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**Blockchain-Enabled Economies: The Role
of Tokens and DAOs in Decentralised Virtual Worlds**

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Abstract

This paper provides a literature-based analysis of the emerging role of blockchain technologies—specifically digital tokens and decentralised autonomous organisations (DAOs)—in shaping decentralised virtual economies. It focuses on the technological and economic infrastructure that enables immersive digital ecosystems often referred to as the metaverse. The study employs a critical review of academic literature, policy reports, and case studies published between 2016 and 2024 to examine how tokens (both fungible and non-fungible) facilitate economic exchange, digital ownership, and community-led governance. Through this methodological approach, the paper aims to clarify the transformative role of tokens and DAOs in enabling decentralised decision making, asset verification, and economic activity in blockchain-powered virtual environments. The main findings show that tokens serve dual functions: as a means of exchange (via cryptocurrencies and stablecoins), and as proof of ownership (through NFTs), while DAOs provide democratic governance frameworks for collective decision making. Platforms like Decentraland and The Sandbox illustrate these principles in action, enabling token-based voting, NFT-based asset trading, and decentralised funding allocation. However, several structural challenges persist. These include legal ambiguity, scalability limitations of current blockchain architectures, crypto market volatility, and unequal governance power distribution within DAOs. The paper also identifies emerging solutions, such as the use of stablecoins, integration of Central Bank Digital Currencies (CBDCs), and adoption of energy-efficient consensus protocols. In conclusion, the review argues that tokens and DAOs are not only technical tools, but foundational components of an evolving decentralised digital economy. Their adoption may redefine economic participation, governance, and asset ownership in virtual environments.

Keywords: blockchain, bitcoin, digital economy.

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1. Introduction

Technological advancements have played, continue to play, and will remain a key driver in the historical evolution of societies and nations worldwide. They serve as a fundamental force in shaping human activities, acting as both an instrument of individual and institutional emancipation and a catalyst for the ongoing transformation of business practices and economic paradigms (Jianu et al., 2011).

The Metaverse represents a persistent digital reality, generated through the convergence of emerging technologies such as extended reality, artificial intelligence, and blockchain. It provides users with an interactive virtual space where they can work, socialise, and trade digital assets. At the core of the Metaverse economy lie cryptocurrencies, decentralised digital assets that facilitate transactions, ensure ownership of virtual goods, and enable community governance through decentralised autonomous organisations (DAOs) (Wang et al., 2022). These elements support an autonomous economic ecosystem, eliminating the need for traditional intermediaries and allowing users to participate in the governance and development of the Metaverse.

Blockchain plays an essential role in the architecture of the Metaverse, providing a decentralised, immutable, and transparent ledger for managing digital assets and economic transactions. Through the use of smart contracts and non-fungible tokens (NFTs), blockchain facilitates the creation and commercialisation of unique digital goods, strengthening the virtual economy (Pernice & Scott, 2021). Additionally, blockchain technology contributes to the security and interoperability between different Metaverse platforms, allowing frictionless transfers of digital assets across different ecosystems (Zohuri et al., 2022). This decentralisation not only enhances transparency and security but also grants users greater control over their data and assets.

The purpose of this study is to analyse the intersection between the Metaverse and cryptocurrencies, highlighting how blockchain is transforming the digital economy using an analytical approach based on a critical review of the literature. Since cryptocurrencies and DAOs are fundamental elements for supporting a decentralised Metaverse, this paper explores their implications for digital markets and governance structures. The study also examines the challenges and risks associated with integrating cryptocurrencies into the Metaverse, including market volatility, legal regulations, and security vulnerabilities (Milutinović, 2018). Through this analysis, the study aims to outline a framework for understanding the future of the digital economy, offering insights into the opportunities and obstacles presented by this emerging technology.

Thus, the integration of cryptocurrencies into the Metaverse not only redefines the way we interact with digital spaces, but also has the potential to reshape the entire global economic system. In the context of the increasing adoption of blockchain technology, this study provides a vision of the future of the decentralised economy and its impact on the digital society (Ball, 2022).

2. Methodology

This study adopts an analytical approach based on a critical review of the literature on the Metaverse, cryptocurrencies, and blockchain technology. The primary objective is to highlight the impact of these technologies on the digital economy and to analyse the challenges and opportunities they generate. The research utilises recent academic sources, scientific articles, research reports, and relevant case studies from the fields of digital economy like: Google Scholar, IEE Explorer, Scopus, ScienceDirect (Elsevier), SSRN (Social Science Research Network).

To conduct this analysis, relevant studies published between 2016 and 2024 were identified and examined, focusing on topics such as blockchain in the Metaverse, the role of cryptocurrencies, DAO governance, and the economic and technological challenges of these systems. The paper compares different economic and technological models applied in the Metaverse, such as Play-to-Earn (P2E) systems, NFTs, and decentralised finance (DeFi).

The study also assesses the risks associated with cryptocurrencies and the Metaverse, including market volatility, regulatory and scalability issues, while also exploring potential benefits such as democratised economic access and decentralised governance through DAOs.

Through this methodology, the study provides a balanced perspective on how the Metaverse and cryptocurrencies are shaping the future of the digital economy.

3. The Technological Foundations of Blockchain in the Metaverse

3.1 What is Blockchain and Why is it Essential for the Metaverse?

Blockchain is a distributed ledger technology (DLT) that enables the secure and decentralised storage and verification of transactions without the need for a centralised intermediary. In the context of the Metaverse, blockchain serves as the backbone of the digital economy, ensuring the authenticity of virtual assets, the implementation of smart contracts, and decentralised governance through decentralised autonomous organisations (DAOs) (Bakare et al., 2024).

One of the most significant advantages of blockchain is decentralisation. Unlike traditional systems, where data and transactions are controlled by a central entity, blockchain distributes this responsibility among multiple participants, providing a high level of security and transparency (Cocco & Marchesi, 2016). In a blockchain-governed Metaverse, users can own unique digital assets through non-fungible tokens (NFTs) and participate in economic and administrative decisions through democratic mechanisms (Bakare et al., 2024).

Comparing centralised and decentralised models, traditional networks are vulnerable to cyberattacks and manipulations since data is managed by a limited number of actors. In contrast, blockchain offers a secure and immutable system in which transactions are validated through consensus and permanently recorded (Cocco & Marchesi, 2016). However, adopting blockchain in the Metaverse presents challenges, including high energy costs and scalability

issues, which require innovative solutions such as new consensus mechanisms and interoperability between different blockchain networks (Pinna & Ruttenberg, 2016).

Thus, blockchain not only redefines the ownership and security of digital assets but also provides the necessary foundation for building a functional, autonomous, and transparent Metaverse.

3.2 Digital Tokens and the Metaverse Economy

Digital tokens are essential elements of the Metaverse economy, facilitating economic transactions, digital ownership, and decentralised governance. They are divided into two main categories: fungible tokens (FTs) and non-fungible tokens (NFTs). Fungible tokens, such as cryptocurrencies and stablecoins, are interchangeable and used as a means of payment or for financial transactions (Jordan, 2019). On the other hand, NFTs are unique and indivisible, representing distinct digital assets such as virtual properties, in-game items, or access rights to various digital services (Ionescu & Chiperi, 2022).

The role of tokens in Metaverse economic transactions is particularly significant. Firstly, they enable users to purchase digital goods and services, eliminating the need for traditional intermediaries and ensuring fast and transparent payments through blockchain technology (Li & Mann, 2018). For example, in platforms like Decentraland or The Sandbox, users buy virtual land and assets using cryptocurrencies specific to the ecosystem.

Secondly, NFTs guarantee the uniqueness and authenticity of digital assets, providing a secure verification mechanism for ownership (Jordan, 2019). This aspect is essential for artists and content creators, who can monetise their work without the risk of duplication or counterfeiting.

Additionally, tokens are used for decentralised governance through DAOs, where token holders can participate in decision making regarding the rules and development of Metaverse platforms (Li & Mann, 2018). Thus, blockchain-based digital economies become more democratic and autonomous, granting users direct control over virtual ecosystems.

4. The Role of DAOs in Managing and Governing the Metaverse

4.1 What Are DAOs and How Do They Work?

Decentralised Autonomous Organisations (DAOs) are digital governance structures that operate based on blockchain technology and smart contracts. These organisations eliminate the need for a centralised authority, allowing members to make decisions democratically based on token ownership and usage (Evans et al., 2016). A DAO is coded to automatically execute rules established by community consensus, and participant votes are transparently recorded on the blockchain, preventing fraud and manipulation (Li & Mann, 2018).

The advantages of DAOs are significant, especially in the context of the Metaverse. Firstly, they enable decentralised governance, giving users the ability to

influence platform development, resource distribution, and internal economic policies. Secondly, the transparency and immutability of blockchain ensure the integrity of decisions and eliminate risks associated with centralised management (Jordan, 2019). Additionally, DAOs can reduce operational costs, as decision making processes are automated through smart contracts (Evans et al., 2016).

However, DAOs also face significant challenges. One of the primary issues is the lack of a clear legal framework, which can lead to uncertainties regarding the legal responsibilities of participants and the enforceability of decisions made (Ionescu & Chipperi, 2022). Moreover, the decision making process based on tokenholder votes can create inequalities, favouring users who hold a large number of tokens and who may disproportionately influence voting outcomes (Li & Mann, 2018). Another risk is cybersecurity, as DAOs are exposed to potential vulnerabilities and exploits.

4.2 DAOs and Their Influence on the Metaverse Economy

DAOs play a crucial role in establishing and managing the Metaverse economy, providing a democratic decision making mechanism. Through these structures, users can vote on ecosystem fees, digital ownership rules, and the allocation of financial resources. For example, on platforms like *Decentraland* and *The Sandbox*, DAOs make economic decisions, such as how virtual spaces are developed and which projects receive community funding (Li & Mann, 2018).

Another important aspect is the management of virtual communities. DAOs allow users to express their opinions on the platform's development direction and actively participate in managing digital assets. This is particularly relevant in the context of NFTs and the creator economy, where artists and content developers can protect their rights and influence monetisation rules (Jordan, 2019).

Currently, several active DAOs are influencing the Metaverse:

- **Decentraland:** A platform where users vote on digital infrastructure development, content policies, and commercial partnerships (Ionescu & Chipperi, 2022).
- **The Sandbox:** A Metaverse platform that manages virtual land and assets, setting prices and regulations for the digital real estate market (Evans et al., 2016).
- **Organisations such as MakerDAO and Aave:** These integrate decentralised finance (DeFi) into the Metaverse, offering loans and liquidity for transactions in virtual economies (Jordan, 2019).

5. Economic Models and the Impact of Cryptocurrencies in the Metaverse

The Metaverse has opened new perspectives on the digital economy, where cryptocurrencies play a crucial role in facilitating transactions and developing innovative economic models. Unlike traditional economies, the Metaverse is decentralised, supported by blockchain technology, and governed through

Decentralised Autonomous Organisations (DAOs) (Li & Mann, 2018). Among the most popular emerging economic mechanisms are the Play-to-Earn (P2E) model, the use of NFTs for digital ownership, and decentralised finance (DeFi), each offering advantages but also presenting challenges.

5.1 Play-to-Earn and the Gamified Economy

One of the most engaging economic models in the Metaverse is Play-to-Earn (P2E), where users can earn cryptocurrencies by playing and interacting with various virtual platforms. Instead of investing only time and money without returns, this model allows them to generate real income from their virtual activities (Evans et al., 2016).

Blockchain-based games serve as examples of digital ecosystems where users can own unique assets and trade virtual goods (Ionescu & Chiperi, 2022). For example, in Axie Infinity, players collect and train digital creatures in the form of NFTs, and through battles and trading, they can earn tokens that can be converted into real money.

Although attractive, the Play-to-Earn model faces challenges related to economic sustainability. Most P2E games rely on a constant influx of new users to maintain token demand, which can lead to the economic collapse of the platform once interest declines (Evans et al., 2016). Additionally, cryptocurrency volatility affects the stability of players' earnings, and emerging regulations raise questions regarding the legality of these economic models (Jordan, 2019).

5.2 NFTs and Digital Ownership

Another fundamental element of the Metaverse economy is NFTs (Non-Fungible Tokens), which allow users to own unique digital assets. NFTs ensure the ownership rights and authenticity of virtual goods, providing a decentralised solution for their registration and transfer (Jordan, 2019).

Within the Metaverse, NFTs are used to represent virtual land, collectibles, digital artwork, and in-game assets (Li & Mann, 2018).

Beyond their economic component, NFTs offer artists and creators a unique way to monetise their work. Through blockchain, artists can sell directly to consumers without intermediaries, and smart contracts allow them to receive a percentage from each resale of the NFT (Evans et al., 2016).

However, this market is not without challenges. NFTs have often become speculative assets, leading to massive price fluctuations and financial losses for many investors (Jordan, 2019). Additionally, copyright issues remain a concern, as blockchain does not prevent the unauthorised use of digital content (Ionescu & Chiperi, 2022).

5.3 DeFi as an Alternative to the Financial System

Blockchain technology plays a crucial role in the decentralised economy, enabling the emergence of new financial models that can be effectively integrated

into the Metaverse. Decentralised Finance (DeFi) represents an alternative to the traditional financial system, eliminating banking intermediaries and providing access to financial services through smart contracts. These allow for transactions, loans, and investments to be executed quickly and securely, without the need for a centralised authority (Vidal-Tomás, 2022).

In the Metaverse, DeFi could become the backbone of the digital economy, allowing users to make payments, access credit, and participate in virtual capital markets.

5.4 Challenges and Opportunities of Using Cryptocurrencies in the Metaverse

Despite their advantages, cryptocurrencies used in the Metaverse present numerous challenges related to regulation and scalability.

On one hand, the absence of a clear legal framework means that many platforms operate in a grey area of international law, which may discourage large investments and widespread adoption (Li & Mann, 2018). On the other hand, current blockchain networks face scalability issues, as high transaction costs and speed limitations affect user experience and the mass adoption of the Metaverse (Jordan, 2019).

At the same time, the use of cryptocurrencies in the Metaverse presents significant opportunities for the future, such as:

The integration of stablecoins like USDT or USDC, which can reduce volatility and make transactions more efficient (Evans et al., 2016).

Adoption by major companies like Nike, Gucci, and Adidas, which are exploring NFTs and cryptocurrencies to expand their digital presence and engage with consumers in innovative ways (Ionescu & Chiperi, 2022).

Stablecoins, which are cryptocurrencies with stable value pegged to fiat currencies or other assets, have the potential to reduce the volatility characteristic of regular cryptocurrencies. These could play a crucial role in the Metaverse by providing a stable and efficient medium of exchange for economic transactions.

For example, the use of stablecoins in Metaverse platforms like Decentraland or The Sandbox could create a functional economy where digital goods are valued in a currency with reduced fluctuations, increasing user and merchant confidence (Vidal-Tomás, 2022).

However, integrating DeFi and stablecoins into the Metaverse also raises challenges related to regulation, scalability, and security. The lack of a clear legal framework may create uncertainties for users and developers, while current blockchain scalability issues can affect the efficiency of financial transactions.

Nonetheless, the development of Layer 2 solutions and the transition to Proof-of-Stake (PoS) models could contribute to improving performance and the widespread adoption of these technologies. As the digital economy evolves, integrating DeFi and stablecoins into the Metaverse will become a key factor in establishing a stable, decentralised, and globally accessible financial ecosystem.

If these issues are properly managed, the Metaverse could become a stable economic ecosystem integrated with the real economy, offering new opportunities for investment, employment, and digital interaction.

6. The Future of the Digital Economy Through the Lens of the Metaverse and Cryptocurrencies

The Metaverse and cryptocurrencies have evolved beyond mere topics of interest, becoming transformative realities reshaping the digital economy. As more companies expand their presence into this virtual universe, the boundaries between the physical and digital worlds are becoming increasingly blurred. The integration of the Metaverse into the economy is no longer a distant possibility but an inevitable direction in technological and financial progress.

The Metaverse is not merely an entertainment space or an extension of the internet; it is an emerging economic ecosystem where users can own, trade, and monetise digital assets. In this context, cryptocurrencies act as the key enabler, facilitating these exchanges by eliminating the need for intermediaries and providing a high degree of financial autonomy. Renowned companies such as Nike, Gucci, and Adidas have begun creating virtual products, selling NFTs, and experimenting with new ways to engage with consumers (Ionescu & Chiperi, 2022). This trend demonstrates that the Metaverse is not just a space for experimentation but a viable business environment.

As blockchain technology becomes more sophisticated, the possibility of a fully digital economy emerges, where all transactions, contracts, and assets are recorded and secured on the blockchain (Jordan, 2019). This economic model offers considerable benefits, including the elimination of fraud, increased transparency, and more efficient transactions. However, it also comes with significant challenges, such as scalability issues, high transaction costs, and the lack of uniform global regulations, which remain major obstacles to a blockchain-exclusive economy (Li & Mann, 2018).

A fully decentralised digital economy would mean that individuals could manage their own assets independently, without relying on traditional financial institutions. Central Bank Digital Currencies (CBDCs) could serve as a bridge between the traditional economy and the blockchain-based financial system, providing stability and security for users (Jordan, 2019). At the same time, DAOs could replace traditional corporate models, enabling communities to make decisions democratically without the need for rigid hierarchical structures (Li & Mann, 2018).

For businesses, the Metaverse presents enormous opportunities. Companies can sell digital goods and services, host virtual events, and monetise user-generated content. Smart contracts eliminate intermediaries, reducing operational costs and accelerating financial processes (Evans et al., 2016). For consumers, the benefits are equally significant. True ownership of digital assets, secure transactions, and

the ability to generate income within the Metaverse make this ecosystem an attractive space for users worldwide (Ionescu & Chiperi, 2022).

However, the adoption of cryptocurrencies and the Metaverse is not without risks. Crypto market volatility, the potential for cyberattacks, and the lack of clear regulations are factors that could slow down widespread adoption (Jordan, 2019). Financial education and the implementation of user protection measures will be essential to ensuring the success of a stable digital economy.

The regulation of cryptocurrencies and their economic impact on the Metaverse is an increasingly debated topic, with significant implications for the adoption and development of this digital ecosystem. Currently, the legal framework for cryptocurrencies varies significantly across jurisdictions, with some countries adopting policies that encourage blockchain innovation, while others impose strict restrictions on the use of digital assets. This legal uncertainty can directly affect how cryptocurrencies are integrated into the Metaverse, influencing the stability of virtual markets and user confidence (Ball, 2022).

One of the primary concerns of regulatory authorities is combating money laundering and illegal financing. Since crypto transactions are decentralised and anonymous, there is a risk that they could be used for illicit activities. As a result, many countries have imposed strict identity verification requirements, such as Know Your Customer (KYC) policies, and Anti-Money Laundering (AML) compliance measures (Vidal-Tomás, 2022). Implementing such measures in the Metaverse could limit user anonymity but would also enhance security and credibility within the ecosystem.

On the other hand, the adoption of stablecoins and regulated cryptocurrencies, including Central Bank Digital Currencies (CBDCs), could positively impact the Metaverse economy by providing a stable and legally recognised means of payment. This would facilitate transactions between users and merchants, reducing volatility and creating a more predictable economic environment (Jentzsch, 2016).

7. Conclusions

The Metaverse and cryptocurrencies represent a profound transformation in how we interact with the digital space, offering a decentralised, secure, and autonomous economy. Through blockchain technology, these concepts redefine digital ownership, financial transactions, and virtual community governance, eliminating the need for intermediaries and giving users greater control over their assets.

The integration of blockchain into the Metaverse ensures transparency, security, and interoperability, enabling the use of smart contracts and digital tokens for the creation, trading, and management of virtual assets. This decentralised system not only improves economic efficiency but also allows for the emergence of new governance models through DAOs, where users actively participate in decision making and the allocation of economic resources.

However, despite the evident advantages, significant challenges remain regarding the adoption of the Metaverse and cryptocurrencies. Crypto market volatility, legal regulations, and cybersecurity risks are major obstacles that must be addressed to ensure a safe and stable adoption (Milutinović, 2018). Additionally, high energy costs and blockchain scalability issues require innovative solutions to support the continued growth of the digital economy.

On the other hand, the use of digital tokens, both fungible (cryptocurrencies, stablecoins) and non-fungible (NFTs), presents significant economic opportunities. Tokens enable users to buy and sell digital goods, virtual land, and services without relying on centralised entities, thereby strengthening an autonomous and decentralised economy.

Furthermore, DAOs are becoming the pillars of decentralised governance in the Metaverse, offering a democratic economic model where community-driven decision making ensures transparent and efficient resource management. Examples such as Decentraland DAO and The Sandbox DAO demonstrate that users can directly participate in the development and administration of digital platforms, a model that could become dominant in the future economy.

Emerging economic models such as Play-to-Earn (P2E) and the use of NFTs have transformed how people generate income in the Metaverse, creating new financial opportunities. However, the sustainability of these models depends on crypto market stability and future regulations.

Looking ahead, the Metaverse and cryptocurrencies could reshape the global economy, providing a borderless, more accessible, and more efficient financial system. The rise of central bank digital currencies (CBDCs), the increasing adoption of stablecoins, and the expansion of DAOs could accelerate the transition toward a fully digitised economy. At the same time, major technology and retail companies are exploring Metaverse integration into their economic strategies, creating virtual marketplaces and new business models.

The research employed a structured literature review as its methodology, synthesising findings from peer-reviewed articles, technical reports, and case studies published between 2016 and 2024. Documents were selected from major academic databases including Scopus, ScienceDirect, SpringerLink, IEEE Xplore, SSRN, and Google Scholar. Through this approach, the study assessed the functionalities, use cases, and implications of tokens and DAOs in virtual ecosystems, such as those found in Decentraland, The Sandbox, and various DeFi protocols.

However, the study also recognises several limitations. Being a literature-based review, it does not include empirical user data or direct platform analytics, which could enrich the understanding of practical adoption dynamics. Additionally, the fast-paced evolution of blockchain and Metaverse platforms may render some insights time-sensitive.

Future research could expand this analysis by conducting empirical studies on user behaviour, quantitative assessments of DAO governance effectiveness, or comparative legal analyses across jurisdictions. Moreover, there is significant value in exploring interoperability among blockchain networks, Layer 2 scalability solutions, and long-term economic sustainability of Play-to-Earn models.

In conclusion, this review confirms that tokens and DAOs are not peripheral innovations but foundational mechanisms driving the decentralisation of digital economies.

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