DOI: 10.55643/fcaptp.1.60.2025.4689

FORMATION AND FUNCTIONING OF FINANCIAL METAVERSE PLATFORMS

Volodymyr Mishchenko
D.Sc. in Economics, Professor, Head of the Sector of Digital Economy, Institute of Economics and Forecasting of the NAS of Ukraine, Kyiv, Ukraine;
e-mail: mvi25prof@gmail.com
ORCID: 0000-0002-8565-2686
(Corresponding author)

Svitlana Naumenkova
D.Sc. in Economics, Professor of the Department of Finance, Taras Shevchenko National University of Kyiv, Kyiv, Ukraine;
ORCID: 0000-0001-8582-6044

Svitlana Mishchenko
D.Sc. in Economics, Professor of the Department of Finance, State University of Trade and Economics, Kyiv, Ukraine;
ORCID: 0000-0002-1840-8579

Ievgen Tishchenko
Candidate of Economy Sciences, Doctoral Student, European University, Kyiv, Ukraine;
ORCID: 0000-0002-1580-4701

Received: 01/01/2025
Accepted: 16/02/2025
Published: 28/02/2025

ABSTRACT

An important direction in the formation and development of a decentralized economy is the creation of a financial metaverse as a hybrid physical-virtual ecosystem, based on a combination of centralized and decentralized mechanisms of financial market activity. This article aims to reveal the features of the formation and functioning of digital financial platforms to ensure effective financial services for metaverse users, considering the benefits and drawbacks of using individual types and forms of digital money.

Based on a comparative analysis, the authors identify the main technological and economic properties, competitive advantages and disadvantages of individual types and forms of digital money in the metaverse's payment and financial systems, taking into account potential economic and social consequences. This promotes a balanced approach to selecting financial services instruments for metaverse users. The decentralized nature of the financial metaverse, combined with centralized monetary systems and financial markets, deepens our understanding of how digital financial ecosystems function and how business operates in the virtual space. The authors argue that the centralization degree of financial services for metaverse users depends on the level of regulation of the circulation and use of digital currencies. The practical focus is on developing a tentative organizational structure for the financial metaverse, justifying potential models for digital financial platforms, and providing recommendations for using CBDCs for financial services in the metaverse. The conclusions and recommendations formulated in the article can be used in making political and regulatory decisions to form and develop financial metaverse platforms.

Keywords: financial metaverse, financial services, decentralized platforms, centralized governance, cryptocurrencies, crypto assets, payment systems, CBDC

JEL Classification: E42, E44, G14, O33

INTRODUCTION

A new stage in the digitalization of the economy and society has become the formation and functioning of the metaverse as a unique socio-technical phenomenon. Its important component is the financial metaverse, thanks to which, the effective monetization and movement of created value occur. The formation and development of the financial metaverse fundamentally change the forms and conditions for providing financial services, opening up new opportunities for doing business, expanding access to financial services, and improving interaction with users, ultimately contributing to the formation of a global and effective economic system.

Bloomberg estimates that revenue from metaverse technologies will exceed USD 800 billion in 2024 (Bloomberg, 2023). There is a need to study the methodological and organizational aspects of organizing financial services for metaverse users in the context of creating new models of banking and financial digital platforms, the use of various types and forms of digital money, and the interaction of decentralized and centralized mechanisms for the functioning of financial markets.

The development of the virtual economy involves using new methods of making payments and settlements, accumulating and saving funds, and receiving various financial services and products in the digital environment. Therefore, the question arises when forming the financial metaverse: How and with what tools should payment, settlement,

and monetary services be organized? To solve this, the vast majority of researchers focus on using cryptocurrencies and crypto assets as the main tools for the functioning of decentralized markets. However, since the metaverse is a hybrid system that combines the real and virtual worlds, there is an absolute practical need to combine centralized and decentralized financial management mechanisms, due to the nature of money, which remains real even in dematerialized (digital) form.

An important aspect of creating an effective structure of the financial metaverse as an independent virtual space object is providing timely, reliable, and secure financial services to users based on a combination of centralized and decentralized infrastructure, digital identification, and digital money.

The theoretical and practical aspects of organizing decentralized finance in the metaverse and integrating it with existing financial systems require broader scientific justification since maintaining the controllability of monetary and financial systems remains the main task of governments and regulators.

LITERATURE REVIEW

In recent years, many authors have reflected on various aspects of forming and developing the financial metaverse in their works. Thus, Coeckelbergh (2024) and Jauhiainen (2024) focus on the theoretical aspects of creating a financial metaverse. Malekolkalami (2024) reveals the features of the formation of the industrial, organizational, and managerial structure of the financial metaverse. Ball (2022) and Chen, Alam, and Jenweeranon (2024) define the functions, tasks, and development prospects of the metaverse. Kontogianni and Anthopoulos (2024) and Ramírez-Herrero et al. (2024) explored the sources of creation and the features of value movement in the metaverse. Gupta et al. (2024) presented the distribution and maintenance of revenue streams generated in the metaverse, as well as settlements and payments. Sánchez-Amboage et al. (2024) studied the monetization of virtual services and products.

Researchers pay the most attention to analyzing the features of the functioning of official and private monetary systems in the metaverse (Mishchenko et al., 2022; Bear, 2024), implementing functions, and determining the characteristics, advantages, and disadvantages of cryptocurrencies and crypto assets that can be used on the metaverse financial platforms (Frank and Rudolf, 2024; Jenweeranon, 2024; Arjunwadkar & Ramageri, 2024). They also carefully examine the use of CBDCs (Mayer, 2024; Dötsch & Ginter, 2024), paying particular attention to the property rights of cryptocurrencies and crypto assets (Ruggeri, Marella & Gabrielli, 2024), the conditions for competition between digital currencies (Bear, 2024), and the provision of macroeconomic and financial stability depending on the technologies of their issuance and circulation (Meng, Wu & Tu, 2024).

An important area of scientific research is the study of the adaptation of traditional financial institutions and agencies to the operating conditions of decentralized financial markets and the metaverse (Akillioğlu, 2024), as well as their transition to a constant presence in virtual space (Trunfio & Rossi, 2022). Scientists substantiate new business models of financial services (Agarwal et al., 2024; Mishchenko et al., 2018), determine the features of providing financial services in the metaverse ecosystem (Malekolkalami, 2024), the functioning of payment systems (Gupta et al., 2024), ensuring the integrity and reliability of financial and digital asset transactions (Ariza, Marín & Duran, 2024), corporate debt financing (Xiao et al., 2024), etc.

The issues of the formation of digital financial infrastructure based on the use of virtual financial services (Dimitrieska et al., 2023), the convergence of physical and virtual payment systems (Schulte & Shemakov, 2024), and cross-border payment mechanisms (Mayer, 2024) are not ignored.

Much attention is also paid to the technological aspects of the functioning of the financial metaverse and the specifics of using blockchain technologies, Web 3.0, decentralized autonomous organizations, artificial intelligence, determining the legal status of avatars when providing financial services (Sze, Salo & Tan, 2024; Mengual, 2024; Frank & Rudolf, 2024), digital identification of users of virtual financial ecosystems, and ensuring privacy and security based on the formation and maintenance of network trust (Garg, 2024; Wang, Gai & Zhang, 2024).

A significant number of scholars focus on the economic, social, and environmental implications of the financial metaverse, in particular on improving governance and creating new business models for digital financial platforms (Varriale et al., 2024), expanding user access to financial services in the metaverse regardless of economic, demographic, geographic, and other factors (Jauhiainen, 2024), potential widening of the digital divide due to rising energy consumption and energy poverty (Naumenkova et al., 2024).

DOI: 10.55643/fcaptp.1.60.2025.4689

Recognizing the financial metaverse as an independent object of virtual space, Valente (2024) explores the problem of *cross-jurisdictional governance*; Remolina (2024) focuses on forming the mechanisms for unifying decentralized and centralized financial markets. Important issues of financial metaverse operation, reflected in scientific publications, are the implementation of regulatory and macroprudential policies (Dimitrieska et al., 2023), organization of effective interaction between monetary authorities and private financial institutions and digital platforms (Aysan et al., 2024; Mishchenko et al., 2021), formation of the regulatory framework necessary for providing financial services in the metaverse (Dwivedi et al., 2022), protection of virtual property, trust, security, and stability in the digital space (Alam, 2024; Haribaskar et al., 2025), regulation of the mechanisms for the functioning of the cryptocurrency ecosystem and the use of crypto assets (Chokor & Alfieri, 2021; Daisuke, 2024).

However, due to the complexity of the problem, a significant portion of the issues surrounding the formation and development of the financial metaverse still remain controversial, which requires the intensification of scientific research in this area.

AIMS AND OBJECTIVES

This paper aims to reveal the features of the formation and functioning of digital financial platforms to ensure effective financial services for metaverse users, considering the pros and cons of using individual forms and types of digital money.

The study aims to examine the interaction features of centralized and decentralized mechanisms of virtual financial markets to ensure effective financial services for metaverse users. Based on the stated goal, several specific tasks were formulated during the study:

- to reveal the economic essence, main characteristics, and principles of formation and development of the financial metaverse as a hybrid physical-virtual ecosystem;
- to build an organizational structure of the financial metaverse based on a combination of the decentralized nature of financial metaverse operation with centralized financial markets and institutions;
- to identify the competitive advantages of using individual types and forms of money in the metaverse's payment and financial systems, considering economic and social aspects;
- to determine the centralization degree of financial services for metaverse users depending on the level of regulation of the circulation and use of digital currencies;
- to justify the benefits of using CBDCs for financial services for metaverse users;
- to present potential models of financial metaverse digital platforms, and characterize their functioning features and inherent risks.

The study aims to identify prospects for expanding the scientific view of the financial metaverse based on a deeper understanding of the essence of digital currencies and digital financial ecosystems, a thorough analysis of the specifics of doing business in virtual space, as well as to formulate new business strategies and business models for traditional and virtual financial institutions by combining centralized and decentralized management mechanisms. The solution to the formulated problems can become the basis for substantiating practical recommendations on making political and regulatory decisions in forming and developing the financial metaverse.

METHODS

This study is based on exploring and developing modern scientific concepts and approaches in areas related to the use of digital money, the functioning of decentralized markets, and the formation of the financial metaverse.

The main conceptual provisions that the authors relied on during the research process are the following:

- by its economic nature, the financial metaverse is considered a hybrid ecosystem, which is formed based on a combination of decentralized (DeFi), centralized (CeFi), and traditional finance (TradFi);
- the main objective of the formation and functioning of the financial metaverse is to provide financial services to users based on digital technological services, payment instruments, payment mechanisms, and tools by ensuring convenient, timely, reliable, and secure payments to support business activity and socio-economic development;

- the financial metaverse operates on the basis of economic activity both in physical and virtual space, operating based on a combination of decentralized and centralized systems, mechanisms, methods, and management tools, using various financial instruments and products in digital format.

We hypothesize that the successful development of the financial metaverse can only occur based on ensuring the functional compatibility of individual financial platforms by effectively combining their decentralized nature with the centralized nature of modern fiat monetary systems and financial markets.

System analysis, comparative analysis, generalization, systematization, system and interdisciplinary approaches were used to theoretically substantiate the essence of the financial metaverse as a physical-virtual ecosystem and construct its organizational structure. This made it possible to give a deep, comprehensive description of the financial metaverse as an independent virtual space object.

To determine the competitive advantages of individual types and forms of digital money, analyze the features of the combination of centralized and decentralized metaverse operation mechanisms, as well as substantiate the benefits of using CBDCs, we used a systemic approach and qualitative analysis, a comparative analysis of the properties and characteristics of individual types and forms of digital money, and the method of expert assessments and classification. This allowed us to critically evaluate the advantages and disadvantages of individual types of digital money and determine the pros and cons of their use.

Formal logic, systematization, and classification were used to substantiate the functioning models of financial metaverse platforms, characterize their features and inherent risks, and deepen the understanding of the features of doing business in the virtual space based on a combination of centralized and decentralized management mechanisms.

Combining these scientific research methods allowed us to comprehensively describe the financial metaverse formation processes and substantiate recommendations for improving the mechanisms and tools for providing financial services to users.

RESULTS

In the metaverse, users' needs for financial services remain essentially the same as in the real world since money, even when completely dematerialized, remains real, as it is a key characteristic of economic activity in both the physical and virtual worlds. The main difference is that user requirements for financial instruments, and for the immersiveness, quality, timeliness, security, and reliability of financial services, are growing significantly. Thus, the main characteristics of the financial metaverse are its ability to create and exchange value on a large scale across various digital platforms, digitally mediated immersiveness, spatiotemporal interactivity, functional compatibility of real and virtual space in real-time, customer focus, and subjectivity of users making responsible decisions and acting of their own free will following their goals and interests.

In the virtual space, the main instruments for providing financial services are digital payment instruments, the use and circulation of which are carried out using financial services provided by centralized or decentralized platforms.

Until recently, the formation and development of the financial metaverse were based primarily on the idea of a decentralized organization of finance and the economy as a whole. This makes it difficult to understand the essence, functions, and properties of modern money from both a theoretical and practical point of view since the interests of states and large technology companies in this area often do not coincide. In this regard, the urgent task of combining the decentralized nature of financial metaverse operation with centralized financial markets and institutions arises, determining its essence as a hybrid physical-virtual ecosystem.

From an organizational point of view, the main institutions, agencies and mechanisms that form the modern financial metaverse are traditional banks and financial institutions, including digital ones; private and public payment systems, including cryptocurrency payment platforms with specialized payment systems for the metaverse; technology companies, startups, and large digital corporations that develop virtual and augmented reality technologies, contribute to the development of the corresponding digital infrastructure and maintain an adequate level of cybersecurity; decentralized (Oddzverse, Uniswap, Aave) and centralized financial platforms (TradFi and CeFi platforms), decentralized autonomous organizations (DAO); cryptocurrency exchanges (e.g. Binance, Coinbase); NFT platforms (OpenSea, Rarible); financial and digital market regulators; decentralized and centralized governance mechanisms and self-regulation mechanisms involving financial metaverse users; cryptocurrencies, tokens, CBDCs, as well as other instruments and institutions.

Figure 1 shows a rough organizational structure of the financial metaverse.

DOI: 10.55643/fcaptp.1.60.2025.4689

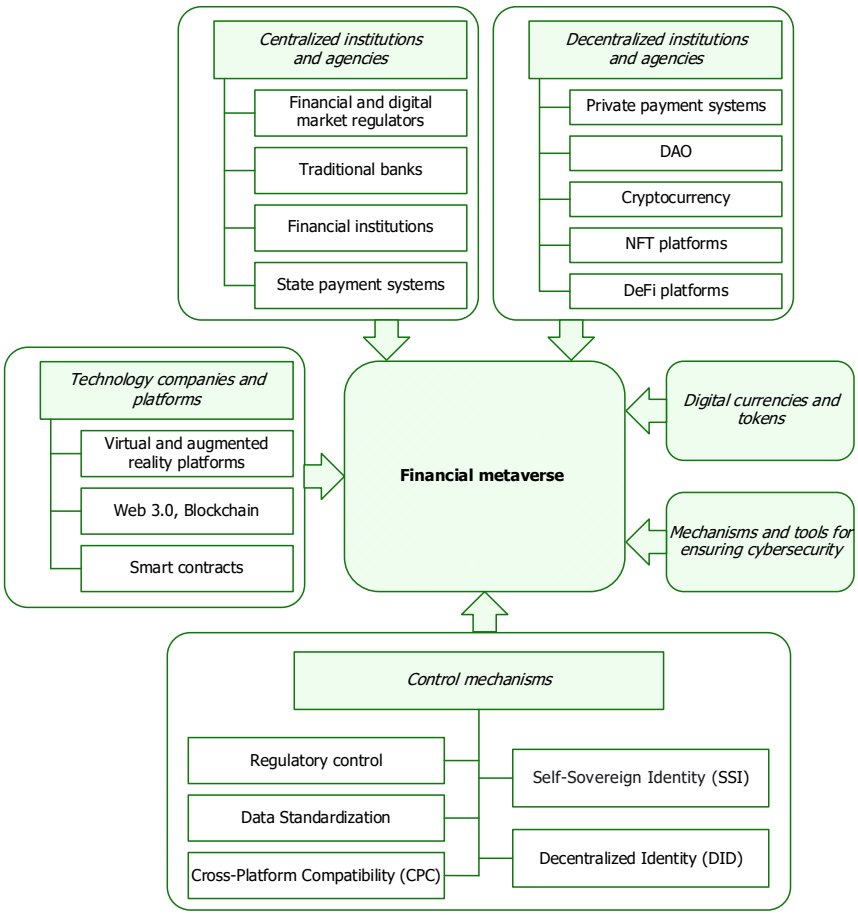

Figure 1. Organizational structure of the financial metaverse.

One of the conceptual issues in forming the financial metaverse is the rationale for the choice and mechanisms of using certain types and forms of digital money to provide financial services. However, the choice of currency for financial transactions and financial services to metaverse users remains controversial due to disputes between supporters and opponents of decentralized markets and private digital currencies.

Today, the prevailing view is that the metaverse, as one of the functioning models of a decentralized economy, should switch to the use of exclusive cryptocurrencies and crypto assets, which have replaced traditional fiat money and are decentralized financial instruments by their nature; this allows for the formation of integrated and effective virtual economic and financial systems. There are various types and forms of crypto assets on the market, their number already exceeds 30,000 and theoretically, there could be even more. According to CoinMarketCap, a website owned by Binance Capital Mgmt, the owner of the Binance crypto exchange, as of January 1, 2025, daily quotes were made for 10,493 types of crypto assets, and the global cryptocurrency and crypto asset market capitalization was USD 3.27 trillion (CoinMarketCap, 2025).

Developers and users of cryptocurrencies, based on their own interests, have independently endowed them with the functions of money and are now actively promoting the idea of their inclusion in official monetary systems. With the same success, any material or immaterial objects (time, joules, metals) can be used as money, which is confirmed by historical experience. However, the fact is that, according to the mechanisms of functioning of modern monetary systems, only tangible or intangible objects officially recognized by the national central bank as legal tender in the country's territory can perform the functions of money. Simply put, these are the monetary units in which wages are paid to workers, taxes are collected, and mass payments for goods and services are made; that is, the vast majority of citizens and businesses constantly use this currency in their daily economic activities and lives. Despite certain advantages, cryptocurrencies have not become widespread among a wide range of users, most of whom use (and will use in the future) officially recognized means of payment when making settlements and payments.

Without official inclusion in national or international monetary systems, cryptocurrencies cannot be full-fledged money, since they cannot perform all the functions of money. Only El Salvador and the Central African Republic have officially

recognized Bitcoin as legal tender, and most countries, including Ukraine, although they have legalized the use of crypto-currencies, have not included them in their monetary systems.

A diversified market has already been formed around the use of crypto assets as a means of payment and speculative financial instruments, a huge financial infrastructure has been deployed, and tens of thousands of people are involved in this area. This is not surprising, since the participants of this market, in addition to income from operations with crypto assets, also receive a corresponding analogue of seigniorage, as in the emission of fiat money, since the cost of mining one private digital unit is several times less than its market price.

The advantages of cryptocurrencies and crypto assets in general emphasized by their supporters (anonymity, speed of settlements, decentralized nature of circulation, irreversibility of transactions, ease of storage, protection from intruders, etc.) are mostly conditional or create new risks and threats that are even more complex than the use of fiat money in electronic form. As global experience shows, most decisions by governments and state regulators regarding the use of crypto assets were made under pressure or through lobbying from large digital corporations and other stakeholders. M. Martini calls this "corporate determinism", which raises questions related to the state sovereignty of individual countries, since it will allow large corporations to manage national virtual spaces (Martini, 2024). However, with the development of digital technologies, in particular quantum computing, which allows any code to be quickly deciphered, cryptocurrencies will have fewer and fewer advantages over digital fiat money, in particular, CBDCs.

It is important to note that dematerializing money by converting it into digital form has not changed its economic essence and functions, and therefore, even in digital format money and all transactions with it remain real. Instead, money has new properties and characteristics, the main ones being technological, interoperability, cybersecurity, energy efficiency, and environmental friendliness. In this regard, Gresham's law, according to which "worse" money displaces better money from circulation, takes on a new meaning. Thanks to the new properties and characteristics of digital money, new factors and conditions of competition between individual types and forms of money have arisen, caused, first of all, by the peculiarities of their issue, circulation, and storage.

From the users' point of view, the main competitive advantages of individual types and forms of money as a means of payment in the metaverse should be availability (including physical, virtual, and price), ease of storage, reliability, and security, which ensures the integrity and completeness of financial transactions. This is because money and monetary relations remain real in the metaverse, and market participants need to purchase certain tangible and intangible goods for them. Therefore, sooner or later, there is a need to convert cryptocurrencies or other crypto assets into fiat money.

A comparative analysis of the properties and characteristics of individual types and forms of digital money allows us to conclude that CBDCs best meet the requirements of metaverse users, especially in terms of price stability, tax transparency, environmental friendliness, and energy intensity (Table 1).

Table 1. Characteristics, properties, and requirements for types and forms of money that can be used in the financial metaverse.

Characteristics, properties, and requirements for types and forms of money	Compliance of individual types and forms of digital currencies and digital assets with the requirements imposed on money				
	Cryptocurrencies	Stablecoins	NFT	Corporate currencies	CBDC
Performance of the functions of money (measure of value, means of payment, means of storing value)	Low	Medium	Low	Medium	High
Price stability (purchasing power)	Low	Medium	Low	Medium	High
Maintaining market liquidity	Low	Medium	High	Medium	High
Interoperability with other types and forms of money	Low	Medium	Low	Medium	High
Convenience of use and storage	High	High	High	High	High
Accessibility for a wide range of users	Low	Medium	Low	High	High
Anonymity of transactions	High	Medium	High	Medium	Low
Tax transparency of transactions	Low	Medium	Low	Medium	High
Transaction costs for conversion	Low	Medium	Low	Medium	High
Possibility of earning income from savings	Low	Low	Low	Medium	High
Technological effectiveness	High	Medium	High	High	High
Energy intensity of emission and use	Low	Medium	Medium	Medium	High

DOI: 10.55643/fcaptp.1.60.2025.4689

The advantages and disadvantages of using various types and forms of digital money are actively discussed in scientific literature and the expert community, and the struggle between their supporters and opponents will continue for quite a long time until responsible political decisions are made. Therefore, in contrast to the technocratic approach that absolutizes the technological benefits of crypto assets, we pay attention to the economic and social aspects of their use in the financial metaverse and are also guided by the goals of economic and monetary policy both at the global level and at the level of individual states.

Based on this approach, it is worth paying attention to the fact that cryptocurrencies cannot serve as a measure of value since they are not officially recognized as money. Also, due to high price volatility, they cannot ensure the stability of their purchasing power or maintain the proper level of market liquidity and financial stability. They also have a low accessibility level for a wide range of users and high transaction costs when converting. They make it virtually impossible to generate income from savings, are not always transparent to tax authorities, etc.

In addition, practice has shown that due to the high energy intensity of the issuance and circulation of crypto assets, their use hurts the environment. According to The Cambridge Centre for Alternative Finance, Bitcoin turnover requires about 110 terawatt-hours of electricity, which in 2022 amounted to about 0.45% of its global consumption. For example, the energy consumption of one Bitcoin transaction block is 1.57 MWh, while processing one transaction in the Visa payment system is only 0.0009 MWh (CCAF, 2024). Overall, global energy costs for servicing crypto assets, blockchain technology, and artificial intelligence have already exceeded 2–2.5% of its consumption and will continue to grow. If this process continues, individual countries may face the problem of energy poverty. Given the global economy's focus on sustainable development, this trend is certainly negative.

Unfortunately, there are no calculations in the literature on the costs of maintaining the circulation of current official currencies, including energy costs, as well as the costs of regulation and supervision. However, in our opinion, the costs of issuing and maintaining the circulation of crypto assets today may be significantly higher than for fiat money in electronic form, especially given the potential move towards widespread use of CBDCs.

To organize payment and settlement mechanisms in the metaverse, corresponding financial service systems are formed based on using certain types and forms of digital money. Existing and potential variants of such systems can be divided into decentralized, centralized, and mixed. Decentralized systems include systems that directly use cryptocurrencies and non-fungible tokens (NFT) or form multi-currency wallets based on them, consisting of several digital currencies (for example, MetaMask, Trust Wallet, and Coinbase Wallet). Mixed systems include those based on the use of existing payment systems (PayPal, Visa, Mastercard, Worldline Stripe, and Square), and those using corporate digital currencies issued by digital platforms to make payments and settlements within their platforms. Although, today the governments of most countries quite strictly limit the issuance of corporate digital money (except for "game" money). Global centralized payment systems include the interbank settlement service Federal Reserve System – FedNow Service and the European Payments Initiative (EPI). The payment system for BRICS countries is under development. However, centralized payment systems could see their greatest growth after the widespread adoption of CBDCs by central banks (Table 2).

Table 2. Characteristics of using individual types and forms of money in payment and financial systems of the metaverse.

Type or form of money used in metaverse payment systems	Centralization degree of settlements and payments	Main disadvantages and risks
Cryptocurrencies and NFTs. Metaverse participants convert the received currency into another currency themselves or through crypto exchanges.	Decentralized	High price volatility; high energy intensity of emission and transactions; problems with user identification; cyber risks; difficulty of exchange for fiat currency; risks of illegal transactions; increased operating costs for small companies; increased costs of regulating the crypto market; the ambiguity of the processes of monetization, creation, and distribution of value in the metaverse; the need to increase the volume of fiat money in circulation; potential threats to financial stability
Using multi-currency wallets based on a specific basket of cryptocurrencies and tokens	Decentralized	High energy intensity of transactions; high transaction costs for currency conversion and transfer to fiat money; need for central banks to support liquidity with fiat money; cyber risks; potential threats to financial stability
Using existing payment systems	Decentralized, mixed	Significant impact of international payment systems on national payment and settlement systems; monopolism; potential negative impact on financial stability
Corporate digital currencies issued by digital corporations for making payments and settlements on their platforms	Mixed; controlled by corporations, but partially regulated by the state	Strengthening the role of large digital companies in global and national monetary systems; monopolism; decrease in the level of national sovereignty and financial stability; the difficulty of conversion into fiat currency
Use of CBDCs (CBDC of individual countries, international financial institutions, multi-currency wallets based on CBDC)	Centralized	High level of government control; lack of anonymity in transactions; insufficient financial inclusion for certain categories of citizens due to digital divides; potential to stifle innovation in the financial sector

Most of the global, public, and private payment systems today are already effectively integrated into the financial metaverse, actively using various digital payment instruments. They are fairly transparent and regulated, which simplifies the work of central banks in supporting financial stability, and with the development of technology, they will be improved following the needs and requirements of metaverse users.

It should be noted that since a single metaverse currency is unlikely to be used in the long term, the degree of centralization of financial services to users will depend on the level of regulation and control over the formation and use of such currencies by government agencies. The minimum level of such regulation can be ensured by establishing separate rules for using cryptocurrencies, licensing crypto exchanges, issuing and circulating stablecoins, etc., and the maximum level can be achieved by issuing and organizing the circulation of CBDCs. In any case, there will always be a need to combine decentralized and centralized mechanisms for the functioning of the financial metaverse by finding a balance between the decentralized nature of cryptocurrencies and the regulation of their circulation in the context of compliance with the requirements of the official monetary and financial systems.

The study allowed us to identify potential models of financial metaverse platforms depending on the use of different types and forms of money by different institutions and agencies, as well as to characterize the features of their functioning and determine their inherent risks (Table 3).

Table 3. Financial metaverse platform models.

Metaverse platform model	Characteristic	Currencies used	Risks
Metaverse banking and payment platforms	The initial stage of the formation of metaverse financial platforms	Official monetary units (including CBDC), other currencies, and means of payment under the state's policy in this area	The slow pace of development of financial services systems in the metaverse
Individual corporate platforms of the metaverse	Digital platforms are creating their payment and financial systems that function as traditional banks	Corporate currencies, cryptocurrencies, stablecoins, NFTs, and other means of payment	High level of monopolism; increasing the influence of business on the state
Independent financial platform of the metaverse	Creating a separate financial platform that will interact with all other platforms	All available digital currencies and other payment methods, according to state policy	High level of monopolism; currency conversion risks; cyber risks
Central bank-based metaverse financial platforms	A more advanced type of banking platform based on the integration of digital technologies and financial products into the country's monetary system	CBDC	The high degree of centralization of the monetary and financial systems
State platforms of the metaverse	Can be used in the system of state and municipal administration to provide public services to citizens and businesses	Mainly official monetary units (including CBDCs), as well as other means of payment following state policy	The high degree of centralization of monetary and financial systems

An analysis of the benefits and drawbacks of each of the proposed platform models shows that in the future, the most effective model for financial services in the metaverse may be one based on the use of CBDC by creating multi-currency wCBDC wallets by users. In our opinion, since CBDCs win the competition with private forms of digital money not because of their technological sophistication, but due to the higher quality of their monetary functions, the use of such a model will allow us to combine and effectively regulate decentralized and centralized mechanisms for the metaverse operation, ensure interoperability of individual platforms, maintain an adequate level of cybersecurity, and facilitate greater control over the money supply and the implementation of central banks' monetary policy objectives.

In addition, by reducing the transaction costs of issuing and circulating CBDCs, their use on metaverse financial platforms has potential benefits for increasing market participants' income, reducing government spending, curbing inflation, and ensuring the stability of the economy as a whole. In the future, CBDCs could be used to create an interoperable global financial ecosystem of the metaverse.

However, to date, due to certain technical limitations, the lack of international standards, and legal and ethical issues, the development and implementation of most CBDCs are still at the research or pilot stage and require informed political decisions to accelerate their widespread use.

DOI: 10.55643/fcaptp.1.60.2025.4689

DISCUSSION

The vast majority of scholars who are proponents of the concept of decentralized finance (Arjunwadkar & Ramageri, 2024; Bear, 2024; Ruggeri et al., 2024) actively recommend using cryptocurrencies and other crypto assets to provide financial services in the metaverse, noting the advantages and disadvantages, in particular, high energy intensity and price volatility, often coinciding with the dynamics of stock asset prices, low tax transparency of transactions, the potential to facilitate illegal transactions, and a negative impact on monetary policy and financial stability. While focusing on the technological characteristics of cryptocurrencies (Jauhiainen, 2024), scholars often ignore social, economic, and environmental aspects. In addition, there is virtually no comparison of the efficiency of using CBDCs and cryptocurrencies in the scientific literature, as it is likely to be unfavourable to the latter. At the same time, some scientists (Chokor & Alfieri, 2021; Dwivedi et al., 2022) recommend significantly strengthening the mechanisms for ensuring the stability of cryptocurrencies, forgetting that they are decentralized by nature and therefore cannot be stable a priori. Since cryptocurrencies are difficult to regulate, central banks have less ability to ensure financial stability and manage inflation. However, the success of the financial metaverse will ultimately, although controversially, be determined by its ability to maintain the efficiency and stability of money by combining the benefits of digital private currencies with regulated centralized financial systems.

Recently, there has been a significant amount of research on developing and implementing CBDCs (Mayer, 2024; Xiao et al., 2024; Haribaskar et al., 2025). However, the authors mainly focus on monetary regulation and financial stability issues and pay insufficient attention to the potential of CBDCs as a means of payment in the metaverse. Moreover, it is worth noting that most researchers do not distinguish between the risks inherent in the metaverse as an independent object (Valente, 2024) and the risks of using individual financial instruments, which may hinder the implementation of effective management practices.

Unfortunately, only a few scholars (Mengual, 2024; Sze, 2024) point to the need to ensure an effective combination of decentralized and centralized mechanisms in forming the financial metaverse.

With the development of the financial metaverse, considerable attention is being paid to issues of changing the role, functions, and structure of traditional financial institutions (Akillioğlu, 2024; Malekolkalami, 2024; Trunfio & Rossi, 2022). These institutions must undergo radical organizational and managerial changes, rather than simply using digital technologies. In the future, these should be completely virtual institutions or virtual platforms whose activities are subordinated to the financial servicing of economic processes by ensuring the functional compatibility of digital forms of money and decentralized management mechanisms, as well as the integrity, reliability, and security of financial transactions in the metaverse.

When studying the processes of formation of the financial metaverse, scientists pay significant attention to issues of its management and regulation (Alam, 2024; Chokor & Alfieri, 2021; Daisuke, 2024). However, most proposals are fragmented and limited to protecting user rights and digital property, applying ethical principles, preventing uncontrolled or inappropriate use of technologies, standardization, and tax and administrative methods. In our opinion, it is necessary to justify more advanced methods and tools that can support safe and efficient business development, as well as user trust.

This study, which has explored the problems of forming the financial metaverse and using individual types and forms of money to service users operating in the virtual space, will help to eliminate gaps in the theoretical and methodological understanding of the new economic phenomenon.

CONCLUSIONS

In the context of forming and developing the general concept of the metaverse, it is advisable to consider the financial metaverse as one of its most important components, which ensures the effective movement of value in virtual and physical space due to the functioning of digital financial platforms and the use of various types and forms of digital money through an effective combination of centralized and decentralized mechanisms for the functioning of financial markets.

The key elements of the financial metaverse are centralized and decentralized institutions, technology companies, digital currencies, and digital assets, as well as governance mechanisms and tools to support an appropriate level of cybersecurity. Their effective use will ensure the manageability and stability of the entire ecosystem. In the future, the financial metaverse will function as a polycentric system, combining centralized and decentralized platforms using different governance models, types, and forms of money.

An analysis of the advantages and disadvantages of cryptocurrencies and crypto assets as the main financial service tools in the metaverse has shown that their advantages are not always obvious, particularly when it comes to accessibility,

security, and environmental friendliness. Instead, CBDCs could be more competitive by providing widespread availability, reliability, security, environmental friendliness, and tax transparency, allowing central banks to use their monetary policy powers more effectively.

The practical implementation of proposals for the formation of models for the functioning of financial metaverse platforms and recommendations for the use of CBDCs for financial services to users will allow combining decentralized and centralized mechanisms and maintaining an appropriate level of cybersecurity and financial stability. The conclusions and recommendations formulated may be useful in improving legislation and normative legal acts on the use of digital money when organizing the functioning and control of decentralized financial markets. However, the practical implementation of these proposals requires qualified testing both within individual jurisdictions and at the international level.

Given the potential economic and social implications of using financial metaverse technologies, the primary focus of researchers should be on ensuring privacy, security, interoperability, inclusiveness of access, trust, and proper regulation of the formation and functioning of the entire ecosystem in the interests of the economy and society.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

FUNDING

The Authors received no funding for this research.

CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

REFERENCES

1. Agarwal, S., Gupta, V., Varma, N., & Bansal, A. (2024). How Is Metaverse Impacting Consumers' Behaviour? In S. Inder, S. Dawra, K. Tennin, S. Sharma (Eds.), New Business Frontiers in the Metaverse. IGI Global. https://doi.org/10.4018/979-8-3693-2422-6.ch004
2. Akillioğlu, F. S. (2024). Banking in the Metaverse Era: Opportunities, Challenges, and Future Directions. *Socrates Journal of Interdisciplinary Social Studies, 10*(46), 44–60. https://doi.org/10.5281/zenodo.13893055
3. Alam, N. (2024). Regulating the Metaverse. In: Chen, HY., Jenweeranon, P., Alam, N. (eds) Global Perspectives in the Metaverse. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-54802-4_3
4. Ariza, A. M. V., Marín, M. C., & Duran, M. L. D. (2024). The Metaverse: Financial Assurance Procedures in Smart Contracts and NFTs. *International Journal of Religion, 5*(11), 223-232. https://doi.org/10.61707/cd824339
5. Arjunwadkar, M. V., & Ramageri, B. M. (2024). Metaverse and NFT. Blockchain Applications for Smart Contract Technologies, edited by Derbali A. M. S. IGI Global, 72–99. https://doi.org/10.4018/979-8-3693-1511-8.ch004
6. Aysan, A. F., Gozgor, G., & Nanaeva, Z. (2024). Technological perspectives of Metaverse for financial service providers. *Technological Forecasting and Social Change*, *202*, 123323. https://doi.org/10.1016/j.techfore.2024.123323
7. Ball, M. (2022). The Metaverse: And How It Will Revolutionize Everything. Liveright Publishing Corporation: New York. https://books.google.com.ua/books/about/The_Metaverse_And_How_it_Will_Revolution.html?id=pdZKEAAAQBAJ&redir_esc=y
8. Bear, K. (2024). Money in the Metaverse. In: Chen HY., Jenweeranon P., Alam N. (eds), Global Perspectives in the Metaverse. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-54802-4_9
9. Bhatia, S., & Tuteja, D. (2024). Contagion and linkages across international currencies. *International Review of Financial Analysis*, 94, 103301. https://doi.org/10.1016/j.irfa.2024.103301
10. Bloomberg. (2023). Metaverse May Be $800 Billion Market, Next Tech Platform. https://www.bloomberg.com/professional/blog/Metaverse-may-be-800-billion-market-next-tech-platform/)
11. CCAF. (2024). The Cambridge Centre for Alternative Finance. Official website. https://ccaf.io/
12. Chen, H.-Y., Alam, N., & Jenweeranon, P. (2024). Global Perspectives in the Metaverse. In: Chen, H.-Y., Jenweeranon, P. (eds), Global Perspectives in the Metaverse. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-54802-4_1

DOI: 10.55643/fcaptp.1.60.2025.4689

13. Chokor, A., & Alfieri, E. (2021). Long and short-term impacts of regulation in the cryptocurrency market. *The Quarterly Review of Economics and Finance*, *81*, 157-173. https://doi.org/10.1016/j.qref.2021.05.005

14. Coeckelbergh, M. (2024). All too real metacapitalism: towards a non-dualist political ontology of metaverse. *Ethics Inf Technol*, *26,* 30. https://doi.org/10.1007/s10676-024-09768-4

15. CoinMarketCap. (2025). Today's Cryptocurrency Prices by Market Cap. CoinMarketCap. https://coinmarketcap.com/

16. Daisuke, K. (2024). An Empirical Analysis of the Cryptocurrency Ecosystem Toward Better Regulation and Supervision. *Carnegie Mellon University ProQuest Dissertations & Theses*, 31487813. https://www.proquest.com/openview/8456d9b6c0c5a8d11c5112bee9fdce08/1?pq-origsite=gscholar&cbl=18750&diss=y

17. Dimitrieska, S., Stanoevska, E. P., & Danevska, A. B. (2023). Financial services in the metaverse. *Trends in Economics, Finance and Management Journal, 5*(2). https://tefmj.ibupress.com/uploads/pdf/71.pdf

18. Dötsch, J. J., & Ginter, T. (2024). Complementing Money Functions: Central Bank Digital Currencies and Currency Competition. *Financial and Economic Review*, *23*(1), 50–75. https://doi.org/10.33893/FER.23.1.50

19. Dwivedi, Y. K. et al. (2022). Metaverse beyond the hype: Multidisciplinary perspectives and insights for future research. *International Journal of Information Management*, 66, 102542. https://doi.org/10.1016/j.ijinfomgt.2022.102542

20. Frank, P., & Rudolf, M. (2024). Is the Metaverse Dead? Insights from Financial Bubble Analysis. *FinTech, 3*(2), 302–323. https://doi.org/10.3390/fintech3020017

21. Garg, K. (2024). Digital identities in the metaverse: Privacy, security, and user authentication in virtual financial systems. *International Journal of Financial Engineering*. https://doi.org/10.1142/S242478632442009X

22. Gupta, R., Rathore, B., Biswas, B., Jaiswal, M., & Singh, R. K. (2024). Are we ready for metaverse adoption in the service industry? Theoretically exploring the barriers to successful adoption. *Journal of Retailing and Consumer Services*, *79,* 103882. https://doi.org/10.1016/j.jretconser.2024.103882

23. Haribaskar, R. et al. (2025). Reforming Monetary Policy: A Comprehensive Analysis of Central Bank Digital Currencies (CBDC's). In: Hamdan, A., Braendle, U. (eds) Harnessing AI, Machine Learning, and IoT for Intelligent Business. Studies in Systems, Decision and Control, vol. 555. Springer, Cham, 603–612. https://doi.org/10.1007/978-3-031-67890-5_54

24. Hope, C. (2024). FBI: Americans Lost $5.6B in Crypto-Related Scams in 2023. CoinMarketCap. https://coinmarketcap.com/academy/article/fbi-americans-lost-dollar56b-in-crypto-related-scams-in-2023?lid=hph0dumh2ehm

25. Jauhiainen, J. S. (2024). The Metaverse: innovations and generative AI. *International Journal of Innovation Studies*, *8*(3), 262–272. https://doi.org/10.1016/j.ijis.2024.04.004

26. Jenweeranon, P. (2024). Reimagine the Paradigm of Property Right: Metaverse and Tokenization. In: Chen, H.-Y., Jenweeranon, P., Alam, N. (eds) Global Perspectives in the Metaverse. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-54802-4_10

27. Kontogianni, E., & Anthopoulos, L. (2024). Preliminary Research Results on Exploring the Business Ecosystem and the Value Sources of Metaverse. *Sustainability*, *16*(8), 3134. https://doi.org/10.3390/su16083134

28. Malekolkalami, T. (2024). What is Required to Implement Financial Services in Metaverse Ecosystem? The *International Journal of Metaverse & Virtual Transformation*, *1*(1), 10–18. https://mvt.artahub.ir/article_193076_596ad58ecade90575265ded054c45370.pdf

29. Martini, M. (2024). Materializing corporate futures: how the EU navigated the Metaverse hype. *Information, Communication & Society,* 1–18. https://doi.org/10.1080/1369118X.2024.2428331

30. Mayer, J. (2024). De-dollarization: the global payment infrastructure and wholesale central bank digital currencies. FMM Working Paper 102-2024. IMK at the Hans Boeckler Foundation, MPI. http://www.boeckler.de/pdf/p_fmm_imk_wp_102_2024.pdf

31. Meng, Y., Wu, J., & Tu, Y. (2024). Central Bank Digital Currency, Financial Technology Level and Regional Financial Stability. *International Review of Economics & Finance,* 103598. https://doi.org/10.1016/j.iref.2024.103598

32. Mengual, L. A. (2024). A legal status for Avatars in the Metaverse from a Private Law perspective. *InDret,* 2, 102–135. https://doi.org/10.31009/InDret.2024.i2.03

33. Mishchenko, V., Naumenkova, S., Grytsenko, A., & Mishchenko, S. (2022). Operational Risk Management of Using Electronic and Mobile Money. *Banks and Bank Systems*, *17*(3), 142-157. http://dx.doi.org/10.21511/bbs.17(3).2022.12

34. Mishchenko, V., Naumenkova, S., Ivanov, V., & Tishchenko, I. (2018). Special aspects of using hybrid financial tools for project risk management in Ukraine. *Investment Management and Financial Innovations, 15*(2), 257–266. http://dx.doi.org/10.21511/imfi.15(2).2018.23

35. Mishchenko, V., Naumenkova, S., & Mishchenko, S. (2021). Assessing the efficiency of the monetary transmission mechanism channels in Ukraine. *Banks and Bank Systems*, *16*(3), 48–62. http://dx.doi.org/10.21511/bbs.16(3).2021.05

36. Naumenkova, S., Tishchenko, I., Mishchenko, V., & Mishchenko, S. (2024). Rethinking energy poverty alleviation through energy efficiency: Evidence from Ukraine. *Environmental Economics*, *15*(2), 198–214. http://dx.doi.org/10.21511/ee.15(2).2024.14

37. Ramírez-Herrero, V., Urbina-Criado, M. O., & Medina-Merodio, J.-A. (2024). Understanding the knowledge

structure and the value creation process of the metaverse. Helioyon. https://doi.org/10.1016/j.heliyon.2024.e3127

38. Rehan, M., & Sharma, D. K. (2024). Embracing Tomorrow: Blockchain's Role in Metaverse and Digital Asset Management. *International Journal of Intelligent Communication and Computer Science*, *2*(1), 82–103. https://ijiccs.in/p6v3.pdf

39. Remolina, N. (2024). DeFi and the Metaverse: Legal and Regulatory Challenges of Decentralization of Financial Services. In: Chen, HY., Jenweeranon, P., Alam, N. (eds) Global Perspectives in the Metaverse. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-54802-4_11

40. Ruggeri, A. G., Marella, G., & Gabrielli, L. (2024). Market Value or Meta Value? The Value of Virtual Land during the Metaverse's Digital Era. *Land, 13*(8), 1135. https://doi.org/10.3390/land13081135

41. Sánchez-Amboage, E., Crespo-Pereira, V., Membiela-Pollán, M., & Faustino, J. P. (2024). Tourism marketing in the metaverse: A systematic literature review, building blocks, and future research directions. *PLoS ONE*, *19*(5), e0300599. https://doi.org/10.1371/journal.pone.0300599

42. Schulte, P., & Shemakov, R. (2024). The Future of Digital Infrastructure: Case Studies of Gobal Corporate Strategies in Augmented Reality. In: Chen, HY., Jenweeranon, P., Alam, N. (eds) Global Perspectives in the Metaverse. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-54802-4_7

43. Sze, L. B., Salo, J., & Tan, T. M. (2024). Sustainable innovation in the metaverse: Blockchain's role in new business models. *Digital Business, 4*(2), 100086. https://doi.org/10.1016/j.digbus.2024.100086

44. Trunfio, M. & Rossi, S. (2022). Advances in metaverse investigation: Streams of research and future agenda. *Virtual Worlds*, *1*(2), 103–129. https://doi.org/10.3390/virtualworlds1020007

45. Valente, J. (2024). Governing the Metaverse. The University of Cincinnati Intellectual Property and Computer. *Law Journal*, *9*(2), 135–149. https://scholarship.law.uc.edu/ipclj/vol9/iss2/3

46. Varriale, V., Cammarano, A., Michelino, F., & Caputo, M. (2024). Exploring the Environmental, Economic, and Social Implications of Metaverse Adoption in Business and Management. *European Management Journal.* https://doi.org/10.1016/j.emj.2024.09.007

47. Wang, F., Gai, Y., & Zhang, H. (2024). Blockchain user digital identity big data and information security process protection based on network trust. *Journal of King Saud University – Computer and Information Sciences, 36*(4), 102031. https://doi.org/10.1016/j.jksuci.2024.102031

48. Xiao, Z., Niu, Y., Xiang, L., & Cui, Y. (2024). Central Bank Digital Currency and Corporate Debt Financing Costs: Empirical Evidence from China. *Finance Research Letters*, *69*, 106195. https://doi.org/10.1016/j.frl.2024.106195

Міщенко В., Науменкова С., Міщенко С., Тіщенко Є.

ФОРМУВАННЯ ТА ФУНКЦІОНУВАННЯ ФІНАНСОВИХ ПЛАТФОРМ МЕТАВСЕСВІТУ

Важливим напрямом становлення та розвитку децентралізованої економіки є формування фінансового метавсесвіту як гібридної фізично-віртуальної екосистеми, функціонування якої відбувається на основі поєднання централізованих і децентралізованих механізмів діяльності фінансових ринків. Метою дослідження є розкриття особливостей формування та функціонування цифрових фінансових платформ для забезпечення ефективного фінансового обслуговування користувачів метавсесвіту з урахуванням переваг і недоліків використання окремих видів і форм цифрових грошей. На основі порівняльного аналізу автори визначають основні технологічні та економічні властивості, конкурентні переваги й недоліки окремих видів і форм цифрових грошей у платіжних і фінансових системах метавсесвіту з урахуванням потенційних економічних і соціальних наслідків, що сприяє реалізації виваженого підходу до вибору інструментів фінансового обслуговування користувачів метавсесвіту. Поєднання децентралізованого характеру фінансового метавсесвіту з централізованими грошовими системами та фінансовими ринками поглиблює розуміння механізмів функціонування цифрових фінансових екосистем і особливостей ведення бізнесу у віртуальному просторі. Автори доводять, що ступінь централізації фінансового обслуговування користувачів метавсесвіту залежить від рівня регулювання процесів обігу та використання цифрових валют. Практичну спрямованість мають розробка орієнтовної організаційної структури фінансового метавсесвіту, обґрунтування потенційних моделей цифрових фінансових платформ, а також рекомендації щодо використання CBDC для фінансового обслуговування в метавсесвіті. Висновки та рекомендації, сформульовані в статті, можуть бути використані в процесі ухвалення політичних і регуляторних рішень із метою формування та розвитку платформ фінансового метавсесвіту.

Ключові слова: фінансовий метавсесвіт, фінансове обслуговування, децентралізовані платформи, централізоване управління, криптовалюти, криптоактиви, платіжні системи, CBDC

JEL Класифікація: E42, E44, G14, O33

DOI: 10.55643/fcaptp.1.60.2025.4689