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A Reviewed Analysis of the Technological Trends in E-Commerce.

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Abstract: ***E-commerce stores are growing increasingly popular among all types of enterprises. Ever since the Covid-19 pandemic strike, both Small and Large Enterprises have started to shift their businesses digitally with the help of e-commerce platforms. As a result of this increased popularity, many new technological trends are being introduced in the E-commerce sector. Businesses are attempting to digitalize their operations by creating an effective digitally enhanced E-commerce platform in order to attract new customers and maximize business prospects. Many new technological trends are being introduced so that consumers can get the best digitalized virtual experience. This review paper looks at the technological trends in the e-commerce industry. Knowledge of these new technological trends will undoubtedly assist businesses in strategic planning and aligning their E-commerce sites with the most appropriate technology, thereby increasing client acquisition and business growth rate.***
Keywords: E-commerce, Technological Trends, AR - VR, Customers, ROPO, Virtual Try-On, Security, Drones, Voice Search, Blockchain, Omni-Channel, Smart Product Recommendation.

I. INTRODUCTION

Since the beginning of the twenty-first century along with the growth of the internet and newer Web Technologies, online businesses have been developing dramatically. The advent of Web 3.0 technology is predicted to have a significant impact on the commerce business. Along with technological advancements, commerce has grown and become more popular but at the same time, the industry is also confronted with additional issues. One of the major challenges we have in this era of the internet is that there is no way to trust a business or a service and make a decision. People are frequently conned or perplexed by a plethora of options. Because people are actively using social media for business and non-commercial purposes, the internet is the ideal approach to handle these difficulties; According *(smart insights-2022, Dave Chaffey)* 57.6 percent of the world's population uses social media. The average daily usage is 2 hours and 27 minutes. The rapid expansion of social media has altered our perceptions of every business. The main issue we now have is that we have a lot of options, including physical stores, and having too many options can lead to confusion. That is why we need to know which one is the best and gives us the best experience.

E-commerce corresponds to the purchasing and selling of goods and services, as well as the transmission of funds or data, over a network, mostly the internet, and it has developed and progressed at an exponential rate during the exceptional COVID-19 pandemic. Many firms, particularly small enterprises, and small-scale businesses have realized the benefits of selling their products online. It's resulting in a complete overhaul of the existing offline business model. Ecommerce not only automates manual processes and paper transactions, but it also assists enterprises in transitioning to a totally digitalized environment and changing how they function. As a result of E-commerce sites, paperless transactions are now easier and more secure than ever. Secure protocols are utilized for transactions, and the OTP system is frequently used.

This Paper would be a reviewed analysis and discussion of the technological advancements in the realm of E-commerce, which are being deployed by the enterprises to enhance the customer's digital and virtual experience on their platform. We will also know how these technological trends are designed to help the customer to find the best suitable products for their needs.

II. LITERATURE REVIEW

Scholars have conducted a variety of studies on the topic of cross-border E-commerce in the context of socializing. According to Zhang X, Liu L, Su Y, Song S, Fang B [1] social e-commerce is a new sort of modern e-commerce. The exchange of goods and services is reliant on information. Customers look for products and communicate with one another through circulating and accepting information. The fundamental problem in studying social E-commerce purchasing behavior is recognizing the pattern of information dissemination among customers[1].

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Many researchers from all around the globe have studied the factors that influence customers' willingness to trust online buying methods, focusing on technology, security, credit, and perception mechanisms. According to Yin Jin [2] in the context of social e-commerce, customers build trust through sharing personal experiences, referrals, and recommendations from others [2].

According to Singh J[3], e-commerce has risen at an exponential rate, resulting in the emergence of numerous top online women's clothing firms. These brands are growing exponentially due to digital marketing, and as a result, people's shopping habits are also changing. The rapid transformation has also resulted in certain crises: the emergence of phishing websites has severely impacted the purchasing experience and customer engagement because of which many customers think that online women's fashion brands' are ineffective, and product quality is exaggerated and overpriced. His research, however, did not offer a remedy to the problem, but it was able to bring this issue into the limelight. [3]. According to Azam [4], Factors based on awareness, experience, knowledge, and attitudes, are the ancestors of trust in e-commerce and e-loyalty. According to the detailed studies on human trust toward e-commerce perception-based considerations have a big impact on e-commerce knowledge when it comes to building trust. Perceived familiarity, perceived resemblance, perceived control, word of mouth, and information obtained from family and friends are the most important elements. However, perceived similarity and perceived control are the most important aspects of trust, and their absence explains the lower trustworthiness and confidence assigned to people with little or no e-commerce experience [4].

While Fang et al. [5] emphasized the importance of trust in the online buyback, he also acknowledged that a customer's trust in e-commerce is also influenced by the situation. The researchers were then inspired to learn more about the official environment of e-commerce and how it influences trust and online buyback. The formal regulatory system put in place to ensure that the e-commerce transactions are highly secured and protected can be referred to as the official context of trust. The level of trust that e-commerce shoppers have in an e-commerce vendor also determines their willingness to buy back items online. Furthermore, online shoppers judge the trustworthiness of e-commerce businesses based on first-hand information, reviews from other people, and public talks [5].

III. TECHNOLOGICAL TRENDS

A. Ai-Chatbots for User Engagement And Communicating with The Customers

With the growth of users on the E-Commerce platform, it becomes difficult for the operations team to manage millions of queries from the users. This causes a delay in responding back to user inquiries, which negatively impacts their experience on the platform. An effective solution for this problem is AI-Chatbots. AI-Chatbots can efficiently assist and manage millions of users' inquiries all at once, by replying with the predefined answers to regular queries that a customer sends through a chat system. When a customer makes a simple request, a chatbot can offer accurate automatic responses within seconds. There are numerous other applications of these AI-Chatbots, such as automatic ordering through chat, easier communication in real-time, customer service offered 24/7, help in providing a more pleasant and personalized customer experience, and reduces the distraction of consumers by suggesting the best fit product based on their needs.

B. Image And Voice Search

Product search technology has developed to an extent of advancement that it is now easier than ever to actively search for the desired products. Consumers can search for their desired products using voice or even images. AI-Virtual assistants such as Alexa, Bixby, and Siri are intelligent technologies that are increasingly widespread in today's technological environment. Just simply speaking out the product description to an AI-Virtual assistant would yield a highly accurate result.

According to Holger Luedorf, Senior Vice President (SVP) Business at Postmates, voice assistants are highly promising game-changers, and he appears to be correct as voice-activated assistants are getting a huge momentum from their users. Many E-commerce giants are in the run of implementing the best voice & image search engines for their E-commerce platform so that consumers would be able to search for products easily just with the help of voice commands or by simply scanning a photo. Some E-commerce platforms have even tied up with voice assistants like Apple's Siri or Amazon's Alexa, voice search feature so that they can get better exposure among the users.

C. Blockchain Technology- For Secured Payments

Blockchain researchers are actively working on the future of the e-commerce ecosystem. It's termed ECoinmerce, and it'll be blockchain-based. The concept of digital asset transactions eliminates the requirement for a third party. Furthermore, these transactions are speedier, with lower fees for both sellers and buyers. Every piece of information entered into a blockchain is preserved and recorded permanently. This means that the entire transaction history of a product is preserved regardless of how many times it is traded or repurchased. This has the potential to significantly reduce fraud and increase transparency.

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D. Omni-Channel To Tackle Ropo (Research Online And Purchase Offline)

According to Google's report 78% of individuals turn to the internet first when it comes to researching something. In recent times, customers have adopted a new technique of purchasing things, called the ROPO (Research Online And Purchase Offline) model. When buying things from a local retailer, the prices, quality, and quantity are all compared online to find the greatest deal. This has become a regular phenomenon for customers. Many buyers will then use their research to make an online purchase. However, depending on the goods, customers may need to visit a store for a variety of reasons. Here is where the ROPO half of the equation of "Purchase Offline" comes into play.

Since the ROPO model allows customers to see an entire selection as one interconnected Omni-channel, E-commerce platforms started adjusting their business strategy for the ROPO effect and this opens up a new world of opportunities. Through this method, online stores become a virtual extension of the offline physical store. As a part of ROPO stores are trying to create personalized digital touchpoints with the information gathered through their offline store.

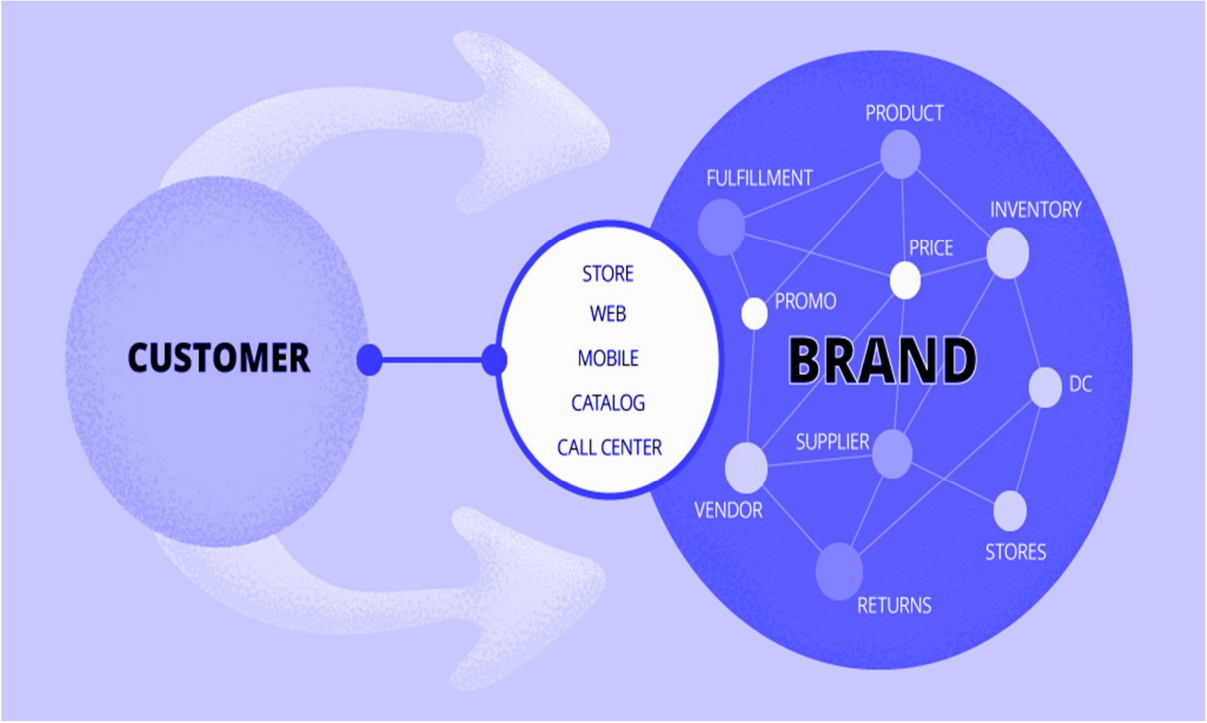


Fig 3.1: Representation of Omni-Channel of interconnected platforms.

E. Smart Product Recommendation Engines

E-commerce businesses are attempting to collect users' data from a number of sources in order to learn more about their needs and desires. With the help of recommendation engines, E-Commerce platforms analyze the best-fit products and offer customized recommendations to users based on their requirements. Smart product recommendation algorithms are being developed by e-commerce companies in order to offer tailored product recommendations to customers. These recommendation engines can help to boost the rate of customer growth and revenue by recommending the best-fit product to many of the platform visitors in a way converting them into customers.

F. Drones & Droids

Amazon is testing a smart AI-based, quick drone delivery system. It assures that with the introduction of drones and droids into the product delivery line shipping and delivery time will be significantly reduced to only a few hours. This will almost certainly increase its e-commerce platform sales. The future of e-commerce delivery is predicted to be centered around an individual person and their expected geolocation and time, rather than a specific address. This type of product delivery and shipping would include powerful AI. These specialized drones and droid bots would completely change the traditional ways delivery system. Manna Aero launched the world's first drone delivery system in 2020.

G. AR and VR (Augmented Reality And Virtual Reality)

With the advent of Web 3.0 technologies Augmented reality and Virtual reality are becoming game-changing technologies in E-commerce. Customers can now virtually sense the products in their complete virtual view and even place them in the physical world before purchasing them. Giant E-commerce firms, like Apple, Amazon, Flipkart, etc are using these technologies. It proves to be very useful when AR and VR have the potential to reduce customers' product returns rate in addition to saving time and providing convenience. With the ability to visualize any product they want, the phrase "experience before you buy" is now more apt for customers than ever before.

Thanks to AR and VR technologies customers can now know if their purchases are the correct match for their needs or not even before they buy it, rather than finding out after they've bought them.

Customers can use AR and VR to:

1) Stand in their living room, put on an AR headset, look through a catalog, and make better purchasing selections by visually sensing the virtual product at their physical location.

2) Instead of visiting retail locations and scrolling through product descriptions and dimensions, they can see what they want in the space where they want the product to be.

3) Many E-commerce stores have started creating virtual showrooms so that buyers can look at things from the comfort of their own homes instead of going to a store.

4) AR and VR technologies provide a virtual panorama of the product so that customers may get a visual sense of the features and functionalities of the products before buying them.



Fig 7.1: Representation of AR AND VR technology in E-Commerce

H. Direct Buy Through Social Media

Many E-Commerce shops have deployed this popular 'Direct Buy' strategy in conjunction with various social media networks. Thanks to these types of integrated strategies customers can now quickly buy the things they want without having to navigate between different websites. Pinterest's Buyable Pins allow users to shop for items without ever leaving the site. They look almost like traditional pins, with the exception of a small blue "*Buy It*" button next to the renowned "*Pin It*" button. Users can either save items they like to a board (like they have in the past) or purchase them immediately through Pinterest. They simply click the "*Buy It*" button and complete their purchase with a credit card.

Integrated applications on Facebook and Instagram now allow users to go directly from a Facebook/Instagram photo post to a product page. When celebrities or influencers endorse and promote merchandise, it brings even more attention to the products and customers can easily buy them with just one click. Business studies have also revealed that this type of integration has beneficially increased user engagement resulting in greater business.

I. Virtual Try-On Technology

According to Kady Thomason founder of Rock & Republic Clothing [6], virtual try-on technology is the future of commerce, both online and in offline stores: He says that "Being able to view yourself in 360 degrees, wearing something where fit is critical, like jeans, glasses, or a fitting jacket digitally will disrupt the online and offline store shopping game forever as customers would be able to precisely identify the size, and the exact color of the product that suits them hence there will be a significant reduction in returns. It assists the consumer in obtaining exactly what they desire. It's fascinating to see how things are progressing with the evolving fusion of fashion and technology "[6]

Visual Try-On Technology is being adopted by many e-commerce sites especially the clothing, shoes, accessories, eyewear, jewelry stores, as well as make-up to boost their commerce, user interactivity, end-user engagement. Technologies like this provide the customers with a sense of virtual feel and help them to get a satisfying product even before they purchase it. It also helps the store owners to save a lot of storage space as there would be no need for them to load their shop with all varieties of the product.

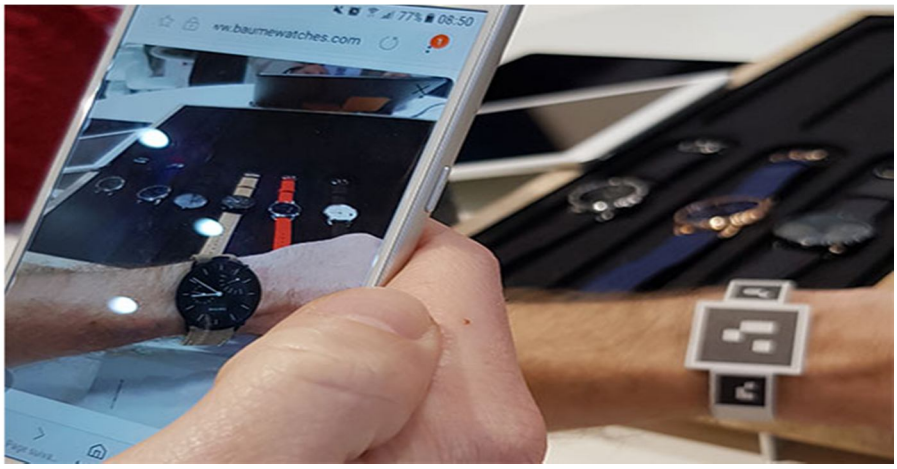


Fig 9.1: Representation of Virtual Try-On technology in E-Commerce

Many E-commerce stores are focusing on technologies that could provide a visual personalized feel to the customers. As per Forbes Smart Insights [7], 40% of advertising agencies claim that customization has a direct impact on increasing sales, cart size, and revenues in direct-to-consumer(D-to-C) channels like e-commerce, while the other 37% say a product or content recommendations have enhanced market and customer lifetime value. Personalization methods have resulted in an increase in transaction rates for more than one-third of buyers [7]. Virtual try-on, paired with AR and VR 3d model product configurators, empowers businesses to offer personalized customization to customers, allowing them to build tailor-made products that reflect their personalities and sense of fashion style and also increase revenue [8].

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IV. YEAR WISE TIMELINE OF DIFFERENT TECHNOLOGICAL TRENDS IN E-COMMERCE

YEAR	E-COMMERCE EVOLUTION
1969	The first ECommerce using a dial-up connection was launched by CompuServe.
1979	The first E-commerce transaction-processing computer was linked to a TV via a telephone line for safe data transmission.
1982	Continued technological advancements and the development of Boston Computer Exchange's initial E-commerce platform.
1992	Introduced “Book Stacks Unlimited” as the first online books buying platform.

1994	E-commerce Web browser tool introduced for windows.
1995	The most significant year in the history of e-commerce launched Amazon and eBay.
1998	PayPal created the first E-commerce payment system solution for money transfers.
1999	Alibaba stunned the world by launching an online retail platform with a $25 million investment.
2000	Google created its first advertising solution, Google AdWords, To assist retailers in utilizing the PPC context.
2004	Payment Card Industry Security Standards Council (PCI) was created to have a check on the E-commerce Platform's payment-related Security Standards. Shopify was also launched.
2005	Bigcommerce, an online storefront platform, is introduced as an app-based platform. Massive growth in the domain of e-commerce.
2006	Amazon released the "Prime Membership" concept as a way for customers to enjoy free two-day shipping for an annual charge.
2011	Google created an online wallet application for payments. Facebook launched sponsored advertisements for brands to promote their business.
2012	Converse was the first retail E-commerce company to use Virtual Try-On Technology for shoes.
2014	Apple released an online payment app, called Apple Pay. Jet.com, an online shopping website was also released.
2017	Instagram adds shoppable tags, allowing brands to sell directly to customers via social media.
2018	Operational costs have lowered down in the B2B vector. Sellers are adopting an omnichannel selling approach that has changed.
2019	Amazon's innovation in product shipping leads to same-day shipping.
2020	Manna Aero launches the world's first drone delivery.
2021	Adobe created a photorealistic 3D design model for improving the visual experience.

V. CONCLUSION

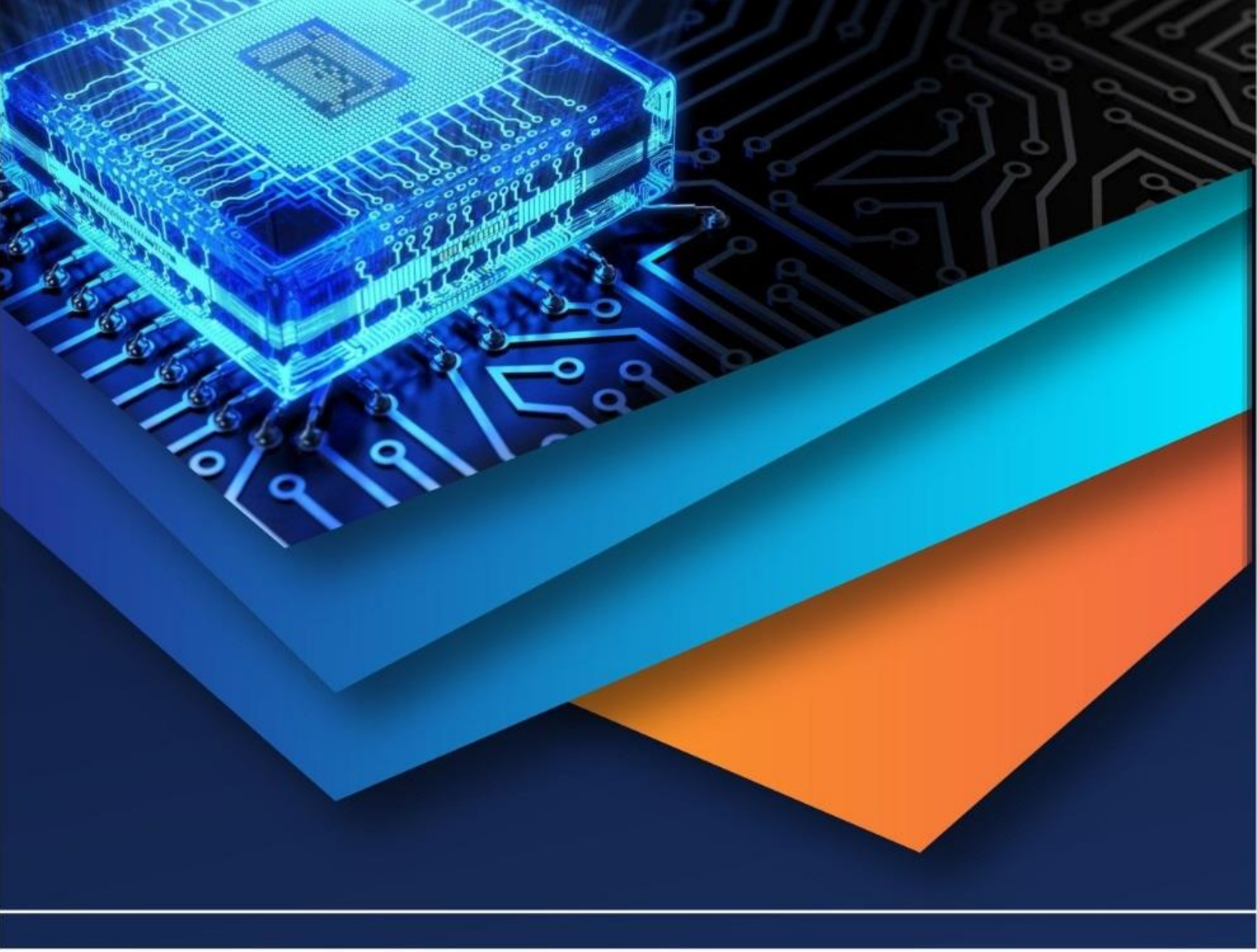
The popularity of e-commerce among customers is remarkable since it allows users to shop at any time and from any location. The popularity of e-commerce has been evidently seen by many firms which started as small-scale E-Commerce sites 10 years back and have grown dramatically because of the rising popularity of E-Commerce platforms among customers. E-Commerce's development and success are aided by a number of breakthroughs and technology trends. Thanks to these technological innovations the procedure of setting up digital shops and selling goods online has gotten significantly simpler and easier. Since the covid-19 outbreak, an increasing number of people have been drawn towards online shopping and digital payments.

Many e-commerce platforms are focusing on developing interactive web technologies such as virtual try-on, augmented reality, virtual reality, and 3D photorealistic models. These technologies are allowing the consumers to get a realistic virtual feel for the products, which improves customer engagement on the site. As a result of these technological innovations, Consumers are becoming loyal fans of E-commerce platforms, resulting in increased brand popularity and business growth. E-commerce platforms will undoubtedly see significant technological developments in the coming years. To stay visible, E-commerce platforms are devising unique technical solutions to offer a special online experience and to convert first-time consumers into devoted loyal customers of their E-commerce brand, who are drawn together by shared interests and actively participate and contribute towards the growth.

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