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Customer Experience through Virtual Reality Online Shopping

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Abstract: Purpose: In the last two decades, the internet has altered the way that people purchase, supporting the growth of e-commerce sites and the move from traditional retail to online shopping. The advancement of technology has facilitated shopping in online space, providing a great number of opportunities for both customers and businesses. E-shopping has gotten more attention since the advent of COVID-19 in the year 2020. The pandemic has impacted consumers' lifestyles, buying behavior, and consumption patterns. The proliferation of the internet and technology has helped businesses to survive and sustain the tough tides. Past research has indicated that there are issues of trust, and perceived risks existing in the case of online shopping. To create a strong mechanism against that, online retailers are integrating Virtual Reality technology into their online shopping offerings to attract customers and provide a real-time shopping experience. This research paper aims to understand the role played by VR technology in enhancing the online shopping experience and its overall impact in driving customer satisfaction.
Research Design, data, and methodology: Our research design & model hypothesizes the 5 major factors that influence customer buying experience through VR in the e-shopping context: interactivity, escape, flow, personalization and informativeness. Together all these factors determine customer satisfaction in e-shopping.
Results:
Conclusions: This study focuses on the potential significance of Virtual Reality technology in today's online shopping space and also the fact that VR technology in marketing research is a promising area, with the scope of future research. Through the research model applied, this study found that VR influences customers in an emotional way rather than in a rational way. Finally, these factors drive customer satisfaction which can stimulate the intention to participate in online shopping through VR technology.
Keywords: Online shopping, VR Technology, Customer Satisfaction, E-shopping

I. INTRODUCTION

One of the most fundamental issues which a customer faces when he/she makes a decision to buy something is the mode of shopping they should pick to gain satisfaction (Das & Sarkar, 2017). There are majorly two platforms available which are online & traditional brick & mortar offline shops (Sarkar & Das, 2017). Offline shopping has been the most familiar way for people to shop as they are very used to shopping in physical stores (Yiting, 2021). For consumers shopping is a happy activity, thus offline environmental factors play a key role in affecting their shopping experience (Yan, 2020).

But there are certain inefficiencies in the in-store purchase systems which have forced the business to rethink and adopt different forms of online shopping to reach the target customers.
(Aljamali & Hammouri, 2021).

However, post the fourth industrial revolution customers' buying patterns have changed significantly as they are making a switch from traditional to online shopping owing to the ease of access to digital technology, and the accessibility of global markets (Moon et al., 2021). The boon in internet services and online e-commerce has become a major channel for shopping and has changed the way customers acquire goods and services in the market (Tabatabaei,2009). The use of smart digital devices and superior technology has facilitated ease in interactions between customers and sellers without ever having to connect or meet in person (Moon et al., 2021). The market is highly unpredictable and this has made it mandatory to create and offer value to the customer in innovative ways (LEE, 2014).

It had been highly predominant that e-commerce picked up pace during the Covid-19 pandemic, and retailers tried hard to build, improve and promote their online stores (Yadav et al., 2020). Customers are now demanding digital payments, home delivery, virtual experience, and accessibility in online platforms (Aljamali & Hammouri, 2021).

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In today's time, it is imperative to learn and analyze consumer behavior for a business to be successful as it is the customers who drive the market (Sarkar & Das, 2017).

The e-commerce platform's sophistication, effectiveness & efficiency are undeniably multiplying. As businesses evolve, questions about past performance become secondary to questions about future functions and relevance (Biele et al.,2021). With the implementation of software in commerce at the heart of every industry today, the lack of understanding of how omnichannel transactions work is awe-inspiring, as is the 4th industrial revolution and its impact on society (Lewis & Dart, 2014). This development explains the manner in which commerce has evolved as a result of technological advancements, emphasizing the prevalent state and challenges of mechanisms, their architecture and design, and the innovations of cyberphysical systems in e-commerce (Leitao, 2016). Modern e-commerce technology addresses the use of omnichannel systems in communication via the fifth-generation network, transactions via blockchain, and composition via the Social Internet of Things (Ahmad et al., 2022).

The 3D virtual reality helps in real-time interactive product visualization and customization in service & product delivery (Samar et al., 2017)

The rise of diversified digital shopping platforms like virtual reality (VR), augmented reality
(AR), etc. has huge potential to enrich consumers' hedonic shopping experiences (Kung et al., 2018).

This paper aims at understanding customer satisfaction and willingness to continue online shopping focusing on the lines of Virtual Reality. It is imperative to know the customer preferences and buying behavior in online shopping and the way it has been tweaked and affected by the virtually equipped E-Commerce platforms.

II. REVIEW OF LITERATURE AND HYPOTHESIS FORMULATION

Grewal (2017) research facilitated the recognition of the future of retailing. Big data is aiding and abetting retailers and researchers in understanding customer behavior using technology and tools to facilitate decision-making, visual displays, merchandise offer decisions, consumption and engagement, big data collection and usage, and analytics and profitability. His research also recommended that more research into the Internet of Things be conducted to determine how it may impact shopping behavior, as well as the role of frontline employees.

LEE (2020) examined the Use of Immersive Virtual Technology in Consumer Retailing and Its Effects on Consumers in terms of five key variables: smartness, vividness, interactivity, playfulness, and escape. To overcome the potential disadvantages of using single measurement items, this study employs previously validated multi-items. The online survey contained 35 items divided into nine constructs. This study's key findings are that virtual technology not only provides a new frontier for engaging with future consumers, but it also allows us to reflect on research practices and marketing theories.

Boyed and Koles (2019) conducted an information analysis using variables like knowledge complexity, social complexity, and task complexity. It has provided a concrete roadmap that describes the expected impact of Virtual Reality on a consumer's value-in-use perceptions through the flow of information between the buyer and supplier and the overall network within which they exist. It leads to an exchange relationship by linking VR to coordination effectiveness. It leaves a future scope to understand the buyer perceptions of desired & transactional value as critical to pre-purchase & purchase, impacting the whole buying journey.

Kumar (2021) in his study of retail applications with Virtual & Augmented Reality Technologies used factor analysis with variables like interactivity, visualization, service, accessibility, technology, and aesthetics. It emphasizes the successful implementation and adoption of VR and AR technology interfaces in online shopping to enhance the shopping experience and make it more consumer-friendly. It talks about the future scope for evaluating more such applications of VR & AR technologies.

Virtual worlds have thrived in the recent decade as a means of eliciting fresh and intriguing customer experiences as technical developments enabled marketers to exploit such advancements in commercial applications. Loureiro et al., (2019) article covers the most relevant studies in simulated worlds, with a focus on VR and marketing, demonstrating how studies have grown over time and examining the findings. A text-mining approach based on a Bayesian statistical topic model known as latent Dirichlet allocation is used to undertake a thorough analysis of 150 papers from 115 journals, all of which are indexed in the Web of Science.

III. HYPOTHESIS

An intelligent product is one that has a high level of intelligence and engagement, and VR is one of them. The smartness of a product affects innovation attribution positively. Autonomy, adaptability, responsiveness, and multifunctionality are critical qualities of smart products that make it easier to acquire information (Rijsdijk et al., 2007). Notably, a smart product can achieve a common purpose, and higher degrees of ability to cooperate relate to higher levels of information value (Jeschke et al., 2017). The VR gadget can be interacted with in a variety of ways, enabling more information to be obtained.

Our research model hypothesizes the five key factors which include interactivity, escape flow, personalization, and informativeness to determine customer satisfaction with VR in the online shopping context. In the subsequent section, we will discuss each hypothesis in detail.

The hypothesis for the study is made below:

1) Hypothesis 1 (H1): The intention to use virtual reality for shopping is strongly correlated with the interactivity that it provides

In terms of users' ability to be active, interactivity provides a substantial amount of control over simulated surroundings (McMahan et al., 2013). As a result, stress that higher involvement translates to a greater flow experience. Furthermore, highly interactive VR content gives viewers a high degree of control and increases the impression of presence (Shin D et al, 2018)

2) Hypothesis 2 (H2): The intention to use virtual reality for shopping is strongly correlated with the escapism it offers

In the framework of virtual games and online shopping, subjective enjoyment plays an important role as a predictor of flow (Myung JaKimaC & MichaelHall,2019). Joy has a significant impact on gameplay immersion and escapism it offers, which influences behavioral intention to continue playing VR games and online shopping (Donghee Shin et al,2017). As a result of the preceding data, we postulated the following

3) Hypothesis 3 (H3): The intention to use virtual reality for shopping is strongly correlated with the flow of content usage

Immersive technology expands one's imagination and enables one to develop and experience a new reality (Baceviciute et al., 2021). As a result, VR can fulfil an individual's urge to escape reality, and VR will guide people to flow experiences.

4) Hypothesis 4 (H4): The intention to use virtual reality for shopping is strongly correlated with the personalization it offers

The introduction of AI-based algorithms has aided in generating highly tailored recommendations based on client purchase history, which may be included in VR shopping experiences while also providing a wonderful customized sensation (Hoyer et al., 2020).

5) Hypothesis 5 (H5): The intention to use virtual reality for shopping is strongly correlated with the information it provides.

The high degree of information gained as a result of VR can be predicted to have a favorable impact on VR enjoyment. Information accessibility is associated with favorable customer engagement such as time savings and positive product appraisal (Kranzbühler et al., 2018).

IV. METHODOLOGY

In the context of virtual shopping, our model posits that five important elements influence the consumer experience of virtual reality: interaction, escape, flow, customization, informativeness, vividness, interactivity, playfulness, and escape. Two independent variables that determine VR usage happiness are information flow and access.

A survey of 154 respondents was undertaken for data analysis, 44.6% of whom are in the range of 19 to 25 years, 31.8% between the ages of 26 and 40, and 16.9% between the ages of 41 and 50. A minimum of two and a maximum of three questions were included in each variable set. This survey's major purpose was to learn about people's experiences with utilizing virtual reality for online purchasing. In order to achieve this goal, as a result, the basis of this research is a questionnaire survey on the topic of virtual reality for online shopping. This section describes how the questionnaire constructs and survey data were measured.

A. Sample and Data Collection

The information was built from 154 respondents ranging in age from 19 to 50 years. This information was gathered by employing virtual reality for online buying. The questionnaire was designed for consumers who are already experienced with VR shopping. Constant reminder messages were delivered in order to boost response rates and compare early and late responses. The questionnaire contained questions about background knowledge, virtual reality usage for online purchasing, and happiness with VR usage using characteristics such as interactiveness, flow, personalization, informativeness, and escape. There are only two types of questions: (1) statements on a 5-point Likert Scale and (2) multiple-choice questions. The survey questionnaire is shown in the table below. In the questionnaire, respondents were given a clear definition of the virtual reality idea to help them comprehend it and answer questions about using virtual reality for online shopping.

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B. Measures

An exploratory review of relevant literature was conducted to establish the indicators used to measure the hypothetical constructs. The construct includes five factors that influence pleasure in VR shopping: interaction, escape, flow, personalization, and informativeness.

Virtual reality construction barriers include indicators such as an absence of knowledge about virtual reality and a lack of data available for understanding the significance of adopting virtual reality, such as the advantages and disadvantages of VR shopping.

C. Non-response and Common Method Bias

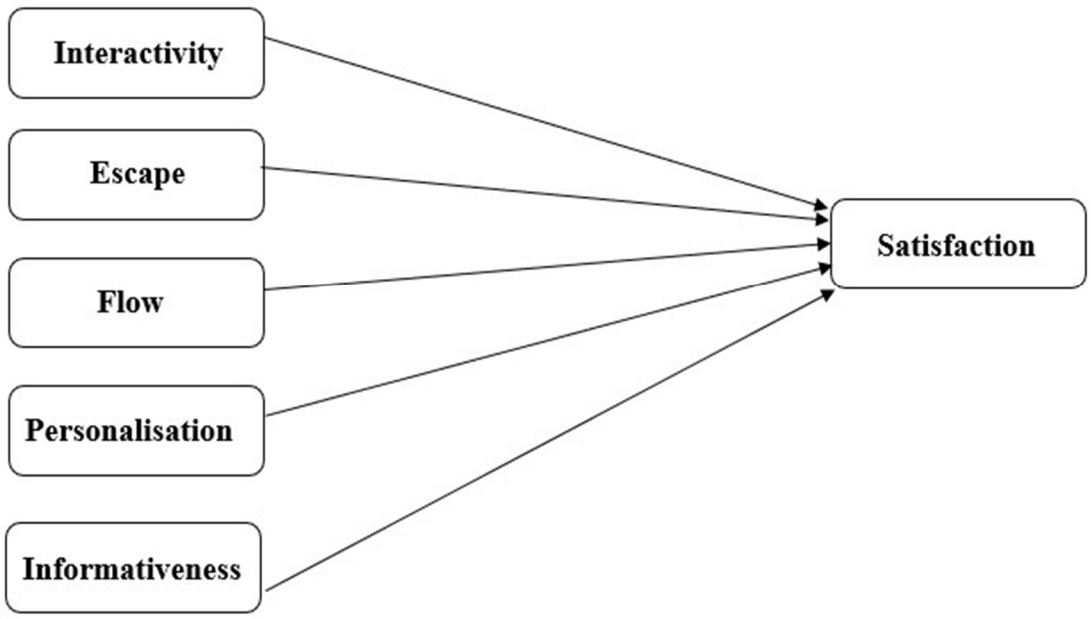
We endeavoured to thoroughly assess the existence of any non-response bias despite the very high rate of responses. To assess for non-response bias, we compared early and late responses. The means of responses received during the first-time frame (n = 154) were compared to the means of feedback obtained after sending follow-up messages using social media platforms such as WhatsApp. We ran t-tests on these sets of received responses and observed no statistically significant differences between the average responses of the two groups (at p 0.05).

Indeed, this shows that non-response bias is not a major issue.

D. Reliability and Validity

The validity of the measurement instrument is assessed using content validity and construct validity. To begin, the content validity of the survey instrument was established by grounding it in research and theoretical studies. The content validity of the survey instrument was also confirmed by pre-testing it with selected respondents from the target group. The survey questionnaire was amended with minor adjustments based on the advice of these two workers representing the International Journal of Business Research. Second, exploratory component analysis was done to test the hypothesis for its validity. We used principal component analysis to assess five constructs in order to investigate the important indicators based on their underlying factors: (1) Interactivity, (2) Escape, (3) Flow, (4) Personalization, and (5) Informativeness. We focused on five criteria for varimax rotation extraction in particular. Five variables with eigenvalues greater than 1.0 were discovered through factor analysis. The research also confirmed that the items do not evaluate any other variables. The items, for an instance, were only loading heavily on their underlying components. Cronbach's alpha was used to determine reliability. In most cases, the dependability coefficient should be 0.70 or higher. Cronbach's alpha values for the factors were greater than 0.80, implying that the theoretical approaches were credible.

Figure 1- Research Model of our study



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V. DATA ANALYSIS & RESULTS

We conducted the analysis with a specific intent to understand the different underlying factors like Interactivity, Escape, Flow, Personalization & Informativeness, through a different set of indicators representing each of the factors to establish their impact on customer satisfaction.

Accordingly, the constructs used to analyse different factors, and indicators were chosen on the basis of readings from pre-existing literature (LEE, 2020; Yadav & Rahman, 2017).

To evaluate the hypothesized model and run the test on the hypothesis proposed, we used SPSS 24 software. The first step was to check the reliability of the survey instruments. Our survey instruments were different online platforms which included sharing the questionnaire through emails and social media. The survey questionnaire discussed questions about customer satisfaction in VR technology-driven online shopping, using constructs such as Interactivity, Escape, Flow, Personalization & Informativeness.

As the first step, reliability was checked for the survey instrument. It was found that Cronbach's alpha value was 0.83 which is above 0.8, implying that our survey instrument was confirmed reliable. Overall, every coefficient is above the required criteria. The results suggest that the research model exhibits high reliability.

The next step was to establish the content validity of our research model, which has been established primarily through an extensive literature review. Secondly, we got the questionnaire reviewed by academic experts and research practitioners. After their thorough review, the suggestions and corrections were incorporated into the questionnaire. The questions were thereafter revised and then distributed to potential respondents through emails & social media.

The next step was to check the construct validity. For this, we performed Exploratory Factor Analysis (EFA) with an aim to identify and validate the relevant indicators for the chosen five factors which are, Interactivity, Escape, Flow, Personalization & Informativeness. It was confirmed and it loaded 5 factors and the total variance explained was 87.4% approximately. The exploratory factor analysis confirmed the validity of each of the indicators under different factors. It is represented in the following table-

Table 1: Exploratory factor analysis & indicators.

Exploratory factor analysis	Indicators
Interactivity	1. VR shopping is an interactive experience 2. Interacting with VR shopping keeps the attention 3. Interacting with VR shopping is quick
Escape	1. Using VR shopping is an escape for me 2. If I am in a bad mood VR shopping puts me in a better mood
Flow	1. While using VR shopping time seemed to go very quickly 2. I was completely immersed in the content while experiencing VR shopping
Personalization	1. VR shopping makes purchase recommendations as per my requirement 2. VR shopping facilitates personalized information search
Informativeness	1. The information provided by VR shopping is comprehensive 2. VR shopping offers accurate information on the product
Satisfaction	1. I am satisfied with this VR Shopping 2. VR shopping has met my expectation 3. I will continue to use VR shopping in the future

Based on the Factor Analysis we also performed recoding where we recorded all the constructs and their selected indicators. The recoded values are as follows-

```
COMPUTE
Satisfaction1=(@13.IamsatisfiedwiththisVRshopping+@14.VRshoppinghasmetmyexpectatio
ns+@15.IwillcontinuetouseVRshoppinginthefuture)/3.
EXECUTE.
COMPUTE
Informativeness1=(@11.TheinformationprovidedbyVRshoppingiscomprehensive+@9.VRsho
ppingoffersaccurateinformationonproduct)/2. EXECUTE.
COMPUTE
Personalization1=(@10.VRshoppingmakespurchasesrecommendationaspermyrequirements
+@12.VRshoppingfacilitatespersonalizedinformationsearch)/2. EXECUTE.
COMPUTE
Flow1=(@6.WhileusingVRshoppingtimeseemedtogobyveryquickly+@8.Iwascompletelyimme
rsedinthecontentwhileexperiencingVRshopping)/2. EXECUTE.
COMPUTE
Escape1=(@4.UsingVRshoppingisanescapeforme+@5.IfIaminabadmoodVRshoppingusingV Rshoppingputsmeinabettermood)/2.
EXECUTE.
COMPUTE
Interactiveness1=(@1.VRshoppingisaninteractiveexperience+@2.InteractingwithVRshoppin
gkeepsattention+@3.InteractingwithVRshoppingisquick)/3.
EXECUTE.
```

After recoding, we performed linear regression to analyze the research model. Here we tested the 5 hypotheses H1, H2, H3, H4 & H5 as explained in the upper section of the paper. The result derived from performing linear regression indicates that the selected drivers of customer satisfaction which are Interactivity, Escape, Flow, Personalization & Informativeness, have a positive impact on the perceived customer satisfaction from VR technology-enabled online shopping. Following table 1 shows the tested hypotheses. It is statistically significant to say that H1 holds true with a t-value of 2.891, and the p-value is also greater than 0.001 i.e., 0.04.

Hence, we conclude that H1 is statistically significant and supported.

Next, H2 also holds significance at 95% significance. Similarly, all the other hypotheses i.e. H3, H4 & H5 also hold significance with a significance level of 95%. Therefore, it holds true that the intention to use virtual reality for shopping is strongly correlated with interactivity, escapism, the flow of content, personalization, and information it provides.

Table 2: Linear regression- drivers of customer satisfaction

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.788	.283		2.783	.006
	Informativeness1	.137	.075	.148	1.826	.070
	Personalization1	.184	.078	.185	2.374	.019
	Flow1	.091	.076	.098	1.211	.228
	Escape1	.146	.074	.157	1.983	.049
	Interactiveness1	.207	.071	.226	2.891	.004

. Dependent variable (DV): Satisfaction1

A. Factor Analysis

Following that, we implemented factor analysis to test and validate the exogenous variable. This analysis employs the PCA (principal component analysis) technique and the VARIMAX rotation approach. As expected, this resulted in the identification of five components that explained 74.4% of the overall variance.

Table 3: Result of Factor Analysis

	Rotated Component Matrix[a]						
		Component					
		1	2	3	4	5	6
Interactiveness	1. VR shopping is an interactive experience	.745					
	2. Interacting with VR shopping keeps attention	.785					
	3. Interacting with VR shopping is quick	.737					
Escape	4. Using VR shopping is an escape for me					.946	
Flow	8. I was completely immersed in the content while experiencing VR shopping		.916				
Personaization	10. VR shopping makes purchases recommendation as per my requirements						.972
Informativeness	9. VR shopping offers accurate information on product			.953			
Satisfaction	13. I am satisfied with this VR shopping				.954		

Extraction Method: Principal Component Analysis.

a. Rotation converged in 6 iterations.

VI. DISCUSSION

This research paper is focused on testing the impact of immersion of Virtual reality in online shopping to enhance customer experience and gauge customer satisfaction. Our research has been inspired by the framework proposed by (LEE, 2020; Yadav & Rahman, 2017) to establish the constructs and indicators. On the basis of the same, we have been able to validate that customer satisfaction is derived through VR technology-enabled online shopping. Our findings are aligned with a study published by (Cowan & Ketron, 2019) which says that VR allows customers to interact with the offering and helps in building strong consumer-brand relationships. As our study also discusses, VR immersion leads to an improved sensory experience and leads to high customer involvement through escapism from the real world (Vance & Berg, 2016). Virtual reality enhances the overall experience for improved interactions with the customer (Bonetti et al., 2018). Using an extensive literature review our work has established a conceptual framework to show customer involvement in immersive VR technology. The theoretical aspect of this study gives plausible considerations to be generalized and applicable to different contexts as well. The finding of this study indicates users are satisfied with using virtual reality for shopping giving them an overall better experience that is simple and easy in terms of the application.

VII. CONCLUSION

This research looks at the factors that influence consumer satisfaction and behavioural intentions after visiting a virtual shopping store. Furthermore, recent dramatic technological progress in the VR sector in recent years has rendered even minor post - study of the past irrelevant in regards to managerial ramifications (Wang et al., 2016), requiring new marketing research based on cutting-edge VR technology and use. However, contemporary VR allows for more immersive experiences due to the use of HMD technology, which provides a full 3D experience (Hayes A, 2020).

It is critical to understand virtual technology. Virtual reality impact and potential as a new advertising medium is a new research subject, so this study fills a number of gaps in the literature. Virtual technology not only opens up a new frontier for marketers to engage with future consumers, but it also allows us to reflect on research methodologies and marketing theories (Wang C.L., 2021). In other words, the variation between the study that was conducted and earlier studies.

VIII. LIMITATION & FUTURE RESEARCH

It is implied that no research is impeccable and always has its own set of limitations, similarly, this research also has its limitations which must be considered for better understanding. Firstly, the sample size needs improvements as this study focuses on customers of the Y & Z generations who are familiar with online shopping. Hence having a larger sample sizing expanding to different pools of generations would help in better interpretation. Thus, the current study cannot be generalized. There exists future scope for the research to expand our current sample and validate the given results representing a bigger set of population. Secondly, our research has not thrown light on the gender-based differences in usage and satisfaction derived from VR technology-based online shopping. Therefore, the gender-based differences in satisfaction derived from VR technology-based online shopping can be a suitable topic for future scope of research. It has been quoted by many researchers that there is gender-based differences that are significant in terms of the perceived and actual VR experience (Yoon et al., 2015). Further studies have the scope to explore these differences and discuss the reasons for the same. Also, our study is limited to the extent of VR technology in the e-commerce industry. However, the business is moving towards the metaverse, and the VR potential there is huge. Therefore, further studies can be conducted to study the influence of VR technology in metaverse space on customer experience and satisfaction levels.

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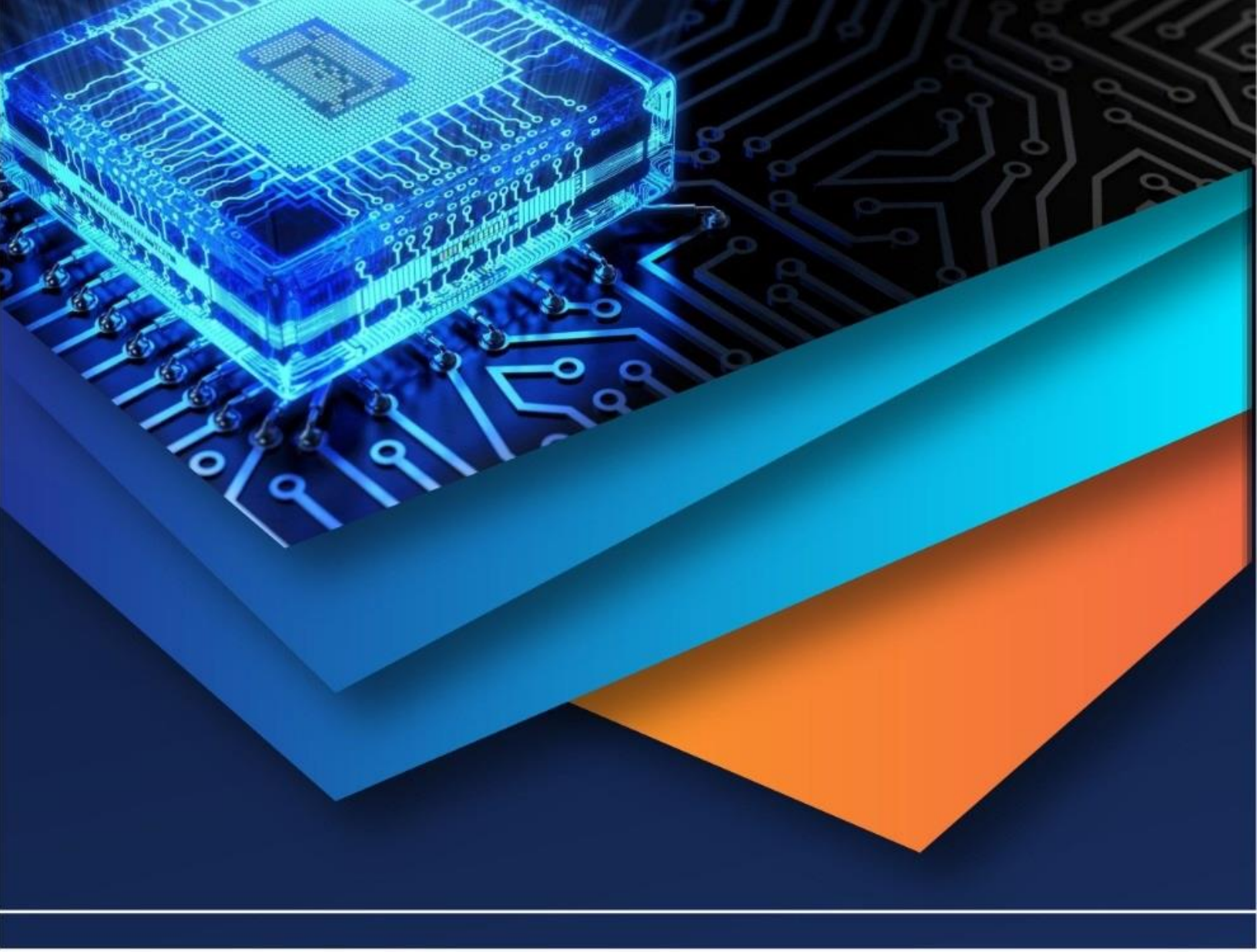

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