Metacommerce - The future of shopping with Metaverse

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***Abstract*—Meta-commerce is a brand-new category of social media and Internet applications that incorporates a number of technologies. The technologies that enable multi-sensory interactions with virtual environments come together here. In meta-commerce, users can navigate a virtual environment that closely resembles the real world. technologies like augmented reality and virtual reality are used. via augmented and virtual reality technology, the metaverse has the potential to expand the physical world by enabling people to interact with both real and virtual settings via avatars. In meta-commerce we will be building a virtual space where the customers can visit a shop virtually and can do shopping virtually just by sitting at home. Not only that, but the customer can also interact with the shop owner and also with the other customers too by sharing the camera. Just by clicking on the items in the shop one can easily shop them virtually. As COVID-19 spread around the world, the demand for virtual reality increased and due to which the Metaverse industry started developing vigorously.**

In this project the proposed concept for the shopping system in meta verse is explained.

Keywords- Meta-verse, Meta-Commerce,VR - Virtual Reality, AR - Augmented reality, Blockchain, Digital Currency

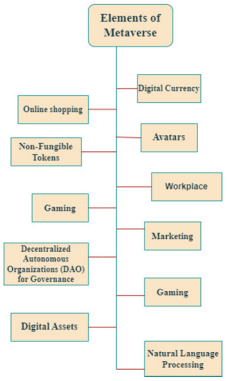
I. Introduction

The meta-verse is a developing concept for the internet of the future. It is a computer-generated word with a separate economic system connected to the physical world that combines the prefix "Meta" (meaning transcendence) and the suffix "verse" (universe). According to some, it is a brand-new internet iteration that integrates the virtual and actual worlds through the use of avatars and blockchain technology. The science fiction book "Snow Crash" from 1992 is when the phrase "metaverse" first appeared. Recently, Web3, a theory for a decentralised iteration of the internet, has influenced interest in meta-verse development. Due to the pandemic this new technology paradigm got the hype and people started to show the interest in adopting, not only that people also got to know the knowledge behind this technology.

Meta-Commerce is the construction of virtual showrooms. The meta-verse will no doubt transform the way people interact, shop, and socialize. Also With that, the physical economy will become as important and prominent as the virtual economy. Users get the benefit to virtually walk through the store while relishing 3D rendered store displays fueled by Augmented reality and Virtual Reality technology. Moreover, it is a primitive step to connecting the gap between the convenience and easiness of online shopping and the enveloping of physical retail. Big tech giants like Meta and Amazon are investing in this field. Meta-verse previously served based on PC access also had low consistency due to space and time problems, but now it is very easy to access the Meta-verse at any point of time, due to the new mobile devices that can connect to the internet at all time. However, it has not yet gained widespread use, and there are no standards in place to accommodate ordinary digital practises at work, in education, or in leisure. Typically, there are three stages to the creation of meta-commerce. The first stage creates a mirror world made up of massive digital twins of real-world objects in virtual settings.

The second phase primarily focuses on the creation of original material by digital natives, who are represented by avatars in virtual environments. The developed digital content in this phase resembles its physical counterparts in every way. In its final stage, the meta-commerce reaches its maturity and transforms into a surreal universe that can support itself.

Meta-verse is not just one element of virtualization but it consists of various elements like avatars, digital currencies, NFTs, workplace, etc. which come together to form a complete meta-verse concept. It is very difficult to explain what is meta-verse without knowing the elements of the meta-verse because all these come together and perform vital role in meta-verse which is a new technology paradigm.

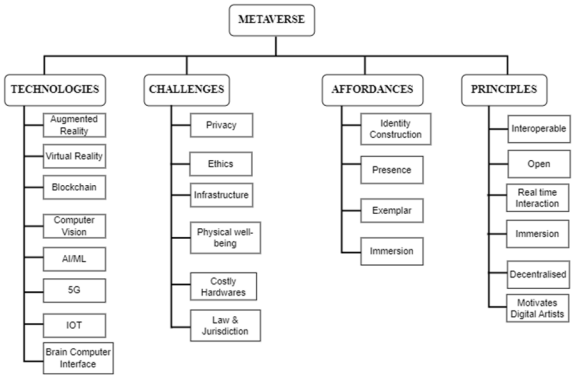


Meta-verse Elements

The fourth industrial revolution led to a rapid expansion of the virtual world. But this gave a rise to trust in technology because in virtual world the trust issue in new technology emerged as an important issue. So to solve this trust issue the concept of Blockchain technology got introduced. The first blockchain was proposed by Satoshi Nakamoto in 2008 known as ”Bitcoin”. A blockchain is made up of data-containing blocks and a chain connecting them. Consensus algorithms are utilised in a blockchain to construct and connect blocks. Similarly Ethereum is also a blockchain where various decentralised applications can be designed as its developer Vitalik Buterin just not kept the limit of blockchain limited to creating cryptocurrency like Bitcoin but also anyone ca create a smart contract which was a new concept where one can create ones own rules.

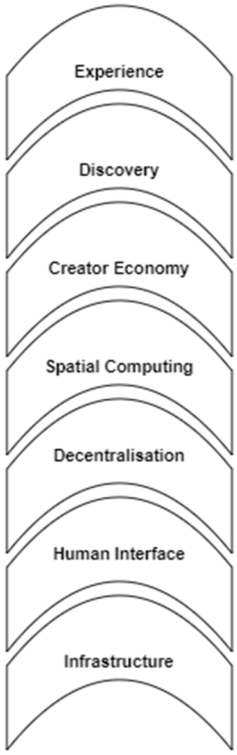
Tech giants like Sandbox, Decentraland, Axie Infinity provide the platforms for creating digital assets in virtual world. These tech giants mainly focus only on metaverse where people can buy, build house, rent their house, do shopping, play games,etc. All these tech giants have their own blockchain which provides security and reduces the trust issues of people in this emerging technology.

Below image gives the complete idea of what the meta-verse is build of, what are the challenges faced by it and which technologies can be used for building a complete meta-verse.



Complete idea of creating Meta-verse

Meta-verse consists of 7 layers which describes detailed construction of virtual world. These layers are very crucial in creating virtual spaces. It gives the exact idea of how the framework of decentralised metaverse is designed. Below is the diagram which explains the seven layers of the meta-verse



Seven layers of Meta-verse

1) Experience Layer: This is the first layer in the meta-verse. In this layer the user gets the experience of playing games, shopping virtually, social gatherings and many more. The excitement and the resources it has generated has direct result of realistic world.

2) Discovery: This is the second layer of the meta-verse. It tells how the customer will discover new experiences and hoe one can explore the virtual world. Discovery refers to finding new people or community and connecting with them. The customer can also give the ratings to the virtual space and experience user had.

3) Creator Economy: This is the third layer of meta-verse. Due to this new technology paradigm there is huge demand or growth for the creators. These creators are known as digital artists. Creating digital assets will generate good economy for the digital artists. These creators will play very crucial role in creating virtual spaces in meta-verse.

4) Spatial Computing: It is the fourth layer of the meta-verse. It is one of the critical capability. It will help companies to understand behaviour and trends of the customer.Spatial computing can be used in various businesses like e-commerce, travel booking, social networking sites, entertainment and more. In this layer Geo-spatial mapping, AR/VR 3D engines are used for spatial computing.

5) Decentralization: It is the meta-verse's fifth stratum. Due to decentralised internet, businesses would lose control over the data and apps because they would be disseminated throughout a network of computers rather than being kept on centralised servers. There will be a copy of each and every transaction with all the peers of the network, which increases the trust in this technology. In this layer technology stack like Blockchain, edge computing AI agents are used.

6) Human Interface: It is the meta-verse's sixth stratum. The layer that links the user to the metaverse is this one. It might be tangible, like a headset or pair of gloves, or it might be virtual, like an avatar or virtual helper. The human interface is continually getting better, making it easier to communicate naturally, much like in the real world. Devices including mobile phones, smartglasses, gloves (for gestures), and voice are utilised in this layer to connect with the metaverse.

7) Infrastructure: It is the last layer of the meta-verse. The meta-verse will have the infrastructure in which the user will able to interact with each other in virtual space. This infrastructure can be made by VR headsets and other hardwares will will immerse the user in Meta-verse. Meta-verse will also need a governance system which will ensure safe and secure place for all users which will be provided by this layer. In this layer technologies like Blockchain, 5G, WiFi6, Clouds, GPUs are used for the creation of the meta-verse.

In metaverse technologies like Blockchain, IOT, 5G, Digital Currency, Natural Language Processing are used to carry out the complete actions in metaverse. In metaverse we use digital avatars which represents the person in virtual world which makes easy to identify the known person in the virtual world. All these technology stack come together and make the metaverse secure and trustworthy.

In metaverse blockchain technology paradigm is used to secure the transactions and the users data in form of blocks which in encrypted with the different cryptographic algorithms. Moreover it also keeps the records of the transactions till date and anyone can see and verify them.

To carry out the transaction like buying and selling just like in physical world, in meta-verse people have to use digital currency also known as crypto currency which is again backed by the blockchain technology.

Whenever the user visit the virtual world or create the virtual world one must need good and fast internet connection and a good networking hardware for carrying smooth process in the virtual world, for that we need 5G technology. And if an individual have any doubts or query which can be asked in websites, here the individual can ask it to the chatbot and in return the chatbot will answer the question asked by an individual.

To understand metaverse more in detail below are the characteristics of the metaverse.

Metaverse Characteristics

1) Decentralised : The meta-verse is completely decentralised means there is no central server so as to keep it secure and transparent. All the nodes in blockchain community will have the same copy of the transactions carried out in the meta-verse which will prevent the manipulations of the transactions.

2) Persistency : Persistency in meta-verse means that the meta-verse will always be on i.e. it will remain online for all time and anyone at anytime can have a visit to the virtual world.Similar to how buildings in the actual world are persistent and can only be removed with the owner's consent, the key to a persistent meta-verse is that content can only be destroyed by the author.

3) Interoperatibility : It is the ability of different platforms, technologies, and services to work together and communicate with each other. Due to interoperatibility brands are able to make a lot of profit through these two aspects: security and extensibility. It allows avatars from different virtual worlds to interact with each other. It also helps to reduce the loss of data between different virtual worlds.

4) Self-Sovereignty : It is an emerging concept that centres the control of information around the user. In the context of the meta-verse, it makes something more desirable than the way data is currently stored. Self-sovereignty is digital identity of an individual which are managed by themselves.

5) Community Driven : For any meta-verse experience very first the community plays a crucial role. The meta-verse can bring the community to the next level of interaction with each other within the community or between different communities. Now a days the communities of various brands have the traffic on their websites, social media accounts but with the help of meta-verse brands can make their community experiences just like real world.

6) Spatiality : A meta-verse which is not a spatial has limited opportunities. It enables the people to engage naturally with digital objects, whether they are in the virtual or physical environment. Real and virtual worlds could get smarter because to this spatial data.

II. . MOTIVATION

Over a past few months meta-verse has emerged as a fascinating and extraordinary trend. This technology has seized the attention of many artists, celebrities, brands and business

owners across the globe. In next few years this industry is going to be worth billion dollars. First we spot number of problems that are faced by the people like no time for shopping physically, waste of energy, problems in expanding the business and many more. So we come up with the solution which will provide a user or the customer who can do shopping virtually. The customer can have the same feeling as if the customer is buying the product in physically. This project will also help the people who want to expand their business. Also the customer can talk with the owner of the shop and also can talk with other friends too.

III. Literature Survey

1] The impact of augmented reality on daily life : In this paper a detailed information about the Augmented Reality. This paper gives the detailed information about AR technology and how it started. According to the authors of this paper the AR technology includes graphics, sounds and touch feedback which creates an enriched user experience which includes Computer Vision and Computer Graphics concepts The journey of AR started in the year 1968. There are 4 types of AR which are discussed in this paper 1) Marked Based AR 2) Marker less AR 3) Projection Based AR 4) Superimposition Based AR. All these types of AR are discussed in this paper in detailed. Various applications are discussed in this paper related to AR. The authors also have acquired knowledge about some applications like EyeDecide, AugThat, Zoomkazam. This technology is still under research and development process. The authors have discussed about the car service in detailed. AR is considered as the future of product design according to the authors.

2] AR and VR technology comparison based on user experience : The authors have discussed that the AR and VR technology is extensively used in various fields like education, construction, medical field, entertainment, etc. The authors have done a comparative analysis if AR and VR. All the consequences of these two technologies are discussed in this paper. The authors have taken the example of the real estate display system. According to the authors While VR systems require the creation of a virtual environment, AR systems are very open systems. The authors' conclusion is that AR system is more advantageous than VR system.

3] In the process of digital transformation, augmented reality is used in luxury brand communications : One may argue that the process of communication between a brand and its target audience is a part of the new media environment and is integrated with it via web-based applications. Luxury brand communication can be said to go through this harmony and adaption process more slowly and cautiously than other brand categories. Luxury businesses have, however, also begun to adjust to digital applications and changes like augmented reality (AR) or artificial intelligence. In this way, web page content will be examined. The purpose of this study is to describe the uses of augmented reality in the digital transformation process, assess those uses, and identify how they relate to one another a luxury brand's sample as a basis for communication One may argue that the process of communication between a brand and its target audience is a part of the new media environment and is integrated with it via web-based applications. Luxury brand communication can be said to go through this harmony and adaption process more slowly and cautiously than other brand categories. Luxury businesses have, however, also begun to adjust to digital applications and changes like augmented reality (AR) or artificial intelligence (AI). In this way, web page content will be examined. The purpose of this study is to describe the uses of augmented reality in the process of digital transformation and to assess.

4] Prospects for Using a Shopping Assistance App with Augmented Reality in Physical Stores : The learning system for analysing virtual world objects is introduced, described, and its importance for present research collaboration is highlighted in this study. The proposal for a learning system to share analytical tools between distant locations and various organisations was explored. In order to accomplish the goal, we concentrated on the meta-verse to create a virtual learning system for how to apply the analytical tools online. The system is required to make remote research collaboration between engineers and researchers possible. We created the plan and are currently getting ready for the test runs. The next step will involve creating some analytical tools employing meta-verse prims and doing virtual training. By contrasting training that combines virtual and real-world environments.

5] Virtual reality in Marketing : E-commerce, also referred to as e-retail, is one of the most exciting and fruitful applications of digital marketing. E-commerce is the practise of buying and selling products and services over the Internet and other electronic platforms. When dynamic 3D product models were incorporated, these 2D web-based virtual stores expanded, and these upgraded websites offered a new level of buyer-product interaction. These two encounter kinds are only permitted when dealing with a digital depiction of the product outside of the physical store, which is its usual place of sale. As a result, they are missing a number of other crucial elements of customer involvement in real stores, such as navigation. Virtual environments were used in early VR tests in consumers' homes; they employed low-immersive systems to simulate in-person shopping experiences using computer screens as visual interfaces and conventional input methods.

6] A Metaverse Survey: Foundations, Security, and Privacy : Only a handful of the many security flaws and privacy violations that could occur in the meta-verse include managing enormous data streams, pervasive user profiling practises, unfair AI algorithm outputs, and the safety of physical infrastructures and human beings. First off, since the metaverse makes use of a variety of cutting-edge technology and systems that are based on them, it's feasible that it will pick up on their flaws. Emerging technology incidents have included the theft of virtual currencies, the appropriation of wearable technology or cloud storage, and the misuse of AI to create false news. We talk about the dangers to security and privacy, outline the major problems with meta-verse systems, and look at the most recent defences. The authors define the meta-verse as a completely

immersive, highly spatiotemporal, and self-sustaining virtual shared environment that combines the ternary real, virtual, and human worlds. The article shows how the Metaverse, the emerging paradigm for the next-generation Internet following the web and mobile Internet revolutions, enables individuals to live like digital natives and encounter a novel sort of virtuality. The foundations, security, and privacy of the meta-verse have all been covered in detail by the authors. The main components of a novel distributed meta-verse architecture with ternary-world interactions have also been studied by the authors. In order to develop bespoke security and privacy countermeasures for the meta-verse, they have also researched existing and potential solutions.

7] A Metaverse: Taxonomy, Components, Applications, and Open Challenges(IEEE Paper): This essay discusses themes linked to Avatar, Metaverse, and XR. The most recent Meta-verse approaches that were available at the time and would be needed in the future, including user interaction, implementation, and application. In this essay, it was said In this paper, the taxonomy from Ready Player One, Roblox, and Facebook Research as well as S.-M. Park's article "Metaverse: Taxonomy, Components, Applications, and Open Challenges" was applied to three well-known Meta-verse domains. The authors asserted that they looked at topics of societal influence, limitations, and unresolved problems for the metaverse. As mentioned in this essay, future Facebook research will attempt to input text utilising the brain's computer and peripheral nervous system's output. Differences between virtual reality (VR) and augmented reality (AR) include While virtual reality is entirely virtual, augmented reality makes use of the real world. This paper provides in-depth information on the taxonomy, components, applications, and open challenges of the meta-verse.

8] An exploratory study on augmented reality and the customer journey: The authors claim that the purpose of this paper was to learn more about augmented reality concepts and methodologies.Amazon and IKEA are just two of the many businesses that use augmented reality to provide customers a true virtual experience. Augmented reality enhances the general client experience. In terms of how augmented reality (AR) might improve the consumer experience, there are two typical ways: 1) Customers are more likely to become attached to a product or service if they interact with it. 2) Gather information about the most popular products among customers to boost sales. The role of augmented reality (AR) in the consumer journey is discussed in this study. In 1998, augmented reality officially began its journey. This paper discusses both ways that augmented reality (AR) might improve the customer experience and how it can also negatively affect.The authors claim that a new digital experience called augmented reality (AR) helps consumers turn their real houses into virtual ones.

9] Virtual experiments and there applications to collaborative projects: the framework and its significance: The learning system for analysing virtual world objects is introduced, described, and its importance for present research collaboration is highlighted in this study. The proposal for a learning system to share analytical tools between distant locations and various organisations was explored. In order to accomplish the goal, we concentrated on the creating a virtual learning system using the metaverse for how to apply the analytical tools online. The system is required to make remote research collaboration between engineers and researchers possible. We created the plan and are currently getting ready for the test runs. The next step will involve creating some analytical tools employing meta-verse prims and doing virtual training. By contrasting training that combines virtual and real-world environments.

10] Review of the Literature on virtual reality and retailing: Current Focus, Overarching Themes, and Future Directions: The authors have discussed that how VR can offer the shopping experiences for consumers and retailers, how VR will encourage the retailers to create new designs efficiently. The authors also discussed all the papers of the VR are just focused on the understanding the VR shopping but still there are no consensus exists for how to create v-Commerce stores that work. The report also states that the development of the human factor theory in VR design should be the primary focus of future research.

11] Beyond the hype: Diverse viewpoints on contemporary opportunities, difficulties, and agendas in practising, research, and policy: This essay explores the possibility of the metaverse using augmented and virtual reality technologies. The authors claim that in addition to shopping, people can do business in the virtual world. However, this should be balanced by additional research on the myriad ethical, behavioural, and negative consequences on vulnerable users. The meta-verse is such a fresh and emerging technology, according to the authors, that study on its implications is continuous and expanding. This has affected fields like marketing, education, and healthcare as well as societal effects relating to social interaction factors from widespread adoption. It has also had an impact on issues like trust, privacy, bias, and the application of the law, as well as psychological aspects linked to addiction and impact on vulnerable people.

12] Getting close to metaverses: mixed reality platforms for young media: The main objectives of this essay are to examine the mixed reality environments that young people use when consuming media and to look at prospective metaverses for upcoming interactive narrative experiences. This article describes the main problem the meta-verse is experiencing. The problem, like with the internet, is the absence of a standardised protocol. Concerns about security and privacy are rising as well. The authors assert that Metaverse is not yet extensively used because it is a novel paradigm-based technology.

13] A thorough overview of study areas and future research agenda for augmented reality in retail : The authors of this paper stated that due to the pandemic, the popularity and the hype of metaverse has been increased and also helped to prove that this technology is very important for the consumers and the retailers. The moral implications of adaptive AR experiences, particularly for at-risk groups like children or people with learning difficulties, should be discussed in future

metaverse research, according to the authors. In this paper the authors also discussed about how the clothing, footware and digital skin are enabled by AR.

IV. . CHALLENGES IN METACOMMERCE

Almost everyone is discussing the meta-verse, its evolution, and the possibility of life elsewhere in the universe. Avtars, Blockchain, Non-Fungible Tokens (NFTs), Artificial Intelligence (AI), Machine Learning (ML), and Cryptocurrencies are some examples of its combinations.

1] DATA AND SECURITY IN METACOMMERCE: Despite the fact that huge giants are transforming Security precautions, data privacy, and security have been continuous issues for users of any online environment. The meta-commerce is susceptible to physical harm from cyberattacks.Attackers of virtual reality systems may be able to affect user behaviour.

2] SIGNIFICANT COSTS AND TIME: The Meta-commerce allows a low cost consumption for learning in some fields. To build any Metacommerce platform, requires more time and also require the cost to build. To maintain the servers and maintain the performance of the platform it requires time and cost as more people build their virtual rooms.

3] LACK OF ADVANCED INFRASTRUCTURE: Many meta-verse applications like meta-commerce requires high speed data network to handle all the information across physical and virtual worlds.Due to poor internet connection one cannot get access the to the virtual worlds.

4] COMMUNITY AND NETWORK IN METACOMMERCE: Without a doubt, metacommerce will develop into a platform for interaction and the building of close relationships. Although we are used to talking online, metacommerce must evolve into a space where people may feel emotion and physical presence.

5] TIME AND SPACE IN METACOMMERCE: Meta-commerce envisions an infinite universe, making it first challenging for consumers to fully immerse themselves. Even if the virtual universe is still far off, it might be challenging to build up the meta-commerce. It takes a long time and much effort to create a virtual environment with all of its objects and features.

V. FUTURE SCOPE

Meta-verse is expanding rapidly as more firms are accumulating into the IT sector. Meta-verse has the potential to impact many business areas like marketing, gaming, shopping, workplace, tourism and many more. We can use 3D objects with link instead of adding just a link We can use bots in a virtual store to assist customers so no need of actual executive to be there. We can add human like movements to avatars. Maximum number of users allowed in a room can be changed. It is said that it will unlock trillion-dollar social economy in coming decades. A more technologically advanced home environment that opens up new options for everyone will be made possible by the meta-verse. With more support and funding from tech giants, Meta-verse will develop and strengthen its position as a pioneer in the decentralised market.

The workplace could be impacted by the metaverse in at least four key ways, including the introduction of new digital, AI-enabled coworkers, the acceleration of learning and skill acquisition through virtualization and gamified technologies, and the eventual emergence of a meta-verse. It will one day turn into a powerful tool for creating virtual worlds.

VI. CONCLUSION

The papers in this survey demonstrate the ongoing research and the development in meta-verse which in a new technology paradigm. These papers highlight the challenges, opportunities, data privacy. These papers also highlight the importance of meta-verse for various business fields like marketing, gaming, entertainment, tourism and much more. In these papers they also mentioned which technologies can be used for the betterment of creating the metaverse. Overall, these papers demonstrate exciting potential of Metaverse and its related technologies to solve wide range of problems.

Many companies are attempting to incorporate this technological paradigm into their operations in an effort to elevate the client experience. The metaverse technology has already solidly established the blockchain technology paradigm. It would be premature to predict the metaverse's expansion chart at this early stage in its development.

There are also ongoing debates about the ethical implementations of Meta-verse and its applications, including issues like data privacy, cyber crime, framing law and jurisdiction.

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