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"Factors Effecting the Role of AR On Millennials Intention To Recommend A Technology Products"

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Abstract

This capstone project investigates factors influencing Millennials' perceptions of companies using Augmented Reality (AR) technology, focusing on profitability-driven factors affecting their intention to recommend technology products. By conducting a mixed-methods study including literature review, qualitative interviews, and quantitative surveys, this research identifies key factors such as user experience, utility, social influence, brand reputation, accessibility, customization, and environmental responsibility. Understanding these factors is crucial for companies leveraging AR to optimize strategies, enhance customer satisfaction, and drive profitability. This study fills a research gap and offers actionable insights for businesses targeting Millennials in an evolving market landscape. This capstone project investigates factors influencing Millennials' perceptions of companies using Augmented Reality (AR) technology, focusing on profitability-driven factors affecting their intention to recommend technology products. By conducting a mixed-methods study including literature review, qualitative interviews, and quantitative surveys with 100memebers millennials samples were collected using purposive and snowball techniques. this research identifies key factors such as user experience, utility, social influence, brand reputation, accessibility, customization, and environmental responsibility. Understanding these factors is crucial for companies leveraging AR to optimize strategies, enhance customer satisfaction, and drive profitability. This study fills a research gap and offers actionable insights for businesses targeting Millennials in an evolving market landscape.

Keywords: AR, Millennials, intention to recommend, technology products.

INTRODUCTION

Augmented reality (AR) is an emerging cutting-edge technology in marketing, It enhances the visual, auditory, tactile, and olfactory perception of users by augmenting or superimposing digital content such as text, geolocation information, graphics, audios, and videos onto a live view of the physical objects and environments in real-time (Carmigniani et al., 2011; Fan et al., 2020; Sung, 2021). AR establishes a closer relationship between users' physical space and virtual objects. Therefore, the user experience with AR is more immersive, more vivid, more interactive, and more realistic (Cipresso et al., 2018). With the popularity of mobile devices and the availability of high- speed wireless networks, an increasing number of web-based AR applications and mobile AR apps have emerged to create novel, immersive, enjoyable, informative, and valuable user experiences. Accordingly, AR is becoming a disruptive technology that will transform marketing in the coming years (Tan et al., 2022). An industry report released by PwC claimed that AR brought net economicbenefits of $33 billion in 2019. Furthermore, the benefits will reach $338.1 billion by 2025 and $1.0924 trillion by 2030 (PwC, 2019).

In the realm of augmented and virtual reality, significant milestones have marked the evolution of these technologies over the years. The journey began in 1968 when Harvard professor and computer scientist Ivan Sutherland introduced the first head-mounted display known as 'The Sword of Damocles.' Progressing into the 1970s, computer researcher and artist (Myron Kruger) established the 'Video place' laboratory at the University of Connecticut, dedicated entirely to artificial reality. It wasn't until 1990 that the term 'augmented reality' was coined by Boeing researcher Tom Caudell.

Louis Rosenburg, a researcher at the USAF Armstrong's Research Lab, made strides in 1992 with 'Virtual Fixtures,' one of the earliest fully functional augmented reality systems used for training US Air Force pilots. Julie Martin brought augmented reality to the entertainment industry in 1994 with the theatre production 'Dancing in Cyberspace.' Advancing into 1998, Sports vision revolutionized sports broadcasting by introducing the virtual 1st & Ten graphic system during a live NFL game. NASA entered the scene in 1999, incorporating augmented reality into the hybrid synthetic vision system of their X-38 spacecraft for enhanced navigation during test flights. In the early 2000s, Hirokazu Kato's AR Toolkit, an open-source software library, empowered developers to build augmented reality software programs using video tracking to overlay virtual graphics ontothe real world

The integration of augmented reality into the mainstream continued in 2009 when Esquire Magazine employed the technology in print media to bring pages to life. Fast forward to 2013, and Volkswagen introduced the MARTA app, providing 1technicians with step-by-step repair instructions within the service manual. The tech giant Google entered

the scene in 2014 with the unveiling of Google Glass, a pair of augmented reality glasses offering immersive experiences and access to applications like Google Maps and Gmail. Microsoft joined the wearable AR technology arena in 2016 with the release of HoloLens, a more advanced but pricey alternative to Google Glass. The retail landscape was forever changed in 2017 when IKEA launched its augmented reality app, IKEA Place, marking a significant shift in the industry's approach to customer experiences.

The development of augmented reality (AR) has undergone a fascinating evolution, marked by key milestones and innovations. In 1968, Harvard professor and computer scientist Ivan Sutherland laid the foundation by creating the first head-mounted display known as 'The Sword of Damocles.' The 1970s witnessed the establishment of the 'Video place' laboratory at the University of Connecticut by computer researcher and artist Myron Kruger, dedicating space entirely to artificial reality research. The term 'augmented reality' was coined in 1990 by Tom Caudell, a Boeing researcher, signifying a crucial moment in AR's nomenclature.

Subsequently, in 1992, Louis Rosenburg, a researcher in the USAF Armstrong's Research Lab, developed 'Virtual Fixtures,' one of the earliest fully functional AR systems, allowing military personnel to virtually control and guide machinery for training purposes. Entertainment embraced augmented reality in 1994 when Julie Martin integrated it into the theatre production 'Dancing in Cyberspace,' featuring acrobats dancing alongside virtual objects projected onto the physical stage. Sports broadcasting took a leap in 1998 when Sports vision introduced the virtual 1st & Ten graphic system during a live NFL game, altering how audiences perceive and engage with televised sports. NASA entered the AR arena in 1999, incorporating the technology into the hybrid synthetic vision system of the X-38 spacecraft to enhance navigation during test flights. The early 2000s saw the emergence of AR Toolkit, an open-source software library developed by Hirokazu Kato in 2000, empowering developers to create AR software programs using video tracking to overlay virtual graphics onto the real world.

In 2009, Esquire Magazine made a significant stride by using augmented reality in print media to bring static pages to life, opening new possibilities for interactive content. Google took a monumental step in 2014 with the unveiling of Google Glass, a pair of AR glasses that allowed users to access various applications and interact with the internet using natural language processing commands. Microsoft entered the market in 2016 with the release of HoloLens, a more advanced and immersive AR device compared to Google Glass, albeit with a higher price tag. The retail industry witnessed a transformative moment in 2017 when IKEA launched its augmented reality app, IKEA Place, revolutionizing how customers interact with products in a virtual space.

The development of augmented reality continues to advance rapidly, with ongoing research, technological breakthroughs, and a growing number of applications across various industries, promising a future where AR

seamlessly integrates with our daily lives. the application of AR in marketing to enhance consumers' experiences, increase their satisfaction, shape their behavior, and boost companies' revenues (Huang and Liao, 2015; Javornik, 2016; Poushneh and Vasquez- Parraga, 2017; Bell et al., 2018). The novel and attractive media of presentation and interaction enabled by AR play a crucial role in achieving the desired effects. Specifically, AR integrates digital information or objects into consumers' perceptions of the physical objects and environments, thus providing consumers with rich information about products or services and allowing them to experience products and services easily. Specifically, AR not only improves online experiences and engagement but creates novel and fantastic on-site experiences (Javornik,2016; Yuan et al., 2021).

First, AR engages consumers in online settings by providing real-time direct product/service experiences in various aspects of marketing (Chung et al., 2018). Specifically, it overcomes the limitations of online shopping by allowing prospects to try on products, such as makeup (Smink et al., 2019; Hsu et al., 2021; Javornik et al., 2021), eyewear (Pantano et al., 2017; Yim et al., 2017; Yim and Park, 2019), clothing (Huang and Liu, 2014; Huang and Liao, 2017; Plotkina and Saurel, 2019), shoes (Hilken et al., 2018; Plotkina et al., 2021), and furniture (Rauschnabel et al., 2019; Kowalczuk et al., 2021; Qin et al., 2021b) virtually without having to interact physically with them. Major online retailing platforms, such as Amazon (McLean and Wilson, 2019), Jing Dong (Fan et al., 2020), Alibaba (Fan et al., 2020), and eBay (Banerjee and Longstreet, 2016), as well as leading brands, such as Tiffany & Co. (Whang et al., 2021), L'Oréal (Hilken et al., 2017), Sephora (Smink et al., 2019), Nike (Hilken et al., 2018), Converse (Whang et al., 2021), Zara (Yuan et al., 2021), IKEA (McLean and Wilson, 2019; Qin et al., 2021b), Mini (Carmigniani et al., 2011), and Lego (Hinsch et al., 2020), have devoted lots of efforts to introduce various forms of AR. They strive to enhance consumers' vicarious experience of physical products in online settings and make it more immersive, interactive, informative, enjoyable, and satisfactory (Yim et al., 2017). Furthermore, AR advertising has significant advantages over traditional advertising. AR empowered advertisements are more informative, novel, entertaining, and complex, which leads to positive consumer responses and helps advertising campaigns stand out (Feng and Xie, 2018; Yang et al., 2020; Sung, 2021).

Second, AR offers a novel and fantastic on-site experience (Barhorst et al., 2021). The application of AR creates augmented stores (Bonetti et al., 2019), restaurants (Heller et al., 2019a; Batat, 2021), museums (tom Dieck et al., 2016; He et al., 2018; Zhuang et al., 2021), and art galleries (tom Dieck et al., 2018b; Tussyadiah et al., 2018). Retail giants, such as Lowes (Chalimov, 2021) and Machine-A (Chitra Korn, 2021), engage consumers and offer interaction by incorporating AR- supported features into their mobile apps and serving consumers in innovative ways Second, AR offers a novel and fantastic on-site experience (Barhorst et al., 2021). The application of AR creates augmented stores

(Bonetti et al., 2019), restaurants (Heller et al., 2019a; Batat, 2021), museums (tom Dieck et al., 2016; He et al., 2018; 2Zhuang et al., 2021), and art galleries (tom Dieck et al., 2018b; Tussyadiah et al., 2018). Retail giants, such as Lowes (Chalimov, 2021) and Machine-A (Chitra Korn, 2021), engage consumers and offer interaction by incorporating AR-supported features into their mobile apps and serving consumers in innovative ways. The interactive experiences include learning more about products, creating unique and customizable products, and virtually trying on products by installing in-store AR displays or adding AR empowered features to the brand's mobile apps (Chalimov, 2021). AR augmented stores can produce extra brand value, simplify consumers' decision-making process, stimulate brand engagement, and lead to stronger consumer purchase desire (Bonetti et al., 2019; Cuomo et al., 2020). AR-empowered restaurant services affect consumers' perceptions of restaurant experiences (Batat, 2021) and promote the choice of high-value products (Heller et al., 2019a). Moreover, augmented reality applications, especially those built upon wearable devices, affect tourists' destination visit intention (Chung etal., 2015). They can also help tourists feel more enjoyable (Tussyadiah et al., 2018), enhance their experiences with tourist destinations (tom Dieck et al., 2018a; Jiang et al., 2019), and increase their willingness to pay more (He et al., 2018). Technology is ushering in a new and exciting way for brands to connect with audiences – and new research has found that experientialism is the way to consumers' hearts. New research, commissioned by global technology firm Epson, entitled "The Experiential Future" has highlighted the attitudes of consumers towards participating in events and attractions. The research sought views on the use of immersive technologies at events and attractions including large-scale projections, interactive displays, holograms, virtual and augmented reality.

Millennials are the demographic most attracted to this type of event. Nearly two-thirds (63%) of survey respondents in this age range have taken part in or attended an experiential event or attraction over the last 12 months, whilst more than half (57%) believe that immersive technology isn't used enough at events. Over a fifth of Millennials (22%) and 17% of Generation Z and have even attended an experiential event outside their home country, as well as 17% of Generation X. This shows that businesses employing these elements stand to gain clear financial advantages, whilst highlighting how the wider tourism economy stands to benefit as a result. Six-in-ten (60%) Millennials also agree that they prefer events or attractions that include an experiential element, followed by 53% of Generation Z, 41% of Generation X and 32% of Baby Boomers.

A visitor experience that triggers emotions and creates a powerful connection is not just crucial for venues and hospitality businesses to attract new consumers; it's also key to drawing people back. Nearly two-thirds (64%) of Millennials would revisit an experiential event, as well as nearly half of Generation X (49%) and Generation Z (49%), as well as over a third of Baby Boomers (36%)

– demonstrating that experiential technologies help drive customer engagement for return visits.

Neil Colquhoun, vice president of CISMEA and Professional Displays at Epson Europe, commented: “New technologies are drastically changing the nature of attractions and events. These findings show that businesses must harness the power of experiential elements not just to drive footfall, but to encourage repeat business. Millennials, Baby Boomers and Gen-Zers all want immersive events and attractions; now it’s up to organizations to deliver on those expectations.”

Arlington Research conducted market research in 26 countries across the EMEA region amongst a total respondent base of 9750 adults aged 16-65 who had attended an event or attraction in the last 12 months from a drop-down list. Age ranges used in the research are defined as follows: Generation Z (born between 1994-2003), Millennials (born between 1980-1993), Generation X (born between 1965-1979) and Baby Boomers (born between 1954-1964).

Millennials are individuals born roughly between the early 1980s and mid-1990s to early 2000s, depending on various definitions and demographic studies. They are often characterized as a generation deeply immersed in technology, having grown up during the rapid advancement of digital technologies, including the internet, smartphones, and social media. As such, Millennials are typically considered early adopters of new technologies and are influential in shaping trends and consumer behaviors, particularly in the realm of technology products and services.

In the context of recommending Augmented Reality (AR) technological products, Millennials are a relevant target demographic due to their familiarity and comfort with digital innovations. Their experiences with technology make them valuable sources of feedback and endorsements for AR products. Millennials' penchant for sharing their opinions and experiences on social media platforms further amplifies their role as potential influencers in recommending AR products to their peers and broader networks. Thus, understanding Millennials' intentions to recommend AR technological products can provide valuable insights for marketers and developers seeking to leverage this demographic's preferences and behaviors in driving adoption and usage of AR technologies.

Technological products are material objects that have been designed by people and developed through technological practice to serve functions. Dr Vicki Compton and Cliff Harwood. Someone who has the necessary skill in technology is often referred to as a technologist. Some of the products of technology include train, aero plane, motor cars, computers, medical equipment, high- rise building, laptops, mobile phones, the internet, etc. EXAMPLE: A smartphone with advanced 3D Augmented Reality (AR) capabilities. With a dedicated AR application, you can bring a virtual tiger into your surroundings using the phone's camera. Simply launch the AR app, activate the camera, and select the option to place a virtual tiger. Using touch gestures, position the tiger anywhere in your environment. Powered by AI

algorithms, the AR technology ensures the tiger seamlessly blends into your surroundings with realistic rendering and dynamic lighting. You can interact with the virtual tiger, feed it treats, and 3capture photos or videos to share with friends andfamily. This example showcases how AR technology on mobile phones can create immersive

experiences by merging virtual elements with the real world. One of the main theories in the study of technology adoption is the technology acceptance model (TAM) (Davis, 1989). The 'denial of the potential of impact from institutional, social, and human control elements' is a significant theoretical flaw in TAM (Elliot & Loebbecke, 2000). To overcome the limitations of TAM, the researcher tried to study the technology adoption with the help of the unified theory of acceptanceand use of technology (UTAUT) extended model (Widodo et al., 2019).

In order to develop a comprehensive approach to users' acceptance of the framework of information technology, the first iteration of the UTAUT was suggested in 2003 (Venkatesh et al., 2003). The UTAUT model must increase its conceptual range and operational capabilities to accommodate modern technologies even after 20 years of its discovery and the swift evolution of information system technology. The Unified Theory of Acceptance and Use of Technology (UTAUT) model offers a structured framework that is invaluable for comprehensively analyzing and predicting millennials' intentions to recommend a technology product. By identifying relevant variables such as performance expectancy, social influence, and facilitating conditions, which directly align with UTAUT constructs like Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions,

LITERATURE REVIEW:

Colorful technology acceptance models that have been developed to explain and prognosticate technology use, with the most used being the Technology Acceptance Model(TAM; Davis, 1989), proposition of Reasoned Action(TRA; Fishbein and Ajzen, 1975), and proposition of Planned Behavior(TPB; Ajzen, 1991). Each model suggests colorful variables in

determining the use of proposed technology. This study, on the other hand, is to acclimatize another model the Unified Theory of Acceptance and Use of Technology(UTAUT; Venkatesh teal., 2003) to develop a exploration model. The UTAUT model is considerably used in recent technology acceptance studies (i.e. Guest teal., 2018; Bharati and Srikanth, 2018; Mediaeval., 2017 and Madigan teal., 2016) UTAUT come out with a concrete model explaining the use geste

of technology.

Grounded on the UTAUT model, performance expectation (PE), trouble expectation(EE), social influence(SI) and easing conditions(FC) are the major predictors towards use gusted

(UB) of proposed technology.

In summary, our exploration thing is to identify the factors affecting the part of AR on millennials' intention to recommend a technology product that drives individualities' behavioral intention. As far as it's concerned, the study investigates a notable exploration gap that the experimenters are unfit to identify any literature review which concentrated on relating the factors, which have the profitability to impact the perception of millennials towards the companies. Grounded on the extended literature review and the development of an intertwined abstract frame.

Our culmination design gains a solid foundation. Understanding the intricate connections among these variables, as illustrated by UTAUT, illuminates how each factor influences millennials' intentions to recommend a technology product. Through this understanding, you can make informed prognostications about their factual gusted regarding product recommendation.

The experimenters are unfit to identify any literature review, which concentrated on relating the factors which have the eventuality to impact the perception of millennials towards the companies. therefore, UTAUT serves as a important tool for unravelling the complex dynamics shaping millennials' stations and actions towards technology product recommendation.

H1 Millennials' positive stations towards immersive technologies appreciatively impact their intentions to recommend Augmented Reality (AR) technological products.

H2 Millennials' comprehensions of the ease of use (trouble expectation) of AR technological products appreciatively impact their intentions to recommend these products.

PERFORMANCE EXPECTANCY:

The influence of performance expectancy has been confirmed in both voluntary and compulsory settings and situations with less experience (Lu, Zhou, & Wang, 2009). Performance expectancy may differ according to gender and age (Venkatesh et al., 2003). The performance expectancy factor has been shown to have a significant impact on intention to use (Afonso et al., 2012; Al Awadhi & Morris, 2008; Al-Gahtani, Hubona, & Wang, 2007; Kabra, Ramesh, Akhtar, & Dash, 2017; Kim et al., 2016; Salloum, Al-Emran, Shaalan & Tarhini, 2018; Sharifian, Askarian, Nematolahi, & Farhadi, 2014; Wang & Shih, 2009). Miklenčičová and Čapkovičová2017 Performance expectancy describes the degree of belief of an individual that the use of technology

will assist him/her to improve in his/her job performance. The factors contained in PE are perceived usefulness, extrinsic motivation, job-fit, relative advantage, outcome expectation. The influence of PE on technology acceptance

is moderated by gender and age. high perceived performance expectancy, offering valuable insights for advancing architectural research and design practices Kozani, Greece2021for effective development and marketing of AR apps tailored to contemporary shopping experiences (Q Jiang, J Chen, Y Wu, C Gu, J Sun 2022) AR applications and overall visitor experiences, emphasizing the importance of understanding performance expectancy for effective AR adoption in museums. (MeenaKumari2022). It significantly affects Users' intention to continue using AR in online purchases (Bilgihan, A., Kandampully, J. and Zhang,2014) performance expectancy and prioritizing positive user experiences can guide the development of well-designed AR applications, ultimately fostering favorable purchase intentions among users,(Federica Cehovin Bernice Ruban 2017).the use of mobile augmented reality (AR) in marketing. consumer search and evaluation behavior.

H4: Higher levels of performance expectancy positively influence intention to use technology in various settings and situations, regardless of experience.

SOCIAL INFUENCE:

Social influence defines the degree of importance perceived by an individual on the belief of other people for him or her to use a new technology. It is composed of these factors: subjective norm, social factors [66] and image. The variables defined to moderate the influence of SI are gender, age, voluntariness, and experience .it examines social impact and establishes a connection between three fundamental human desires: self-image, social connection, and accuracy. Cialdini, R. B., & Goldstein, N. J. (2004). the main reason why men are seen as more powerful and influential than women is due of the disparities in their social standing and ability. (Eagly, A. H. (1983). social influence affects users' perceptions of the attributes of information systems and their intentions to utilize them, particularly in the setting of blogging. (Wang, S. M., & Chuan-Chuan Lin, J. (2011). social influence compare in terms of modeling future behaviour in order to determine how predictive they are in terms of comprehending people's actions within the network Crandall,(D., Cosley, D., Huttenlocher, D., Kleinberg, J., & Suri, S. (2008, August).it applies parallelized processing for large-scale datasets and uses innovative expectation maximization (EM) algorithms to handle hidden social impact.(Ye, M., Liu, X., & Lee, W. C. (2012, August). herd behavior,

validate the importance of peer influences, and point to possible social learning consequences. Differential effects of particular social groupings are also noted. (Salazar, H. A., Oerlemans, L., & van Stroe-Biezen, S. (2013). one attractor predominates, guiding mechanisms of public opinion and mediating confrontations between knowledgeable majorities and self-assured minorities. (Moussaïd, M., Kämmer, J. E., Analytis, P. P., & Neth, H. (2013).

H3: There is no significant relationship between social influence and compliance/conformity.

FACILITATING CONDITIONS:

Facilitating condition defines the extent of the belief of an individual that the existence of organizational and technical infrastructure supports the use of technology. It is composed of perceived behavioral control, facilitating condition, and compatibility. The moderating variables defined for FC are age and experience. LMS-enabled blended learning utilization in distance tertiary education establishing the relationships among facilitating conditions (Bervell, B., & Arkorful, V. (2020), Experience and facilitating conditions as impediments to consumers'

New technology adoption (Mahardika, H., Thomas, D., Ewing, M. T., & Japutra, A. (2019). Lu, J., Yu, C. S., & Liu, C. (2005). Facilitating conditions, wireless trust and adoption intention. relation to Performance Expectancy (PE) and Facilitating Conditions (FC) (Hamzat, S. A., & Mabawonku, I. (2018). In order to verify their efficacy in encouraging the adoption and utilization of e-learning, the study highlights antecedents of facilitating conditions that need to undergo additional quantitative or qualitative testing (Paul, K. J., Musa, M., & Nansubuga, A. K. (2015). (Hossain, M. A., Hasan, M. I., Chan, C., & Ahmed, J. U. (2017). Predicting user acceptance and continuance behaviour towards location-based services: the moderating effect of facilitating conditions on behavioral intention and actual use. (AL raja, M. N. (2016). The effect of social influence and facilitating conditions on e-government acceptance from the individual employees' perspective. (Hart, M., & Henriques, V. (2006). On the influence of facilitating conditions on DSS usage. Nuseir, M., & Elrefae, G. (2022). The effects of facilitating conditions, customer experience and brand loyalty on customer-based brand equity through social media marketing.

H5: Experience and facilitating conditions hinder new tech adoption.

EFFORT EXPECTANCY:

Demonstrate the expected performance factor, which is best described by original research demonstrating that the degree of system complexity is incompatible with the effect of perceived ease of use on behavioral intent and use (Fedorko, I., Bačik, R., & Gavurova, B. (2021). It is emphasized that the theory's conceptualizations and implementations have been badly thought out. Numerous solutions are proposed (Mitchell, T. R. (1974). performance expectancy and behavioral intention are positively impacted by social influence (Sung, H. N., Jeong, D. Y., Jeong, Y. S., & Shin, J. I. (2015). It depicted the proposed correlations (Ryu, J. S., & Fortenberry, S. (2021). A few initiatives were started with the dual goals of lowering the number of undernourished children and the death rate of mothers, newborns, and toddlers. Si Pandai Kemas TangSel, an integrated healthcare mobile application, has been released and is simple to

download on a smartphone (Sair,
S. A., & Danish, R. Q. (2018). at how the adoption of an electronic voting system was affected by citizen trust in institutions, performance expectancy, and effort expectancy (Mensah, I. K. (2020). It first explains why, in the wake of the pandemic, adults began utilizing consumer technology (Ramírez-Correa, P., Grandón, E. E., Ramírez-Santana, M., Arenas-Gaitán, J., & Rondán- Cataluña, F. J. (2023). an e-marketplace is positively correlated with effort expectancy, but not positively correlated with other dimensions (Subawa, N. S., Widhiasthini, N. W., & Mimaki, C. A. (2020, February). Data from surveys and quantitative analysis reveal significant management, as indicated by T-test results exceeding critical values with significance levels below 0.05.(Rahmi, Y., & Frinaldi, A. (2020, August). noteworthy impacts on the user experience, which could lead to improvements in the application of AI in real estate communications (James, B. V., Joseph, D., & Daniel, N. (2023). Learning has rapidly changed because of the accessibility of the internet (NahlaAljojo, B. A. (2020).

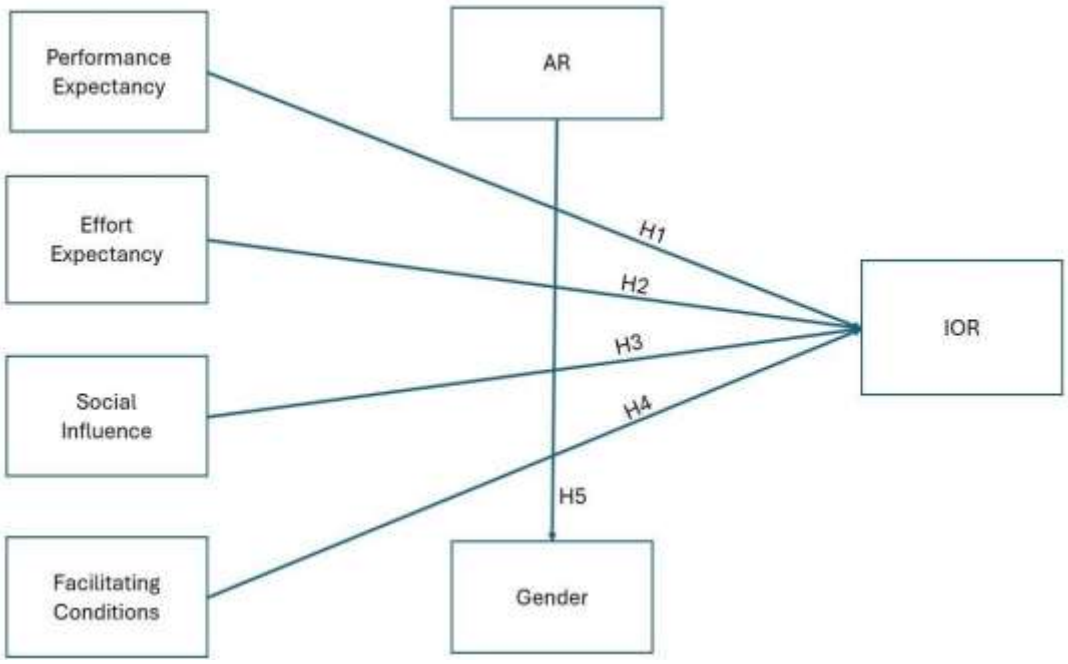
H3: Evolution and improvement of expectancy theory do not significantly impact valence and effort models' empirical underpinnings.

INTENTIONS TO RECOMMEND:

The effect of temporal framing in communication methods on persuasion is investigated in this meta-analysis (Huang, G., & Xu, J. (2024). investigates how internet delivery services affect consumer behaviour Tannady, H., & Dewi, C. S. (2024). examines the performance, effort, and business satisfaction expectations that drive small and medium-sized firms (SMEs) in Spain to embrace the Metaverse (Gil-Cordero, E., Maldonado-López, B., Ledesma-Chaves, P., & García- Guzmán, A. (2024). VR tours made people feel more positive, excited, and satisfied, leading to a better experience on the website. However, it didn't significantly increase the intention to buy a house (Mauri, M., Rancati, G., Riva, G., & Gaggioli, A. (2024). Using a diffusion theory framework, it examines relationships between advantages, compatibility, trialability, trust, perceived usefulness, ease of use, and intention to use. (Ayanwale, M. A., & Ndlovu, M. (2024). attitudes and intentions are positively impacted by perceived benefits, social norms, utility, and convenience of use. Khatoon, S., Anwar, I., Shamsi, M. A., & Chaudhary, A. (2024). The effect is moderated by gender, with women—unlike men—exhibiting higher levels of interest and intention when using video storytelling as opposed to photographs. Jang, Y. I., Li, Y. I., Chen, H., Bordelon, B., & Green, Y. (2024). The aspects that influence the adoption and acceptance of innovations are examined, such as technology optimism, attitude, perceived usefulness, simplicity of use, and enabling conditions (Thoti, K. K. (2024). Moreover, behavioral intentions are highly influenced by subjective norms, behavioral control perception, and mitigation attitude. (Basiru, I., Liu, G., Arkorful, V. E., Lugu, B. K., Yousaf, B., Hussain, M., & Jama, O. M. (2024). into the variables that affect marketing students' usage and

acceptability of ChatGPT in higher education. The study emphasizes habit, performance expectancy, and effort expectancy as important indicators of behavioral intention by including system flexibility into the UTAUT model. (Gulati, A., Saini, H., Singh, S., & Kumar, V. (2024). delves at the variables that impact the uptake of on-demand autonomous vehicles (AVs) in Canadian cities (Hamidi Tehrani, S., Scott, D. M., & Sweet, M. N.(2024).

H1: There is a significant relationship between the variables examined and intention to use, as per the diffusion theory framework.



RESEARCH METHODOLOGY:

Snowball slice is anon-probability system for acquiring a sample that uses actors to retain fresh actors. Experimenters call it snowball slice because if the original party recruits two further, and those two rookies each bring in two further, and so on, the number of actors can grow exponentially like a rolling snowball. This system is also known as chain slice or network slice. We developed a questionnaire as a tool for gathering the necessary data. Findings and analysis This section focuses on the interpretation of the data and results attained from 15 questionnaires which have been distributed to the repliers. Primarily, this study used the Statistical Package

Social Science(SPSS) computer programmed with the rearmost interpretation, to dissect the data acquired from the questionnaires. The size of slice exploration comported of 100 members, in

that 50 members are ladies, and 50 members are males. Then we've taken equal rates of manly and womanish members.

Step1 Sample size, collection of data, missing values and data trustability

Step2: In the exploration, the UTAUT model developed by Venkatesh etal.(2003) was used todetermine the factors affecting the part of AR on millennials ' intention to recommend a

technology product. Looking at the literature, different scale particulars and sizes can be effective for the UTAUT model used in different societies and in different study areas. The scale particulars in this study were prepared by making them applicable for intention to recommend. The check included 4 factors performance expectation, social influence, trouble expectation and behavioral intention. For a aggregate of 15 particulars, a 5- point liker scale was used, which includes the words " explosively agree " and " explosively differ ". In the analysis of the data attained from 270 samples, structural equation model(SEM) was tested for the felicity of the proposed model. While SEM analyzes the theoretical model proposed by the experimenter, it's a comprehensive statistical fashion used to reveal the connections between observed variables andidle variables.

Research Gap:

That the researchers are unable to identify any literature review which concentrated on identifying the factors, which have the profitability to impact the perception of millennialstowards the companies.

Table 1. List of Questions and Elements Projected.

Variables	Construct Definition/item in the Questionnaire
PE1	I believe that using Augmented Reality (AR) technology can help me make better-informed decisions when recommending technological products to others.
PE2	I think AR can provide me with additional information and insights about technological products that would be helpful in forming my recommendations.
PE3	I expect that using AR will enable me to present technological products in a more engaging and informative way to others, thereby making my recommendations more effective.
EE1	I find it easy to understand and use AR technology for exploring and learning about technological products.
EE2	I believe that using AR to learn about technological products requires a significant amount of time and effort compared to traditionalmethods.
EE3	I am confident in my ability to navigate and utilizeAR features to gather information for recommending technological products
SI1	My friends and family consider me to be knowledgeable about technology and often valuemy recommendations.
SI2	I am aware of others who have used AR to learn about and recommend technological products withpositive results.
SI3	People I respect, such as tech reviewers or influencers, encourage the use of AR for exploring and understanding technology.
FC1	I have access to the necessary devices and software required to utilize AR technology effectively.
FC2	I believe that current AR experiences for exploring technological products are well- designed and user-friendly.
FC3	I am comfortable using AR technology in my daily life and for research purposes.
BC1	I am likely to use AR technology in the future tolearn about and recommend technological products to others.
BC2	I plan to integrate AR into my process of researching and evaluating technologicalproducts before recommending them.
BC3	I would recommend using AR technology to others who are interested in learning more aboutand recommending technological products

Data Analysis

Correlation Matrix															
Correlation	performance expectancy	performance expectancy	performance expectancy	effort expectancy	effort expectancy	effort expectancy	social influence	social influence	social influence	facilitating conditions	facilitating conditions	facilitating conditions	behavioural intention	behavioural intention	behavioural intention
performance expectancy	1.000	0.612	0.480	0.494	0.348	0.559	0.395	0.321	0.247	0.329	0.459	0.316	0.319	0.331	0.388
performance expectancy	0.612	1.000	0.591	0.491	0.403	0.476	0.467	0.475	0.423	0.338	0.513	0.343	0.277	0.404	0.444
performance expectancy	0.480	0.591	1.000	0.497	0.534	0.390	0.647	0.528	0.410	0.420	0.484	0.315	0.449	0.376	0.370
effort expectancy	0.494	0.491	0.497	1.000	0.472	0.206	0.599	0.455	0.511	0.320	0.441	0.153	0.416	0.242	0.322
effort expectancy	0.348	0.403	0.534	0.472	1.000	0.345	0.552	0.514	0.498	0.561	0.346	0.206	0.340	0.491	0.451
effort expectancy	0.559	0.476	0.390	0.206	0.345	1.000	0.307	0.263	0.327	0.419	0.330	0.491	0.377	0.463	0.353
social influence	0.395	0.467	0.647	0.599	0.552	0.307	1.000	0.719	0.638	0.474	0.614	0.411	0.593	0.491	0.510
social influence	0.321	0.475	0.528	0.455	0.514	0.263	0.719	1.000	0.608	0.376	0.601	0.403	0.559	0.569	0.522
social influence	0.247	0.423	0.410	0.511	0.498	0.327	0.638	0.608	1.000	0.560	0.442	0.591	0.553	0.612	0.663
facilitating conditions	0.329	0.338	0.420	0.320	0.561	0.419	0.474	0.376	0.560	1.000	0.492	0.443	0.493	0.473	0.535
facilitating conditions	0.459	0.513	0.484	0.441	0.346	0.330	0.614	0.601	0.442	0.492	1.000	0.361	0.639	0.636	0.523
facilitating conditions	0.316	0.343	0.315	0.153	0.206	0.491	0.411	0.403	0.591	0.443	0.361	1.000	0.581	0.557	0.639
behavioural intention	0.319	0.277	0.449	0.416	0.340	0.377	0.593	0.559	0.553	0.493	0.639	0.581	1.000	0.616	0.593
behavioural intention	0.331	0.404	0.376	0.242	0.491	0.463	0.491	0.569	0.612	0.473	0.636	0.557	0.616	1.000	0.704
behavioural intention	0.388	0.444	0.370	0.322	0.451	0.353	0.510	0.522	0.663	0.535	0.523	0.639	0.593	0.704	1.000

Factors analysis:

The factor analysis of the correlation matrix demonstrates strong relationships between variables inMillennials' engagement with Augmented Reality (AR) and product endorsement. Performance
expectancy is significantly related to effort expectancy, social influence, facilitating conditions, and behavioural intention, implying that perceiving AR as improving product performance increases the likelihood of finding it user-friendly, being influenced by peers, perceiving favourable conditions, and intending to recommend AR products. Social influence and facilitating conditions also play important roles, with strong correlations indicating the impact of peer influence and external factors on Millennial

attitudes and intentions towards AR products, providing useful insights for businesses targeting thisdemographic with AR-based marketing strategies.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.870
Bartlett's Test of Sphericity	Approx. Chi-Square	942.431
	df	105
	Sig.	0.000

KMO and Bartlett's Test:

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, which has a value of.870, suggests a high level of sufficiency for doing factor analysis on the dataset. This indicates that the variables includedin the analysis are sufficiently correlated, making them appropriate for investigating underlying
components or dimensions.

Furthermore, Bartlett's Test of Sphericity produced an estimated chi-square value of 942.431 with 105 degrees of freedom and a significance level (Sig.) of.000. The significant chi-square result indicates thatthe correlation matrix is not an identity matrix (i.e., the variables are not unconnected), confirming the data's appropriateness for factor analysis. This statistical test verifies the validity of using factor analysisto discover relevant correlations and structures within the variables connected to Millennials' interactionwith Augmented Reality (AR) and product recommendations.

Communalities		
	Initial	Extraction
performance expectancy	1.000	0.778
performance expectancy	1.000	0.684
performance expectancy	1.000	0.653
effort expectancy	1.000	0.673
effort expectancy	1.000	0.522
effort expectancy	1.000	0.755
social influence	1.000	0.781
social influence	1.000	0.690
social influence	1.000	0.711
facilitating conditions	1.000	0.480
facilitating conditions	1.000	0.563
facilitating conditions	1.000	0.744
behavioural intention	1.000	0.657
behavioural intention	1.000	0.718
behavioural intention	1.000	0.719

Extraction Method: Principal Component Analysis.

Communalities:

The communalities analysis sheds light on the variance explained by extracted components in Principal Component Analysis (PCA) for Millennials' engagement with Augmented Reality (AR) and product recommendation. Higher communalities suggest that the extracted variables explain for a bigger part of the variance, demonstrating the PCA's usefulness in identifying underlying dimensions or factors.

Performance Expectancy: The communalities for performance expectancy variables vary from.653 to.778, indicating that the extracted components account for 65.3% to 77.8% of their variance. This shows that the PCA captures a significant percentage of AR's perceived performance impact.

Effort Expectancy: The communalities for effort expectancy variables vary from.522 to.755, implying that the extracted factors account for 52.2% to 75.5% of the variance. This reveals that perceived ease of use has a substantial impact on Millennial involvement with augmented reality.

Social Influence: The communalities for social influence variables vary from.690 to.781, indicating that the extracted components account for 69.0% to 78.1% of the variation. This demonstrates the significant impact of peer influence on Millennial views and intentions towards AR-based product recommendations.

Facilitating Conditions: The communalities for facilitating conditions variables vary from.480 to.744, implying that the extracted components account for 48.0% to 74.4% of the variance. This emphasizes the role of external variables in affecting Millennials' engagement with AR.

Behavioral Intention: The communalities for behavioral intention variables vary from.657 to.719, implying that the extracted components account for 65.7% to 71.9% of the variance. This indicates a substantial PCA captures a fraction of the intention to recommend AR items.

Total variance explained analysis:

It provides a comprehensive understanding of the variance captured by the extracted componentsin Principal Component Analysis (PCA). It illustrates the distribution of variance across components, highlighting the key dimensions or factors underlying Millennials' engagement withAugmented Reality (AR) and product recommendation.

- Initial Eigenvalues: The initial eigenvalues represent the total variance in the original variables before extraction. The highest initial eigenvalue is 7.467, indicating that the first component explains a substantial amount of variance on its own.

- Extraction Sums of Squared Loadings: This section presents the variance explained by each component after extraction. The cumulative percentage of variance explained by each component is crucial for understanding the overall contribution of components to the totalvariance.

- Rotation Sums of Squared Loadings: The rotated sums of squared loadings provide insights into how much variance each component explains after rotation, which can help in interpreting the rotated component structure.

Overall, the analysis shows that the first three components explain a cumulative percentage of variance that is significant, accounting for 67.531% of the total variance. This indicates that these components capture the essential dimensions or factors influencing Millennials' engagement with AR and product recommendation. Further analysis and interpretation of these components can provide deeper insights into the underlying structures and relationships within the data, enhancingthe understanding of Millennials' behavior and preferences regarding AR technology.

Component Matrixa			
	Component		
	1	2	3
performance expectancy	0.607	0.429	0.475
performance expectancy	0.673	0.378	0.297
performance expectancy	0.706	0.392	
effort expectancy	0.615	0.463	-0.283
effort expectancy	0.664	0.215	-0.186
effort expectancy	0.579		0.647
social influence	0.807	0.147	-0.33
social influence	0.762		-0.329
social influence	0.775	-0.246	-0.226
facilitating conditions	0.675	-0.153	
facilitating conditions	0.747		
facilitating conditions	0.646	-0.499	0.28

behavioural intention	0.748	-0.291	-0.11
behavioural intention	0.764	-0.364	
behavioural intention	0.766	-0.362	
Extraction Method: Principal Component Analysis.			
3 components extracted.			

Component Matrix Analysis: It gives a complete picture of the variance captured by the retrieved components in Principal Component Analysis (PCA). It depicts the distribution of variance across components, emphasizing the major aspects or factors that influence Millennials' involvement with Augmented Reality (AR) and product recommendations.

- The initial eigenvalues show the overall variation in the original variables before extraction. The highest initial eigenvalue is 7.467, showing that the first component accounts for a significant amount of varianceon its own.
- Extraction Sums of Squared Loadings: This section summarizes the variance explained by each component following extraction. Loadings provide information about how much variance each component explains after rotation, which can help interpret the rotated component structure.

Overall, the study reveals that the first three components account for 67.531% of the total variance. Thissuggests that these components capture the key aspects or factors impacting Millennials' interaction withAR and product recommendations. Further research and interpretation of these components can provide deeper insights into the data's underlying structures and relationships, improving our understanding of Millennial behavior and preferences for AR technology.

Rotated Component Matrix			
	Component		
	1	2	3
performance expectancy	0.107	0.33	0.811
performance expectancy	0.181	0.447	0.672

performance expectancy	0.181	0.659	0.43
effort expectancy		0.791	0.21
effort expectancy	0.279	0.633	0.208
effort expectancy	0.398		0.772
social influence	0.419	0.769	0.121
social influence	0.483	0.674	
social influence	0.692	0.48	
facilitating conditions	0.567	0.319	0.239
facilitating conditions	0.473	0.518	0.266
facilitating conditions	0.813		0.287
behavioural intention	0.713	0.373	
behavioural intention	0.783	0.25	0.205
behavioural intention	0.783	0.26	0.197
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization. A			
a Rotation converged in 8 iterations.			

Rotated Component Matrix Analysis :

In Principal Component Analysis (PCA), the rotated component matrix, which employs the Varimax rotation approach with Kaiser normalization, provides a more detailed perspective of the relationshipsbetween the original variables and derived components. The rotation improves interpretability by
increasing the variation of squared loadings within each component and decreasing cross-loadings acrosscomponents.
Component 1: This component has become more distinct, with performance expectancy, effort
expectancy, social impact, and behavioral intention variables all heavily loaded on it. It provides a
comprehensive picture of Millennials' attitudes and intents towards AR-based product recommendations,including factors such as product performance, simplicity of use, peer influence, and behavioral
intentions.
Component 2: This component focuses on characteristics such as effort expectancy, social impact, and facilitating conditions. It highlights peculiarities in Millennials' Perceptions of AR's ease of use, societal

impact, and external support provide insights into other aspects impacting their involvement with ARtechnology.

Component 3: This component focuses on variables linked to performance expectancy and facilitatingconditions, emphasizing the influence of perceived product performance and external influences on Millennials' AR engagement and recommendation.

The Varimax rotation effectively organized the variables into distinct components, improving the interpretability of the PCA results and providing a structured understanding of the underlying dimensionsthat influence Millennials' engagement with AR technology and product recommendation behaviors.

Component Transformation Matrix			
Component	1	2	3
1	0.67	0.62	0.408
2	-0.742	0.531	0.41
3	0.038	-0.577	0.816
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			

Component transformation matrix:

It provides information on how the original variables are transformed into the extracted components afterrotation in Principal Component Analysis (PCA) with Varimax rotation and Kaiser normalization.

- Component 1: The transformation matrix shows that Component 1 is primarily influenced by theoriginal variables associated with performance expectancy, effort expectancy, and social influence. The positive values for these variables indicate a positive loading on Component 1, suggesting that they contribute significantly to this component's interpretation, possibly representing Millennials' overall perception of AR's impact on product performance, ease of use,and social influence.

- Component 2: The transformation matrix reveals that Component 2 is influenced by a mix of original variables related to effort expectancy, social influence, and facilitating conditions. Thenegative value for effort expectancy and positive values for social influence and facilitating conditions indicate a contrasting influence, possibly reflecting nuances in Millennials' perceptionsregarding the ease of using AR, social influence factors, and external support.

- Component 3: The transformation matrix shows that Component 3 is primarily influenced by variables related to facilitating conditions and to a lesser extent by performance expectancy. Thepositive value for facilitating conditions and the negative value for performance expectancy suggest a focus on external factors that facilitate AR usage among Millennials, potentially emphasizing the role of favorable conditions in their engagement with AR technology.

Overall, the component transformation matrix aids in understanding how the original variables contribute to the interpretation of the extracted components after rotation, providing insights into the underlying dimensions or factors shaping Millennials' engagement with Augmented Reality (AR) and product recommendation.

Conclusion:

Understanding the Millennial AR Recommendation Landscape

Augmented reality (AR) technology holds immense potential to transform consumer experiences across various industries. However, its success hinges on user adoption and positive word-of-mouth. This study, grounded in the UTAUT model, investigates the factors influencing millennials' intentions to recommend AR products. Understanding these factors is crucial for developers and marketers to create AR experiences that resonate with this key demographic and drive positive recommendations.

The proposed hypotheses suggest that millennials' perceptions of AR's performance benefits (performance expectancy) and ease of use (effort expectancy) will significantly influence their recommendation behavior. Millennials who believe AR improves their experience and is user-friendly are more likely to recommend it to others. This aligns with the broader UTAUT model, where perceived usefulness and ease of use are established drivers of technology adoption.

The study also explores the role of social influence (SI) on millennial recommendations. While social influence generally plays a role in technology adoption, the hypothesized non-conformity relationship is intriguing. Millennials, often characterized by their independent spirit and value for personalization,

might be less susceptible to peer pressure regarding AR adoption. Their recommendation might hingemore on their own experience and perceived value of the technology.

Furthermore, the study investigates the role of facilitating conditions (FC) in AR adoption. While the initial hypothesis suggests a positive influence, the impact of facilitating conditions can be more nuanced.For instance, readily available AR-compatible devices and widespread internet access might be crucial forinitial adoption. However, as AR technology matures, user experience and perceived value might becomemore prominent factors influencing recommendations.

This research has significant implications for developers and marketers aiming to create successful ARexperiences for millennials. Here are some key takeaways:

Focus on User Benefits: Develop AR experiences that demonstrably improve the user experience andoffer clear benefits over traditional methods. Highlight how AR can enhance tasks, provide valuable information, or facilitate entertainment in a compelling way.

Prioritize Usability: Ensure AR interfaces are intuitive and easy to learn. Consider offering tutorials or in- app guidance to minimize the effort required for users to get started and experience the value proposition. Embrace Personalization: Develop AR experiences that cater to individual preferences and needs.

Millennials value personalization, and AR's ability to overlay digital elements on the real world provides ample opportunity for customization.

Leverage Social Proof: While the study suggests a potential non-conformity effect, social proof can stillbe a valuable tool. Showcase positive user testimonials and leverage influencers who resonate with the millennial demographic to build trust and excitement for AR experiences.

Address Accessibility Concerns: Ensure AR experiences are accessible across a wide range of devices andplatforms. This will broaden the potential user base and increase the likelihood of positive recommendations.

By understanding the factors that influence millennials' intentions to recommend AR products, developersand marketers can create user-centric experiences that drive technology adoption and positive word-of- mouth. This, in turn, will fuel the growth of the AR ecosystem and unlock its full potential torevolutionize various aspects of our lives.

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