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The Metaverse Virtual Economy: A Comprehensive Overview

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Abstract
The concept of the metaverse, where digital and physical realities merge, has garnered significant attention, particularly with advancements in virtual and augmented reality. This study scrutinizes the Metaverse Virtual Economy (MVE), an innovative convergence of real and virtual experiences. By synthesizing insights from prior research on the metaverse, the article explores transformational factors leading from the real world to the meta-universe, considering economic implications, both microeconomic and macroeconomic. Described as an expansive, closed-loop, perfectly competitive market, the MVE minimizes transaction costs and intermediaries. At a macroeconomic level, the MVE may foster sustainable economic growth; however, this growth might be uneven, reflecting the digital divide. As the integration of the metaverse into daily life continues, and the frictions between the two universes diminish, there arises a need to investigate the impact on economic policymaking including the potential applications of virtual currencies. The findings of his study suggest that the MVE poses both opportunities and challenges for businesses and consumers alike. It also emphasizes the necessity for careful exploration, regulation, and understanding of the complex dynamics to leverage the metaverse as a vital component of the future economy.

Key Words: Metaverse, Virtual Economy, Economic Growth, Unemployment, Virtual Currencies, Economic Policies

Metaverse Sanal Ekonomisi: Kapsamlı Bir Genel Bakış

Öz
Dijital ve fiziksel gerçekliklerin birleştiği metaverse kavramı, özellikle sanal ve artırılmış gerçeklik alanındaki gelişmelerle birlikte büyük ilgi görmüştür. Bu çalışma, gerçek ve sanal deneyimlerin yenilikçi bir birleşimi olan Metaverse Sanal Ekonomi'yi (MVE) incelemektedir. Makale, metaverse ilişkin önceki araştırmalardan elde edilen içgörüleri sentezleyerek hem mikroekonomik hem de makroekonomik sonuçları göz önünde bulundurarak gerçek dünyadan meta-evrene giden dönüşümsel faktörleri araştırmaktadır. Geniş, kapalı döngü, tam rekabetçi bir piyasa olarak tanımlanan MVE, işlem maliyetlerini ve aracıları en aza indirir. Makroekonomik düzeyde, MVE sürdürülebilir ekonomik büyümeyi teşvik edebilir; ancak bu büyüme dijital uçurumu yansıtacak şekilde eşitsiz olabilir. Metaverse'ün günlük hayata entegrasyonu devam ettikçe ve iki evren arasındaki sürtüşmeler azaldıkça, sanal para birimlerinin potansiyel uygulamaları da dahil olmak üzere ekonomi politikası oluşturma üzerindeki etkisinin araştırılması ihtiyacı ortaya çıkmaktadır. Bu çalışmanın bulguları, MVE'nin hem işletmeler hem de tüketiciler için hem fırsatlar hem de zorluklar ortaya koyduğunu göstermektedir. Ayrıca, metaverse'ü geleceğin ekonomisinin hayati bir bileşeni olarak güçlendirmek için karmaşık dinamiklerin dikkatli bir şekilde araştırılması, düzenlenmesi ve anlaşılması gerekliliğini vurgulamaktadır.

Anahtar Kelimeler: Metaverse, Sanal Ekonomi, Ekonomik büyüme, İşsizlik, Sanal Para Birimleri, Ekonomi Politikaları

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Introduction

Almost every decade, ICT platforms undergo a paradigm shift, and technologies and products emerge and shape the way of living. Information and communication technologies have undergone a significant transformation as a result of the introduction of the PCs in the 1990s, the internet in the 2000s, and the mobile communication paradigm in the 2010s. The keyword of the 2020s paradigm has been "metaverse" (Lee, 2021: 72). Although, the concept of the metaverse has been around for decades, it has only recently gained widespread attention due to the development of new technologies like virtual and augmented reality. The metaverse is a virtual world where the digital and physical realms are intertwined. It is a place where people can work, play, and socialize in a way that is more immersive and interactive than ever before.

As a portmanteau of 'meta', which is derived from the Greek word "μετά", and 'verse', a shorter form of "universe", points out a fictional virtual universe where the physical real-universe and the digital-universe are intertwined and -possibly an infinite number of- parallel digital universes are united (Ondrejka, 2004; Türkmen, 2022).

The 1990s novel Snow Crash by N. Stephenson makes reference to the idea of the metaverse, as mentioned in Jung (2021), but more formal definitions for the metaverse emerge in the 2000s. According to Son, et. al. (2006) it is "a virtual world where people engage in social, economic and cultural activities using avatars"; according to Ryu and Ahn (2007) metaverse is a "virtual reality space where social and economic opportunities are given like living virtual worlds or real life". According to another definition, the metaverse is "a space, method and itself in which virtual space and reality actively interact" (Suh, 2008). According to IEEE, the metaverse is defined as "the virtual space environment contains objects, residents, and relationships that exist in a virtually defined time".

The metaverse is often distinguished from other virtual reality technologies like virtual reality (VR), which involves immersive experiences that fully replace the physical world, and augmented reality (AR), which involves the overlay of digital information onto the physical world. While VR and AR can offer highly immersive and interactive experiences, they are limited by their reliance on the physical world and tend to be more ephemeral in nature. In contrast, the metaverse is a fully digital world where people can interact with each other and digital objects in a virtual environment that is separate from the physical world. The metaverse allows for persistent, long-term interactions and the creation and exchange of virtual goods and services, as well as the emergence of virtual communities and societies.

The Covid-19 epidemic hastens the development of the Metaverse, although the term goes back to Snow Crash (1992) (Grimshaw, 2014; Türkmen, 2022). The compelling conditions due to Covid-19, "the black swan of the global economy" (Türkmen, 2021), such as the lockdowns of workplaces, closure of borders, social distance, bans from leaving the house which came to the fore with the pandemic, combined with the opportunities offered by web 3.0 technology, the components in the infrastructure of the metaverse concept have become widely available. The development of the Metaverse has entered a quick development phase since Roblox composed the Metaverse concept into its plan and Zuckerberg announced that Facebook would be renamed "Meta" in 2021 (Chang, et. al, 2022).

The metaverse is still in its early stages of development, but it is already being used for a variety of purposes. For example, it is being used for gaming, education, and training. It is also being used for social networking and entertainment.

It has the potential to revolutionize the way we live, work, and play. It could also have a significant impact on the economy; create new jobs in the areas of design, development, and marketing, lead to new forms of entertainment and education, enable businesses to access new markets and offer new products/ services and lead to the development of new ways for businesses collaborate with employees and customers. It could also lead to the development of new business models and the creation of new jobs also lead to development of new ways to manage supply chains and inventory. Lastly, the metaverse could also have an impact on the way that governments operate. For example, it could lead to the development of new ways to deliver government services. It could also lead to the development of new ways to regulate businesses and protect consumers.

When the publications on the Metaverse are examined, it can be seen that the subject is sometimes approached from the device side or contents or some studies remained only defining it. Consequently, it is difficult to locate a study that examined the ecosystem in the context of formal economics. This paper

points to supply a special understanding of the MVE. From this aspect, the basics and the implications of the MVE will be investigated. Rather than being just a mechanical report of the essential technologies, this study comprises an arrangement of interesting points giving a fundamental understanding of metaverse-related improvements in economic thinking and policy-making. This study's goal is to develop a theoretical framework for understanding what kind of changes Metaverse includes in the context of macroeconomic and microeconomic policies. Another purpose of this study is to lay the groundwork for future economic research about the metaverse ecosystem. To do this, we will use a qualitative research approach. The analyzes that form the basis of this study is drawn from private/public research related to metaverse and reports related to both the technical and non-technical side developments.

The basic research questions for this study are:

1. How does the metaverse virtual economy differ from real-world market structures, and what are the microeconomic implications of these differences?

2. What are the macroeconomic implications of the metaverse virtual economy, including its impact on economic growth, the forms of money used in the virtual world, and policy making in a virtual environment?

This study uses a qualitative research approach to explore the potential economic impacts of the metaverse. The data for this study was collected from a variety of sources, including: private and public research related to the metaverse and the reports related to both the technical and non-technical developments of the metaverse. The qualitative data is analyzed using a thematic analysis approach. This approach involved identifying and coding the key themes that emerged from the data. The themes were then used to develop a theoretical framework for understanding the potential economic impacts of the metaverse.

The paper is organized in four chapters. The technical aspects of the MVE will be discussed in the second chapter with the title of 'Basics of Metaverse Virtual Economy', the macroeconomic and microeconomic implications for the MVE will be presented in the third chapter. The last part is the Discussions and Conclusions.

The Basics of Metaverse Virtual Economy

As stated in Dionisio et al. (2013), there are five phases in the development of the concept of the metaverse. The first phase dates back to the late 1970s to the fantastic realities of the Lord of the Rings and Dungeons & Dragons. The second phase starts with the introduction of William Gibson's Neuromancer. The third phase was in the mid-1990s, comprised of progress in 3D graphics, integrated audio, etc. The fourth phase started in the post-millennial decade. There are several important developments; the invention of Bitcoin in 2008 and blockchain in 2009 and the release of the virtual commercial world "Second Life" (Kemp & Livingstone, 2006) enable the world to come closer to the reality of the metaverse. Steven Spielberg's 2018 film "Ready Player One" is also an important attempt to bring the utopia of the metaverse to life in the most understandable way. The fifth phase of the development is still ongoing. 3D virtual environment enabling open-source contributions comes to the fore (Uysal & Semiz, 2022). The advancement of VR Technology enabled the transition from passive virtual environments to interactive, 3D virtual worlds.

As stated earlier, Metaverse is a kind of multi-technology convergence that offers an immersive experience based on a certain harmony of virtual reality, NFT and blockchain technologies. In other words, the Metaverse uses the digital twin approach to build a mirror copy of the real world, establishes an economic system based on blockchain technology, and tightly combines the virtual and real-world economic systems. As a new gateway to digital experiences, the metaverse breaks down the concept of geography and opens up exciting new possibilities for industries as diverse as education, finance, marketing, healthcare, construction, entertainment, arts, collaboration, and productivity.

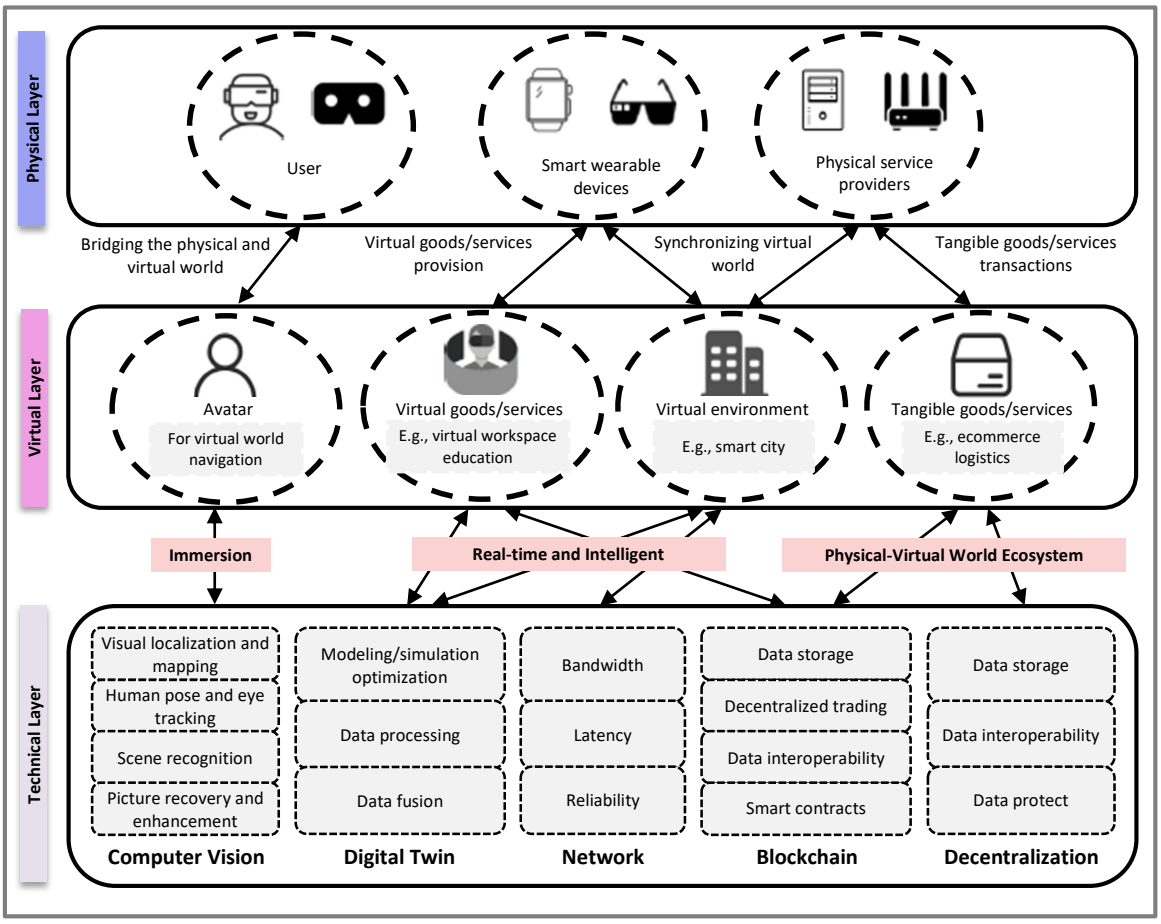

Figure 1. *Metaverse Architectural Features (Chang, et.al.,2022, p.4.)*

The architectural features of the MVE are depicted above in Figure 1. The meta-environment can be divided into three layers, namely the physical layer, the virtual layer, and the technical layer, that rule how the metaverse works, how the two worlds are connected, etc.

The first layer is the physical layer that is comprised of the end users, end users' hardware, and physical service providers. The hardware that is used in the metaverse includes virtual reality headsets, augmented reality glasses, and haptic gloves. These devices allow users to interact with the metaverse in a more immersive way. On the other hand, the software that is used in the metaverse includes virtual world platforms, game engines, and development tools. These tools allow developers to create and manage virtual worlds.

According to Chang, et. al, (2022) the virtual layer of the metaverse is comprised of the following virtual worlds:

- Gaming worlds: These metaverses are designed for gaming, and they typically feature immersive worlds that players can explore and interact with. Some of the most popular gaming metaverses include Fortnite, Roblox, and Minecraft.

- Social worlds: These metaverses are designed for social interaction, and they typically feature virtual worlds where people can socialize with friends and family, join events, and participate in activities. Some of the most popular social metaverses include Second Life, VRChat, and AltspaceVR.

- Work worlds: These metaverses are designed for work, and they typically feature virtual worlds where employees can collaborate on projects, attend meetings, and learn new skills. Some of the most popular work metaverses include Spatial, Gather, and Workrooms.

By bridging into the virtual layer, the items in the physical layer take virtual digital twin forms such as the user's avatar, virtual environments, tangible, and intangible goods, and services in such different forms from the virtual in-world assets- such as digital space, personal digital content or objects such as

collectibles, wearables, buildings, decoration elements- or financial instruments of value such as NFTs, digital wallet, in-world currency, etc. (Türkmen, 2022).

The third layer is the technical layer comprised of computer vision, digital twin, blockchain, network, and decentralization. Computer vision technology allows users to interact with the metaverse in a more natural way. For example, users can use their hands to manipulate objects in the metaverse, or they can use their voice to control their avatars. Through image processing, computer vision technology allows interaction between the virtual and real worlds. Digital twin technology allows users to create virtual representations of real-world objects. This can be used for a variety of purposes, such as training, simulation, and collaboration. Blockchain technology can be used to store and secure data in the metaverse.

As the frictions between the two worlds decrease, the digital twinning technique can convert physical entities into nearly equivalent virtual and digital content. Since the digital world is existing in the form of digits, the storage for the massive amount of data and infrastructure that guarantees privacy and sovereign ownership is needed. A decentralized cloud storage infrastructure of Blockchain technology can help to solve the data leakage and storage limit problems at the same time. In addition to the decentralization in storage, decentralization in the governance of the metaverse environment in the concept of Distributed Autonomous Organizations provides participants to make decisions jointly and enables participation. For the immersive experience high bandwidth, low latency, and a high-reliable network are needed to offer users a seamless and engaging experience.

According to Manyika, et.al (2022) the metaverse has the potential to have significant positive impacts on society, such as increased social interaction, improved education and training, new forms of entertainment, increased productivity. However, there are also some potential challenges that the metaverse could pose to society, such as increased isolation, addiction, Cyberbullying and harassment and increased security and privacy risks.

In their work, Weinberger and Gross (2023) present a Metaverse Maturity Model delineating distinct levels of economic development within virtual environments. At the initial stage, characterized by the absence of a formal economy, users engage primarily in in-app purchases. Progressing to the next level, a virtual economy emerges, facilitated by virtual currency exchange, where fiat money transitions into virtual currency. Subsequent stages witness the evolution of a self-regulating market driven by supply and demand dynamics, with fiat money facilitating transactions. Advancing further, virtual economies incorporate virtual jobs and services, generating tangible income in the physical world. Finally, at the pinnacle of maturity, a fully developed economy emerges, marked by self-regulating markets seamlessly blending virtual and physical world economies. Weinberger and Gross's model provides a comprehensive framework for understanding the varying levels of economic sophistication across different stages of Metaverse development.

Macroeconomic And Microeconomic Implications for The Metaverse Virtual Economy

In this section, the microeconomic and macroeconomic implications of the MVE will be examined and the medium/long-term opportunities and challenges it presents for businesses and consumers will be explored.

Microeconomic Implications for the Metaverse Virtual Economy

In microeconomic theory, the main focus is on how individuals, households, and firms make decisions and how they interact with each other in markets. These decisions and interactions have an impact on the whole economy. The microeconomic effects of the metaverse can be understood in the context of microeconomic theory by examining how transactions and activities within the metaverse affect the allocation of resources and the distribution of income. For example, shopping within the metaverse involves the allocation of resources (e.g., money, time) by consumers and the distribution of income (e.g., profits) to firms. Similarly, the salaries of workers within the metaverse involve the allocation of resources (e.g. labor) by firms and the distribution of income (e.g. wages) to workers. In that sense, the MVE's microeconomic market structure is quite different from real-world market structures with many features. These differences can be detailed as follows;

- In the metaverse universe, where private property and freedom of competition are paramount, one may observe a market characterized by minimal intervention from official authorities. Moreover, the

decentralization in storage via blockchain and the decentralization in governance in the form of DAOs provides participants to make decisions jointly and enables participation.

- Digital economic agents within the Metaverse economic structure are digital content producers (supplier) and buyers (demand). In the metaverse market, on the one hand, individual users in atomized sizes offer digital goods and services with original designs, on the other hand, metaverse branches of companies that exist in the real world offer their own companies' goods and services to the market with 3D web technology.

- In the real-world economy, there are frequently entrance barriers that make it difficult for new enterprises to enter markets and compete with previously established firms. These barriers can take many forms, such as regulatory barriers, financial barriers, or technological barriers. However, in the metaverse economy, these barriers are often absent or greatly reduced, making it relatively easy for new entrants to enter the market and participate in economic activity. One reason for this is that the metaverse economy is largely digital, and as such, it is not subject to many of the physical constraints of the real-world economy. Hence, the firms and individuals can enter the metaverse relatively quickly and easily, as long as they have the necessary technical skills and resources to produce digital goods or services. Moreover, the lack of barriers to entry and exit in the MVE can lead to increased competition (Athey& Stern, 2022), and innovation, as new firms and individuals can more easily enter the market and offer new products and services. This can benefit consumers by providing them with more choices and potentially lower prices, and it can also drive economic growth by enabling the creation of new industries and markets within the Metaverse.

- There are "no or very low transactions costs for the exchange and proof-of-ownership of digital assets" within the Metaverse ecosystem (Chen & Bellavitis, 2020; Chalmers et al., 2022)

- The role of market intermediaries decreases; hence intermediation costs also decrease (Fisch, 2019; Bellavitis et al., 2021). The role of intermediaries is one of the key differences between the market structure in the metaverse and real-world markets. In the metaverse, the use of blockchain technology and distributed autonomous organizations can enable direct interactions between digital content producers and buyers, reducing the need for intermediaries like brokers or agents. This can lead to lower transaction costs and greater efficiency in the market. For example, a user who creates and sells a digital item in the metaverse might be able to do so directly through a decentralized marketplace, rather than having to go through a traditional retailer or distributor.

- Another aspect of the metaverse market that is different from real-world markets is the wide variety of digital goods and services that are available. A wide variety of digital goods and services that can be offered in the metaverse. Some of the most common types of digital goods and services include; virtual clothing, virtual furniture, virtual homes, virtual games, virtual education, virtual healthcare, virtual work. Shortly, individual users can create and sell their own original designs, while real-world companies can also offer their products or services through virtual branches. This can create a diverse and dynamic market, with a wide range of offerings for buyers to choose from. For example, a user in the metaverse might be able to purchase virtual clothing, furniture, or even entire virtual homes from other users or companies, or they might be able to participate in virtual events or activities like concerts or sporting events.

- With the disappearance of the borders of the market and access to the entire market electronically, information asymmetries have decreased.

The microeconomic market structure of the metaverse is quite different from that of the real world. In the real world, markets are typically characterized by a few large firms that dominate the market. This is because it is difficult and expensive to enter a market and compete with established firms. It is relatively easy to enter the metaverse and compete with established firms. This is due to the fact that the metaverse is a digital world, and as such, it is not subject to many of the physical constraints that limit competition in the real world. For example, there are no geographic barriers to entry in the metaverse. This means that firms from all over the world can compete in the metaverse. Additionally, there are no regulatory barriers to entry in the metaverse. This means that firms can enter the metaverse without having to obtain licenses or permits. Considering all the above-mentioned issues, the metaverse universe is an example of a perfectly competitive market, which is nearly a utopic market structure in the real world.

In the real world, when goods and services are produced, some of the value of those goods and services is lost to the environment in the form of pollution or waste. Contrastingly, the MVE is a very

large closed-loop perfectly competitive economy. This means that the metaverse economy is self-contained and self-sustaining, relying on the internal exchange and circulation of virtual goods and services within the virtual world. This is in contrast to the real-world economy, which is open-loop and relies on the extraction and consumption of natural resources, as well as the import and export of goods and services between different countries (Lee, 2021). The closed-loop nature of the metaverse economy has several implications for economic growth and development. For example, it could lead to a more efficient and sustainable use of resources, as the metaverse does not require the use of physical resources or energy for the production and exchange of virtual goods and services (Fisch, 2019). This could help to reduce the environmental impact of economic activity and contribute to the transition to a greener economy (Chalmers et al., 2022). In addition, the closed-loop nature of the metaverse could also enable the creation of new economic opportunities and value-creation within the virtual world, as the metaverse economy is not limited by the constraints of the physical world (Chen & Bellavitis, 2020). This could lead to the emergence of new industries and markets within the metaverse, as well as the development of innovative virtual products and services that are not possible in the real world (Goetzen, 2022).

In contrast to traditional economic principles emphasizing resource scarcity and self-interest, the metaverse presents a paradigm shift where altruism and non-logical decision-making prevail. Personal fulfillment supersedes traditional economic drivers in this virtual realm, as agricultural and industrial frameworks are absent. Consequently, the metaverse operates on a conceptual economic model where individual identity determines the value of goods and services, departing from labor-based valuation seen in conventional economies.

This departure from conventional economic paradigms is highlighted by Yang et al. (2022), who underscore the unique economic dynamics of the metaverse. Within this virtual environment, marginal benefits exhibit an upward trend, contrary to the diminishing returns observed in physical production processes. Additionally, reduced marginal product costs and minimal transaction costs characterize the metaverse, fostering a high-volume trading environment. These findings shed light on the distinctive economic landscape of the metaverse, emphasizing identity-based valuation and streamlined transactional processes.

When we turn to the equilibrium in the metaverse markets; the usual price equilibrium is not expected to emerge in the short run. There are several reasons for this. First of all, both the heterogeneous users offering a wide variety of goods/services are located within the same system and the supply and demand curves have not yet been formed (Goetzen, 2022). Moreover, since the infinite number of digital products/services would push prices to zero, the pricing of digital products/services sold in the MVE is very tough. Also, the market depth is not yet sufficient and the market is shaped by the supply potential of content producers hence it would not be wrong to say that "every supply creates its own demand" in the market at this stage.

In addition to this, with the disappearance of the spatial boundary of the market, companies that are faced with more rival companies prefer to differentiate their products/services by abandoning the traditional price competition. In this context, since the competitive structure is built on the product/service features of the alternative digital content provider, competition is more destructive than before and supports the phenomenon of "creative destruction". The concept of 'creative destruction' refers to the process of change and innovation that leads to the emergence of new products, businesses, and technologies, often at the expense of older ones. In the MVE, the wide range of digital goods and services available and the ease of entry and exit into the market can lead to rapid innovation and change. This can create opportunities for new players to enter the market and disrupt established businesses, but it can also lead to the failure of businesses that are unable to adapt to the changing market conditions. For example, a new virtual reality game that is more immersive or engaging than existing games could quickly gain popularity and displace older games in the market, leading to the 'creative destruction' of the older games.

As the role of market intermediaries decreases since suppliers and demanders can meet in the markets without time and place restrictions. As this situation reduces transaction costs, it also leads to a decrease in the general price level.

Macroeconomic Implications for the Metaverse Virtual Economy

While the microeconomic implications of the MVE are significant, they also have macroeconomic implications that will impact the overall economy (Wang, et.al., 2022). In this section, how the MVE affects economic growth, the forms of money used in the virtual world, policy making in a virtual environment and impact on other economic indicators will be examined.

The MVE has the potential to significantly impact the real-world economy in a number of ways. One key way in which the metaverse could affect economic growth is through the creation of new industries and markets within the virtual world. For example, the metaverse could become a platform for the sale of digital or virtual products, assets and services, such as virtual real estate, virtual clothing and accessories, and virtual experiences (Fisch, 2019). This could lead to the growth of new businesses and employment opportunities within the metaverse, as well as increased demand for the development of virtual content and technology (Lee, 2021).

When the economic growth in the Metaverse is examined in the context of sustainability; we can see that while several economic activities are unsustainable due to resource depletion and environmental pollution in the real world, the MVE reconciles with sustainable economic growth, since the digital resources are infinite. However, the global spread of economic growth will differ.

When developing countries are compared with developed countries; it is possible that the differences in growth will become more evident when the differences that have started due to the lack of information infrastructure and competent personnel of the developing countries are combined with the zero digital resource cost production opportunities of the 'early starter' developed countries in the metaverse universe. In this sense, it would not be unrealistic to think that there may be a turn in favor of developed countries in the global distribution of growth.

Another way in which the metaverse could impact the real-world economy is through the use of virtual currencies and blockchain technology. Since the Metaverse environment needs its native currencies, then we are talking about digital forms of money different than government-supported conventional forms of money. These currencies, have the potential to challenge traditional fiat currencies and disrupt the traditional financial system. However, they also have the potential to facilitate economic growth by enabling new forms of exchange and value creation. There are two crucial issues to be solved: guaranteeing privacy and sovereign ownership and at the same time easily convertible into the two worlds' real wealth. The first problem is solved via cryptocurrency infrastructure with the combination of NFTs, creating native currencies such as; ALICE, GHST, DAR, MANA, SAND, AXS, SLP, HIGH, TVK, ILV, and PYR. Regarding the second issue, some metaverse game platforms can be considered to be closed digital micro-economies, but the virtual wealth and the digital properties cannot be directly transferred into the real world. Therefore, the MVE needs an interface with the real-world enabling convertibility with higher liquidity and with lesser frictions, which is solved by NFTs and blockchain infrastructure.

Virtual currencies, such as Bitcoin and Ethereum, are digital assets that are used as a medium of exchange within the metaverse and can be traded on digital currency exchanges (Chalmers et al., 2022). The use of virtual currencies in the metaverse could lead to the growth of new financial markets and investment opportunities, as well as increased demand for blockchain technology and related services (Chen & Bellavitis, 2020). For example, virtual currency exchanges could become major players in the global financial market, with the ability to facilitate cross-border payments and financial transactions in a secure and transparent manner (Goetzen, 2022). In addition, the use of blockchain technology in the metaverse could enable the creation of decentralized autonomous organizations (DAOs), which are decentralized, transparent, and self-governed networks that can operate independently of traditional intermediaries (Suh, 2008). This could have significant implications for traditional business models and the distribution of power and wealth in the real world (Fisch, 2019).

On the other hand, while the use of digital currencies and other forms of virtual money has the potential to facilitate economic growth in the MVE, it also raises new challenges for policy makers. In particular, policy making bodies will need to consider how to regulate and monitor virtual currencies and other forms of money in the virtual world, and how to address issues like money laundering and fraud.

Another way in which the metaverse could impact the real-world economy is through policy making. As the virtual world economic agents and financial structure can realize the forms of the conventional world as expected by the "digital twins". A "digital twin" is a virtual representation of a real-world object

or system that can be employed to model and examine the behavior of the real-world counterpart. In the context of the MVE, digital twins can be used to create virtual versions of real-world businesses, allowing them to operate and interact in the virtual world. This can create new opportunities for real-world businesses to engage with customers and partners in the metaverse, and can also allow them to test and analyze new products or services in a virtual environment before bringing them to market. For example, a real-world retailer might create a virtual branch in the metaverse, where customers can browse and purchase products using their avatars, or a real-world manufacturer might use a digital twin to test and optimize the design of a new product before producing it in the real world. Since the behavior and operations of both the virtual agents and the real agents may generate new economic results, the policymakers should adopt the "multiple worlds" view in their models and theories.

In this context, if the metaverse as a digital twin of the real world, with its own economy and financial system becomes an important platform for economic activity and transactions, then it could potentially have an impact on the real-world economy and financial system and also could affect real world monetary policy. For example, if the demand for money in the metaverse increases significantly, it could potentially lead to an increase in the demand for money in the real world. This could potentially affect the level of economic activity in the real world and the inflation rate. The metaverse could lead to new forms of regulation as governments try to regulate the metaverse and its impact on the economy.

Some of the examples of how the metaverse could potentially impact economic policymaking and policy makers under different policies can be detailed as follows;

1. Taxation: The metaverse could potentially challenge traditional models of taxation, as it provides a platform for virtual transactions and activities that may not be subject to traditional tax regimes. Policy makers may need to develop new approaches to taxing virtual economic activity in order to ensure that taxes are fairly and efficiently collected. Moreover, governments could regulate the metaverse to protect consumers, ensure fair competition, etc.

2. Monetary policy: The metaverse could potentially impact monetary policy by influencing the demand for money and the level of economic activity in the real-world economies. Moreover, the monetary policy in the Metaverse should also be considered. The metaverse could potentially have a single global currency, although this would depend on the specific design and features of the metaverse and the willingness of users to adopt a single global currency. A single global currency in the metaverse could potentially offer a number of benefits, such as simplifying transactions and reducing exchange rate risks. It could also potentially facilitate the integration of the metaverse economy with the real-world economy.

However, the adoption of a single global currency in the metaverse would also likely involve a number of challenges and considerations. For example, the design and issuance of the currency would need to be carefully managed in order to ensure its stability and security. There may also be political and economic considerations related to the adoption of a single global currency, as it could potentially impact the sovereignty of national states and the traditional models of currency issuance.

3. Labor policy: The metaverse could potentially impact labor policy by creating new job opportunities for workers and potentially leading to the automation of certain tasks and the displacement of some workers. Policy makers may need to develop new approaches to addressing issues such as job displacement and skills development in order to ensure that workers are able to participate in the metaverse economy.

4. Trade policy: The metaverse could potentially impact trade policy by creating new opportunities for international trade and potentially challenging traditional models of trade regulation. Policy makers may need to develop new approaches to regulating international trade in the metaverse in order to ensure that trade is fair and efficient.

Lastly, through parallel management of the parallel economic systems it is likely that more optimal economic equilibrium points can be achieved. According to Ning et.al. (2021) with the help of the large virtual economic data simulations from the virtual universe, small economic data in the real economy can be translated into more effective policy initiatives and policymaking.

Finally, the metaverse could also have an impact on employment and other economic indicators in the real world. For example, the growth of virtual industries and markets within the metaverse could lead to the creation of new jobs and the reallocation of labor from the physical to the virtual world (Fisch,

2019). This could have implications for labor market participation and the distribution of wealth in the real world (Lee, 2021).

The metaverse could potentially affect employment and/or unemployment in a number of ways. For example, if the metaverse becomes a significant platform for conducting economic transactions and engaging in economic activity, it could potentially create new job opportunities for workers. This could lead to a decrease in unemployment as more people are employed in the metaverse. On the other hand, if the metaverse becomes a significant platform for conducting economic transactions and engaging in economic activity, it could potentially lead to the automation of certain tasks and the displacement of some workers. This could lead to an increase in unemployment as some workers are no longer needed in the real-world economy. Moreover, the metaverse could potentially revolutionize the way we work, as it provides a platform for remote work and collaboration. It could lead to the proliferation of virtual offices and virtual teams, as well as the emergence of new job roles and skill sets. Overall, the impact of the metaverse on unemployment is yet ambiguous; it will depend on the extent to whether it becomes a significant platform for economic activity and the extent to which it leads to the creation or displacement of jobs in the real-world economy.

In addition, the metaverse could also affect the demand for physical goods and services, as some people may choose to purchase virtual versions of these products within the metaverse instead (Chalmers et al., 2022). For example, virtual real estate or virtual experiences could become increasingly popular, leading to a decrease in demand for physical real estate or travel.

The Meta-curse for the Economy

This section deals with some externalities or possible negative consequences due to the emergence and usage of Metaverse-related technologies. These 'Metacurses' (Chohan, 2022) can be listed as follows; increased inequality and digital divide, probable pollution due to increased electricity usage in the real world for using the metaverse environment, and administrative weakness in policy making.

As stated in the above sections, the metaverse economy has the potential to significantly impact the real-world economy in a number of ways. At the macro level, the growth of the metaverse economy could contribute to overall economic growth, as it provides a new platform for businesses and individuals to engage in economic activity and create value. This could lead to the creation of new industries and jobs within the metaverse, as well as the expansion of existing industries into the virtual realm. Additionally, the metaverse economy could facilitate the transfer of wealth and resources between the real and the virtual environments, which could help to stimulate economic activity in both realms. However, it is important to recognize that the distribution of these economic impacts may not be evenly felt across all segments of society. There are concerns that the metaverse economy could exacerbate existing economic inequalities, as it may disproportionately benefit those who have the technical skills and resources to participate in the virtual world. This could lead to a digital divide, with some segments of the population being left behind as the metaverse economy grows and evolves.

To address these potential imbalances, policy makers will need to consider how to ensure that the benefits of the metaverse economy are more evenly distributed across society. This could involve measures such as investing in education and training programs to help people gain the skills needed to participate in the metaverse economy, or implementing policies to support the development of new technologies that can help to bridge the digital divide.

The metaverse could lead to job displacement in some sectors of the economy. This is because some jobs that are currently done in the real world could be automated or outsourced to the metaverse. In addition, the metaverse could lead to social isolation, as people spend more time interacting with virtual friends and colleagues. This could have a negative impact on mental health and well-being.

Administrative weakness is possible since the policy-making body is not defined and the regulatory body is not clear, in addition, there is no set of rules prepared for the newly developing virtual environment. Access to the contents and information opportunities created by the modern world depends on the social and economic status of consumers and the existence of infrastructure opportunities. When the possibilities of access to information in the real world are examined, it can be said that men, those with a high-income level, those with a high education level, those living in the city, young people, and white-collar workers are in a more advantageous position compared to other groups in the society. As Ledezma (2021) points out, heterogeneity is reproduced through firms' technology adoption decisions. In

addition, it is observed that the "early comers" of the metaverse universe are multinational technology firms, which also indicates the exclusion of smaller firms. Increasing heterogeneity may spill over/contagion to worsen worldwide inequality both among the firms and the employees.

In this sense, since informational capitalism encountered within the scope of metaverse transformation reproduces inequalities between different groups in society, similar to conventional capitalism, permanence can be observed in situations that create inequality. This indicates that the probability of divergence will increase, contrary to the convergence hypothesis in the Neo-Classical growth model.

Blockchain technology requires an unusually high amount of electricity to perform. If this requirement is fulfilled via nonrenewable resources, then the MVE will leave the real-world economic agents- even those who never actively use the Metaverse environment- with negative externalities such as pollution or resource depletion.

Additionally, since the volume of the metaverse economy shows a continuous growth trend, national states and international financial institutions have started to develop economic policies compatible with the metaverse economy. However, since the structure does not have a hierarchy, it has not yet been clarified where the authority will be located, and whether the dominant authority will be in nation states or another authority specific to the virtual world. For this reason, policy development is very difficult, on the other hand, it does not seem possible for conventional central banks to use traditional monetary policy instruments on virtual currencies based on blockchain technology, especially in terms of monetary policies. It is obvious that there is a need for theoretical and practical developments in this field.

From microeconomic perspective; there are many companies and organizations that are operating within the metaverse or exploring its potential such as; Nike, Meta, and Google, Decentraland, High Fidelity, Epic Games, etc. Some of the opportunities they have encountered include the potential to reach new customers and markets, the potential to create new and innovative products and services, and the potential to drive economic growth and innovation. But these companies have encountered a range of challenges as they operate within the metaverse.

One of the biggest challenges for companies operating in the metaverse is monetization. Many companies have struggled to find effective ways to generate revenue within the virtual world, as traditional monetization models such as advertising and subscriptions may not be as effective in the virtual space. They need to adapt to a fully digital environment, and develop new business models and revenue streams.

Another challenge for companies operating in the metaverse is the technical complexity of building and maintaining virtual worlds. This can involve developing and maintaining sophisticated software and hardware systems, as well as dealing with issues such as latency and security.

Lastly, since the metaverse is a largely unregulated space, and companies operating within it may face challenges related to compliance with laws and regulations. The metaverse could lead to new forms of crime and fraud, as criminals seek to exploit the new opportunities that the metaverse presents.

While the microeconomic implications of the MVE are significant, they also have macroeconomic implications that will impact the overall economy (Wang, et.al., 2022). In this section, how the MVE affects economic growth, the forms of money used in the virtual world, policy making in a virtual environment and impact on other economic indicators will be examined.

Conclusions

Metaverse is a change that is not new for those who closely follow technological changes and advances such as VR, 5G, wearable technologies, sensor technologies, blockchain technologies, and NFT, but it is a very difficult change to be positioned in the mind and associated with the real world for ordinary individuals in society. However, no one can tell how successful the Metaverse will be in its promised applications in any industry at this time. Furthermore, it is well known that significant investments are made in the use and advancement of the Metaverse by major technological corporations. This situation causes us to be hopeful about the potential of the metaverse.

In this study, a conceptual framework has been created about what kind of changes Metaverse includes in the context of macroeconomic and microeconomic policies. MVE's market structure is quite

different from real-world with many features. According to our findings, the differences can be detailed as follows.

As a combination of the two words, meta and universe, the metaverse refers to an immersive and united and shared virtual universe that relies upon blockchain technology, DAOs, NFTs, VR, and Web 3.0 infrastructure. Technically the MVE should have the following features; De-Fi for making financial transactions without the need for any of the conventional financial institutions, NFTs for sovereignty and the uniquity of virtual goods/services, and blockchain technology to accumulate and transfer virtual items in digital wallets decentralized governance for enabling democratic participation of virtual economic agents, decentralized cloud services for secure and private data saving.

According to the aforementioned issues, the metaverse has the potential to bring about significant paradigm changes in theoretical economics. Some examples of the potential macroeconomic paradigm changes that could be brought about by the metaverse are listed:

•The metaverse could potentially revolutionize the way we work, as it provides a platform for remote work and collaboration. It could lead to virtual offices and virtual teams, as well as the emergence of new job roles and skill sets. The metaverse could also potentially change the way we spend our leisure time (as an alternative to work), as it provides a platform for virtual tourism, gaming, and other forms of entertainment. It could lead to the emergence of new forms of leisure activities and the transformation of traditional leisure industries.

•The metaverse could potentially affect national states in a number of ways by challenging the traditional concept of territoriality and the role of national states in regulating economic activity. As the Metaverse provides a platform for virtual transactions and activities that are not geographically constrained, it could potentially challenge the traditional concept of territoriality. This could lead to the emergence of new forms of governance and the transformation of traditional governance structures. The metaverse could also potentially affect the role of national states in regulating economic activity, as it provides a platform for virtual transactions and activities that may not be subject to traditional regulations. This could lead to the emergence of new regulatory frameworks and the transformation of traditional regulatory mechanisms.

•The metaverse could potentially affect economic policymaking and policy makers in a number of ways. For example, the metaverse could potentially impact the structure of the economy and the distribution of income, as it provides a platform for virtual transactions and activities that may not be subject to traditional economic structures and rules. This could lead to the emergence of new economic policy challenges and the need for new policy responses. The metaverse could also potentially affect the role of policy makers in regulating economic activity, as it provides a platform for virtual transactions and activities that may not be subject to traditional regulations. This could lead to the emergence of new regulatory frameworks and the transformation of traditional regulatory mechanisms. With the help of the large virtual economic data simulations from the virtual universe, small economic data in the real economy can be translated into more effective policy initiatives and policymaking but there is a gap in the administrative organization for policy-making bodies.

•The MVE is expected to reconcile with sustainable economic growth, but the global spread of economic growth will be uneven due to the digital divide.

•The metaverse has the potential to be a significant platform for global economic activity and interactions, and as such it could potentially be seen as a new era of globalization. Till now, the globalization is driven by factors such as advances in transportation and communication technologies, the liberalization of trade and investment policies, and the expansion of international organizations. The metaverse has the potential to facilitate globalization as it provides a platform for virtual transactions and activities that are not geographically constrained. It could allow people from different parts of the world to easily interact with each other and engage in economic activities, regardless of their physical location. This could potentially lead to the emergence of new forms of economic and cultural exchange and the integration of the metaverse economy with the real-world economy. However, the impact of the metaverse on globalization will depend on the extent to which it becomes a significant platform for economic activity and the willingness of people and institutions to adapt to these changes. It is also important to note that the metaverse is not the only factor driving globalization, and other factors such as

advances in transportation and communication technologies and the liberalization of trade and investment policies will continue to play a role in the globalization process.

•The metaverse would eliminate biological, cultural, and ethnic differences in a sense, as these are fundamental aspects of human identity and experience. Also, as the metaverse provides a platform for people from different backgrounds to interact with each other and engage in activities which are not constrained by physical geography, this could potentially lead to increased understanding and appreciation of diversity.

•It is also important to note that the metaverse is not immune to the same social and political conflicts that exist in the real world. It is possible that the metaverse could potentially see conflicts and tensions related to issues such as identity, power, and resources. However, it is difficult to predict the specific nature and intensity of these conflicts and whether they would be referred to as "wars" in the traditional sense.

In the same way, the examples of the potential microeconomic paradigm changes that could be brought about by the metaverse are listed:

•The metaverse universe is a very large closed-loop virtual economy, dominated by conditions of perfect competition, with its norms, and whose boundaries and capabilities are not yet fully predicted. The metaverse economy is self-contained and self-sustaining, relying on the internal exchange and circulation of virtual goods and services within the virtual world. Hence, it could lead to a more efficient and sustainable use of resources, as the metaverse does not require the use of physical resources or energy for the production and exchange of virtual goods and services This could help to reduce the environmental impact of economic activity and contribute to the transition to a greener economy.

•The purpose of the establishment of the Metaverse economy is not to interfere with the liberal approach that constitutes the basic philosophy of the universe but to provide the most appropriate financial and social conditions so that the relations can be maintained in maximum freedom. The lack of barriers to entry and exit in the metaverse economy can lead to increased competition and innovation, as new firms and individuals can more easily enter the market and offer new products and services. This can benefit consumers by providing them with more choices and potentially lower prices, and it can also drive economic growth by enabling the creation of new industries and markets within the metaverse

•With the decrease in transaction costs and the elimination of the effects of intermediaries on the markets, the atomized market assumption of the perfect competition market has come very close. On the other hand, with the expansion of the definition of the market and electronic access, information asymmetries have decreased and converged to a perfectly competitive market. In the short run, the usual price equilibrium is not expected to emerge due to insufficient market depth.

•It is also important to discuss the impact of digital goods on traditional economic theory. Digital goods, such as those found in the metaverse, can be replicated indefinitely at little or no cost, which challenges traditional economic concepts like marginal cost and marginal revenue. This can lead to significant shifts in the way traditional economic theory is applied to digital goods, as the cost of producing additional units is effectively zero. One potential way to address this issue is to consider the value of non-replicable factors, such as rarity or uniqueness, in the production and pricing of digital goods. Some researchers have argued that the concept of marginal cost is still relevant in the digital economy, as it is still necessary to consider the cost of producing the first unit of a digital good. Others have argued that the concept of marginal cost is less relevant in the digital economy, and that the focus should instead be on the value of the digital good to the consumer. Regardless of the approach taken, it is important to consider the impact of digital goods on traditional economic theory in the context of the MVE.

Our world is experiencing a new transformation of the way of doing business, creative destruction in job opportunities, and a change in modes of saving and payment methods. It is very likely that new employment prospects will emerge especially in the relevant sub-sectors of commerce and it will possibly alter the meaning and way of daily monetary transactions. It can also be possible that many of the real-world products/services will disappear and will be replaced by newer virtual ones. As the frictions between the two universes decrease, in other words, multi-sided value creation and consumption made possible, then the economic structure of the real world will become more tied to the MVE.

Overall, the MVE has the potential to significantly impact the real-world economy in a number of ways, including the creation of new industries and markets, the use of virtual currencies and blockchain

technology, and the reallocation of labor and demand for goods and services. It is important to carefully consider these impacts as the metaverse continues to develop, in order to maximize the benefits and minimize any negative consequences. This may require the development of new policies and regulatory frameworks to address issues such as virtual currencies and blockchain technology, as well as efforts to ensure that the benefits of the metaverse are shared equitably across society. Further research and policy efforts will be necessary to understand and manage the economic impacts of the metaverse in the coming years.

Ethical Declaration

During the writing process of the study "*The Metaverse Virtual Economy: A Comprehensive Overview*" scientific rules, ethical and citation rules were followed. No falsification was made on the collected data and this study was not sent to any other academic publication medium for evaluation.

Statement of Contribution Rate of Researchers

The contribution rates of the authors in the study are equal.

Declaration of Conflict

There is no potential conflict of interest in the study.

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GENİŞ ÖZET

Metaverse, teknolojik gelişmeleri yakından takip edenler için yeni olmayan, fakat toplumun sıradan bireyleri için zihinde yerleşmesi ve gerçek dünya ile ilişkilendirilmesi oldukça zor olan bir değişimdir. Bu çalışma, Metaverse Sanal Ekonomi hakkında özel bir yaklaşım sunmayı amaçlamaktadır. Bu çalışma için temel araştırma soruları şunlardır: 1. Metaverse sanal ekonomi gerçek dünyadaki piyasa yapılarından nasıl farklılaşmaktadır ve bu farklılıkların mikroekonomik sonuçları nelerdir? 2. Ekonomik büyüme, sanal dünyada kullanılan para biçimleri ve sanal ortamda politika oluşturma üzerindeki etkisi de dahil olmak üzere, Metaverse sanal ekonominin makroekonomik etkileri nelerdir? Bu çalışma, Metaverse'ün potansiyel ekonomik etkilerini keşfetmek için nitel bir araştırma yaklaşımı kullanmaktadır. Bu çalışma için veriler, Metaverse ilişkin özel ve kamu araştırmaları ile Metaverse ilişkin hem teknik hem de teknik olmayan gelişmelerle ilgili raporlar da dahil olmak üzere çeşitli kaynaklardan toplanmıştır. Nitel veriler tematik analiz yaklaşımı kullanılarak analiz edilmiştir. Bu yaklaşım, verilerden ortaya çıkan temel temaların belirlenmesini ve kodlanmasını içermektedir. Temalar daha sonra Metaverse'ün potansiyel ekonomik etkilerini anlamaya yönelik teorik bir çerçeve geliştirmek için kullanılmıştır. Teknik olarak, Metaverse sanal ekonomisinin belirli özelliklere sahip olması gerekmektedir; özellikle De-Fi, NFT'ler, blok zincir teknolojisi gibi elementler bu yapıyı oluşturmaktadır. Bu kavramlar, sanal ekonomik ajanların demokratik katılımını, verilerin güvenli ve özel bir şekilde saklanmasını sağlamaktadır. Metaverse, teorik ekonomide önemli paradigma değişiklikleri getirebilir. Örnek olarak, Metaverse'ün iş yapma şeklimizi, ulus devletlerin ekonomi politikası yürütme şeklini, sürdürülebilir ekonomik büyümeyi, küresel ekonomik etkileşimi, biyolojik, kültürel ve etnik farklılıkların sonuçlarını etkileyebilecektir. • Metaverse, uzaktan çalışma ve işbirliği için bir platform sağladığından, çalışma şeklimizde potansiyel olarak devrim yaratabilir. Bu durum sanal ofisler ve sanal ekiplerin yanı sıra yeni iş rolleri ve beceri setlerinin ortaya çıkmasına yol açabilir. Sanal turizm, oyun ve diğer eğlence biçimleri için bir platform sağladığından Metaverse, boş zamanlarımızı geçirme şeklimizi de (işe alternatif olarak) değiştirme potansiyeline sahiptir. Yeni boş zaman etkinlikleri biçimlerinin ortaya çıkmasına ve geleneksel boş zaman endüstrilerinin dönüşümüne yol açabilir. • Metaverse, ulus devletleri de potansiyel olarak çeşitli şekillerde etkileyebilir. Örneğin, Metaverse geleneksel bölgesellik kavramına ve ulusal devletlerin ekonomik faaliyetlerin düzenlenmesindeki rolüne meydan okuyabilir. Metaverse, coğrafi olarak sınırlandırılmamış sanal işlemler ve faaliyetler için bir platform sağladığından, geleneksel bölgesellik kavramına meydan okuyabilir. Bu da yeni yönetişim biçimlerinin ortaya çıkmasına ve geleneksel yönetişim yapılarının dönüşmesine yol açabilir. • Metaverse aynı zamanda ekonomi politikalarını ve politika yapıcılarını da çeşitli şekillerde etkileyebilir. Örneğin, Metaverse, geleneksel ekonomik yapılara ve kurallara tabi olmayan sanal işlemler ve faaliyetler için bir platform sağladığından, ekonominin yapısını ve gelir dağılımını potansiyel olarak etkileyebilir. Bu da yeni ekonomi politikası zorluklarının ortaya çıkmasına ve yeni politika yanıtlarına ihtiyaç duyulmasına yol açabilir. • Metaverse sanal ekonomisi kendi kendine yeten ve kendi kendini idame ettiren (closed loop) bir yapıya sahiptir ve sanal dünya içerisinde sanal mal ve hizmetlerin değişimine ve dolaşımına dayanır. Dolayısıyla, Metaverse sanal mal ve hizmetlerin üretimi ve değişimi için konvansiyonel anlamdaki fiziksel kaynakların kullanılmasını gerektirmediğinden, kaynakların daha verimli ve sürdürülebilir bir şekilde kullanılmasına yol açabilir. Bu da ekonomik faaliyetlerin çevresel etkilerinin azaltılmasına yardımcı olabilir ve daha yeşil ve sürdürülebilir bir ekonomiye geçişe katkıda bulunabilir. • Dijital uçurum (digital divide) nedeniyle ekonomik büyümenin küresel yayılmasının dengesiz olacağı da öngörülmektedir. Metaverse sanal ekonomisinde giriş ve çıkış engellerinin olmaması, yeni firmalar ve bireylerin pazara daha kolay girip yeni ürün ve hizmetler sunabileceğinden rekabetin ve inovasyonun artmasına yol açabilir. Bu durum,

tüketicilere daha fazla seçenek ve potansiyel olarak daha düşük fiyatlar sunarak fayda sağlayabilir. Diğer yandan, Metaverse içinde yeni endüstrilerin ve pazarların yaratılmasını sağlayarak ekonomik büyümeyi teşvik edebilir. Metaverse sanal ekonomisi, yeni iş fırsatlarının ortaya çıkması, iş olanaklarında yaratıcı yıkım ve günlük finansal işlemlerin tanım ve yönteminin değişmesi gibi yeni bir dönüşüm yaşamaktadır. Gerçek dünyanın ekonomik yapısının Metaverse sanal ekonomisi ile daha çok bağlantılı hale gelmesi olasıdır. Metaverse aynı zamanda ekonomi teorisi için de yeni zorluklar ortaya koymaktadır. Örneğin, metaveride bulunanlar gibi dijital ürünler çok az maliyetle veya hiç maliyet olmadan süresiz olarak çoğaltılabilir, bu da marjinal maliyet ve marjinal gelir gibi geleneksel ekonomik kavramlara meydan okur. Ek birim üretmenin maliyeti etkin bir şekilde sıfır olduğundan, bu durum geleneksel ekonomi teorisinin dijital mallara uygulanma biçiminde önemli değişikliklere yol açabilir. Metaverse, farklı arka planlardan insanların birbirleriyle etkileşimde bulunmalarına olanak tanıdığından, çeşitliliği anlama ve takdir etme potansiyeline de sahip olabilir. Ancak, Metaverse'ün geleneksel anlamda savaş olarak adlandırdığımız yapıda olmasa da yumuşak gücün kullanımını gözlemlediğimiz belirli çatışma ve gerilimleri de içermesi mümkündür. Sonuç olarak, Metaverse sanal ekonomisinin, yeni endüstrilerin ve piyasaların oluşumu, sanal para birimleri ve blok zinciri teknolojisinin kullanımı, işgücü ve mal ve hizmetler için talebin yeniden dağıtılması da dahil olmak üzere gerçek dünya ekonomisini önemli şekillerde etkileme potansiyeline sahip olduğu belirtilmiştir. Bu etkilerin dikkatlice değerlendirilmesi, faydaların maksimize edilmesi ve olumsuz sonuçların en aza indirilmesi önem taşımaktadır. Bu, sanal para birimleri ve blok zinciri teknolojisi gibi konuları ele almak üzere yeni politika ve düzenleyici çerçevelerin geliştirilmesini gerektirebilir. Metaverse'ün ekonomik etkilerini anlamak ve yönetmek için gelecek yıllarda daha fazla araştırma ve politika çabası gerekecektir.