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METAVERSE - Bridge between Physical and Virtual System: A Techno-Management Aspect

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Abstract*— In the present scenario, real life problems are solved through the use of advanced technology, such as artificial intelligence, data mining, cloud computing, blockchain and internet of things. Now technology is again coming forward through the advanced version of augmented reality and virtual reality which is called Metaverse. This paper presents a comprehensive assessment of Metaverse as well as the present scenario of this advanced technology. This paper represents linking of Metaverse through the blockchain, artificial intelligence, digital currency and mixed reality etc. At the end this paper also include SWOT analysis as well as future scope of Metaverse in the field of tourism industry.

Keywords: Metaverse, Artificial Intelligence, Blockchain, Mixed Reality, Cloud computing.

I. INTRODUCTION

The metaverse is a fictionalized version of the Internet that is a single, all-encompassing virtual environment made possible by the use of virtual reality (VR) and augmented reality (AR) headsets. It appears in science fiction and futuristic literature. The term "metaverse," which was created by fusing the words "meta" and "universe," first appears in the science fiction book Snow Crash in 1992. The evolution of the metaverse is commonly linked to advancements in virtual reality technology due to the rising demand for immersion. Interest in the creation of the metaverse has lately increased due to Web3, a theory for a decentralized internet **[1, 2]**. **Figure 1** shows the formation of Metaverse.

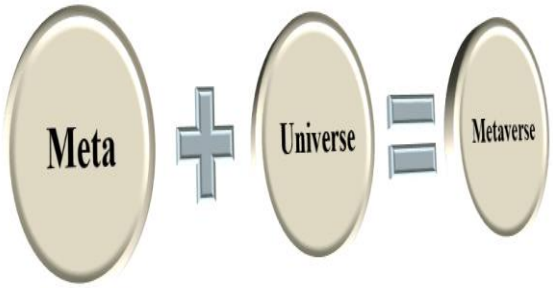

Figure 1: Formation of Metaverse

For public relations objectives, buzzwords like Web3 and the Metaverse have been utilized to inflate the development progress of numerous related technologies and projects. Concerns about information privacy, user addiction, and user safety exist in the metaverse as a result of issues with the video game and social media industries as a whole. The metaverse is a system of interconnected, realistic virtual worlds where users can interact with one another, make and play games, work, and shop. The metaverse can be compared to cyberspace or an advanced, three-dimensional internet where logging in is not required. It might also include aspects of augmented and virtual reality **[3, 4]**. "A highly distributed and compatible system of real-time generated 3D virtual environments that can be accessed synchronously and permanently by a virtually limitless number of users with a continuity of identification, experience, entitlements, objects, conversations, and payments" **[5]**. **Figure 2** shows the different features of Metaverse. Persistence, virtual world, 3-D, interoperable and massively scaled are the properties of Metaverse. Persistence is the action or fact which is composed by Metaverse.

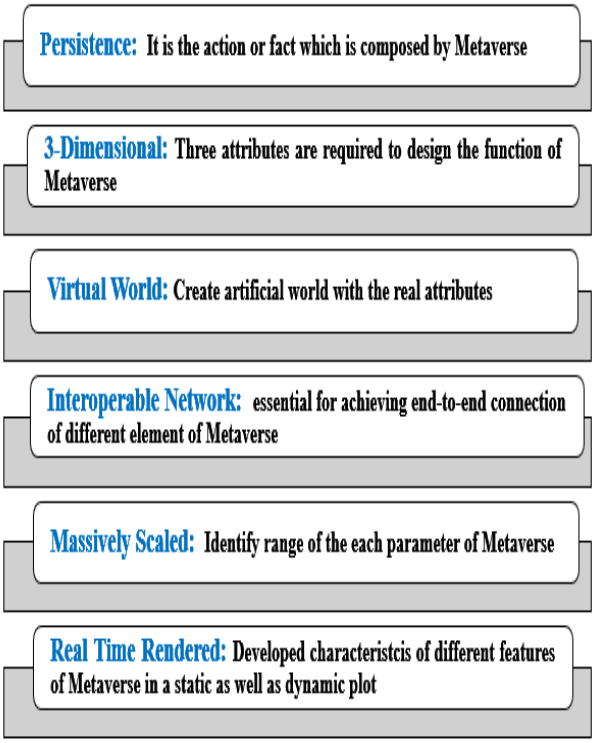

Figure 2: Different Features of Metaverse

The knowledge representation of the metaverse can be a vast and multidimensional concept, encompassing various aspects such as technology, virtual worlds, user interactions,

and societal implications. Following are the high-level representation of the knowledge domains relevant to the metaverse:

- **Virtual Worlds:**
  - Definition and characteristics of virtual worlds.
  - Architecture and infrastructure of virtual worlds.
  - Creation and design of virtual environments, including terrain, objects, and avatars.
  - Physics simulations and rendering techniques for realistic virtual experiences.
- **Metaverse Platforms:**
  - APIs, SDKs, and development tools provided by metaverse platforms.
  - Integration of applications and services with metaverse platforms.
  - Governance models and policies of metaverse platforms.
- **Blockchain and Decentralization:**
  - Introduction to blockchain technology and its applications in the metaverse.
  - Smart contracts and non-fungible tokens (NFTs) for virtual asset ownership and trading.
  - Decentralized identity and authentication mechanisms for user avatars.
  - Consensus mechanisms and scalability challenges in blockchain-based metaverses.
- **User Interactions and Experiences:**
  - Avatars and user customization in the metaverse.
  - Social interactions, communication, and collaboration in virtual environments.
  - Virtual economies, virtual currency, and marketplaces within the metaverse.
  - Gamification elements and interactive experiences in virtual worlds.
- **Immersive Technologies:**
  - Augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies.
  - Hardware devices and peripherals for immersive experiences.
  - User interfaces and input methods for virtual interactions.
  - Haptic feedback, spatial audio, and other sensory enhancements.
- **Ethics, Privacy, and Security:**
  - Ethical considerations in virtual worlds, such as digital rights, inclusivity, and representation.
  - Privacy concerns and data protection in the metaverse.
  - Security challenges and mitigations, including identity theft and virtual asset fraud.
  - Legal and regulatory frameworks for virtual environments and blockchain-based systems.
- **Impact on Society:**
  - Socioeconomic implications of the metaverse, including job creation and economic opportunities.
  - Cultural and societal transformations resulting from virtual interactions.
  - Education, training, and remote collaboration in virtual environments.
  - Potential for virtual tourism, entertainment, and media consumption.

II. STATE OF ART WITH METAVERSE

During the assessment of advanced technology, it is necessary to identify the past work, which has already been done related to that topic. In that case state of art or literature work is one of the best alternatives to identify the past progress of advanced topics. Metaverse is not very old, but some researchers already work in this field. **Zallio et al. [6]** describe different design features of metaverse with their diversity and inclusion. This forecast necessitates taking into account a number of difficulties and possibilities that will affect the Metaverse's design. With the aim of identifying the steps businesses need to take, a qualitative ethnographic study was conducted with industry professionals to examine the impact on society of the Metaverse through the perspective of inclusiveness, diversity, equity, accessibility, and safety (IDEAS). In order to develop a first declaration for inclusion, diversity, equity, accessibility, and safety in the metaverse, the results showed the breadth of future studies questions that will need to be addressed and the analysis that will need to be done. **Oh et al. [7]** describe benefits of metaverse w.r.t. the society. It focused on millennials and Generation Z to see if improved social presence in the metaverse helped young users engage in supportive interactions and if active participation in supportive interactions in the metaverse helped users feel less lonely because of improved social self-efficacy. **Mourtzis et al. [8]** identified different features of value creation through the metaverse. A proposed model for integrating the Metaverse in Manufacturing is also offered in this book, along with problems and opportunities (including Manufacturing) and a brief comparison to virtual reality. **Lee et al. [9]** describe different features of metaverse for remote manufacturing. The Industrial Metaverse's goal in the manufacturing industry would be to accelerate procedures like new manufacturing line startup, remote monitoring and debugging, remote control, and simulation-based new user and manager training. Metaverse technology is regarded as the digital twin of a workspace and adds interactive experience to the configuration layer of cyber-physical systems. **Jaung et al. [10]** describe the creation of a digital forest in the metaverse. This virtual replication of nature has the power to alter users' attitudes, knowledge, and behavior toward it. Despite this

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potential, it's not yet known what kind of consumer demand exists. By performing a discrete choice experiment with university students acting as possible metaverse users, this study evaluates the need for digital forest recreation in the metaverse to close this knowledge gap. The study's findings showed that users prefer digital forest recreation to outdoor adventure and a digital twin with a focus on nature in the metaverse, suggesting that this type of leisure has the potential to affect how people and nature interact.**Aharon et al. [11]** studied the customer opinion about the metaverse. Although the Metaverse may in the future serve as a potential growth engine for businesses, we find that regardless of the size of the companies, the timing of the disclosure, or whether the disclosure was Clear or Vague, there is a short-term positive overreaction in share price behavior that is completely reversed within the 30 days after the announcements. **Thomason et al. [12]** analyzed different features of metaverse in the field of health industry. **Prieto et al. [13]** identified application of metaverse in different social media platforms. This essay's main goal is to look at the mixed reality environments that young people use while engaging with media, while also investigating potential metaverses for future interactive story experiences. The approach begins with the emergent design of metaverses, from their inception to their present condition. The interface of these platforms are then examined based on youth practises, with a focus on the story dimension, after a list of recommended platforms for young people is suggested in the second step.

III. DIFFERENT FEATURES OF METAVERSE

In the advanced topic, it is necessary to identify the different aspects of that technology w.r.t. the different domains. There are different aspects of metaverse in the terms of Decentraland, The sandbox, Bloktopia, Meta Horizon world and Metahero. Following are the point to point discussions about each aspect of Metaverse technology.

Decentraland: Decentraland is a blockchain-based virtual social environment and it is used to create, exchange goods, make money, and discover virtual worlds. A browser-based 3D virtual world platform is called Decentraland. By using the MANA cryptocurrency, which operates on the Ethereum blockchain, users can purchase virtual land parcels on the platform in the form of NFTs. It is governed by the non-profit Decentraland Foundation and opened to the public in February 2020. It functions as the framework for the Decentraland world and is simply a digital ledger that permanently records bitcoin transactions over a network of computers. It offers great chances for learning and having fun with virtual encounters. **Figure 3** shows the different features of Decentraland. **Table 2** shows the python program for the Decentraland.

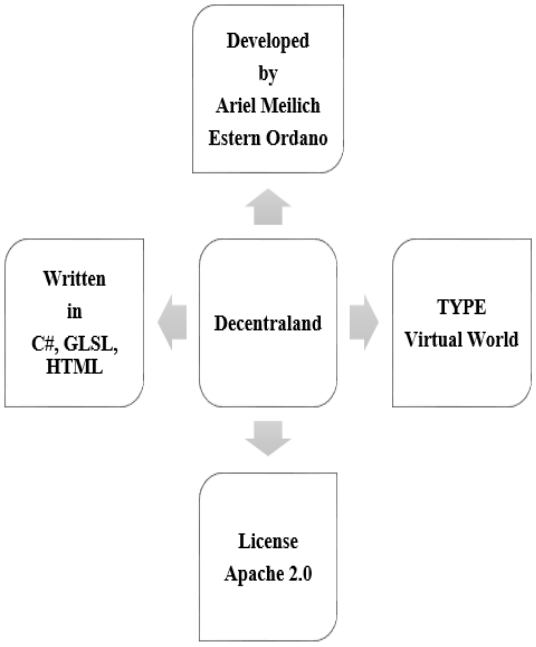

Figure 3: The features of Decentraland

Table 2: Python Program for the Decentraland

```
import requests

def get_parcel_info(parcel_id):
    url =
f"https://api.decentraland.org/v1/parcels/{parcel_id}"
    response = requests.get(url)
    if response.status_code == 200:
        return response.json()
    else:
        return None
def get_parcel_owner(parcel_id):
    parcel_info = get_parcel_info(parcel_id)
    if parcel_info:
        return parcel_info.get("owner", "Unknown")
    else:
        return "Parcel not found"

def get_parcel_coordinates(parcel_id):
    parcel_info = get_parcel_info(parcel_id)
    if parcel_info:
        return parcel_info.get("x", 0), parcel_info.get("y", 0)
    else:
        return 0, 0
def main():
    parcel_id = "0,0"  # Enter the desired parcel ID or
coordinates here

    owner = get_parcel_owner(parcel_id)
    print(f"Owner of parcel {parcel_id}: {owner}")

    x, y = get_parcel_coordinates(parcel_id)
    print(f"Coordinates of parcel {parcel_id}: ({x}, {y})")

    if __name__ == "__main__":
        main()
```

Based on the above program, can create Different Frames of the Decentraland of Metaverse. Following are some key frames that illustrate the experience of Decentraland in the metaverse:

Frame 1: Virtual Land Ownership: Let's denote a virtual land parcel as "L." Each parcel can be represented by its unique coordinates or identifiers.

- Users explore a vast digital landscape, represented as a grid of virtual land parcels.
- Each parcel is owned by an individual or entity, marked by unique designs and structures.
- Avatars navigate through the diverse landscapes, showcasing the creativity and variety of user-generated content.

Frame 2: User-Created Content: We can represent a user in Decentraland as "U." Users can be indexed by a user ID or username.

- Users engage in the creation of virtual structures and environments using Decentraland's development tools.
- Builders construct 3D structures, including art galleries, immersive experiences, virtual homes, and commercial spaces.
- A bustling marketplace highlights the trade of digital assets, with users showcasing and selling their unique creations.

Frame 3: Social Interaction: It can represent interactions between users or users and assets using a set, "I." This set can include various types of interactions, such as communication, transactions, collaborations, or events.

- Avatars gather in designated social spaces, such as virtual parks, plazas, or entertainment venues.
- Avatars communicate through voice and text chat, forming connections and engaging in conversations with other users.
- Users participate in live events, including virtual concerts, art exhibitions, or conferences, fostering a vibrant and interactive community.

Frame 4: Decentralized Economy: It can introduce a currency, "C," to represent the native cryptocurrency (e.g., MANA) used within Decentraland for economic transactions. Transactions between users involving the exchange of assets or services can be represented mathematically using this currency.

- Users engage in economic activities, such as buying, selling, and renting virtual land parcels.
- Digital goods, including artwork, clothing, and collectibles, are traded using Decentraland's native cryptocurrency (MANA) as well as other cryptocurrencies.
- A virtual marketplace showcases the wide range of available assets, demonstrating the decentralized and user-driven nature of the economy.

Frame 5: Governance: Let's denote a set, "G," to represent the proposals and decisions made through the decentralized governance process. Each proposal within G can have a unique identifier, and the decision-making mechanism can be modeled using voting mechanisms or consensus algorithms.

- Token holders participate in the decentralized governance of Decentraland.
- Proposals related to platform updates, improvements, and ecosystem development are voted upon by the community.
- Decisions are made collectively, ensuring the platform evolves according to the needs and desires of its users.

These frames aim to capture the essence of Decentraland within the metaverse, showcasing its emphasis on user creativity, ownership, social interaction, economic opportunities, interoperability, and decentralized governance.

The Sandbox: The Sandbox is a 3D virtual world where users may interact, create items, and earn money. It is hosted on the Ethereum blockchain. Sandbox is compatible with a wide range of gadgets, including smartphones and Windows phones. It offers users opportunities to make money through brand-new virtual experiences. Users can upload, publish, and sell their VoxEdit-made NFT creations on The Sandbox's NFT marketplace. To provide decentralized storage, creations are first uploaded into the IPFS network, and then they are registered on the blockchain to establish ownership. When this is done, the works are then transformed into ASSETS that may be sold by posting an initial sale offer on the market, where buyers can then buy them **[18]**. **Table 3** shows the python program for the Sandbox. **Figure 4** shows the outcome of the python program for the sandbox.

Table 3: Python program for the Sandbox

```
import pygame
from pygame.locals import *
# Initialize Pygame
pygame.init()

# Set up the display
WIDTH = 800
HEIGHT = 600
screen = pygame.display.set_mode((WIDTH, HEIGHT))
pygame.display.set_caption("Metaverse Sandbox")

# Game loop
running = True
while running:
    # Handle events
    for event in pygame.event.get():
        if event.type == QUIT:
            running = False

    # Update the game logic

    # Render the scene
    screen.fill((255, 255, 255))
```

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```
    # Add your 3D rendering code here

    # Update the display
    pygame.display.flip()

# Clean up
pygame.quit()
```

This program sets up a basic Pygame window and starts the game loop. The game loop handles events, updates the game logic, renders the scene, and updates the display. To create a complete 3D virtual platform, you would need to extend this basic program with additional functionality, such as:

Loading 3D models and textures: Use a 3D modeling software or a library like Pygame's pygame.sprite. Sprite to load and render 3D models and textures.

User interactions: Implement controls to allow users to navigate the virtual environment, interact with objects, and perform actions.

Physics and collisions: Add a physics engine or collision detection system to enable realistic interactions between objects and the environment.

Networking and multiplayer: Implement networking functionality to enable multiple users to interact and collaborate within the virtual platform.

Persistence and world building: Introduce mechanisms to save and load the state of the virtual world, allowing users to create and modify the environment.

Figure 4: Outcome of the python program of the Sandbox

Bloktopia: Bloktopia gives consumers an immersive experience through virtual reality. It is a 21-story virtual building that symbolizes the 21 million Bitcoins that are currently in circulation. It gives rise to a number of possible revenue-generating opportunities with new virtual experiences. Avatar customization, a variety of activities, cryptocurrency education, and buying virtual "real estate" in the tower are all available to users. It can be incredibly challenging to find your way through the cryptosphere. Information on YouTube, Telegram, and Crypto Twitter is very fragmented. By presenting itself with a central hub where users can gather and learn in a welcoming environment, Bloktopia will be able to solve this problem. One of the key aspects of Bloktopia is the ability to create and build within the metaverse. Users can design and construct their own virtual structures, ranging from houses and businesses to entire cities. These creations can be monetized by selling or renting them to other users, further enhancing the economic aspect of Bloktopia. **Figure 5** shows the Bloktopia based virtual based structure of the buildings.

Figure 5: Bloktopia based Virtual Structure of the Buildings

Meta-Horizon Worlds: On Horizon Worlds, users can interact socially, conduct business meetings, explore a virtual setting, take part in virtual activities, and play games. Horizon Worlds is one of Meta's VR social apps. The Horizon universe does not use blockchain technology. In addition to accessible VR settings, it includes useful VR building components for content makers such code blocks, audio, and animation effects. Users can engage in social interaction, hold important meetings, explore a virtual environment, participate in virtual activities, and play games on Horizon Worlds. One of Meta's VR social apps is called Horizon Worlds. Blockchain technology does not exist in the Horizon universe. It also contains helpful VR building elements for content creators, like code blocks, audio effects, and animation effects, in addition to accessible VR settings. **Figure** 6 shows the creation of the horizon universe.

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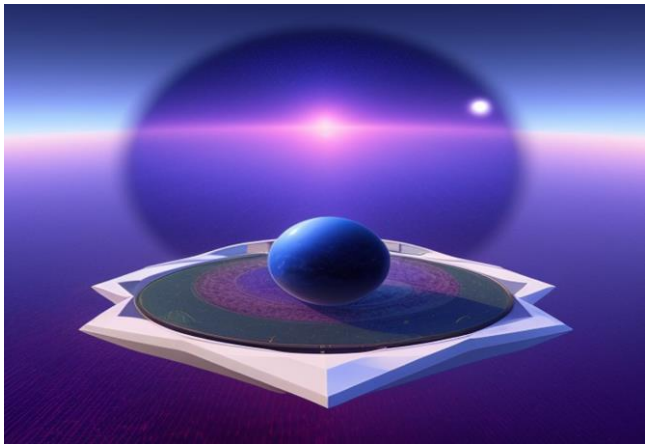

Figure 6: Creation of the Horizon Universe

The Metahero: With the help of the Metahero project, users can scan genuine objects and bring them into the Metaverse as opposed to a virtual world. It focuses on using ultra-HD photogrammetric scanning technology to digitize tangible artifacts. In order to create incredibly lifelike 3D avatars and virtual objects for usage in games, virtual reality, social media, and online fashion, Metahero has developed 3D scanning and modelling technology. The technology also enables the production of NFTs from genuine artwork and collectibles **[19]**.

IV. CROSS-CONNECTION OF METAVERSE

In the world of globalization, any of the advanced technology is also interconnected with the other technology and finds out the solution of real world problems. Metaverse is not a single concept and it depends on the concept of other recent technology, such as Blockchain, Mixed Reality, Internet of Things and Artificial Intelligence. Following are the assessments of Metaverse w.r.t. The other technology. **Figure 7** shows which technology interconnected with Metaverse.

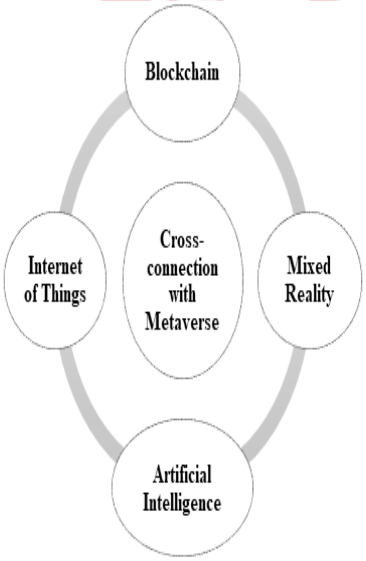

Figure 7: Cross-Connection of Metaverse

Metaverse with Blockchain: Blockchain is an essential part of the Metaverse because it gives users the ability to protect their virtual assets and provides them with digital proof of ownership. Data volume, value, and importance of safety and dependability are increasing in the Metaverse. To assure data authenticity in the Metaverse, blockchain expertise and technology are required, and artificial intelligence is used to safeguard its diversity and depth of content.

Metaverse with AR and VR: By leveraging mixed reality and AR/VR technology, users of the Metaverse will be able to have more interactive experiences that blend the real and virtual worlds. It is easy to see why the Metaverse is growing in popularity every day: it will make video games come to life, live performances like concerts and plays, and educational or professional contacts appear more real. AR and VR are the primary building pieces of Metaverse projects. The connectedness of real and virtual surroundings, real-time interaction, and precise 3D object rendering are three essential elements needed for augmented reality systems to work. The metaverse, which combines virtual reality, augmented reality, and mixed reality, will make it harder to distinguish between online and offline interactions. It wants to develop into a place where we may work, shop, play, and interact. A handful of data driven firms like Adidas and Balenciaga have already blended into the realm of metaverse **[20]**.

Metaverse with Artificial Intelligence: AI can be used in a variety of ways to supply the enterprise applications of the Metaverse. AIOps, a branch of AI that soon will include Metaverse systems, uses machine learning to help businesses manage their IT infrastructure. Additionally, corporations are using chatbots that are driven by AI more and more frequently. AI bots with realistic avatars can be used in the Metaverse for a variety of tasks, including marketing, customer service, and sales.

Metaverse with IOT: IoT and the Metaverse will make it possible for tech professionals to build digital twins or duplicates. Through virtual beings and digital duplicates, IoT offers the Metaverse immersive use-cases and experiences. It gives the metaverse the ability to provide its users with such lifelike virtual experiences. Experts in technology will be able to build digital twins or duplicates thanks to the Metaverse and IoT. Through digital replicas and virtual beings, IOT offers the Metaverse immersive use-cases and experiences. It is essential to the metaverse's ability to provide consumers with such lifelike virtual experiences. **Figure 8** shows the roadmap of Metaverse.

In the near future, Metaverse with IOT will work in the field of inventory management, supply chain management, promotional Ads and to identify potential customers. Metaverse can track the inventory level and it can maintain it in advance and the system raises the alert due to insufficient inventory. With the combination of metaverse and IOT, compensate for the limitation of Machine to Machine device

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management platform, solution delivery platform **[21]**.

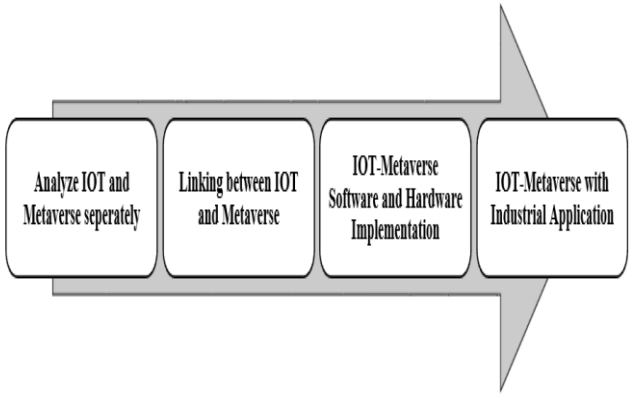

Figure 8: Roadmap of Metaverse and IOT

Metaverse with Big Data Analysis: Business operations might be altered by the metaverse, and there will be a lot of information to manage as a result of the exponential growth in data generation that is predicted to exceed 160 zettabytes by 2025. By 2024, the Metaverse industry might be valued $800 billion. Businesses will be able to gather and analyze vast amounts of data from internal and external sources within platforms as the metaverse expands in order to acquire detailed, practical insights about audiences and their common interests and intentions. **Figure 9** shows the application of different attributes of Big data in the field of Metaverse.

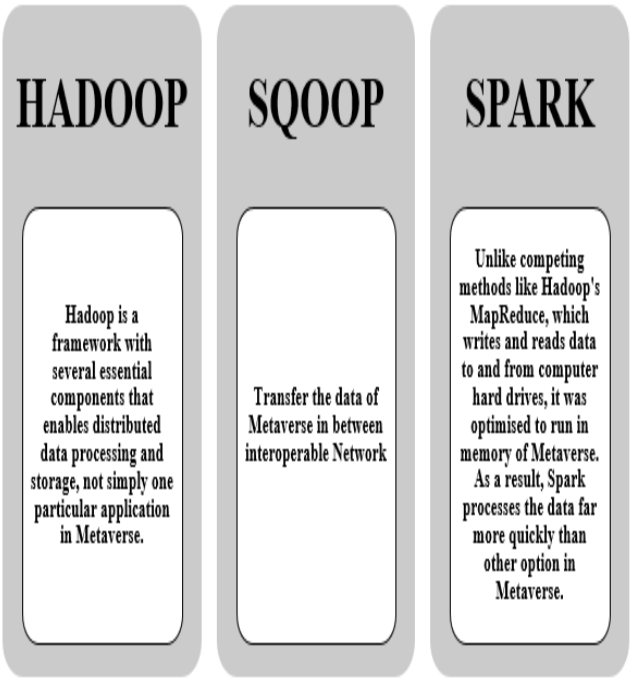

Figure 9: Role of Big data analysis in the Metaverse

Metaverse with Digital Twinning: A virtual representation created to faithfully represent a physical object is called a digital twin. A wind turbine, as an example of an object being researched, is equipped with a variety of sensors that are important to its functionality. These sensors generate information about a variety of performance characteristics of the physical device, including energy output, temperature, environmental conditions, and more. The processing system then applies this information to the digital version. As the divide between the physical and digital worlds continues to shrink, the digital twin in the metaverse represents the next significant development in human technology. As the divide between the physical and digital worlds continues to shrink, the digital twin in the metaverse represents the next significant development in human technology. On the other hand, the metaverse technology symbolizes a complete virtual world where everyone and everything interacts just like they would in the actual world. Following the adoption of the technology by numerous cryptocurrency networks, the idea of the metaverse has garnered a lot of popularity. We can create a digital version of the real world by combining digital twins and the metaverse. We can successfully conduct what-if scenarios as long as we are providing the metaverse's components with accurate and real-world data.

Metaverse with Industry 4.0: Technologies like distributed ledgers, digital twins, and artificial intelligence become crucial facilitators as the global industrial complex moves toward realizing the principles of Industry 4.0 and beyond. The metaverse is currently evolving, and the industrial sector is leading the way by innovating to prepare the environment for the future. It aims to provide flexible manufacturing by utilizing the advantages of cutting-edge digital technologies that are intended to increase the usefulness of the virtual world. With the aid of cutting-edge technology, manufacturers are working diligently to establish the infrastructure necessary for digital investments, IT/data centers, and supply chains. By 2025, the Industrial Metaverse will generate $540 billion in income as businesses start utilizing Industry 4.0 capabilities. Digital twins, which represent actual items in the Metaverse, are one of the principal applications of the Metaverse. Although some businesses are currently utilizing the technology, its use is anticipated to increase. The Industrial Metaverse is anticipated to take the lead because of the extensive digitalization of big production facilities and the steadily improving infrastructure, including the “Internet of Things ” and digital twin technologies.

Metaverse with Digital Currency: Cryptocurrencies built on blockchain technology may make it possible to do business in the metaverse. Instant, direct, cost-free peer-to-peer transactions over the internet are what cryptocurrencies offer. NFTs may be used to verify ownership of objects in both the digital and real worlds. Although cryptocurrency (Bitcoin (CRYPTO:BTC) is the first of hundreds of cryptos) and the metaverse, which are essentially three-dimensional immersive virtual worlds, are two quite distinct things, they may become increasingly dependent on one another as they advance. This is where cryptocurrencies and apps created on a blockchain enter the picture with the possibility of e-commerce and social

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engagement. Direct peer-to-peer transactions over the internet carry the promise of cost reductions down to zero and rapid settlement of money. An NFT (non-fungible token) can be used to ensure ownership of items. These items can be works of art, digital collectibles, or digital replicas of real-world purchases, like a pair of sneakers from Nike (NYSE:NKE), which you can wear in the metaverse. The goal of the NFT initiative Crypto Baristas is to close the gap between the real world and the digital one. Those who own a Crypto Barista NFT persona have access to a metaverse where they may connect with other coffee lovers. But this isn't simply a location to get a digital coffee. Additionally, the initiative is funding Coffee Bros., a real café in New York City that will collaborate with coffee growers all over the world (the first being an established farmer in Honduras) **[22, 23]**.

Metaverse with cloud computing: A virtual reality universe requires a lot of processing power and storage, therefore the metaverse will really be great for cloud computing. Remote cloud-based computing will be the only practical solution when more performance and information are required. If the metaverse turns out to be as large as many believe, the cloud will benefit greatly. Here are five potential effects of the metaverse on cloud computing. If the main public clouds do invest in hosting the metaverse, I predict they will do so by introducing managed services that will essentially be metaverse-as-a-service, or fully hosted and managed options that let users quickly create their own, unique metaverse settings. Making sure that bandwidth restrictions or internet connectivity issues don't interfere with users' ability to effortlessly enjoy the metaverse is one of the primary technological concerns that may occur as the metaverse grows. There is already solid reason to think that personally identifiable information in the metaverse will need to be safeguarded in the same manner that it is protected in a traditional cloud environment, even if it is unclear how regulators would define or handle personal information there. The need for hybrid cloud architectures as a method of hosting metaverse environments is anticipated to arise from the need for improved performance and the requirement for strong data security. **Figure 10** shows the importance of different technology in the field of Metaverse and in which way, such type of technology is utilized in the Metaverse.

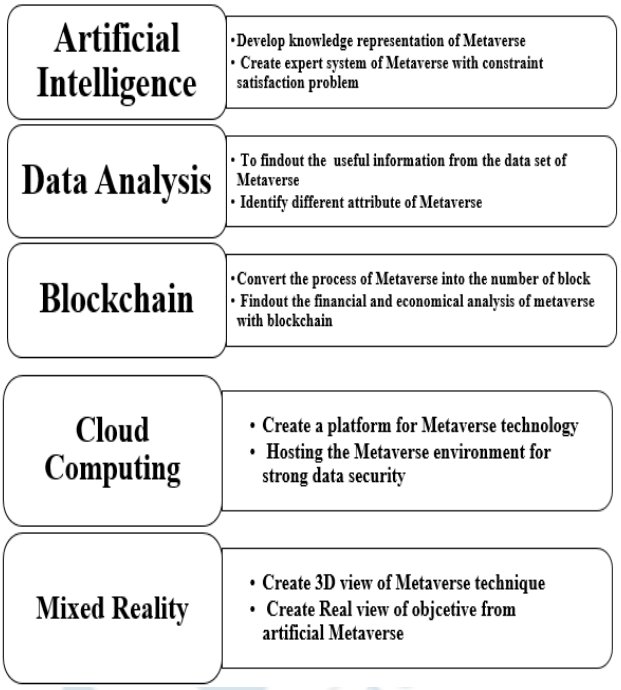

Figure 10: Role of different technology in the field of Metaverse

V. ASSESSMENT OF METAVERSE THROUGH THE SWOT THEORY

Using a SWOT analysis, a person or organization may determine their strengths, weaknesses, opportunities, and threats in relation to project planning or competitive business environments. Situational analysis or situational evaluation are other names for it. Table shows the assessment of Metaverse technology with the help of SWOT theory. **Figure 11** shows the assessment of Metaverse w.r.t. the SWOT theory.

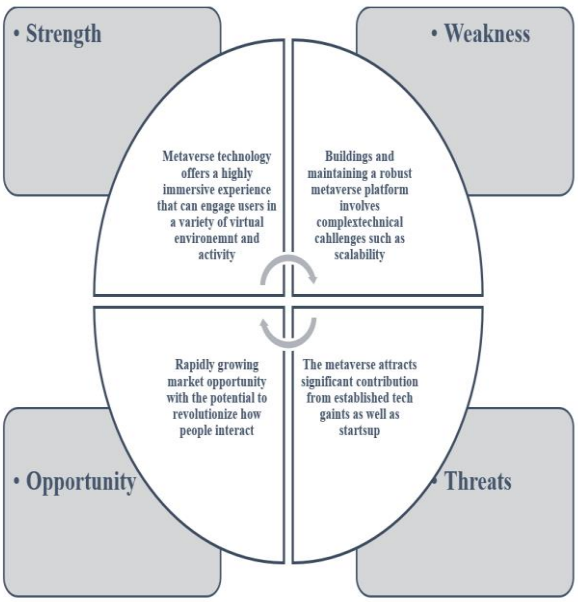

Figure 11: Assessment of Metaverse through the SWOT theory

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VI. FUTURE SCOPE OF METAVERSE - IN TOURISM INDUSTRY

The application of the metaverse in the tourism industry holds great potential to enhance and transform the way people explore, experience, and engage with travel destinations. Following are several ways the metaverse can be applied in the tourism industry:

Virtual Destination Exploration: The metaverse can offer virtual replicas of real-world travel destinations, allowing users to explore and interact with them from the comfort of their own homes. Through immersive virtual reality experiences, users can visit famous landmarks, historical sites, natural wonders, and cultural hotspots, providing a preview and enticing them to plan physical trips.

Virtual Travel Experiences: The metaverse can enable virtual travel experiences that provide a sense of presence and immersion. Users can engage in virtual tours guided by locals or experts, offering a deeper understanding of the destination's history, culture, and attractions. These experiences can include interactive elements, such as virtual interactions with locals, trying local cuisine virtually, or participating in virtual events and festivals.

Collaborative Travel Planning: The metaverse can facilitate collaborative travel planning by allowing users to connect and share their experiences, recommendations, and itineraries. Users can interact with fellow travelers, exchange tips, and gather insights from a community of like-minded individuals, making the planning process more interactive, personalized, and engaging.

Virtual Travel Agencies: Virtual travel agencies within the metaverse can provide personalized travel assistance and services. Users can interact with virtual travel agents who can offer tailored recommendations, book accommodations, flights, and activities, and provide real-time support. These virtual agencies can leverage AI technologies to understand user preferences and provide customized travel options.

Virtual Events and Conferences: The metaverse can host virtual tourism events, conferences, and trade shows. This allows participants from around the world to virtually attend and engage with industry experts, tourism boards, travel agencies, and other stakeholders. Virtual events can provide networking opportunities, educational sessions, and showcase destinations, promoting tourism and fostering collaboration within the industry.

Augmented Reality (AR) Travel Guides: By integrating augmented reality into the metaverse, travelers can have interactive AR travel guides that enhance their physical experiences. AR overlays can provide real-time information, historical context, and points of interest as users explore a destination, adding an extra layer of engagement and knowledge to their journeys.

Virtual Souvenirs and Collectibles: The metaverse can enable the creation and trade of virtual souvenirs and collectibles associated with travel destinations. Users can own and display virtual items that represent their travel experiences, such as virtual artworks, virtual replicas of landmarks, or unique digital collectibles specific to a location.

These are just a few examples of how the metaverse can be applied in the tourism industry. As technology continues to advance, we can expect even more innovative and immersive ways to enhance the travel experience through virtual and augmented reality within the metaverse.

VII. CONCLUSION

The metaverse, like the internet, may offer significant advantages in some circumstances. However, it may also significantly aggravate already existing societal issues. Governments and businesses already violate people's civil rights, autonomy, and privacy through internet surveillance. By disseminating false information and shielding users from opposing viewpoints, social media promotes polarization. Platforms share user information with other businesses under the surveillance capitalism paradigm so that those businesses may precisely target those users with ideas or products. Users frequently have no idea that their information is being collected, sold, or used to target them with certain news or items. These problems could get worse or turn into something altogether new in the metaverse. But there could possibly be advantages we haven't completely understood yet. However, it is important to acknowledge that the metaverse is still in its early stages of development, and many challenges and considerations need to be addressed. Issues such as privacy, security, digital rights, and the equitable distribution of resources and opportunities within the metaverse will require careful attention. The future of the metaverse will depend on the collaboration of various stakeholders, including technology companies, developers, policymakers, and users. As the technology continues to evolve and mature, it is crucial to ensure that ethical and responsible practices are implemented to harness its full potential for the benefit of society.

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