TEST Engineering & Management

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

Augmented Reality, Virtual Reality and Metaverse: Trend in Retail

Makhija Diljeet Kaur G,
Assistant Professor, Institute of Management, Nirma University
Email: diljeetkaur@nirmauni.ac.in, diljeet.makhija@gmail.com

Article Info
Volume 83
Page Number: 289 - 297
Publication Issue:
May - June 2020

Article History
Article Received: 11August 2019
Revised: 18November 2019
Accepted: 23January 2020
Publication:07May2020

Abstract:

Retail sector has seen tremendous change since the last two decades, from organized retail to online retail, i.e., physical to electronic spaces. From traditional retail to online retail, the impact on customer's experience, satisfaction and his will to purchase the product, all of them have been affected. Despite of having the advantage of purchasing the product on the finger tip, with the ease of staying indoors and still having all the possible options available, the customers did miss the personal touch before making the decision. This personal touch could be simple thing like trying the product and feeling how it would look on the customer, which was a normal way to purchase in offline retail. One way to fill the gap between of experience between the traditional and the online way of making the purchase decision is the use of technology via augmented reality or virtual reality in online shopping to provide customers with a more realistic view of how the product will look on them or in their house before making the purchase decision. Many companies have added the feature of augmented reality in their apps or on the website, where the customer can try the product virtually and then decide to purchase it. While talking about virtual reality, its application may lead to just virtual stores where people could fee and try and then make the purchase decision without visiting the physical store and for the organization without having a brick and mortar store. With the Industry 4.0 revolution, metaverse retailing looks like the future of retail. The paper discusses what augmented reality and virtual reality are and the advantages and disadvantages of these technologies with respect to retail.

Keywords*: Metaverse Retailing, Augmented Reality, Virtual reality, Customer Satisfaction, Online purchase.*

I. INTRODUCTION

Technological advances such as telephones, computers, internet, ICT tools have significantly changed the way we have been living and using technology by creating an interactive space which links our real and virtual world (Li, Whalley& Williams, 2001). Since the mid-1990s, the interconnection between these two spaces, physical and virtual/electronic has been grabbing our attention in the form of e-commerce and the way we work (Li, 2007). With the emergence of internet and electronic spaces, the way we have been living has changed, from socializing to shopping. Rather than meeting personally, social networking is at help to us by connecting us to people whom we cannot meet physically. Similarly, from visiting a physical store we have now started online shopping, e commerce is playing its role here.

E commerce, was a disruptive technology which changed the way firms and customers worked, giving the customers the ability to shop from anywhere and at anytime according to their convenience, and for organizations to understand the power of internet as a marketing channel. Organizations using e-commerce as a mode of marketing channel were using 2D spaces, were the customer missed the experience of touching

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

and trying the product before making the buying decision. With the introduction to virtual 3D spaces, the way we have been shopping may change, the phenomenon is discussed and stated as Metaverse retailing (Bourlakis, Papagiannidis& Li, 2009).

II. Literature Review

Augmented Reality in Retail:

Interest in, and use of, augmented virtual reality technology is growing rapidly. Extensive mobile adoption, cost savings, improved mobility and the ability of AR to provide experiential value and influence customer buying decision all contributed to this rise.AR system combines the real and the virtual information for the customer in the real environment in real time, to give them the experience of the virtual object as a real object (Azuma, 1997;Azuma et al., 2001). It comprises of a "live, direct or indirect, view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data" (Dacko 2017). With the introduction of smartphones in the market, use of Augmented Reality has become easier (Daponte et al. 2014; Gartner 2016). According to Van Krevelen and Poelman (2010), "smartphones as AR tool Shows the greatest potential for bringing technology into the mass markets, lowering software manufacturing costs because no new AR system is needed and enhancing the user-friendliness of technology by using a platform (i.e. cell phone) familiar to consumers". Höllerer&Feiner (2004) studied mobile Augmented Reality and discussed the various advantages and challenges of the same and concluded that mobile AR will have a great impact on the customers decision once it available to them.

Augmented Reality has drawn a lot of adoption in the past few years and has been growing rapidly. With the use of smart phones, AP provides experiential values and helps customers in buying decisions at low cost. Brengman, Willems and Kerrebroeck (2019) in their study concluded that "AR can lead to increased perceptions of product ownership, which leads to more favorable product attitudes and higher purchase intentions. This study also demonstrates that allowing users to examine products marketed online in more detail by digitally touching them generates perceived ownership which appears to be generally more pronounced (for each of the different investigated media) for products with material properties (i.e. requiring sensory information)".

"AR can bring major benefits both in the online and brick-and-mortar sectors by enabling the interaction with virtual objects and enhancing the shopping experience with capabilities offered by the Internet, respectively" (Martínez, 2014). According to Gaioshko(2014), "AR provides customers with virtual fitting rooms, where, the product is put on the consumers real time video, which gives them and idea about the look the clothing can given them in real and thus can help them reduce returns."

"American Apparel, the clothing retailer is also adopting AR technology with the aim of bringing the online experience offline. By using a particular application, in-store patrons can scan the item to see the product in different colours and read reviews by other customers who have bought that item", Lum(2013).

Not only the clothing industry, but also, many other sectors have started using augmented reality as a feature to provide customer with a better interactive digital platform to help them make a better purchase decision. For name few, the giant beauty retailer Loreal Paris came up with Makeup Genius app to provide the customer an experience of trying the makeup product virtually starting from kajal to lipstick to Compaq to ease their shopping experience. Furniture giant IKEA also tried its handson the newly available technology to provide a better experience to its customers through its 2014 product catalogue and providing a virtual preview of furniture in a room. The technology is also used by Asian Paints to give the

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

user an idea of what colors would look better on the walls of their houses and offices depending on the quality of sunlight received in the room. The digital transform has helped the company to get happier customers. AR, which was used in marketing campaigns, can be seen as a type of experiential marketing as it focuses not just on a product / service but also on a whole customer experience (Yuan and Wu, 2008; Bulearca and Tamarjan, 2010).

Even though the use of AR in retail is growing, many barriers still stand in the way of its mass adoption. Very few consumers have Internet access and not all mobile handsets support AR activities or have minimal computing capacity. Also not every product has the ability to show interactions.

Martínez et al. (2014) in their study identified reduction of costs in terms inventory, easier adaptability leading to fast learning curve and fun to be the drivers of adoption for Augmented reality and inaccuracy, acceptance of the technology among everyone as the bottlenecks in the adoption of technology. They in their study concluded that, "changes in the perception of the technology from the users in terms of social practices and the perception of the benefits from its usage are needed to enhance the acceptation of the technology. Finally, an increase of the number of users and devices may create a network effect that can boost the implantation of AR as an everyday life technology."

Virtual Reality in Retail:

Virtual reality (VR) is one of the recent developments in technology which has great potential for the various industries as VR creates a very realistic computer-simulated world. VR creates an virtual environment where a person can interactively experience the product through his sense of vision and listening. It has been widely used in games.Secondlife used VR as a platform for its game which become very popular. According to Joe Bardi, "Virtual Reality (VR) is the use of computer technology to create a simulated environment. Unlike traditional user interfaces, VR places the user inside an experience. Instead of viewing a screen in front of them, users are immersed and able to interact with 3D worlds. By simulating as many senses as possible, such as vision, hearing, touch, even smell, the computer is transformed into a gatekeeper to this artificial world. The only limits to near-real VR experiences are the availability of content and cheap computing power."

Metaverse Retail:

A Metaverse is virtually shared space created to multiple users, who can together use it for a common purpose and it includes virtual reality and augmented reality. Schroeder (2002) defined a metaverse (virtual world) as "computer-generated, multi-user, three-dimensional interfaces in which users can also experience other participants as being present in the environment". In this virtual world, the customer can get the experience of shopping through a retail outlet in a 3D avatar which also has the feature of interacting with other avatars for guidance/assistance (Donath, 1999). The current use of e-commerce is restricted to the 2D feature which can understood as a website/webpage with description of the product and its images. The 3D feature will be different from the existing 2D feature in terms of the experience the customer has, and the detailing of the product it can show. Metaverse Retailing can give retailers attractive opportunities for improving customer experience, creating a positive feedback by the customers and increasing the community (Papagiannidis& Bourlakis,2010; Verhagen et. al, 2012). Gadalla, Keeling &Abosag (2013) through their study found that, "Metaverse context presents opportunities for retailers in enhancing social experience, responsive service and creative co-production opportunities, perhaps exploiting customer desires for novelty, consumption aspirations and managing identity". Papagiannidis & Bourlakis (2010) suggested that" In future retail organizations to maintain their market

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

share, they should use integrated information technologies to increase their customer interactions and also, will have to operate in three different environments, brick and mortar, online and metaverse."

According to Swilley (2016), a metaverse can show consumers movements and selection of the products, letting marketers see the in real time observe customer's experience of using the 3D store as it is happening rather than reading transaction logs or tracking the customers navigations through the site. In a metaverse, through the avatar form, the customer , the employees and the others shopping at the same time can be seen and heard, similar to the brick and mortar outlet, but with information availed from the virtual world store can be analyzed to plan the future strategy for the retailer.

Advantages:

These technologies can be used to increase the knowledge of the customer and give them a better experience, which is more than the real experience. Virtual reality can create a realistic virtual world to enhance the experience of the customers. Also, it can help customers share their reviews in real time over long distances while shopping without wasting time in reading their review posted online. It has become a mode of information sharing and increasing.

Disadvantages:

Security and data overloading can be a point of concern for the said technologies. As they are in the developing stages, can be little costly of the organizations if they do not want to pass the cost of using the same to the customers. With development of such technologies, social distancing increases in the customers and they hardly live in the real world, this may create some psychological concerns.In the beginning, organizations will have to manage the brick and mortar store as well, because directly routing to the virtual store, may lead to difficulty in technological shifts required. They might have to have logistics and warehouse management for both the store, virtual and real, leading to higher amount of inventory cost during the introduction period. The supply chain of the organizations can be hugely affected in the transition.

Current Scenario:

Many organizations have been using Augmented Reality for as a part of their mobile application or through their website. To name a few, lenskart, Ikea, Loreal Paris, Asain Paints and many more. Organizations like "I Want One Of Those (IWOOT) (http://www.iwantoneofthose.com), a UK-based online retailer offered a selection of gadgets, toys and home, office, outdoor and travel accessories. IWOOT was one of first companies to allow users to purchase products in Second Life and get them delivered in real life" Papagiannidis&Bourlakis (2010). Below are some images of how organizations are using Augmented Reality to enhance their customer experience. Figure 1 is how IKEA gives its customer the experience of visually how the sofa will look in his living room through the app. Usually while making a purchase decision on furniture, the customer has to get measurements correct and also they have to visualize how the product will suit their living room/selected space. With the AR app, IKEA has solved the problem for the customer by introducing a feature where they can virtually fit the furniture and set it atvarious angles and then decide if the piece of furniture fits in their space, and then make the purchase decision. Figure 2 shows how a woman can try all the cosmetic products offered by Lorealparis ranging from lipsticks to eye liner to concealers virtually and decide which one best suits her skin tone. She does not have to apply the same on her real skin and test. While when this kind of shopping was done through 2D framework, the customer has the questions like how would the shade look on her in real and what if it does not come out that well, it would be a waste of time and money. This

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

kind of app is a help for such customers. Figure 3 shows the AR app of Dulux Paints, which is giving various color options that the customer can have for his wall, and also gives him/her an idea of how the color would look on the wall. At times, the customer likes a color in the catalogue but when applied to the wall, it does not come out the way imagined, this app helps customers to virtually try the shad they would like to have and then make the final decision. These are a few examples of use of AR for giving a better experience to the customer. Many organizations have started using this technology for a better customer experience.

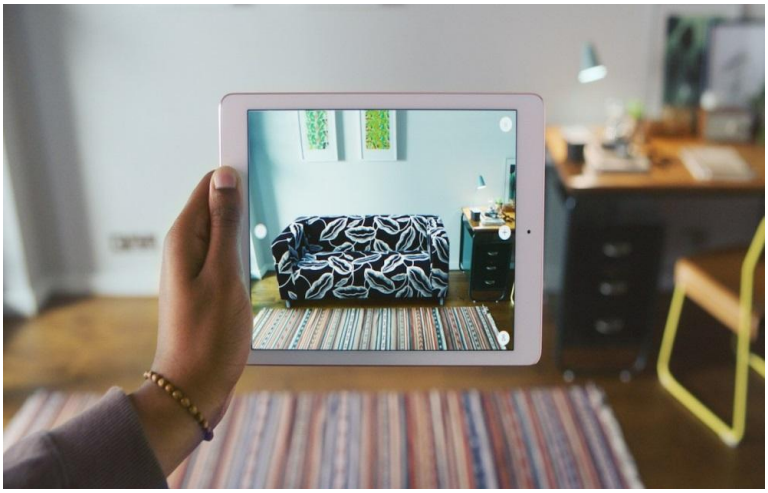

Figure 1: IKEA app using Augmented Reality
Source: https://digiday.com/marketing/ikea-using-augmented-reality/

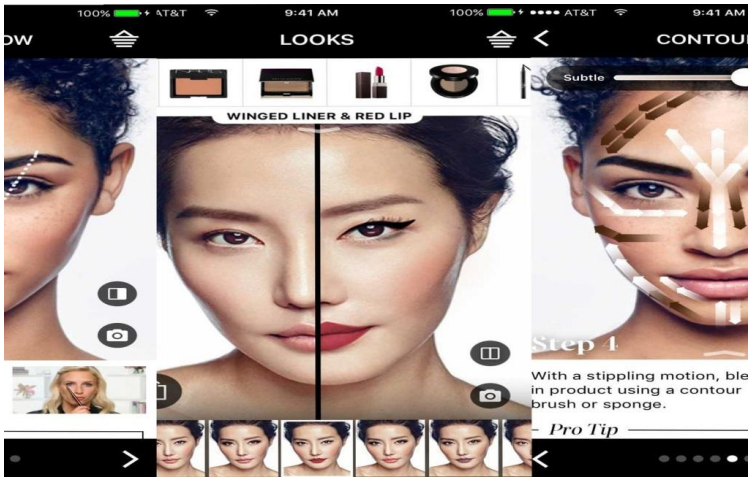

Figure 2: Loreal Paris helps customers virtually try the cosmetics and then make the purchase decision. Source: https://www.theverge.com/2018/3/16/17131260/loreal-modiface-acquire-makeup-ar-try-on

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

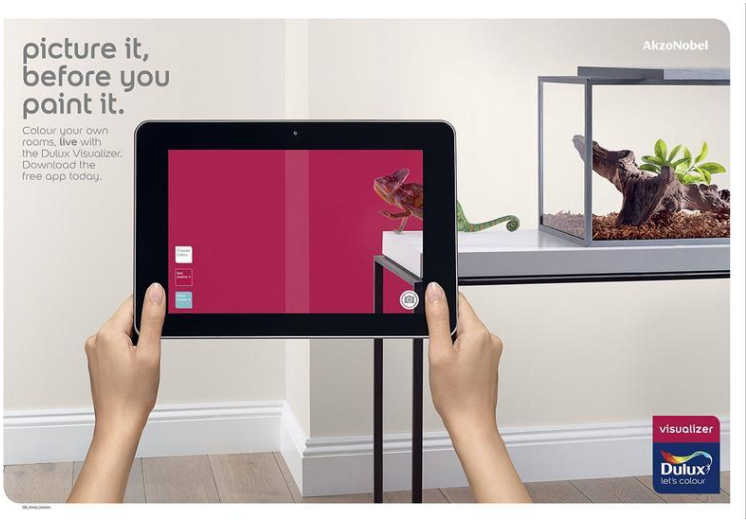

Figure 3: Dulux App, to select the color for your wall.
Source: https://www.cmo.com.au/article/548702/dulux_augmented_reality_mobile_app_allows_consumers_revisualise_walls_/

Future of these technologies:

With the increased sell in smart phones and ease of access to internet, the future of retail seems to be highly dependent on technology and AR, VR and Metaverse will soon be the new trend in e-commerce. A Few statistics related to the technology are given in figures below which show a bright future of the technology in retail as well:

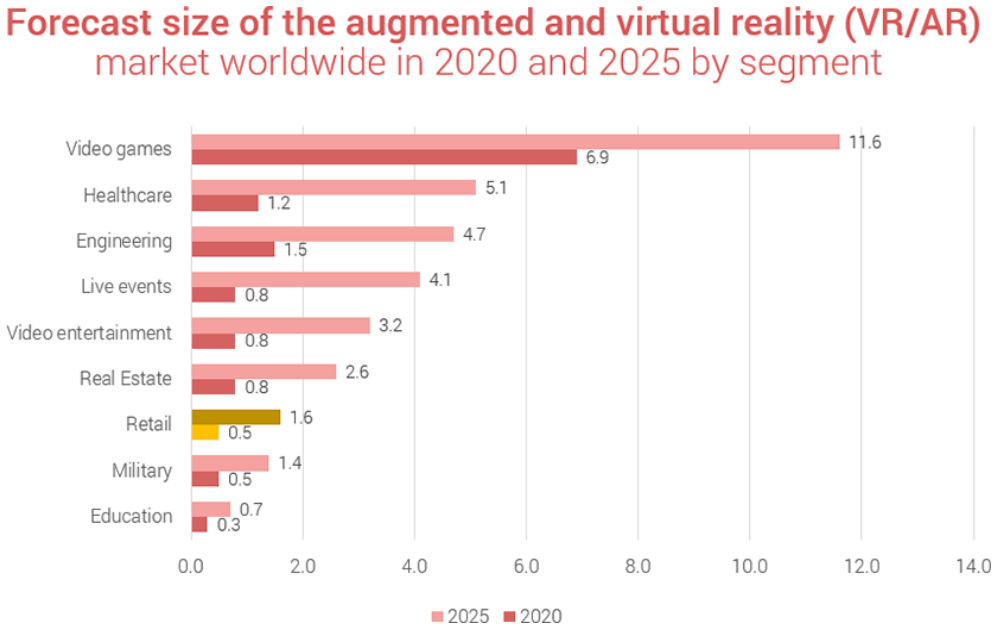

Figure 4: Forecast of augmented and virtual reality market worldwide in2020 and 2025 by segment
Source: statista

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

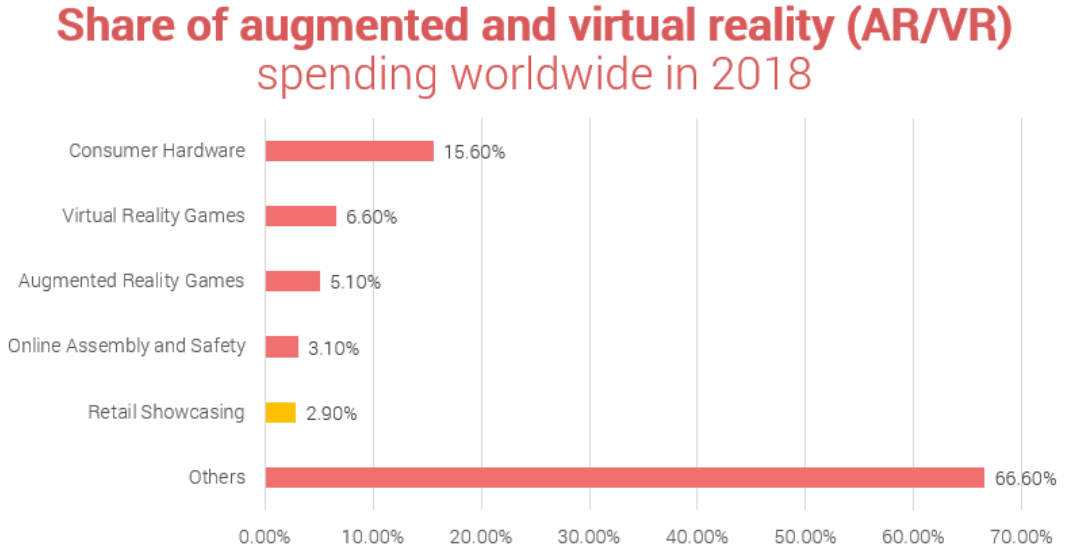

Figure 5:Share of augmented and virtual reality spending worldwide
Source: statis

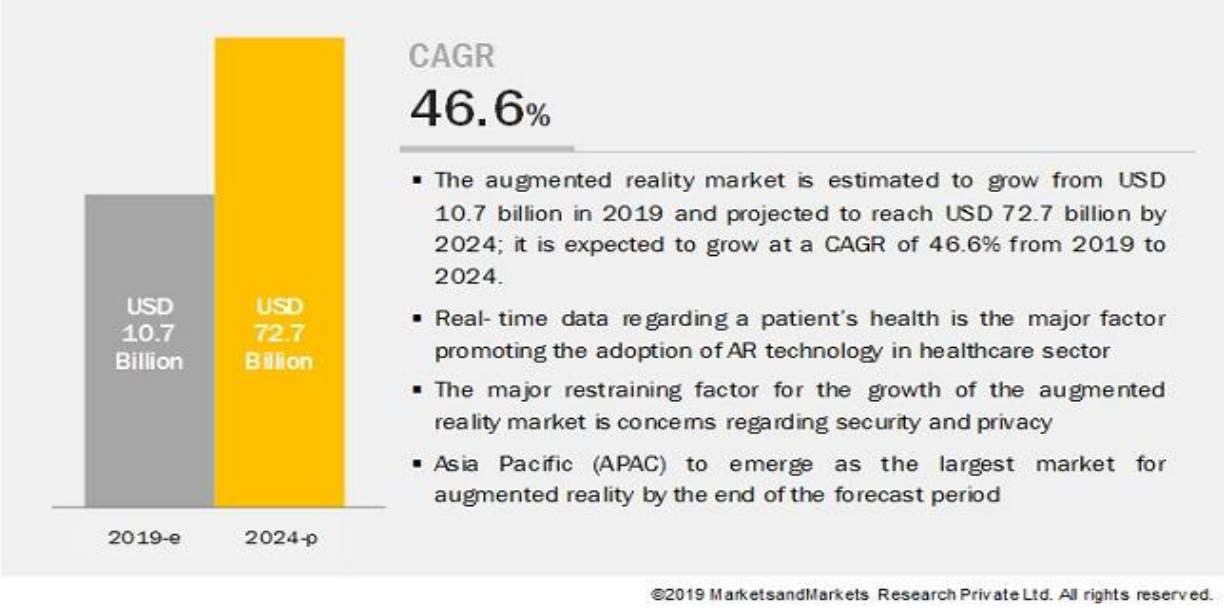

Figure 6: Attractive opportunities in Augmented Reality Market
Source: Press Releases, Investor Relation Presentations, Annual Reports, Expert Interview and Markets and Markets Analysis

Conclusion:

As the gaming industry has seen revolution with the introduction of technologies like Augmented Reality and Virtual Reality, the change in the way e commerce is working is also not far. Customers today do virtual shopping while playing online games, entery virtual battle fields. The day is not far when they would enter a virtual retail store and do the shopping for their daily chores. The

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

technologies seem promising and future of retail, but as said, they may come with their own disadvantages, which the companies will have to find a way to overcome.

References:

1. Azuma, R. 1999. The challenge of making augmented reality work outdoors. In Ohta, Y. and Tamura, H., editors, Mixed Reality, Merging Real and Virtual Worlds, pages 379–390. Ohmsha/Springer, Tokyo/New York.
2. Azuma, R., Baillot, Y., Behringer, R., Feiner, S., Julier, S., and MacIntyre, B. 2001. Recent advances in augmented reality. IEEE Computer Graphics and Applications, 21(6):34–47.
3. Bourlakis, M., Papagiannidis, S., & Li, F. (2009). Retail spatial evolution: paving the way from traditional to metaverse retailing. Electronic Commerce Research, 9(1-2), 135-148.
4. Brengman, M., Willems, K., & Van Kerrebroeck, H. (2019). Can't touch this: the impact of augmented reality versus touch and non-touch interfaces on perceived ownership. *Virtual Reality*, *23*(3), 269-280
5. D. Gaioshko, "10 ways how augmented reality can help retailers", January 29, 2014.
6. Dacko, S. G. (2017). Enabling smart retail settings via mobile augmented reality shopping apps. Technological Forecasting and Social Change, 124, 243-256.
7. Daponte, P., De Vito, L., Picariello, F., &Riccio, M. (2014). State of the art and future developments of the Augmented Reality for measurement applications. Measurement, 57, 53-70.
8. Donath, J. S. (1999). Identity and deception in the virtual community. In P. Kollock& M. Smith (Eds.), Communities in cyberspace (pp. 29–59). London: Routledge.
9. Gadalla, E., Keeling, K., &Abosag, I. (2013). Metaverse-retail service quality: A future framework for retail service quality in the 3D internet. Journal of Marketing Management, 29(13-14), 1493-1517.
10. Gartner (2016) Why IT leaders should pay attention to augmented reality. http://www.gartner.com/smarterwithgartner/it-leaderspay-attention-to-augmented-reality/
11. Höllerer, T., &Feiner, S. (2004). Mobile augmented reality. *Telegeoinformatics: Location-based computing and services*, *21*.
12. Li, F. (2007). What is e-Business? How the Internet transforms organisations. Oxford: Blackwell.
13. Li, F., Whalley, J., & Williams, H. (2001). Between the electronic and physical spaces: implications for organisations in the networked economy. Environment and Planning A, 33, 699–716.
14. M. Bulearca and D. Tamarjan, "Augmented Reality: A Sustainable Marketing Tool?", Global Business and Management Research: An International Journal, 2(2&3), pp. 237-252, 2010
15. Martínez, H., Skournetou, D., Hyppölä, J., Laukkanen, S., &Heikkilä, A. (2014). Drivers and bottlenecks in the adoption of augmented reality applications. *Journal ISSN*, *2368*, 5956.
16. Papagiannidis, S., &Bourlakis, M. (2010). Staging the new retail drama: At a Metaverse near you!. Journal of Virtual Worlds Research, 2(5), 4–17.
17. R. Lum, "American Apparel Turns To Augmented Reality", August 1, 2013. [Online] 44 Available: http://www.creativeguerrillamarketing.com/augmented-reality/american-apparel-turns-toaugmented-reality/. [Accessed March 7, 2014].

May – June 2020
ISSN: 0193-4120 Page No. 289 - 297

18. Schroeder, R. (2002). Social interaction in virtual environments: Key issues, common themes, and a framework for research. In R. Schroeder (Ed.), The social life of avatars (pp. 1–18). London: Springer.
19. Swilley, E. (2016). Moving Virtual Retail into Reality: Examining Metaverse and Augmented Reality in the Online Shopping Experience. In Looking Forward, Looking Back: Drawing on the Past to Shape the Future of Marketing (pp. 675-677). Springer, Cham.
20. Van Krevelen D, Poelman R (2010) Augmented reality: technologies, applications, and limitations. Int J Virtual Real 9:1–20
21. Verhagen, T., Feldberg, F., van den Hooff, B., Meents, S.,&Merikivi, J. (2012). Understanding users' motivations to engage in virtual worlds: A multipurpose model and empirical testing. Computers in Human Behavior, 28, 484–495. doi: 10.1016/j.chb.2011.10.020
22. Y.E Yuan and C.K Wu, "Relationship Among Experiential Marketing, Experiential Value and Customer Satisfaction", Journal of Hospitality & Tourism Research, Vol 32(3), pp. 387-410, 2008.