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AUGMENTED REALITY COMPLEMENTING THE RETAILERS AND CONSUMERS- A CASE STUDY FROM IKEA

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ABSTRACT

Purpose – The objective of the paper is to explore the impact of Augmented Reality (AR) on both the retailers and the purchasing behaviour of consumers. The paper will provide valuable insights into the effectiveness of augmented reality in the retail industry.

Design/Methodology/Approach – In order to assess the problem, researchers have gathered data from Ikea's financial accounts from the previous seven years (2016-2022). Numerous factors have been carefully examined and analysed, including IKEA website traffic, total operational income, global shop visits, and the physical presence of stores globally. The scientific conclusion was drawn based on the use of the student's T-test.

Findings –The finding of the paper suggests that AR strengthens the customers decisions to buy. It also suggests that despite the convenience of online shopping, some customers may still prefer the traditional brick-and-mortar experience of physically seeing and touching the products before making a purchase decision.

Practical Implications- AR surely provides benefits such as enhancing customer engagement and improving the shopping experiences, but its adoption may not be feasible or practical for all retailers. The decision to adopt AR technology should be based on carefully analyzing the retailer's specific needs, goals, and resources.

Originality/Value – AR is one of the most significant transformations in retail businesses. However, the research also suggests that retailers need to adopt a "Phygital" approach, which combines online and offline market presence for the competitive advantage and addressing the need for all types of customers.

Keywords- Augmented Reality (AR), Digital Platform, Retails, IKEA, Consumer Buying Behaviour.

1. INTRODUCTION

The boundaries have no meaning for shopping lovers, people living at distant places can search, find and share the products of their choices in their social community. Companies are also introducing modern ways to make their customer experiences more delightful. Companies from all over the world are knitting together the internet community, through which their presence can be felt strongly around the globe.

The current generation is more tech-friendly, over the years, customers have shown their interest in online searches before making their final purchases. To comfort and provide more ease of purchasing, companies have also introduced augmented reality (AR) and virtual reality (VR) shopping. Multiple AR and VR effects excite consumers and increase their purchasing preferences. The retail industry has encountered numerous transformations over the past decade, moving from traditional retail to social media and e-commerce, and finally to the digital world.

Digital platforms have the power to create the link between the offline and online shopping. As a result, a lot of fashion businesses are seeking for digital platforms to offer experiences that are more accurate, interesting, and updated. With the help of AR, consumers can now enjoy a more realistic shopping experience because of features like live video streaming. By placing virtual items in an actual environment in real-time has improved the user's experience of engagement with the real world by giving a sense of reality. Skarbez, R., Smith, M., & Whitton, M. C. (2021).

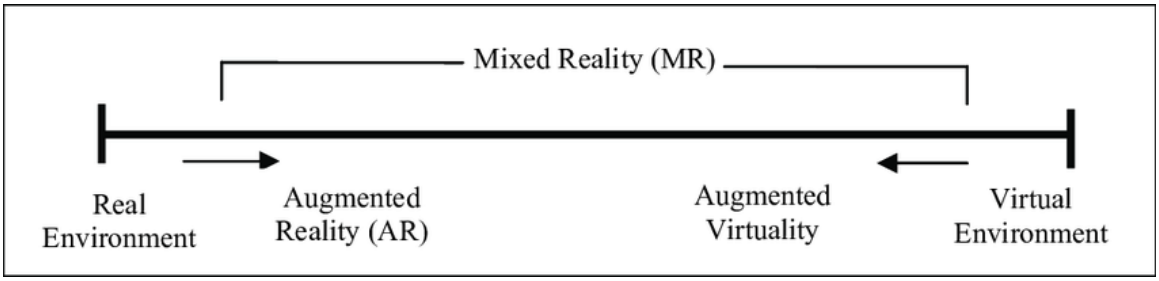

Figure 1: Milgram Reality-Virtuality Continuum

By using AI technology, businesses can keep track of a customer's behaviour, previous purchases, preferences, and demographic profile, and use this information to generate new and more personalized product recommendations and boost sales. Customers can navigate virtual stores, try on merchandise in 3D environments, and even obtain a 360-degree perspective. Customers can even purchase a new vehicle after a thrilling demonstration drive, receive personalized beauty advice, and try on jewellery, eyeglasses, and cosmetics to determine how they fit and appear (Raghavan, 2023).

Due to the deep internet penetration, e-commerce and online shoppers are increasing day by day. As of 2023, there are 2.64 billion digital consumers worldwide. 33.3% of the world's people fall into this category (Oberlo, 2023).

By 2028, the global AR market is anticipated to reach $128 billion. (Zion Market Research, 2021). AR allows customers to visualize themselves with products in a real-world setting. Ikea was one of the first companies to implement this concept with its Ikea Place app and website, allowing customers to visualize how furniture will appear in their space before purchase.

The IKEA app is a mobile application developed by the home furnishing retailer, IKEA. The app uses augmented reality (AR) technology to allow customers to visualize IKEA furniture and home décor products in their own homes before making a purchase. Using the IKEA app, customers can select a product from IKEA's catalog, point their smartphone or tablet camera at the desired location in their home, and see a 3D representation of the product in that location. Customers can then adjust the size and placement of the product to see how it will fit in their home.

The IKEA app provides customers with a more immersive and interactive purchasing experience. This can assist consumers in making more informed purchasing decisions and decrease the likelihood of returns. In addition to its AR capabilities, the IKEA app also includes features such as product reviews, the ability to create shopping lists, and a store locator. The app is available for download on both iOS and Android devices. Overall, the IKEA app is an example of how retailers can use AR technology to enhance the shopping experience and improve customer engagement and satisfaction.

The U.S. Department of Commerce reports that online purchasing increased by more than 30 percent between 2019 and 2020. According to Square's Future of Commerce report, 43% of retailers' current revenue originates from online sales. Consequently, brands are attempting to develop more immersive online experiences (Brewster, 2022).

Up to 23 million employments may be impacted by VR and AR by 2030. By combining augmented and virtual reality, the world economy could increase by $1.9 trillion by 2030. (Dalton, 2024). The ideas behind AR and VR are not new, the rise in online commerce has increased consumer and commercial interest in the technology. For example, just 22% of customers are interested in AR and VR buying, and 32% of firms questioned for Square's Future of Commerce research stated that they were interested in offering AR and VR experiences. according to Foresight Factory's Future of Shopping research (Valoti, 2021) for garment shopping, 3 out of 10 consumers prefer virtual changing rooms to physical ones.

One example of social shopping is the increase in the sharing of product pictures with friends. Since the pandemic began, 1 in 2 globally Gen Z (48%) and millennials (49%) customers have shared more pictures or screenshots of things they are interested in with friends and family. (Valoti, 2021).Since the epidemic began, 40% of worldwide customers claim to have increased their mobile shopping. 31% of consumers currently shop on their mobile devices once a week, and 46% of consumers say they would never shop without using their phone (Valoti, 2021). Based on the examination of data from 2021, we forecast that the percentage of Gen Z consumers who use

augmented reality (AR) before making a purchase will rise by 57% in less than five years. Global retailers' increased investment in augmented reality shopping combined with the natural rise in customer knowledge of the technology might lead to an even faster acceptance. (Valoti, 2021). 16% of consumers have already utilized augmented reality (AR) while making purchases online, and 38% more say they would like to do so in the future. The most common reasons cited for wanting to use AR are to see what items look like on the consumer This indicates that AR is perceived more as a utility than as a way to enhance the enjoyment of online shopping. The ability to digitally evaluate things is driving customers to the virtual check and fulfilling a legitimate business function. (Valoti, 2021). Facebook recently unveiled the Horizon Workrooms virtual reality prototype, which simulates meetings down to the speaker's hand motions. Users may view the goods they looked for overlaid in their present surroundings thanks to Google's display of augmented reality (AR) search results. A business with technology that enables businesses to produce 3D pictures of their items was recently acquired by Snap. With this development and others, AR and VR are likely to soon become standard components of the consumer experience (Gregory, 2023).

2. REVIEW OF LITERATURE

The first industrial revolution (Figure 2) saw the development of the steam engine and automated manufacturing, and since then, the industry has continuously evolved.
(De Vries, J., 1994). Production lines and the electrification of industries were part of the second phase. (Mokyr, J. 1998). The third industrial revolution started in the 1970s with the introduction of automation. (Troxler, P., 2013). More recently, Industry 4.0 has encouraged the industrial sector's use of digital technology, creating advanced and intelligent manufacturing proc\esses (Xu, M., David, J. M., & Kim, S. H. 2018).
The term "industry 4.0" refers to a new wave of industrial innovation that is defined by the fusion of smart technology with sophisticated production and operational methods in assets, people, and organizations. (Lasi, H., Fettke, P., Kemper, H. G., Feld, T., & Hoffmann, M., 2014). This revolution rests on nine technological pillars (Figure 2), including cybersecurity (Lezzi, M., Lazoi, M., & Corallo, A., 2018). Augmented Reality (AR) (De Pace, F., Manuri, F., & Sanna, A., 2018), (Lavingia, K., & Tanwar, S. 2020) and robotic automation (Lavingia, K., & Tanwar, S., 2020), and recognizes the importance of pillars such as systems integration (Vaidya, S., Ambad, P., & Bhosle, S. 2018)., simulation (Schluse, M., Priggemeyer, M., Atorf, L., & Rossmann, J., 2018), Big Data analytics (Khan, M., Wu, X., Xu, X., & Dou, W. 2017, May) (Yan, J., Meng, Y., Lu, L., & Li, L., 2017), additive manufacturing (Dilberoglu, U. M., Gharehpapagh, B., Yaman, U., & Dolen, M., 2017)., cloud computing (Xu, X. 2012), and the Internet of Things (IoT) (Sisinni, E., Saifullah, A., Han, S., Jennehag, U., & Gidlund, M., 2018) for the optimization of industrial operations. Using these cutting-edge digital technologies, data gathering and information creation have increased to previously unheard-of proportions. (Nayyar, A., & Kumar, A. (Eds.), 2020).

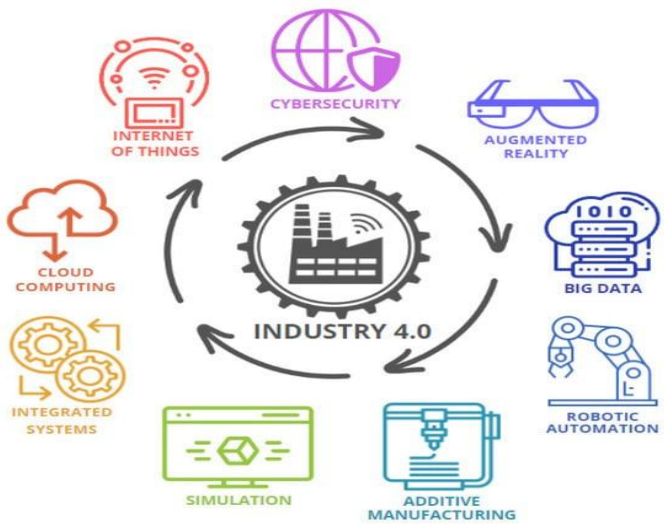

Figure 2: Industry Evolution

Aircraft production is likely to be the first industry to use HMD-based augmented reality systems. This technique is being studied by McDonnell Douglas [Neumann96] and Boeing [ARPA95] [BoeingTRP94]. The former uses optical approaches, while the latter is pursuing video approaches, Azuma, R. T.,1997.
The review demonstrates that the literature on AR and VR shopping is still in its infancy and that there is still opportunity for advancement in terms of methodological rigour and theoretical brilliance, as well as in the literature's scope and depth (Nannan Xi, 2019).

AR and VR is widely used and accepted in online shopping, study shows that shopping interfaces need to be made better and more user-friendly (Francesca Bonetti, September, 2017). But more research needs to be done to figure out how consumers' acceptance and use of these technologies are changing. This includes looking at whether consumers' fears about privacy, acceptability, and price are likely to be overcome, as well as the important management implications that come from such insights. AR and VR technologies are always changing to make internet shopping better (Francesca Bonetti, September, 2017).

Retailers and providers of AR and VR technologies must collaborate to enhance and enrich the shopping experiences of customers, this may be accomplished via understanding and comparing various viewpoints, exchanging perceptions and expertise on how customers embrace technology, addressing implementation hurdles and needs, addressing necessary innovations and keeping up with the market trends, etc. (Atieh Poushneh, January 2017).

Consumers nowadays have high standards for these virtual surroundings; thus, retailers of AR and VR technologies should be prepared to make adjustments and take into account this when developing suitable strategies. (Papagiannidis et al., 2017).

To improve the social, "utilitarian," and "hedonistic" aspects of shopping in a virtual reality store, it is crucial to concentrate on store design elements and user experience design. Retailers should also include the advantages of both online and offline purchasing, which are what customers value the most (personal guidance, after-sales support, etc.). (Liangchao Xue, 20 February 2019)

Multisensory usability is now faced with new difficulties because of the increased use of AR and VR. The worlds of marketing and event technology are now experiencing exciting times. Retailers are developing VR content to appeal to Gen Z customers since they want more immersive shopping experiences than any other generation. Gen Z members are eager to adopt augmented and virtual reality in the retail setting since many of their desired values are met by this type of purchasing experience. (Kata Kapusy, 2017)

The user experience is enhanced and made more user-friendly by the efficient integration and usage of VR and AR technology interfaces in online retailing. The collaboration and common understanding of human-computer interaction, retailing, marketing, and other disciplines must be examined while building an effective virtual shopping environment. (Kumar, 2021)

AR can help buyers to have a better idea of how the product will appear on them. Users may design their virtual avatars using simple 3D modelling technologies. These methods for creating 3D avatars will make it easier for customers to evaluate things before buying them. Customers are more satisfied with online shopping when they can try on clothing using a customized virtual avatar to get a feel of "how it would look" and determine whether the items would fit them (Y Liu, 2020).

To truly engage consumers and make them feel present in the AR world, businesses should design their AR marketing efforts with a focus on generating totally engaging and involved experiences. Achieving this aim calls for minimizing distractions from the actual content, which has huge implications for app design and curation. As exterior dimensions, it was discovered that personalized experiences, information seeking, enjoyment, novelty, and a sense of motion all impacted the AR experience. To create and set up apps that satisfy consumers, the industry, especially those who are marketing managers and app designers/developers, should incorporate these insights into their AR plans (M. Claudia tom Dieck, 2023).

Augmented reality has the potential to be a powerful tool for improving customer happiness in the context of purchasing. Customers are confronted with a variety of brands while shopping, as well as a variety of distractions. Brick-and-mortar stores may also gain from stocking goods that use augmented reality if they provide helpful information and promote an enjoyment of learning and entertainment (Jennifer B. Barhorst, 2021).

3. JUSTIFICATION OF THE STUDY

After a detailed review of the literature, we found that there is an evidential research gap that studies the effect of AR on retailers and consumer buying behavior. The result drawn from this research paper has the potential to raise awareness for retailers to have an edge in the industry and to enjoy a competitive advantage. To solidify the research, the financials of IKEA, a home furnishings retailer have been taken for the study which clearly states how AR has influenced the financial health, customer store visits, and presence of offline stores.

4. RESEARCH OBJECTIVES

i. To examine how AR has affected the company's financial situation.
ii. To research how AR affects customer store visits.
iii. To understand how AR relates to the existence of offline stores.

5. RESEARCH HYPOTHESES

H01: AR has no significant effect on the financial health of the company.
H02: AR has no significant relation to the customer store visits.
H03: AR has no relation with the presence of offline stores.

6. RESEARCH METHODOLOGY

The research paper is an exploratory study that contains secondary data from various sources, including financial data, journals, magazines, articles, newspapers, and media reports. The paper aims to analyse and organize the collected data, using statistical techniques such as the student's t-test, to scientifically authenticate the research.

7. LIMITATIONS AND FURTHER STUDY REFERENCES

i. The data has been collected from the secondary data only, which limits the study.
ii. If the personal interviews could have been conducted by retailers and consumers that would have given us insights about the barriers related to adaptations of AR and VR for both.
iii. The confirmation with the collaborative tech providers would provide us the better insights about AR and VR.
iv. Due to the infancy of this concept and the unavailability of vast data limited the scope of the study conducting a comprehensive study.

8. RESULTS AND DISCUSSION

The consolidated financial figures from various variables have been taken to study the null hypothesis. IKEA website visits have been taken which provides the AR to consumers (Ikea app visit data is unavailable), stores worldwide, and store visits have been considered to investigate the paper.

Table 1: CONSOLIDATED INCOME STATEMENT

Year	IKEA stores worldwide	IKEA store visits in millions	IKEA website visits in billions	IKEA retail sales in billion Euros	Total revenue	Net income
2016	389	915	2.1	36.4	2176	258
2017	403	936	2.3	38.3	22878	912
2018	422	957	2.5	38.8	25516	1449
2019	433	1000	2.8	41.3	25254	1485
2020	445	825	4	39.6	23613	1731
2021	458	775	5	41.9	25615	1433
2022	460	822	4.3	44.6	27578	710

Source-Financial Statement of Ikea (2016-2022)

9. TESTING OF HYPOTHESIS

H01: Augmented reality has no significant impact on the financial health of the company.

$$t = \frac{r}{\sqrt{1 - r2}} X \sqrt{n} - 2$$

r=+0.822
t=3.409
t0.05=2.57

Since the value calculated is higher than the critical value, the null hypothesis is rejected. As such, there is a substantial effect of augmented reality (AR) on the company's financial health.

HO2: AR has no significant relations on the customer store visits.

$$t = \frac{r}{\sqrt{1 - r2}} X \sqrt{n} - 2$$

r=+0.808
t=3.067
t0.05=2.57

Since the value calculated is higher than the critical value, the null hypothesis is rejected. Thus, there is a noticeable difference in the quantity of customers that visit the company's store as a result of the use of augmented reality (AR).

HO3: AR has no relation with the presence of offline stores.

$$t = \frac{r}{\sqrt{1 - r2}} X \sqrt{n} - 2$$

r=+0.745
t=3.743
t0.05=2.57

Since the value calculated is higher than the critical value, the null hypothesis is rejected. As a result, the company's consumer retail visits have been significantly impacted by augmented reality (AR).

10. FINDING AND SUGGESTION

Allied Market Research projects that the worldwide augmented and virtual reality market will reach $571.42 billion by 2025. Not only are AR and VR great for entertainment, but they also have significant implications for business plans. Managers and business executives will organize, set up, and incorporate this technology into current business objectives in the future.

Though AR and VR have been used for more than 20 years in a few industries, they are still a relatively young technology in terms of general public acceptability. Furthermore, challenges remain in the development of the devices needed to consume the information as well as the technologies needed to produce it (Md Shadaab Khan, 2024).

Product companies throughout all industries need to reconsider how they design and develop products, advertise, and manage their supply networks now more than ever. How are they getting ready for AR and VR? What obstacles exist? What are the expectations of people in the trenches making day-to-day decisions about AR/VR adoption?

Jabil Inc., an American company, sponsored a survey of more than 200 team managers and executives responsible for making AR/VR decisions at firms that develop, sell, and/or manufacture products for the consumer electronics, retail, entertainment, and healthcare industries.

The major findings of the survey-

i. The future of AR and VR still needs significant advancements to achieve widespread acceptance.
ii. Regarding the interface, 99% of respondents think that issues with consumer technological constraints, expensive production costs, and AR/VR-specific device restrictions are issues.
iii. High content costs, constrained technology, and subpar software are cited by 97% of participants as the main obstacles to content creation (Md Shadaab Khan, 2024).

Despite of these challenges, the participants expressed confidence that AR/VR will become a regular part of modern life within the next five years. The market for augmented and virtual reality is expected to increase from its estimated $27.6 billion in 2021 to $856.2 billion in 2031, with a compound annual growth rate (CAGR) of 41.1% from 2022 to 2031. Numerous factors, including the widespread use of smartphones, the rise in popularity of video games, the affordability of augmented and virtual reality-based solutions, and the rapid uptake of these technologies by businesses, are expected to fuel the growth of the global augmented and virtual reality market. However, throughout the projected time, poor user experience design is expected to hinder market expansion. When taken as a whole, these elements offer prospects for market expansion.The market for augmented and virtual

reality is divided into segments according to geography, industrial sector, application, and size of the organization. The market is divided into major enterprises and small and medium-sized companies based on the size of the organizations. The market is split into consumer and enterprise segments based on the applications used. It is divided into gaming, media & entertainment, aerospace & military, healthcare, education, manufacturing, retail, and other sectors based on industry vertical. It is examined in terms of regions in North America, Europe, Asia-Pacific, and LAMEA.The Augmented and virtual reality industry is dominated by key players such as Google Inc., Sony, Magic Leap, Inc., HTC, Microsoft Corporation, Osterhout Design Group, Facebook, DAQRI, Samsung Electronics Co., Ltd., and Wikitude (Md Shadaab Khan, 2024).

After careful analysis, it is clear that AR and VR will rule many different kinds of businesses during the next five years. The AR/VR industry is evolving quickly, and for many businesses, the biggest challenge will be selecting the most suitable collaborator to work with on creating a virtual system for digital buyers. The use of AR in retail has been on the rise, and companies like IKEA have been early adopters of the technology. In this case study, we have explored that AR has a positive effect on the financial fronts, the number of offline stores and the visits to stores of consumers have increased and have a sound prospect in the future also.By providing an interactive and customized shopping experience, augmented reality (AR) can help consumers make better purchasing decisions and increase overall customer satisfaction. Retailers that specialize in low-cost products may not have the budget to invest in developing an augmented reality app.

However, for some retailers, adopting augmented reality may provide a competitive advantage and enhance their financial health by increasing sales and customer loyalty. The decision to adopt augmented reality should be made based on a thorough understanding of the technology, the retailer's specific needs and goals, and the potential impact on customer behaviour.

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