing and media campaigns.

6.2 Future Research

Further areas of research must include generational differences in the way they perceive the brand values and the extent to which they are willing to engage with futuristic concepts such as experience centres and virtual stores when it comes to shopping for daily necessities.

Future research has to include other retail sectors apart from beauty and skincare to investigate whether the product category can impact the level physical interaction required before completing the final purchase.

While some products can be purchased online without the need to physically examine them, other product types require prior testing before completing the checkout process.

For the purpose of this study a simple VR experiment mostly focusing on the design elements of the store was designed. Software restrictions have not allowed for avatar creation, or a real product try-on which requires a technical specialist's expertise and specific programming for face detection and motion tracking. Virtual product preview enabling product rotation, zooming and close examination are among the features suggested for future development and inclusion in all virtual beauty and cosmetics stores designed by future retailers.

More research has to be conducted on a larger sample of people to include all genders to understand whether gender is a variable that might affect the acceptance of virtual reality into beauty and skincare e-commerce. Since the majority of beauty and skincare brands are also offering products for males such as perfumery, aftershave, colognes, moisturising products as well as specific male cosmetics such as undereye rollers and other products the brands are encouraged to research male's acceptance to the introduction of virtual reality into its online platforms.

While designing for the generations of the future such as Gen Z, Gen Alpha, Gen Beta and Gen Gamma more research on personality traits, trending issues including influential role models, popular controversial topics and personal preferences has to be taken into consideration to design successfully operating stores of the future.

References

- Akesson, T. (n.d.). *Virtual Reality - Into The Magic* [online]. [Accessed 25 January 2020]. Available at: https://www.ikea.com/ms/en_US/this-is-ikea/ikea-highlights/Virtual-reality/.
- Alvarez, E. (2018). *Adidas is using augmented reality to sell limited-edition sneakers* [online]. [Accessed 25 January 2020]. Available at: <https://www.engadget.com/2018/11/02/adidas-originals-complexcon-drops-ar/?guccounter=1>.
- Amer, A. & Peralez, P. (2014). Affordable altered perspectives: Making augmented and virtual reality technology accessible. *Proceedings of the 4th IEEE Global Humanitarian Technology Conference, GHTC 2014*, pp. 603–608.
- Barbaschow, A. (2016). *IKEA Launches Virtual Reality Shopping Experience* [online]. [Accessed 27 January 2020]. Available at: <https://www.zdnet.com/article/ikea-launches-virtual-reality-shopping-experience/>.
- BASARAN, U. & BUYUKYILMAZ, O. (2015). The Effects of Utilitarian and Hedonic Values on Young Consumers' Satisfaction and Behavioral Intentions. *Eurasian Journal of Business and Economics*, vol. 8(16), pp. 1–18.
- Beautiful, T. (2015). Adopted by.
- Beauty Business Journal. (2019). *Enhancing Beauty With Virtual Reality – Advancements In Beauty Tech* [online]. [Accessed 18 November 2019]. Available at: <https://beautybusinessjournal.com/enhancing-beauty-with-virtual-reality-advancements-in-beauty-tech/>.
- Bedgood, L. (2019). *Consumer Shopping Trends and Statistics by the Generation: Gen Z, Millennials, Gen X, Boomers and the Silents* [online]. [Accessed 27 January 2020]. Available at: <https://www.business2community.com/trends-news/consumer-shopping-trends-and-statistics-by-the-generation-gen-z-millennials-gen-x-boomers-and-the-silents-02220370>.
- Bialik, K and Fry, R. (2019). *Millennial life: How young adulthood today compares with prior generations* [online]. [Accessed 27 January 2020]. Available at:

<https://www.pewsocialtrends.org/essay/millennial-life-how-young-adulthood-today-compares-with-prior-generations/>.

Blázquez, M. (2014). Fashion shopping in multichannel retail: The role of technology in enhancing the customer experience. *International Journal of Electronic Commerce*, vol. 18(4), pp. 97–116.

Bologna, W. (2019). IMPACT FOR BEAUTY.

Bonetti, F., Warnaby, G. & Quinn, L. (2018). Augmented Reality and Virtual Reality in Physical and Online Retailing: A Review, Synthesis and Research Agenda, pp. 119–132.

Bump, P. (2019). *Millennials vs. Gen Z: Why Marketers Need to Know the Difference* [online]. [Accessed 26 January 2020]. Available at: <https://blog.hubspot.com/marketing/millennials-vs-gen-z>.

Business Insider. (2018). *Teens aren't using Facebook as much as millennials and Gen Xers — here's the social platform each generation uses the most* [online]. [Accessed 27 January 2020]. Available at: <https://www.businessinsider.com/top-social-media-platform-by-age-group-2018-8>.

CBinsights. (2020). *How Sephora Built A Beauty Empire To Survive The Retail Apocalypse* [online]. Available at: <https://www.cbinsights.com/research/report/sephora-teardown/>.

Cheng, O. E. & Kong, F. H. (n.d.). Giving physical retail a facelift : 5 lessons from beauty, pp. 5–7.

Chesters, A. (2011). *A Brief History of M.A.C* [online]. [Accessed 24 January 2020]. Available at: <https://www.theguardian.com/fashion/fashion-blog/2011/oct/24/brief-history-of-mac>.

Childers, T. L., Carr, C. L., Peck, J. & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of Retailing*, vol. 77(4), pp. 511–535.

Clair, S. (2014). *Beauty History Lesson: How M.A.C. Redefined the Makeup Industry* [online]. [Accessed 17 January 2020]. Available at: <https://www.beautylish.com/a/vxnxi/mac-cosmetics-history>.

Companies, E. L. (2020). *The Estée Story* [online]. [Accessed 27 January 2020]. Available at: <https://www.elcompanies.com/en/who-we-are/the-lauder-family/the-estee-story>.

Cosmetics Business. (2019). *Clean Beauty: How the Latest Lifestyle Trend ‘Veganism’ is Positively Affecting the Beauty Industry* [online]. [Accessed 28 December 2020]. Available at: https://www.cosmeticsbusiness.com/news/article_page/Clean_Beauty_How_the_latest_lifestyle_trend_Veganism_is_positively_affecting_the_beauty_industry/159406.

Cruz-Neira, C., Fernández, M. & Portalés, C. (2018). Virtual Reality and Games. *Multimodal Technologies and Interaction*, vol. 2(1), p. 8.

Dacko, S. G. (2017). Enabling smart retail settings via mobile augmented reality shopping apps. *Technological Forecasting and Social Change*. Elsevier Inc., vol. 124, pp. 243–256.

Demirkan, H. & Spohrer, J. (2014). Developing a framework to improve virtual shopping in digital malls with intelligent self-service systems. *Journal of Retailing and Consumer Services*. Elsevier, vol. 21(5), pp. 860–868.

Demodern Projects. (2020). *IKEA Virtual Reality Showroom* [online]. [Accessed 26 January 2020]. Available at: <https://demodern.com/projects/ikea-vr-showroom>.

Dimock, M. (2019). *Defining generations: Where Millennials end and Generation Z begins* [online]. Available at: <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/>.

Dormehl, L. (2017). *8 Virtual Reality Milestones That Took it From Sci-Fi to Your Living Room* [online]. [Accessed 22 January 2020]. Available at: <https://www.digitaltrends.com/cool-tech/history-of-virtual-reality/>.

Dredge, S. (2015). *Toyota Oculus Rift app uses virtual reality to explain distracted driving* [online]. [Accessed 17 January 2020]. Available at: <https://www.theguardian.com/technology/2015/jan/15/toyota-oculus-rift-virtual-reality-distracted-driving>.

- Economy, P. (2019). *The (Millennial) Workplace of the Future Is Almost Here -- These 3 Things Are About to Change Big Time* [online]. [Accessed 22 February 2020]. Available at: <https://www.inc.com/peter-economy/the-millennial-workplace-of-future-is-almost-here-these-3-things-are-about-to-change-big-time.html>.
- Van Elven, M. (2019). *Puma Launches its First Augmented Reality Shoe* [online]. [Accessed 20 January 2020]. Available at: <https://fashionunited.uk/news/fashion/puma-launches-its-first-augmented-reality-shoe/2019040842589>.
- Esteé Lauder Companies. (2016). 2016 Corporate Sustainability Communication on Progress, pp. 1–16.
- Ethical Elephant. (2018). *Estée Lauder Brands – Which Ones are Cruelty-Free or Sold in China?* [online]. [Accessed 27 January 2020]. Available at: <https://ethicalelephant.com/list-of-estee-lauder-brands/>.
- Farah, M. F., Ramadan, Z. B. & Harb, D. H. (2019). The examination of virtual reality at the intersection of consumer experience, shopping journey and physical retailing. *Journal of Retailing and Consumer Services*. Elsevier Ltd, vol. 48(November 2018), pp. 136–143.
- Fashion Network. (2017). *Estée Lauder Ramps Up VR Beauty Strategy With Added YouCam Experience* [online]. [Accessed 24 January 2020]. Available at: <https://uk.fashionnetwork.com/news/estee-lauder-ramps-up-vr-beauty-strategy-with-added-youcam-experience,902691.html>.
- Financial Times. (2020). *L'Oréal buys beauty tech company ModiFace* [online]. [Accessed 20 January 2020]. Available at: <https://www.ft.com/content/0abc9a28-28f0-11e8-b27e-cc62a39d57a0>.
- Flavián, C., Ibáñez-Sánchez, S. & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research*. Elsevier, vol. 100(October 2018), pp. 547–560.
- Francis, T and Hoefel, F. (2018). *'True Gen': Generation Z and its implications for companies* [online]. [Accessed 25 January 2020]. Available at:

[Gaitan, G. \(2017\). *MAC Cosmetics launches virtual try-on mirror powered by ModiFace* \[online\]. \[Accessed 24 January 2020\]. Available at: <https://drugstorenews.com/beauty/mac-cosmetics-launches-virtual-try-mirror-powered-modiface>.](https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights>true-generation-z-and-its-implications-for-companies.</p></div><div data-bbox=)

Gayle, L. (2019). *How Generation Z Is Transforming the Workplace* [online]. [Accessed 27 January 2020]. Available at: <https://www.financialexecutives.org/FEI-Daily/August-2019/How-Generation-Z-Is-Transforming-the-Workplace.aspx>.

Grand View Research. (2019). *Vegan Food Market Size Worth \$24.06 Billion By 2025 / CAGR 9.6%* [online]. [Accessed 27 January 2020]. Available at: <https://www.grandviewresearch.com/press-release/global-vegan-food-market>.

Hamleys. (2020). *Let the fun begin* [online]. [Accessed 26 January 2020]. Available at: <https://www.hamleys.cz/en/attractions-2>.

Heater, B. (2019). *LEGO Launches Eight AR-Focused Sets* [online]. [Accessed 20 January 2020]. Available at: <https://techcrunch.com/2019/02/14/lego-launches-eight-ar-focused-sets/>.

Heather. (2018). *How To Manage Generational Diversity In The Workplace* [online]. [Accessed 22 February 2020]. Available at: <https://harver.com/blog/generational-diversity-in-the-workplace/>.

Hilken, T., de Ruyter, K., Chylinski, M., Mahr, D. & Keeling, D. I. (2017). Augmenting the eye of the beholder: exploring the strategic potential of augmented reality to enhance online service experiences. *Journal of the Academy of Marketing Science*. Journal of the Academy of Marketing Science, vol. 45(6), pp. 884–905.

Hirsh, S. (2019). *Cruelty-Free Makeup Brands: A Guide to Animal-Friendly Cosmetics* [online]. [Accessed 27 January 2020]. Available at: <https://www.greenmatters.com/p/cruelty-free-makeup-brands-2019>.

Huang, T. L. & Liao, S. (2015). A model of acceptance of augmented-reality interactive technology: the moderating role of cognitive innovativeness. *Electronic Commerce Research*. Springer US, vol. 15(2), pp. 269–295.

Huang, T. L. & Liu, F. H. (2014). Formation of augmented-reality interactive technology's persuasive effects from the perspective of experiential value. *Internet Research*, vol. 24(1), pp. 82–109.

Immerse UK. (2020). *IKEA* [online]. [Accessed 26 January 2020]. Available at: <https://www.immerseuk.org/case-study/ikea/>.

Jacques, R. (2015). *7 Surprising Things You Didn't Know About M.A.C.* [online]. [Accessed 21 January 2020]. Available at: <https://www.allure.com/story/mac-makeup-surprising-facts>.

Javornik, A. (2016). Augmented reality: Research agenda for studying the impact of its media characteristics on consumer behaviour. *Journal of Retailing and Consumer Services*. Elsevier, vol. 30, pp. 252–261.

Kelly, C. (2018a). *Deal of the Year: L'Oréal buys Modiface* [online]. [Accessed 26 January 2020]. Available at: <https://www.mobilemarketer.com/news/deal-of-the-year-loreal-buys-modiface/542049/>.

Kelly, C. (2018b). *Deal of the Year: L'Oréal Buys Modiface* [online]. [Accessed 27 January 2020]. Available at: <https://www.mobilemarketer.com/news/deal-of-the-year-loreal-buys-modiface/542049/>.

Ketabchi, N. (2020). *Looks That Thrill - Inside the Booming Beauty Industry* [online]. [Accessed 27 January 2020]. Available at: <https://www.toptal.com/finance/growth-strategy/beauty-industry>.

Kim, J. H., Thang, N. D. & Kim, T. S. (2009). 3-D hand motion tracking and gesture recognition using a data glove. *IEEE International Symposium on Industrial Electronics*, pp. 1013–1018.

King University Online. (2020). *Manager of a Generation: Millennials vs. Gen X* [online]. [Accessed 27 January 2020]. Available at: <https://online.king.edu/infographics/manager-generation-millennials-vs-gen-x/>.

Krasonikolakis, I., Vrechopoulos, A. & Pouloudi, A. (2014). Store selection criteria and sales prediction in virtual worlds. *Information and Management*. Elsevier B.V., vol. 51(6), pp. 641–652.

L'Oréal's ModiFace brings AI-powered virtual makeup try-ons to Amazon. (2020), vol. 33(June 2019), p. 2019.

Laura McQuarrie. (2018). *Chanel's 'Coco Game Center' in Tokyo Pairs Retro Games and Makeup Tables* [online]. [Accessed 15 September 2019]. Available at: <https://www.trendhunter.com/trends/game-center>.

Lim, Y. J., Osman, A., Salahuddin, S. N., Romle, A. R. & Abdullah, S. (2016). Factors Influencing Online Shopping Behavior: The Mediating Role of Purchase Intention. *Procedia Economics and Finance*. Elsevier B.V., vol. 35(October 2015), pp. 401–410.

Lim, Y. S., Heng, P. C., Ng, T. H. & Cheah, C. S. (2016). Customers' online website satisfaction in online apparel purchase: A study of Generation Y in Malaysia. *Asia Pacific Management Review*, vol. 21(2), pp. 74–78.

LOreal. (2018). Annual Report 2018 - L'Oréal [online]. *L'oréal Annual Report*, pp. 1–64 [online]. Available at: https://www.loreal-finance.com/en/annual-report-2018/Loreal_2018_Annual_Report.pdf.

Loureiro, S. M. C., Guerreiro, J., Eloy, S., Langaro, D. & Panchapakesan, P. (2019). Understanding the use of Virtual Reality in Marketing: A text mining-based review. *Journal of Business Research*. Elsevier, vol. 100(October 2018), pp. 514–530.

Mandal, S. (2013). Brief Introduction of Virtual Reality & its Challenges. *International Journal of Scientific & Engineering Research*, vol. 4(4), pp. 304–309.

Markets and Markets. (2014). *Cosmetic Products Market by Type (Skin, Hair, Sun, Oral, Fragrance, Color, Soap, Bath, Shower, Personal Hygiene), Distribution Channel (Supermarket, Pharmacy, Departmental, Specialty, Direct, Internet, Salon) & Geography - Global Trends & Forecasts to 201* [online]. [Accessed 27 January 2020]. Available at:

<https://www.marketsandmarkets.com/Market-Reports/cosmetic-products-market-240004417.html>.

Martínez-Navarro, J., Bigné, E., Guixeres, J., Alcañiz, M. & Torrecilla, C. (2019). The influence of virtual reality in e-commerce. *Journal of Business Research*, vol. 100(October 2018), pp. 475–482.

Marxent 3D Commerce. (2018). *Macy's Virtual Reality Enhances Customer Experience* [online]. [Accessed 25 January 2020]. Available at: <https://www.marxentlabs.com/news/macys-using-virtual-reality-to-enhance-omnichannel-customer-experience/>.

Morgan, P. (2015). *Estée Lauder Expands Business through Brand Acquisitions* [online]. [Accessed 27 January 2020]. Available at: <https://articles2.marketrealist.com/2015/08/estee-lauder-expands-business-brand-acquisitions/#aprd>.

Nah, F. F. H., Eschenbrenner, B. & DeWester, D. (2011). Enhancing brand equity through flow and telepresence: A comparison of 2D and 3D virtual worlds. *MIS Quarterly: Management Information Systems*, vol. 35(3), pp. 731–747.

Naughton, J. (2016). *Beauty Digital Forum: Sephora's Bridget Dolan Discusses Digital's Future* [online]. [Accessed 27 January 2020]. Available at: <https://wwd.com/beauty-industry-news/beauty-features/sephora-bridget-dolan-digital10359484-10359484/>.

Nyberg, L., Lundin-Olsson, L., Sondell, B., Backman, A., Holmlund, K., Eriksson, S., Stenvall, M., Rosendahl, E., Maxhall, M. & Bucht, G. (2006). Using a virtual reality system to study balance and walking in a virtual outdoor environment: A pilot study. *Cyberpsychology and Behavior*, vol. 9(4), pp. 388–395.

NYX Launches A Virtual Reality Makeup Tutorial. (n.d.) [online]. [Accessed 20 January 2020]. Available at: https://www.beautypackaging.com/contents/view_breaking-news/2017-12-19/nyx-launches-a-virtual-reality-makeup-tutorial/%0D.

O'Shea, D. (2017). *Sephora opens NYC Beauty TIP Workshop Concept Stores, Debuts Tap and Try* [online]. [Accessed 27 January 2020]. Available at:

<https://www.retaildive.com/news/sephora-opens-nyc-beauty-tip-workshop-concept-stores-debuts-tap-and-try/439533/>.

Okechukwu, M. & Udoka, F. (2011). Understanding Virtual Reality Technology: Advances and Applications. *Advances in Computer Science and Engineering*, (June).

Pappas, I. O., Kourouthanassis, P. E., Giannakos, M. N. & Chrissikopoulos, V. (2016). Explaining online shopping behavior with fsQCA: The role of cognitive and affective perceptions. *Journal of Business Research*. Elsevier Inc., vol. 69(2), pp. 794–803.

Park, M., Im, H. & Kim, D. Y. (2018). Feasibility and user experience of virtual reality fashion stores. *Fashion and Textiles*. Springer Singapore, vol. 5(1).

Peukert, C., Pfeiffer, J., Meißner, M., Pfeiffer, T. & Weinhardt, C. (2019). Shopping in Virtual Reality Stores: The Influence of Immersion on System Adoption. *Journal of Management Information Systems*. Routledge, vol. 36(3), pp. 755–788.

Pita, P. (2016). *Ford VR Lets You Live Le Mans In Virtual Reality* [online]. [Accessed 26 January 2020]. Available at: <http://virtualrealitytimes.com/2016/08/28/ford-vr-lets-you-live-le-mans-in-virtual-reality/>.

Pizzi, G., Scarpi, D., Pichierri, M. & Vannucci, V. (2019). Virtual reality, real reactions?: Comparing consumers' perceptions and shopping orientation across physical and virtual-reality retail stores. *Computers in Human Behavior*, vol. 96(February), pp. 1–12.

Prance-Miles, L. (2019). *MAC Targets Gen Z Consumer with New Shanghai-Based Experience Centre* [online]. [Accessed 27 January 2020]. Available at: <https://www.globalcosmeticsnews.com/mac-targets-gen-z-consumer-with-new-shanghai-based-experience-centre/>.

Prinzivalli, L. (2019). *A European Sephora's Color-Coded Shopping Baskets Are Going Viral Introverts everywhere are celebrating this idea.* [online]. [Accessed 22 February 2020]. Available at: <https://www.allure.com/story/sephora-viral-shopping-basket>.

Ramli, N. S. (2017). Existing literatures, (March), pp. 10–11.

Report, A., To, P., The, O. F., Exchange, S., Of, A. C. T., Report, T., To, P., The, O. F., Exchange, S. & Of, A. C. T. (2019). *UNITED STATES SECURITIES AND EXCHANGE COMMISSION FORM 10-K The Estée Lauder Companies Inc.*

Samsung Newsroom. (2017). *NYX Professional Makeup Partners With Samsung to Launch Innovative Virtual Reality Makeup Tutorial* [online]. [Accessed 27 January 2020]. Available at: <https://news.samsung.com/us/oreal-nyx-professional-makeup-partners-samsung-virtual-reality-makeup-tutorial/>.

Sarazyn, J. (2014). (12) Patent Application Publication (10) Pub . No .: US 2014 / 0332121 A1 Eiongation (%) Patent Application Publication, vol. 1(19), p. 33 [online]. Available at: <https://patents.google.com/patent/US20140331942A1/en>.

Schiro, A. (1997). *Frank Angelo, 49, Cosmetics Innovator, Dies* [online]. [Accessed 25 January 2020]. Available at: <https://www.nytimes.com/1997/01/17/us/frank-angelo-49-cosmetics-innovator-dies.html>.

Schnack, A., Wright, M. J. & Holdershaw, J. L. (2019). Immersive virtual reality technology in a three-dimensional virtual simulated store: Investigating telepresence and usability. *Food Research International*. Elsevier, vol. 117(September 2017), pp. 40–49.

Scholz, J. & Duffy, K. (2018). We ARE at home: How augmented reality reshapes mobile marketing and consumer-brand relationships. *Journal of Retailing and Consumer Services*, vol. 44(March), pp. 11–23.

Seo, D. (1998). *Estee Lauder Buys Remaining MAC Equity* [online]. [Accessed 24 January 2020]. Available at: <https://www.latimes.com/archives/la-xpm-1998-feb-28-fi-23826-story.html>.

Speicher, M., Hell, P., Daiber, F., Simeone, A. & Krüger, A. (2018). A virtual reality shopping experience using the apartment metaphor. *Proceedings of the Workshop on Advanced Visual Interfaces AVI*, (August).

Storefront Magazine. (2017). *7 Case Studies That Prove Experiential Retail Is The Future* [online]. [Accessed 3 January 2020]. Available at: <https://www.thestorefront.com/mag/7-case-studies-prove-experiential-retail-future/>.

- Sun, L. (2018). *Amazon Follows Alibaba's Lead Into VR Shopping* [online]. [Accessed 27 January 2020]. Available at: <https://www.fool.com/investing/2018/07/19/amazon-follows-alibabas-lead-into-vr-shopping.aspx>.
- The Vegan Database. (2019). *Animal Rights ARtivism – Talented Vegan Artists To Follow Now!* [online]. [Accessed 18 November 2019]. Available at: <https://thevegandatabase.com/animal-rights-artivism-talented-vegan-artists-to-follow-now/>.
- Tie, A. (2018). *Playful Chanel Opens Coco Game Center, Its Innovative Beauty Pop-Up Arcade* [online]. [Accessed 27 January 2020]. Available at: <https://www.scmp.com/magazines/style/fashion-beauty/article/2147596/playful-chanel-opens-arcade-beauty-pop-coco-game>.
- Utroske, D. (2016). *The Beauty of Virtual Reality: selling cosmetic and personal care ingredients in the digital future* [online]. [Accessed 26 January 2020]. Available at: <https://www.cosmeticsdesign.com/Article/2016/11/10/The-Beauty-of-Virtual-Reality-selling-cosmetic-and-personal-care-ingredients-in-the-digital-future>.
- V12. (2019). *Consumer Shopping Trends and Statistics by the Generation: Gen Z, Millennials, Gen X, Boomers and the Silents* [online]. [Accessed 25 January 2020]. Available at: <https://v12data.com/blog/generational-consumer-shopping-trends/>.
- Villacoublay, V. (2015). } are, vol. 2(12).
- Virtual Reality Society. (2017). *History Of Virtual Reality* [online]. [Accessed 22 January 2020]. Available at: <https://www.vrs.org.uk/virtual-reality/history.html>.
- Vonkeman, C., Verhagen, T. & van Dolen, W. (2017). Role of local presence in online impulse buying. *Information and Management*. Elsevier B.V., vol. 54(8), pp. 1038–1048.
- Vrechopoulos, A., Apostolou, K. & Koutsouris, V. (2009). Virtual reality retailing on the web: Emerging consumer behavioural patterns. *International Review of Retail, Distribution and Consumer Research*, vol. 19(5), pp. 469–482.

- Watch, M. (2019). *Cruelty-Free Cosmetics Market Significant Insights 2019: Industry Statistics, Growth, Demand, Revenue, Opportunities, Size, Share, Global Trends and Fast Forward Research* [online]. [Accessed 22 January 2020]. Available at: <https://www.marketwatch.com/press-release/cruelty-free-cosmetics-market-significant-insights-2019-industry-statistics-growth-demand-revenue-opportunities-size-share-global-trends-and-fast-forward-research-2019-06-11>.
- Watson, A., Alexander, B. & Salavati, L. (2018). The impact of experiential augmented reality applications on fashion purchase intention. *International Journal of Retail and Distribution Management*.
- Wilson, M. (2019). *Lego is Betting on The Wrong Future* [online]. [Accessed 26 January 2020]. Available at: <https://www.fastcompany.com/90305260/lego-is-betting-on-the-wrong-future>.
- Wong Lau, K., Lee, P. Y. & Lau, H. F. (2014). Shopping Experience 2.0: An Exploration of How Consumers are Shopping in an Immersive Virtual Reality. *Advances in Economics and Business*, vol. 2(2), pp. 92–99.
- Wu, X. & Gereffi, G. (2018). Amazon and Alibaba: Internet governance, business models, and internationalization strategies. *Progress in International Business Research*, vol. 13(December), pp. 327–356.
- Yim, M. Y. C., Chu, S. C. & Sauer, P. L. (2017). Is Augmented Reality Technology an Effective Tool for E-commerce? An Interactivity and Vividness Perspective. *Journal of Interactive Marketing*, vol. 39(October), pp. 89–103.

Appendices

Link to MAC cosmetics virtual store:

<https://api2.escape3d.com/v1/view/0421e766-aa62-49f1-a28e-0506fa56c3ae>

Appendix A - Surveys

Survey 1_Preliminary / General survey **Gender:** Female / Male **Age:**

(5) Strongly Agree (4) Agree (3) Neutral (2) Disagree (1) Strongly Disagree

Questions:

1. There is a clear difference between traditional online shopping and shopping in a virtual store.

1 2 3 4 5

2. Virtual reality can be a valuable tool for enhancing in-store shopping experience.

1 2 3 4 5

3. All beauty and cosmetics brands must eventually evolve into online stores.

1 2 3 4 5

4. Shopping for beauty products online doesn't differ from shopping for other shopping categories such as shopping for clothing items, home necessities, groceries, etc.

1 2 3 4 5

5. Testing the product is an absolute necessity when it comes to buying make up beauty products such as: (lipsticks, foundation, eyeliners, etc.).

1 2 3 4 5

6. Testing is an absolute necessity when it comes to buying skincare products such as: (creams, serums, etc.).

1 2 3 4 5

7. Hygiene plays an important factor/concern while testing make up products in store

1 2 3 4 5

8. Online shopping is deceiving when it comes to shopping for beauty and skincare products using an app or a website.

1 2 3 4 5

9. Long (free) standard delivery options discourage buyers to shop online.

1 2 3 4 5

10. Online exclusive special offers and promotions are powerful strategies to enhance online sales

1 2 3 4 5

(5) Strongly Agree (4) Agree (3) Neutral (2) Disagree (1) Strongly Disagree

Questions:

1. Mac cosmetics is a well-integrated brand that can be an all in one destination while shopping for beauty and cosmetics products.

1 2 3 4 5

2. Mac store design is overall attractive.

1 2 3 4 5

3. Mac's current in-store design and atmosphere is comfortable and relaxing for all shoppers.

1 2 3 4 5

4. Mac current store illumination is adequate and appropriate for trying the products in-store.

1 2 3 4 5

5. Mac current stores are of an appropriate size with clearly defined zoning and dedicated areas for promotions and new released products.

1 2 3 4 5

6. Mac in-store assistance is adequate and appropriate when it comes to promoting its products and services on walk-in customers.

1 2 3 4 5

7. Mac cosmetics store design is targeting young audience.

1 2 3 4 5

8. Current Mac products packaging represent the brand in the best way possible.

1 2 3 4 5

9. There is enough creativity in the display and presentation of product ranges available in current Mac cosmetics stores.

1 2 3 4 5

10. Which of the 5 features you would like to see most in future Mac cosmetics stores?

- a)Virtual Mirrors
- b)Virtual Assistants
- c)Video-based private consultation booths
- d)Pick and collect counters (from online shopping)
- e)Digital skin analysis technology

(5) Strongly Agree (4) Agree (3) Neutral (2) Disagree (1) Strongly Disagree

Questions:

1. Instructions on how to navigate inside Mac's virtual instore were clear and easy to digest

1 2 3 4 5

2. It was easy to navigate inside Mac's virtual store

1 2 3 4 5

3. Mac's virtual store design is more exciting than its current store designs

1 2 3 4 5

4. I would be interested in future shopping in an officially released virtual store by Mac

1 2 3 4 5

5. Virtual stores must contain some sort of a digitalized virtual assistance to make the experience more human friendly

1 2 3 4 5

6. Elements like cash desk and mirrors are no longer functional in Mac cosmetics virtual stores

1 2 3 4 5

7. Mac's virtual store experience was relatively close to reality.

1 2 3 4 5

8. I felt dizziness and discomfort after the experience.

1 2 3 4 5

9. I felt disengaged of the experiment when I was unable to physically experience virtual products

1 2 3 4 5

10. Introduction of game aspects including scoring, virtual gifts, competitions and giveaways would enrich and encourage overall virtual store experience.

1 2 3 4 5

Appendix B – Tabulated Data collected from surveys containing Averages and Standard Deviation Values – tables with individual scores to each question is available in a soft copy.

Survey 1- Average and Standard Deviation by Age Group

Table 0.1 Average and Standard Deviation Values from Survey 1

SURVEY 1	GEN X		MILLENNIALS		GEN Z	
	Avg	SD	Avg	SD	Avg	SD
Question 1	3.4	1.429840706	4	0.666666667	3.5	1.354006401
Question 2	3.7	0.823272602	4.2	0.632455532	3.9	1.100504935
Question 3	3.4	1.0749677	3.8	1.032795559	3.1	1.370320319
Question 4	2.3	0.674948558	3.1	1.197219	2.5	1.269295518
Question 5	4.1	1.197219	4.4	0.966091783	4.6	0.966091783
Question 6	3.2	1.398411798	3.7	1.251665557	4.3	0.948683298
Question 7	4.4	1.0749677	4.8	0.421637021	4.5	0.971825316
Question 8	3.1	0.994428926	3.9	0.737864787	3.3	0.823272602
Question 9	3.3	0.823272602	3.6	1.264911064	3.4	1.349897115
Question 10	3.9	0.994428926	4.5	0.527046277	4	1.054092553

Survey 2- Average and Standard Deviation by Age Group

Table 0.2 Average and Standard Deviation Values from Survey 2

SURVEY 2	GEN X		MILLENNIALS		GEN Z	
	AVG	SD	AVG	SD	AVG	SD
Question 1	3.1	0.875595036	4.1	1.100504935	4	1.247219129
Question 2	3.5	1.269295518	3.4	1.0749677	4.4	0.843274043
Question 3	3.2	1.032795559	2.8	0.918936583	3.7	0.948683298
Question 4	3.4	0.966091783	3.2	0.918936583	3.9	0.567646212
Question 5	3.3	0.948683298	3.1	1.100504935	3.8	1.398411798
Question 6	2.5	1.08012345	3.1	0.994428926	3.5	1.178511302
Question 7	3.6	1.264911064	3.3	0.948683298	3.9	0.737864787
Question 8	3.4	1.0749677	3.7	0.674948558	3.9	0.737864787
Question 9	2.9	1.197219	3.5	1.08012345	3.6	1.0749677
Question 10	Digital Skin Analysis		Virtual Mirrors and Digital Skin Analysis		Digital Skin Analysis and Virtual Mirrors	

Survey 3- Average and Standard Deviation by Age Group

Table 0.3 Average and Standard Deviation Values from Survey 3

SURVEY 3	GEN X		MILLENNIALS		GEN Z	
	AVG	SD	AVG	SD	AVG	SD
Question 1	3	1.054092553	4.2	1.032795559	4.6	0.516397779
Question 2	2.8	1.135292424	4	0.942809042	4.7	0.483045892
Question 3	4.1	0.994428926	3.2	0.918936583	3.6	1.0749677
Question 4	3.9	0.994428926	3.5	1.178511302	4.4	0.699205899
Question 5	4.1	0.737864787	3.3	1.059349905	3.2	0.918936583
Question 6	4.5	0.527046277	4.2	0.918936583	4	0.666666667
Question 7	3	0.942809042	3.4	0.843274043	4.3	0.483045892
Question 8	2.3	1.059349905	1.9	0.875595036	1.4	0.516397779
Question 9	3.2	0.918936583	3.7	0.823272602	3.5	1.354006401
Question 10	4.4	0.516397779	4.9	0.316227766	4.9	0.316227766



Figure 0.1 Participants during the VR experiment at Aurecon Office, Dubai, United Arab Emirates

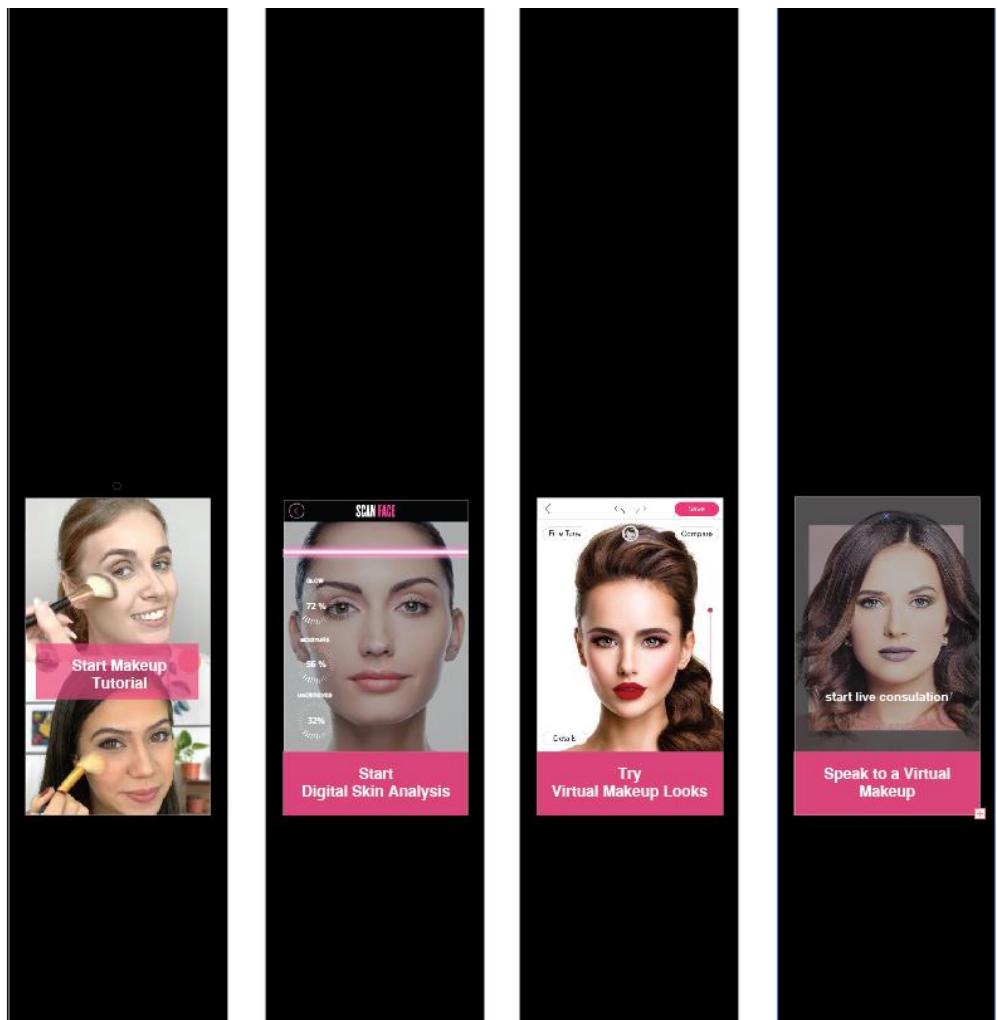


Figure 0.2 The four platforms that substituted mirrors in a virtual store