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INVESTIGATING THE EFFECTS OF THE METAVERSE ON BUSINESS MODELS

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Abstract: The word "metaverse" combines the concepts of the digital with the supernatural. People may interact with one another, form communities, and conduct economic operations, all in this digital environment. The recent buzz surrounding the metaverse is due to the coming together of many mature technologies for handling material in various forms, conveying that content, and presenting it to the user. It's inevitable that the Virtual world will have a growing effect on the way organizations do business, both in the present and in the future. It is vital to determine the value of a remedy in the Virtual world in comparison to analogue or digital solutions before migrating existing operations there. The sense of familiarity that is imparted is crucial in comparison to state-of-the-art apps. Also essential are the development of novel approaches to interacting with customers over the internet. Concurrently, adjustments should be made to the fundamental core operations, and cost savings opportunities should be exploited. This article outlines the steps people may take to gain entry to the Virtual world and cope with the repercussions inside their organization.

Keywords: *Metaverse, Augmented Reality, virtual reality, business model.*

1. INTRODUCTION

The term "Metaverse," a portmanteau of the words "meta" (beyond) and "verse" (world), refers to the next generation of the internet in which users can engage in simulated social interactions. The metaverse is "a place where you can use real-time data to interact with virtual items in the physical world." Technology, hardware, and data about everything in the real world are the three pillars of the metaverse. There are seven tiers to the metaverse concept: user

experience, exploration, creator economics, spatial computing, decentralized control, user interface, and physical infrastructure[1].

The science fantasy novel Snow Crash by Neal Stephenson 1992 introduced the term "Metaverse." A virtual reality (VR) setting where individuals owned avatars and spoke with one another and even built relationships with artificial bits of intelligence. The universe in Neal Stephenson's book is very similar to the real world today. Individuals spend more time online than offline because the internet is integral to the functioning of modern society. Furthermore, people's communication styles have evolved, with more frequent and intense exchanges becoming the norm[2]. We predict that the internet of information will soon give way to the internet of value, with Avatars (Digital Accounts) and value mediator Oracles becoming the new standard economic models as more digital asset exchanges take place online. MVS was named after Neal Stephenson's novel Metaverse shown in fig 1.1[3].

According to its own subtitle, "virtual is the future, and the future has come," the term "really" describes a transition from the physical to the digital realm. Super-realism is a hallmark of Really metaverse, a KOOOLA virtual city and AAA Metaverse gaming product. The seamless integration of social media, online shopping, video games, and commercial exchanges represents a seamless union of the virtual and the real[4].

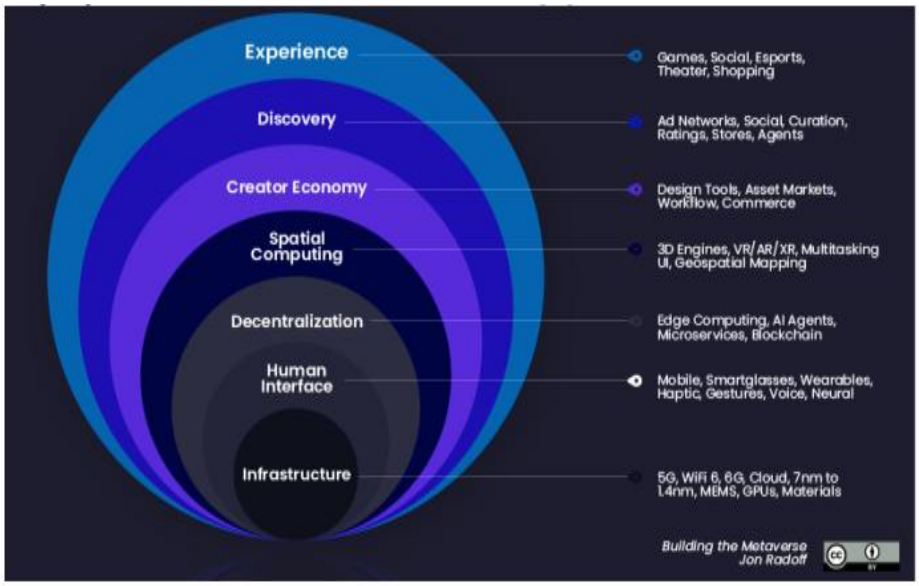

Fig 1.1 Architecture

The following patterns of the present VR/AR market were uncovered by first conducting competitive assessments. Companies that make video games took the initial moves toward

creating a metaverse-like environment[5]. These businesses built digital marketplaces where users could buy and trade digital goods, and they provided tools to encourage developers to work together. However, making information modelling and VR technologies aren't just useful for the gaming industry. Unity technologies, for instance, put their cutting-edge wares to use in the auto, transportation, manufacturing, film, animation, cinematic, government and aerospace, AEC, gambing, and education technology sectors. As a result, businesses catering to gamers have the means to establish virtual environments similar to the metaverse[6].

2. LITERATURE REVIEW

Mark Zuckerberg, CEO of Facebook, changed the name of the firm to Meta Interfaces Inc. on October 28. Zuckerberg said that Meta's mission is to "bring the metaverse to life" through facilitating interpersonal interactions, the discovery of new communities, and the development of new enterprises [7]. He listed several potential uses for this type of digital platform, including improving social connections through the use of a horizon home, revolutionizing our perspectives on entertainment, gaming, fitness, education, and commerce, and fostering cooperation among employees regardless of their physical locations [8]. Mark Zuckerberg argues in his keynote that the virtual world is more than just a new stage for Facebook. I like to think of it as the internet's next big thing. As a result, we chose to analyze Facebook's business model since it is indicative of the direction the emerging digital platforms market is taking [9].

However, only Microsoft and NVIDIA have such platforms, so it's apparent that Meta is one of many in its ambition. Microsoft's platform is known as Microsoft Mesh. At the moment, we can use it to work together digitally in a number of ways: we can learn together remotely, access distant knowledge, and even create something in 3D simultaneously [10]. Using the NVIDIA Omniverse, many 3D environments may be linked together to make a single persistent online setting. The BMW Group is only one of the many corporations that has used this technology successfully. The BMW Group is utilizing NVIDIA Omniverse to build a digital duplicate of its future manufacturing. Digital design and full simulation throughout the entire process in Omniverse [11]. The instance demonstrates the usefulness of technology like digital twins in managing factory-wide procedures. It's important to note that Apple and Google

approach virtual world technologies and platforms with notably different priorities [12]. They're putting more effort on AR systems. These systems may be accessed using standard mobile devices and require no additional hardware to function. The primary goal of these programmes is to facilitate regular tasks and increase the usefulness of mobile devices [13].

Business model shifts, not only new technologies or financial resources, are responsible for the most dramatic and pervasive market shifts in recent history. Rebuilding the business model is necessary if a corporation wants to innovate new technologies, increase profits, and alter the market [14].

Business models (BMs) have evolved into an essential instrument for commercializing discoveries since they provide a framework for a firm to employ in order to build and extract value from technological advances or unique ideas. Due to their elevated status as innovation's primary motors, BMs are now a key point of difference in the marketplace. When considering the ever-evolving nature of the environment in which businesses operate, even a BM that has been in place for some time and is now generating profits should not be considered a permanent fixture. Researchers increasingly recognize the capacity of a corporation to alter its BM before being compelled to do so by external pressure, particularly in turbulent situations, as a crucial competitive advantage factor. Due to the growing consensus that BMs must evolve, there has been a proliferation of scholarly works on innovation in business models (BMI). Furthermore, BMI has been cited by some authors as a practical means by which businesses may adapt to shifting environmental conditions and the sources of value creation .

The social media behemoth Facebook is an example of a company under intense external pressure in a volatile business climate . The usage of social media has risen in the recent decade, with Facebook's platforms boasting 2.9 billion monthly active subscribers as of the third quarter of 2021. After a series of massive acquisitions and rapid expansion, the firm is now also the largest provider of photo-sharing services with Instagram, the most widely used instant messaging service with WhatsApp, and the market leader in virtual reality glasses with Oculus [15].

However, Facebook has recently been subject to a barrage of criticism, which has damaged the company's reputation and caused users to lose faith in the platform. Some of the company's most prominent issues stem from the Cambridge Analytical data-picking incident,

which was revealed in 2018. In table 2.2 shown the incident involved 87 million records that were used for sophisticated and decisive targeting during the presidential campaign of 2016 between Hillary Clinton and Donald Trump. Antitrust probes, privacy and security worries, and the company's reputation for a hostile work environment and poor management all plagued the business.

Table 2.1 Findings Dimension

Findings Dimension	Description
Technology use	Depending on your goals for the metaverse, you should invest in a suitable degree of technology. A business can save time and effort on non-value-added tasks by using emulators and interactive rules developed with the help of technology.
Structural change	It's essential for a virtual world service provider to think of new ways to make money, such as the sale of digital goods and the implementation of non-fungible token economies.
Financial readiness	Exploratory and discovery-based advertising approaches are projected to become increasingly prevalent as the number of available advertising channels grows. The optimal performance of a company's strategic positions in a metaverse requires the use of big data and AI technologies, both of which need the restructuring of the company's internal structures.
Stakeholder credibility	A provider of services shall put in place safeguards to detect and stop discrimination on the basis of sexual orientation, racism, and unlawful commerce. Timely system updates are necessary to appropriate a cultural norm that prioritizes user happiness. The metaverse service provider must also safeguard its consumers' data.
Financial sustainability	Users who are interested in exploring the virtual world for its own sake should be served by a service provider who reliably provides them with engaging events. Moreover, the legal difficulties that users face in their commercial endeavours should be given more consideration.

3. METAVERSE DESIGN PRINCIPLES

a) Minimalist Design Principle

Blockchains may be thought of as digital ledgers, the primary purpose of which is record keeping. MVS will focus its digital asset and digital identity ledger designs on chronicles themselves rather than precipitating application content on top of the ledger's core features. By implementing suggestions via the Metaverse Improvement Proposal system, we want to maintain all features as straightforwardly as possible while also strengthening the system's foundation (MIP). The minimalist design philosophy is based on this idea.

b) Stable Evolution Principle

Only two occasions occurred during MVS's history where MIP was needed:
(1) improving fundamental capabilities,
(2) fixing vulnerabilities.
Even so, MIP should guarantee the dependable operation of the Metaverse blockchain.

c) Compatibility Principle

All desktop and mobile operating systems must be supported by all MVS updates, and there must be backward compatibility.

d) Modular Design Principle

When implementing MVS, a layered device structure was adopted to lessen the dependence between individual modules.

3.2 Technical basis

1. Unreal Engine

Hyper-realistic visual virtual worlds are developed with the help of the independent game engine Unreal Engine 4, which means that thousands of applications and games have been running on the "stack" of its tools and software, streamlining processes and making it more straightforward for the Realy virtual world to share assets, integrated experience, and information. Multiple classic media experiences make use of Unreal Engines. Disney's "The

Mandalorian" was shot and recreated in Unreal, allowing director Jon Favreau to immerse himself in the digital set-in order to arrange shots and place actors better. Since the majority of the scenery and materials in the game already exist, the viewer is also free to explore most of the settings. Live events are another popular medium for employing Unreal Engine outside of media production. For instance, Fox Sports' NASCAR scenes rely on Unreal Engine, which also serves as the foundation for other applications like Realy metaverse online avatars and technical assistance for concerts.

2. New Frontier Technology (NFT) for Virtual Products

Any digital good can be represented by a non-fiat token (NFT), which grants the buyer legal title to the digital interest. Officially, companies can distribute NFTs for in-game items, including virtual land, virtual apparel, virtual pets, and in-game mounts. Using encrypted NFC chips, certain name-brand NFT devices are able to create a 1:1 mapping between real-world and digital goods. Users are able to grasp both real and digital things in their hands. Avatars made using face-squeezing tools, virtual apparel made with clothing tools, 3D model buildings that match technical specifications, furniture, decorations, artworks, films, etc., may all be individually minted by players as NFTs.

3.) What are the differences between centralized and decentralized wallets?

During Web3, users' decentralized identities will be stored in their digital wallets. Users will gain ownership of their own knowledge, data, and social networks. Access the Realy ecosystem's many offerings and the metaverse at large with only one login to a decentralized wallet. However, for Realy, it's crucial that the barrier to entry for blockchain use be lowered in order to entice more regular internet users. It exemplifies the benefits offered by Realy's various companies, celebrities, and artists, and it does it in a compelling way. To address this issue, Realy has created a centralized custodial wallet system separately. To receive a wallet address, users need to sign up with their phone number or email address and use any of the free Realy blockchain products. By working with both centralized and decentralized wallets, Realy can attract a much larger user base. As a corollary, once users of centralized wallets have developed sufficient competence in remote control of data assets and other areas of blockchain awareness, they are free to switch to decentralized wallets, and likewise, the holdings of centralized wallets are free to enter and leave the wallets.

4.) support for several chains

The Realy metaverse is the first virtual town metaverse product built on the Solana platform. The Realy ecosystem is, however, also compatible with several chains. More than a hundred thousand people have signed up for Realy, which has integrated with Binance Smart Chain and offers items that facilitate non-virtual currency (NFT) transactions involving real-world goods like clothing labels, art toys, footwear, and the like. Metaverse goods developed by Realy will provide the Web3 community as a whole with hyper-realistic and immersive experiences, and Realy will help other public chains, such as Ethereum, in doing so.

(5) Internet of Things (IoT) chip with the holographic display

Holo-projection, 3D projection, augmented reality, and virtual reality are all examples of equipment and technologies that may be used to realize the merging of virtual and reality in terms of content. Users of Metaverse content items like virtual concerts will benefit from Realy's partnership with top technological firms. For its anti-counterfeiting, one-to-one correspondence, proper confirmation, and physical-virtual good transactions, Realy use NFC IoT chips that are encrypted and converted into NFTs. It's a tool and technique for making mass-market virtual reality a reality.

3.3 General Impact of the Metaverse on Business Models

It has been established in other chapters that the metaverse may virtually support both traditional and novel forms of activity, with a wide variety of outcomes. It will be required in many industries to either modify existing, very successful business models or to create whole new models in order to facilitate or promote these virtual activities. There is a wide variety of possible company models. While it is true, as Baumann notes, that "how viable business models may be developed in the Metaverse"7 is not entirely evident, first concepts for economic models in the metaverse for both individuals and businesses are already developing and will be examined more below. Depending on your point of view, the metaverse's transitions might be either an advantage or a burden. In this chapter, we will first look at the potential and difficulties in broad strokes, and then drill down into specific discussions based on a few different sectors. For the purposes of this chapter, we will be using a simplified version of the "Business Model

Canvas" (BMC)8 framework, which would be widely used in the development of business models and which features the following dimensions:

- Value proposition
- Target groups, customer relationships & sales channels
- Revenue streams
- Key activities, resources & partners
- Revenue streams

Impact of the Metaverse on Business Models in selected Industries
There isn't much of a gulf between digital games, which are typically already in high resolution, and virtual ones. It's good knowledge that virtual reality glasses make games more exciting and lifelike by allowing players to immerse themselves in the action entirely. Likewise, playing games online with others and buying extra content within a game are all examples of a trend toward digital distribution. Additionally, social networks revolving around specific games already exist. As a result, the metaverse's impact on business models will be relatively minor, focusing instead on the development of new channels for distributing games and facilitating a seamless evolution from Metaverse-based activities and pursuits to gaming in the Virtual world.
Tourism, real estate marketing, the fashion sector, and furniture shopping are just a few examples of established markets where the use of XR to test out things has increased the value offer. While virtual reality is utilized everywhere, augmented reality is seeing rapid growth in the fashion and design industries. Clothing and furnishings may already be selected, tried on, and purchased digitally through the use of augmented reality (AR) technology that projects the item onto a digital mirror for "virtual fitting" or into the camera view of a smartphone. If a company can save enough on physical display goods to outweigh the expense of the virtual presence, the result is a more efficient cost structure. However, businesses will need to take precautions to establish a robust community for long-term client connections with these goods.

The automobile sector is experiencing a similar shift, with customers increasingly able to customize and purchase vehicles online after viewing them visually. However, the age requirement for obtaining a driver's licence restricts the accessibility of non-automated cars. Children who do not yet have their driver's licences may nonetheless get a feel for the product

and the brand through virtual test drives in the metaverse. This is an excellent method to start off with a solid foundation of trust with your customers.

The distribution of food is one of the relatively new industries that has been influenced by the metaverse. The popularity of delivery services has exploded in recent years as a result of their ability to quickly and efficiently fulfil customers' online orders from businesses like restaurants. Most of these services provide either immediate delivery or the option to choose a delivery time, but only for a single address. A decent user experience, however, necessitates that persons whose physical locations are far apart, in reality, all receive their meals at the same time and at the exact physical locations where the rest of the group is eating. In this regard, delivery services must shift their focus from "as soon as possible there" to "just-in-time everywhere."

The usage of online dating sites has been commonplace for many years now. More options for interacting with one another in a digital setting are made possible by the metaverse. When making first contact, users in the metaverse can benefit from the anonymity and safety provided by the virtual environment, somewhat of the risks associated with in-person encounters. Tinder and other early platforms are already planning to expand their value in this way. Long-term, it's possible that only avatars meet in the virtual world at first, and that these meetings pre-select potential mates for the actual people, based on the preferences of the assigned individuals. Saving people so much time with automation like this would be a huge benefit.

The Corona epidemic has sped up the process of digitizing formerly analogue sectors, like as cooperation and education. The metaverse not only enhances the value offer, but also enables us to successfully engage even more individuals in these areas, independent of their physical location, provided the necessary technological infrastructure is in place. Aside from allowing clients to see production equipment and goods using their avatar in real time, the metaverse also presents a chance for manufacturers to teach their own personnel on sophisticated gear without having to travel far or halt production. As a side benefit, this can help bring about greater equality in the workplace. There is a notable improvement in the BMC's namesake areas due to greater integration of significant resources among staff and the introduction of new client groups via new channels.

Real people have emerged in recent years as powerful influences in the marketing sector. However, the initial wave of digital influencers like Lil Miquela are now reaping the rewards of

their efforts as well. This movement toward more exclusively virtual identities may speed up in the metaverse. The elimination of the need to rely on a human individual, who has finite resources (such as time off for eating and sleeping), would have a profound impact on the BMC field of customer interactions, allowing for the possibility and automation of constant marketing efforts. Increased velocity in communicating with consumers might result from this.

The healthcare sector is also fascinating since it is one area where analogue activities will always exist. Through audiovisual communication technology, telemedicine has made it feasible to consult a doctor remotely. Patients will be able to pinpoint their problems better and provide vital information to their doctors via the metaverse, thanks to controllers and other sensors that can broadcast physiological data like pulse and movement data. Similar to how AR may be used to show pictures of CT scans directly onto a patient, VR can aid with surgical procedures. The metaverse also has the potential for application in medical training simulations. By enhancing the core functions of medical consultation in the BMC domain of the same name, the metaverse may provide a patient with an improved value proposition.

The metaverse has an impact on not just businesses but also universities and governments. This white paper shows how the metaverse may provide research institutes with a new frontier on which to conduct their most important studies. Metaverse also provides fresh avenues for disseminating scientific findings, especially among the young. The metaverse provides opportunities for governments to engage in virtual conversations with their constituents and to streamline the performance of some bureaucratic tasks that have significant impacts on the public. However, it's feasible that providing both physical and digital versions of a product like a passport might result in extra expenses for running two separate systems. A city's finances may also be profoundly affected by the metaverse. While companies benefit from the metaverse's scalability because it frees them from physical capacity limits, governments lose out on money that would have come from renting out actual event locations like stadiums.

4. CONCLUSION

This study serves as a springboard for future research efforts aimed at assisting businesses in making productive use of the metaverse. Further, companies will receive scientific guidance as they explore and utilize the metaverse to find the most effective technique. In

addition, a social scientific analysis will be conducted to determine what factors contribute to the variations in consumption habits among the nations under study. Additional adjustments to the economic system, as well as repercussions for specific businesses, will be emphasized, and future usage scenarios for the Virtual world will be devised.

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