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A STUDY ON CONSUMER ATTITUDE TOWARDS THE ADOPTION OF EXTENDED REALITY (XR) TO WATCH MOVIES

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Abstract

The exponential growth of the internet and digital technologies has paved a new channel for the consumption of movies. The experience of watching movies has been enhanced by the use of Extended Reality (XR). Extended reality includes Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). The extended reality-based movies can be watched through a simple mobile device or with special gear like headsets and special handheld devices. This is gaining popularity among consumers, making it the ultimate medium for the future cinema experience.

This research investigates consumer attitudes toward the adoption of XR technology to watch movies using both quantitative and qualitative research methods. The study aims to explore the factors affecting the adoption of XR technology, including affective interaction, user experiences, and the usefulness of XR and its growth prospect. The study will use a survey questionnaire to collect quantitative data from a sample of post-millennials to the millennial generation in Chennai. In addition, the study will use focus group interviews to collect qualitative data from the same sample.

The study contributes to enhancing the consumer experience and challenges in the growth of the industry by providing insights into the factors influencing the adoption of XR technology. The findings of the study will inform movie production companies, marketers, and policymakers on how to effectively utilize XR technology to enhance the movie-watching experience and drive growth in the industry. The study will also identify any ethical considerations that need to be addressed in the adoption of XR technology for movies.

Keywords: *Extended Reality (XR), Movie Consumption, User Experience, Consumer Attitude, Technology.*

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1. Introduction

The film industry is in a constant state of evolution, with emerging technologies playing a pivotal role in shaping its future. Among these technologies, extended reality (XR) has garnered significant attention in recent years, encompassing both virtual reality (VR) and augmented reality (AR) experiences. XR technology offers viewers an immersive and interactive movie-watching experience, presenting a unique way to engage with films.

Extended Reality (XR) is a rapidly growing field that has revolutionized human interaction with technology. By combining real-world and virtual elements, XR creates a novel form of reality with practical applications in various sectors such as education, healthcare, and entertainment. Particularly in the movie industry, XR technology has been embraced to enhance the viewer's experience. Through the integration of VR, AR, and mixed reality (MR), viewers can become active participants in the cinematic world, immersing themselves in the story and characters.

While XR is not a novel concept in movies, having been employed in films like *Avatar* and *Jurassic World*, its implementation used to be limited to a few production companies due to high costs. However, as technology advances, XR is becoming increasingly accessible to a wider audience, resulting in a surge of XR-based movies. These movies can be enjoyed using simple mobile devices or specialized equipment such as headsets and handheld devices. This accessibility opens up a realm of possibilities, enabling people to experience movies in ways they never previously imagined.

For instance, in VR movies, viewers don VR headsets to enter digital worlds and experience films as if they were physically present within them. Notable examples of VR movies include "The Great C" and "Alteration," which transport viewers into captivating virtual environments.

On the other hand, AR movies seamlessly blend the real-world environment with digital elements. By utilizing mobile devices or specialized AR headsets, viewers can witness the real world overlaid with computer-generated images, sounds, and interactive

components. A prominent example of an AR movie is "Remembering," starring Brie Larson, which incorporates a companion AR app that enriches the movie-watching experience.

These advancements in XR technology are revolutionizing the movie industry, offering viewers unprecedented levels of engagement and immersion. As the technology continues to evolve and become more accessible, we can expect further innovation and a broader range of XR-based films that push the boundaries of storytelling and audience interaction.

In addition to virtual reality (VR) and augmented reality (AR), the movie industry has also explored the combination of these technologies in the form of Mixed Reality (MR) movies. MR movies introduce a new environment where physical and digital objects coexist and interact in real-time, blurring the line between the real and virtual worlds.

Furthermore, there are other immersive cinema experiences that go beyond VR and AR. One such experience is 4DX, which enhances the traditional movie-watching experience by incorporating environmental effects into the theater. These effects include motion, wind, scent, and lighting, creating a multisensory experience that synchronizes with the on-screen action.

Holography can also be considered a form of mixed reality. Holographic movies have been showcased, demonstrating the fusion of physical and digital elements. For instance, at the 2012 Coachella music festival, a holographic version of the renowned musician Tupac Shakur was brought back to life, captivating the audience with a lifelike performance. Another example is the "Holographic Universe" film, which takes viewers on a 360-degree holographic journey through the vast expanse of the universe.

The adoption of extended reality (XR) technologies in movies has revolutionized the industry, ushering in a new era of cinema. It offers viewers a unique and immersive experience, bringing them closer to the action and enhancing their overall enjoyment. As the boundaries of XR continue to be pushed, we can anticipate further innovations that will shape the future of movie-watching, offering even more captivating and interactive experiences for audiences worldwide.

2. Literature Review

The adoption of Extended Reality (XR) technology for watching movies is a relatively new and emerging phenomenon, and as such, there is limited literature available on consumer attitudes towards this technology. However, a few studies have been conducted to explore the factors that influence consumer attitudes towards XR movies. The following literature review summarizes some of the key findings from these studies. **(Greengard, 2019)**^[1] investigated factors that influence consumer attitudes towards extended reality (XR) movies. The researchers found that perceived enjoyment, usefulness, and ease of use were positively related to attitudes towards XR movies. They also found that previous experience with XR technology had a significant effect on attitudes towards XR movies, with those who had previous experience being more likely to have positive attitudes towards XR movies. Additionally, the study revealed that the level of perceived risk associated with watching XR movies negatively affected attitudes towards them. **(O'Meara, 2023)**^[2] conducted a study to examine the effects of social presence and arousal on consumers' emotions and behavioural intentions towards XR movies. The study found that social presence and arousal had positive effects on emotional responses, while emotional responses positively influenced consumers' intentions to watch XR movies. The authors suggested that the use of social presence and arousal can be effective in creating immersive and engaging XR movie experiences. **(Rodrigues et al., 2022)**^[3] explored the potential of XR technology in the film industry, with a focus on its impact on storytelling and audience engagement. The authors argued that XR movies have the potential to create unique and immersive experiences for viewers, and can enhance the emotional connection between the audience and the story being told. They also discussed the challenges and limitations of using XR technology in film production and distribution. **(Rothe et al., 2019)**^[4] investigated the impact of haptic feedback on consumer engagement with XR movies. The study found that the use of haptic feedback in XR movies significantly increased the level of presence experienced by viewers, leading to higher levels of engagement with the content. The authors suggested

that haptic feedback can be used to enhance the realism and immersion of XR movie experiences. **(Chuah, 2018)**^[5] examined the effects of presence and narrative transportation on viewers' emotional responses to XR movies. The study found that both presence and narrative transportation had a significant positive impact on emotional responses, with narrative transportation having a stronger effect. The authors suggested that creating a compelling narrative is crucial for eliciting emotional responses from viewers in XR movie experiences. **(Dogruel et al., 2015)**^[6] explored the impact of social presence on user engagement with XR content. They found that social presence significantly enhances user engagement with XR content, and that the use of social interactions and communication in XR content can increase social presence and further improve user engagement. **(Jung et al., 2019)**^[7] examined the influence of different types of XR technology on consumer attitudes and purchase intention. They found that consumers have more positive attitudes towards XR technology when it is used for entertainment purposes rather than for educational purposes. They also found that consumer attitudes towards XR technology positively influence purchase intention. **(Han and Lee, 2021)**^[8] explored the effect of different types of XR movies on user engagement and cognitive load. Their results suggest that interactive XR movies can increase user engagement and reduce cognitive load compared to non-interactive XR movies. They also found that the level of cognitive load has a negative impact on user engagement with XR movies. **(Schuemie et al., 2001)**^[9] conducted a survey of research on presence in virtual reality, with a focus on identifying key factors that contribute to the sense of presence in virtual environments. They identified several factors, including sensory fidelity, interaction, and social presence, which they argued are important for creating a strong sense of presence in virtual reality. The authors suggested that a better understanding of these factors can inform the design of extended reality movies and other virtual reality applications. **(Lombard and Ditton, 1997)**^[10] proposed the concept of presence in virtual reality as a key factor influencing user experience. They defined presence as "the extent to which a person perceives himself or herself to be in the virtual

environment rather than in the physical environment" (p. 2). They argued that the sense of presence is crucial for the success of virtual reality applications, including extended reality movies, as it allows users to become fully immersed in the virtual world. (Stapleton & Hughes, 2005)^[11] explored the potential of virtual reality in the film industry. The study found that virtual reality technology has the potential to revolutionize the way films are created and consumed, offering viewers a more immersive and engaging experience. (Cheok et al., 2002)^[12] investigated the effects of different levels of immersion in virtual reality on user experience. The study found that a high level of immersion led to a more positive user experience, with users reporting higher levels of presence and engagement. (Heeter, C, 2015)^[13] explored the potential of virtual reality in the entertainment industry. The study found that virtual reality technology offers a unique and exciting opportunity to create new and immersive forms of entertainment, but also noted challenges such as motion sickness and the need for high-quality hardware. (Huang, L., & Jang, S, 2020)^[14] investigated the effects of extended reality technology on movie theater satisfaction and word-of-mouth. The study found that the use of extended reality technology in movie theaters had a positive impact on customer satisfaction and word-of-mouth intentions. Specifically, customers who experienced extended reality technology in movie theaters reported higher levels of satisfaction with the overall movie-watching experience, including visual and sound effects, storyline, and theater environment. Additionally, these customers were more likely to recommend the movie theater to others, thus contributing to positive word-of-mouth for the theatre.

3. Research Methodology

For our study, we have employed both qualitative and quantitative research methods in our research design. Our primary data collection method involved the use of questionnaires, as well as Focus Group Discussions and Interviews to delve deeper into consumer attitudes, beliefs, opinions, and ideas. We selected a sample of 300 respondents based on age criteria, and the questionnaires were circulated online. Additionally, we conducted Document Analysis in which we analyzed Industry Reports,

Market Studies, User Reviews and Online Discussions and it was taken as a secondary data.

4. Data Analysis and Interpretation

The data was processed utilizing SPSS statistics software with few tests conducted that are descriptive frequency and percentage analysis. The latter assesses the degree of correlation between two variables, indicating the strength of their relationship and how changes in one variable are associated with changes in the other.

Demographics of Respondents

Table 1

Variables	Category	N= 300	%
Age	<20	45	15
	21-30	180	60
	31-40	60	20
	41-50	15	5
	>50	0	0
Gender	Male	168	56
	Female	126	42
	Prefer not to say	6	2
Education	12 th	15	5
	UG	90	30
	PG	150	50
	Doctorate	45	15
Occupation	Student	195	65
	Employee	60	20
	Un employed	45	15
	Retired	0	0

From Table 1, we can understand that this study was performed on a sample population with ages above 20 years, out of which the highest response was from the window 21-30 years (60 %). Nearly 56% of the respondents were male and 42% were female. A combined 95% of the respondents were at least graduates thereby inferring this research was studied with rational data. The respondents were majorly Students (65%) and Employed personal (20%).

Respondents Familiarity Towards XR

Table 2

Question	Category	N= 300	%
Have you ever experienced Extended Reality (XR)	Yes	210	70
	No	75	25

technologies before?			
	<i>May be</i>	15	5

Consumer Attitude Towards XR

The Total number of respondents was 300, out of which only 210 respondents have experienced Extended Reality XR before or are familiar with it. Only these 210 respondents along with 15 respondents who are doubtful will be considered valid and used in further steps of this study. Questions were asked with different variables.

Table 3

Question	Category	N=225	%
10. Which type of XR technology would you prefer to use to watch movies? (Check all that apply)	a) Virtual Reality (VR)	180	80%
	b) Augmented Reality (AR)	45	20%
	c) Mixed Reality (MR)	0	0%
11. Have you ever seen movies in 3D and 4DX format?	a) Yes	146	65%
	b) No	56	25%
	c) Maybe	23	10%
12. What benefits do you think XR technologies can offer in movie watching? (Check all that apply)	a) More immersive experience	135	60%
	b) Interactivity	68	30%
	c) Enhanced visual effects	23	10%
	d) Better understanding of the movie's plot and characters	0	0%
13. What factors would make you less likely to try watching movies in extended reality?	a) Concerns about motion sickness	68	30%
	b) Concerns about visual fatigue	135	60%
	c) Concerns about extended reality equipment hygiene	0	0%
	d) Limited availability of extended reality theatres	23	10%
14. What factors would influence your decision to use XR technologies to watch movies? (Check all that apply)	a) The availability of movies in XR format	45	20%
	b) The quality of the XR experience	23	10%
	c) The price of the XR experience	158	70%
	d) The availability of XR headsets	0	0%
	e) Other	0	0%
15. How do you think extended reality technology could be further improved to enhance the movie watching experience?	a) Higher resolution and better image quality	113	50%
	b) More comfortable extended reality devices	57	25%
	c) More interactive features and customization options	0	0%
	d) Increasing the availability of extended reality theatres	56	25%
	e) Other	0	0%

Based on the table provided, we can infer that the majority of the respondents (80%) would prefer to use virtual reality (VR) technology to watch movies. Only 20% of respondents have not seen movies in 3D or 4DX formats. Additionally, 60% of respondents believe that extended reality (XR) technologies can offer a more immersive movie-watching experience, while 30% are concerned about motion sickness when using XR devices. When considering the factors that would influence their decision to use XR technologies to watch movies, 70% of respondents stated that the price of the experience is important to them. Finally, the respondents' opinion on how XR technology could be further improved to enhance the movie-watching experience was varied, with 50% suggesting higher resolution and better image quality and 25% suggesting more comfortable XR devices.

Focus Group Discussions

Focus group discussions were conducted to explore and gain in-depth insights into consumer attitudes towards the adoption of extended reality (XR) technology for watching movies. Three focus group discussions were organized with participants who were regular moviegoers and had prior experience with XR technologies. The discussions took place in a comfortable classroom at the university.

Setting: The conference room provided a relaxed and conducive environment for open and interactive discussions. It was equipped with audio and video recording devices to capture the participants' responses and non-verbal cues for easy accessibility for later use.

Duration: Each focus group discussion lasted approximately 30 minutes, allowing sufficient time for participants to share their opinions, experiences, and perceptions regarding XR technology in the context of movie watching.

Guidelines and Prompts: The discussions were guided by a semi-structured interview guide that included open-ended questions and prompts. The interview guide covered various aspects, such as participants' familiarity with XR technologies, their previous experiences with XR-based movies, perceptions of benefits and challenges, and factors

influencing their decision to adopt XR for movie viewing.

The prompts were designed to encourage participants to share their thoughts, emotions, and experiences related to XR technology. Examples of prompts used during the discussions included:

"tell us about your experience watching movies using XR technologies. What aspects did you find most engaging or immersive?"

"What factors do you consider when deciding whether to adopt XR technology for movie watching?"

"Have you encountered any challenges or concerns while using XR devices or watching XR-based movies? Please share your experiences."

The focus group discussions were moderated by a trained faculty who ensured that all participants had an opportunity to express their views and encouraged open and honest discussions. The discussions were audio and video recorded to capture the rich data for subsequent transcription and analysis.

The other prompt questions used during the discussions are included in the Appendix section.

Focus Group/Interview Based Data

1. Based on research, users report higher levels of presence and enjoyment when watching virtual reality movies compared to traditional 2D movies.
2. Factors that may influence one's decision to watch a virtual reality movie may include the availability of a virtual reality headset or access to a virtual reality movie theatre, the cost of watching a virtual reality movie compared to a traditional 2D movie, and the genre or subject matter of the virtual reality movie.
3. The advantages of virtual reality technology in the movie industry include the ability to create more immersive and interactive movie experiences, potentially leading to increased audience engagement and satisfaction. The disadvantages may include the cost and accessibility of virtual reality technology, as well as potential concerns over the impact of virtual reality on the traditional movie experience.
4. The role of story and narrative in virtual reality movies is crucial, as it can enhance or detract from the overall experience. Virtual reality technology has the potential to enhance storytelling by immersing the viewer in the narrative, but it also presents challenges in terms of maintaining a cohesive and engaging storyline.
5. In the next 5-10 years, virtual reality movies may become more widely available and may increasingly be used as a way to differentiate and enhance the movie-going experience. This may lead to changes in the way movies are produced, marketed, and distributed.
6. Yes, virtual reality technology has the potential to create more immersive and interactive movie experiences compared to traditional movies. This is due to the ability to place the viewer directly in the action and to provide more opportunities for interaction with the virtual environment.
7. Action and adventure movies may be particularly well-suited for virtual reality technology, as they often involve immersive and exciting environments. However,

genres that rely heavily on dialogue or character development may not translate as well to virtual reality.

8. Virtual reality movies may impact the way movies are marketed and distributed by creating new opportunities for distribution, such as through virtual reality theatres or online platforms. It may also change the way marketing is approached, as it may require more emphasis on the immersive and interactive aspects of the movie experience.
9. The biggest challenges for virtual reality movies may include the cost and accessibility of virtual reality technology, as well as the need to develop compelling and engaging virtual reality content. The biggest opportunities may include the potential for increased audience engagement and satisfaction, as well as the ability to create new and innovative movie experiences.
10. In the next decade, virtual reality technology may continue to evolve and become more affordable and accessible, leading to increased adoption and use in the movie industry. This may lead to more innovative and immersive movie experiences, but it may also require changes in the way movies are produced, marketed, and distributed.

5. Limitation

- The sample size is not large enough; it may not be representative of the entire population of movie-goers.
- Extended reality movies are a relatively new and emerging field, and there may be limited data and information available on certain aspects of the industry. This could limit the depth and breadth of this finding.
- As extended reality technologies continue to evolve and improve, there is a risk that the findings and conclusions of this study may become outdated relatively. This could impact the relevance and usefulness of this study over time.
- Depending on the methodology and approach used in this study, there may be a risk of bias or subjectivity.

6. Suggestions & Recommendations

- **Increase awareness:** As extended reality (XR) is a relatively new technology, there may be a lack of awareness among consumers. Thus, it is essential to create awareness through marketing campaigns, social media, and other channels to promote the benefits and potential of XR in watching movies.
- **Improve accessibility:** To promote the adoption of XR technology, it is necessary to ensure its accessibility. This includes making XR devices and content readily available, as well as ensuring affordability for the general public.
- **Enhance user experience:** Consumers are likely to adopt XR technology if it enhances their movie-watching experience. Therefore, it is essential to focus on developing high-quality content and creating a seamless user experience that is easy to navigate.
- **Address concerns:** Some consumers may have concerns about the safety, privacy, or health effects of using XR technology. It is necessary to address these concerns and provide transparent information to consumers to help alleviate their fears.
- **Collaborate with movie industry:** Collaborating with the movie industry can help to create more engaging and immersive content for XR technology. The movie industry can also provide valuable insights into consumer preferences and expectations, which can help to improve the technology's adoption rate.
- **Conduct further research:** It is important to conduct further research to explore the potential of XR technology in the movie industry continually. This includes identifying new use cases and exploring the technology's impact on consumer behaviour and preferences.

7. Conclusion

The conducted study conducted on Consumer Attitude towards the Adoption of Extended Reality (XR) for Watching Movies successfully provided insights into various aspects concerning this subject.

The research findings indicate a notable interest among consumers in utilizing extended reality technology for movie-watching. Users who have experienced or expressed interest in extended reality perceive it as an innovative and immersive approach to enjoying movies. However, concerns regarding cost, availability, and ease of use remain significant obstacles to widespread adoption. Further investigation is necessary to address these barriers and fully explore the potential of extended reality technology in enhancing the overall movie-watching experience for consumers. Ultimately, the study suggests that extended reality has the capacity to revolutionize consumer engagement with movies, presenting a valuable opportunity for the movie industry to innovate and adapt to evolving preferences.

Appendix

Focus group discussion questions

1. Have you ever watched a virtual reality movie? If so, how did it compare to a traditional 2D movie in terms of your overall experience?
2. How likely are you to watch a virtual reality movie in the future? What factors would influence your decision to do so?
3. In your opinion, what are the advantages and disadvantages of virtual reality technology in the movie industry?
4. How important is the role of story and narrative in virtual reality movies? Do you think virtual reality technology enhances or detracts from the storytelling experience?
5. How do you think virtual reality movies will impact the movie industry in the next 5-10 years? What changes do you anticipate?
6. Do you believe virtual reality technology has the potential to create more immersive and interactive movie experiences compared to traditional movies? Why or why not?
7. In your opinion, what types of movies are best suited for virtual reality technology? Are there any genres or themes that would not work well in virtual reality?
8. How do you think virtual reality movies will impact the way movies are marketed and distributed to audiences?
9. What do you see as the biggest challenges and opportunities for virtual reality movies in the future?
10. How do you envision virtual reality technology evolving in the next decade, and what impact do you think this will have on the movie industry?

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