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Global Imperatives for the Development of the Cryptocurrency Segment of the Global Financial Market

Abstract

The development of the cryptocurrency segment within the global financial market has emerged as one of the most transformative phenomena of the digital economy over the past decade. The present study aims to analyse the global imperatives driving this development, focusing on the key trends, challenges, and opportunities shaping the cryptocurrency market. *Methodology*. This study uses a combination of analytical and comparative methodologies to examine the cryptocurrency segment within the global financial market. The analytical approach is used to assess the structural dynamics, market trends and capitalisation growth of cryptocurrencies, while the comparative method facilitates the assessment of differences and similarities in the adoption of cryptocurrencies across different countries and financial systems. Data was collected by reviewing publicly available financial reports, cryptocurrency market data and institutional studies. Quantitative analysis was performed to evaluate numerical trends in market capitalisation, transaction volumes, and cryptocurrency usage in payment systems. Furthermore, a qualitative analysis was conducted to elucidate the regulatory challenges and their ramifications for financial stability. *Results*. The findings indicate the preeminence of Bitcoin, its evolution into a global asset, and the expanding role of altcoins, utility tokens and stablecoins. The analysis reveals the rising use of cryptocurrencies in commercial payments, the issuance of national digital currencies, and the substantial adoption of blockchain technologies by global corporations. However, the study also identifies critical challenges, including regulatory ambiguities, security vulnerabilities, and systemic risks associated with financial stability. The value and originality of this research lie in its comprehensive approach to assessing the multifaceted nature of the cryptocurrency market. The integration of quantitative insights with policy implications has resulted in the formulation of a novel framework for comprehending the strategic role of cryptocurrencies in the evolving global financial landscape. The study's findings offer actionable recommendations for policymakers, investors, and financial institutions seeking to navigate the intricacies of the cryptocurrency ecosystem.

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1 Introduction

The cryptocurrency segment of the global financial market has become the focus of considerable academic and practical interest due to its transformative potential in reshaping financial systems worldwide. The dynamic adoption of blockchain technology and digital currencies underscores the pressing need to address both their innovative opportunities

Keywords

blockchain technology, digital currencies, financial innovation, decentralised finance, cryptocurrency regulation, cryptocurrency market trends, cross-border payments

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and systemic challenges. Despite the remarkable growth of cryptocurrencies, critical gaps remain in understanding their regulatory, economic, and technological implications, rendering this topic both relevant and timely.

The main problem lies in the lack of a unified approach to managing the complexities of cryptocurrency markets, including their regulatory ambiguity, security vulnerabilities and potential to disrupt financial stability. This study addresses these challenges by analysing the drivers and barriers to the integration of cryptocurrencies into the global financial ecosystem, emphasising the balance between innovation and risk mitigation.

The study aims to explore the structural dynamics of cryptocurrency markets, assess the implications of their rapid growth, and propose strategic recommendations for policymakers and financial institutions. The study's tasks include analysing market capitalisation trends, assessing the adoption of blockchain technologies, and identifying the systemic risks associated with cryptocurrencies.

The research material is presented in a logical sequence. The initial section delineates the theoretical underpinnings of cryptocurrency adoption, while the subsequent section undertakes an empirical examination of prevailing market trends and the regulatory frameworks that pertain. The final section synthesises the findings and provides actionable recommendations for the sustainable integration of cryptocurrencies into global financial systems. The structure of the study is such that it addresses the objectives of the study clearly and provides a robust framework for understanding the complexities of the cryptocurrency ecosystem.

2 Results of the Research

One of the leading trends in the implementation of financial innovations in the global digital ecosystem in recent years has been the emergence and dynamic spread of cryptocurrencies. These are based on digital technologies such as open distributed ledger systems (blockchain) and automated decentralised payment systems. These digital assets are capable of performing the traditional functions of national currencies in different countries, including issuance, accounting and the execution of a wide range of financial transactions. This fundamental distinction between cryptocurrencies and traditional electronic money is a key factor in enhancing their competitive impact on the global financial innovation ecosystem. Concurrently, all information pertaining to completed transactions is unencrypted and publicly accessible, while the data concerning account holders remains wholly anonymous. Furthermore, the multitiered nature of digital currencies, as an inherent characteristic, essentially reflects their unlimited potential for market exchange with other virtual assets or fiat money. The global circulation of cryptocurrency assets is supported by a sophisticated technological infrastructure, facilitating their online purchase and sale, as well as their use in international payments and money transfers.

As demonstrated in Table 1, the size of the Bitcoin blockchain has increased from virtually zero in 2009 to 562.8 gigabytes, with its database growing by almost one gigabyte on a daily basis. The Bitcoin blockchain comprises a continuously growing list of all transactions and records, with a limit of 21 million coins, which are projected to be mined by 2140. The Bitcoin blockchain has been designed as a countermeasure to the regulatory policies of national governments and central banks. It effectively conceals both the country of origin and the destination of cryptocurrency transactions (mining). Research involving IP addresses has confirmed that the United States currently leads in Bitcoin mining activities, although it should be noted that IP addresses can be easily manipulated using VPN services.

In recent years, the issuance of national digital currencies has emerged in many countries as a viable alternative to decentralised cryptocurrency assets. These currencies are designed to fulfil the traditional functions of a medium of exchange, a unit of account, and a store of value. In addition, they combine the properties of both physical cash and non-cash funds (Bank for International Settlements, 2020). This dual functionality facilitates the execution of transactions both online and offline, positioning the development of digital currencies as a significant

Year	Blockchain size, gigabytes	Growth compared to the previous year, %	Year	Blockchain size, gigabytes	Growth compared to the previous year, %
2009	0,00	100,0	2017	98,65	175,7
2010	0,01	100,0	2018	151,52	153,6
2011	0,07	700,0	2019	197,53	130,4
2012	0,93	1328,6	2020	254,18	128,7
2013	5,11	549,5	2021	317,38	124,9
2014	14,56	284,9	2022	379,23	119,5
2015	29,43	202,1	2023	440,76	116,2
2016	56,16	190,8	2024	532,82	120,9

TABLE 1 Bitcoin blockchain size dynamics from 2009 to 2024

Source: calculated and compiled by the author based on data from (Statista, 2024)

catalyst for systemic innovation within the global payment system.

The increasing prevalence of these currencies can be attributed to their clear competitive advantages over other payment methods. These include a continuous rise in the investment appeal of crypto assets and the complete anonymity of transaction participants. Furthermore, cryptocurrency transactions are conducted not through centralized financial institutions but via distributed ledger systems. This decentralised infrastructure ensures near-instantaneous transaction execution while effectively bypassing traditional intermediary mechanisms.

It is reasonable to assert that, given the evolution of cryptocurrencies into a fundamental tool of digital banking, business entities across various countries, particularly those lacking feasible opportunities to establish traditional bank accounts, can lawfully employ cryptocurrency assets as substitutes for conventional banking services. The development of a comprehensive regulatory framework governing the circulation of cryptocurrencies has the potential to enhance the efficiency, security and cost-effectiveness of electronic payment and transfer systems.

From a quantitative perspective, it is estimated that there are currently more than 10,000 types of cryptocurrencies in existence worldwide (Figure 1). However, alternative assessments posit that this figure may in fact approach 20,000, although a significant portion of these assets remain inactive or have been entirely removed from circulation.

The primary drivers of the consistent expansion of the cryptocurrency segment within the global

financial market are, first and foremost, the growing interest of economic entities in blockchain-based decentralised financing platforms and the steadily increasing resource potential of cryptocurrencies as an effective tool for mitigating inflationary processes, economic turbulence, and political instability.

Equally significant are factors such as the increasing use of cryptocurrency assets by both businesses and individuals to conduct cross-border transactions, as well as the high level of exchange rate volatility in traditional segments of the global currency market, which serves as a source of financial risk.

When analysing the current currency structure of global cryptocurrency market capitalisation, Bitcoin remains the dominant asset. At the end of July 2024, its market capitalisation stood at nearly 1.4 trillion USD and continues to grow, driven by a remarkable 3000% increase in value over the past few years. Bitcoin is followed by Ethereum (402.6 billion USD), Tether (114.4 billion USD), Solana (89.8 billion USD), BNB (86.3 billion USD), USDC (34.1 billion USD), XRP (33.9 billion USD) and Lido Staked Ether (32.9 billion USD).

The total market capitalisation of the top 20 most popular cryptocurrencies at that time was approximately 2.3 trillion USD, demonstrating a high level of market concentration with Bitcoin's unquestionable dominance (see Table 2). It is also worthy of note that Bitcoin is one of the most popular blockchains for non-fungible tokens (NFTs), according to CryptoSlam data. The Bitcoin network subsequently became the fourth blockchain to surpass 2 billion USD in historical NFT sales (Forkast, 2024).

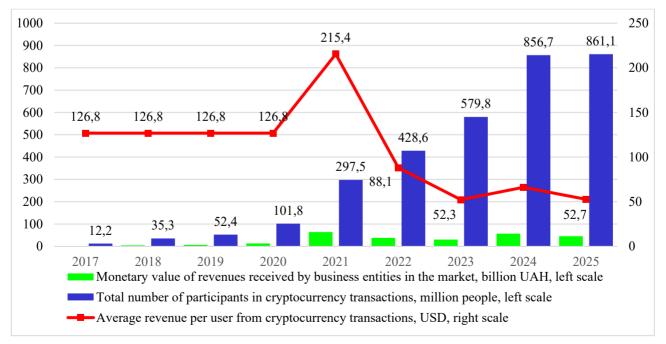


FIGURE 1 Total number of cryptocurrencies traded on the global financial market from 2013 to 2024 *Source: compiled by the author based on data from (Statista, 2024)*

Ranking	Cryptocurrency	Value (USD)	Market capitalization (billion USD)	Ranking	Cryptocurrency	Value (USD)	Market capitalization (billion USD)
1	Bitcoin	69460,0	1370,0	11	Cardano	0,4	15,0
2	Ethereum	3340,0	402,6	12	TRON	0,2	12,1
3	Tether	1,0	114,4	13	Avalanche	28,4	11,2
4	Solana	193,2	89,8	14	Wrapped Bitcoin	69,4	10,8
5	BNB	591,5	86,3	15	Shiba Inu	0,0	10,1
6	USDC	1,0	34,1	16	Bitcoin Cash	429,0	8,5
7	XRP	0,6	33,9	17	Chainlink	13,7	8,4
8	Lido Staked Ether	3350,0	32,9	18	Polkadot	5,8	8,1
9	Dogecion	0,2	19,5	19	NEAR Protocol	5,6	6,2
10	Toncoin	6,8	17,1	20	Uniswap	7,7	5,8
Total for the Top 20							2296,8

TABLE 2 Market ca		f +1		· · · · · · · · · · · · · · · · · · ·	- f + 1 1 - f T - 1	- 0004
IABLE Z Market ca	ditalisation o	t the 20 most	Dodular crydi	cocurrencies as	of the end of Jul	V 2024

Source: calculated and compiled by the author based on data from (Forbes, 2024)

For instance, the global number of active unique addresses involved in the network as either senders or receivers of this cryptocurrency has grown from 7 on August 31, 2009, to over 877,900 as of May 2024 (Glassnode Studio, *2024*). Furthermore, this cryptocurrency has demonstrated consistent price growth, with isolated periods of decline, reaching a value exceeding 68,200 USD by the end of July 2024 (see Table 3).

Bitcoin has been shown to demonstrate deflationary tendencies over an extended period, as well as robust resistance to censorship and high security for storage, transfers and the preservation of user anonymity. Since its inception as a medium of exchange for international e-commerce, Bitcoin has rapidly established itself as a market leader, achieving unparalleled competitive advantages. These include transaction speed and efficiency, the absence of financial intermediaries, low fees for online transfers, and the irreversibility of transactions.

Furthermore, in comparison to conventional assets such as real estate, gold, or securities, Bitcoin exhibits significantly higher liquidity and market demand. In addition, its convenience in facilitating transactions for the purchase and sale of goods and services reinforces its position as a preferred asset in the global financial ecosystem.

As such, the global financial community is currently witnessing a significant shift, often referred to as the Bitcoin revolution, in which this cryptocurrency is increasingly positioned as a quasi-global asset, aptly dubbed "Gold 2.0" (Tkalenko, Tipanov, Savchuk,

Year	Number of active addresses, thousands	Bitcoin price, USD	Growth rate of active addresses, % compared to the previous year	Growth rate of Bitcoin price, % compared to the previous year
2010	0,3		100,0	
2011	23,9	18,17	7966,7	100,0
2012	11,7	5,22	-51,1	-71,3
2013	51,0	13,19	435,9	252,7
2014	134,2	904,76	263,1	6859,4
2015	252,0	172,21	187,8	-80,9
2016	501,3	388,19	198,9	225,4
2017	701,2	905,34	139,9	233,2
2018	1171,2	17094,08	167,0	1888,1
2019	430,4	3840,96	-63,3	-77,5
2020	712,2	7347,60	165,5	191,3
2021	1206,9	35603,36	169,5	484,6
2022	952,4	43154,46	-21,1	121,2
2023	716,4	16620,82	-24,8	-61,5
2024	960,6	42830,90	134,1	257,7
July 28 2024		68222,71	X	Х

TABLE 3 Dynamics of the number of active unique addresses and Bitcoin price from 2010 to 2024

Source: calculated and compiled by the author based on data from (Glassnode Studio, 2024)

Murashko, Petukhova, 2022). Recent developments have led to the emergence of this asset as both a prominent tradeable asset and a focus of substantial speculative interest. It is increasingly occupying a central role in the global financial landscape as a potential replacement for traditional fiat currencies (Gandal, Hamrick, Moore, & Oberman, 2018).

In contrast, the majority of other cryptocurrencies on the market remain relatively small and lack the capacity to have a significant impact on the structural dynamics of the cryptocurrency segment within the global financial system.

Amid a steady decline in the circulation of physical cash assets and the dynamic progression of the COVID-19 pandemic, there has been a notable acceleration in the volume of commercial payments using cryptocurrency assets. For example, between 2017 and 2021, the total annual revenue generated by economic actors in the global cryptocurrency market will increase significantly, from 1.6 billion USD to 64.1 billion USD. Over the same period, the average income per user increased from 126.8 USD to 215.4 USD, which indicates the growing adoption and integration of cryptocurrencies into economic activity (Figure 2).

It is noteworthy that in recent years, various companies and firms, along with major global corporations – key players in the high-tech sector

such as Microsoft Corporation, Visa Inc., AT&T Inc., BMW AG, Tesla, and many others – have actively integrated digital currencies into their corporate payment systems as a means for consumers to settle payments for goods and services.

For instance, Dash has become one of the most widely used cryptocurrencies in retail transactions. During the first quarter of 2020, the number of active Dash wallets increased to 102,000, representing a 214% rise compared to the corresponding period of the previous year. Over the same period, the average daily number of commercial transactions conducted using Dash grew to 17,200 (Cointelegraph, 2024). Currently, over 1,500 transactions using Dash as a payment currency are recorded daily worldwide (Statista, 2024), particularly in Latin American countries such as Venezuela and Brazil.

It is important to acknowledge the emergence of Latin America as a global leader in cryptocurrency usage. Numerous business entities within the region are collaborating with cryptocurrency processing services. For instance, Burger King in Venezuela has been working with the processing service Cryptobuyer for a number of years, allowing its customers to make payments in cryptocurrencies. In Brazil, the Atar Pay technical solution has enabled over 2.5 million online retailers to adopt cryptocurrency as a payment method (Cointelegraph,

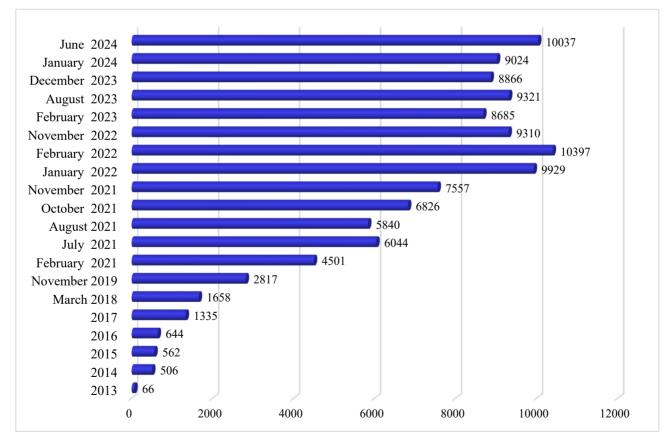


FIGURE 2 Key indicators of the global cryptocurrency market development from 2017 to 2023 with a forecast to 2025 Source: compiled by the author based on data from (Statista, 2024)

2024). In Venezuela, following a governmentinitiated financial reform in August 2018, the national currency, the sovereign bolívar, was historically pegged to the national cryptocurrency, Petromoneda.

Furthermore, central banks in almost 70 countries worldwide are currently exploring the potential issuance of their own digital currencies, with pilot projects already underway in six countries, including China, South Korea, and Sweden. In this regard, the Bank for International Settlements, in collaboration with the central banks of seven nations (including the U.S. Federal Reserve, the European Central Bank, and the Bank of England), has developed clear criteria that such digital currencies must meet (Bank for International Settlements, 2020). These initiatives are contributing to the acceleration of institutionalisation of the their market circulation.

Japan has been following a comparable trajectory in financial development. In recent years, it has become a global hub for cryptocurrency exchanges and market activities. Significantly, the total cryptocurrency market turnover in Japan accounts for 60% of the global Bitcoin trading volume (Mosakova, 2020), a phenomenon primarily driven by the establishment of a favourable regulatory framework for cryptocurrency market development. To illustrate this point, in 2020, a consortium of Japanese banks led by Mizuho Financial Group and Japan Post Bank introduced the national cryptocurrency J-Coin. The value of J-Coin is pegged to the yen, with the aim of modernising Japan's national financial system and optimising its structural parameters.

A thoroughgoing analysis of the global imperatives driving the development of the cryptocurrency segment within the world financial market reveals the particular importance of the trend of dynamic growth in the capitalisation of altcoins, utility tokens, governance tokens and stablecoins. Altcoins, or alternative cryptocurrencies, function in a similar manner to Bitcoin while fulfilling unique roles in global payment systems that distinguish them from traditional fiat currencies. Furthermore, their adaptability enables a broad spectrum of potential applications.

Utility and governance tokens are closely associated with non-fungible tokens (NFTs) and the broader global financial ecosystem. To illustrate this point, consider the case of the cryptocurrency MANA, which facilitates the acquisition of real estate in any global location by employing decentralised financing mechanisms (Statista, 2024).

In the context of the Ethereum ecosystem, the token, Ether, plays a pivotal role in facilitating the settlement of network fees associated with all smart contract transactions executed on its platform. These include decentralised applications (dApps), decentralised financial solutions, and non-fungible tokens, thereby underlining the multifaceted functionality of Ethereum within the cryptocurrency and blockchain landscape.

Finally, stablecoins represent a category of cryptocurrency assets that are pegged to national (fiat) currencies or other tangible assets. This linkage enables them to mitigate the price instability characteristic of digital currencies, exhibiting significantly lower volatility compared to traditional cryptocurrency assets. It is widely acknowledged that the value of stablecoins remains relatively stable, in contrast to the profound structural shifts and extreme volatility observed in cryptocurrency markets in recent years.

The growing interest of the global business community in this type of cryptocurrency asset is demonstrated by a number of examples, including Tether, a stablecoin pegged to the United States dollar (Williams-Grut, 2018). Another notable example is the Diem project (formerly known as Libra), introduced in 2019 by Facebook, Inc. (now Meta Platforms). It is important to highlight that access to this cryptocurrency asset is available to nearly all participants of global social networks, whose total user base now exceeds 5 billion individuals (Smart Insights, 2024).

3 Regulatory Frameworks and Systemic Challenges in Cryptocurrency Markets

It is imperative to emphasise that, in the context of the rapid structural evolution of the global cryptocurrency market in recent years, significant challenges and deficiencies in its functioning have become increasingly evident. These issues pose potentially severe threats to global financial stability and security. The inherent uncertainties surrounding various aspects of digital currency circulation –including issuance technologies, legal status, and the macroeconomic and monetary impact – present substantial obstacles to a comprehensive risk assessment.

Firstly, the growing activity of speculators and transnational criminal organisations on existing cryptocurrency trading platforms has accelerated the erosion of trust among market participants. Contemporary financial practices indicate that the primary threats to current cryptocurrency systems, both at the national and international levels, are predominantly technical. Consequently, the capacity of law enforcement agencies and financial institutions' information security systems to effectively mitigate these risks is exceeded. For instance, in 2022, cryptocurrency exchanges suffered 3.8 billion USD in losses due to hacking, which decreased to 1.7 billion USD in 2023 (George, 2024). However, by mid-2024, the total loss had already reached nearly 1.4 billion USD, with the average theft size increasing by 1.5 times compared to the previous year (Swirnevska, 2024). Furthermore, in Q2 of 2024, approximately 470 reports of stolen digital assets were received by SlowMist's MistTrack service, of which only 22.7 million USD belonging to 18 victims were successfully frozen (Fork Log., 2024).

Secondly, a significant challenge to the global cryptocurrency market stems from the principle of personal anonymity in financial transactions conducted via common technological platforms. Thirdly, the functioning of the global cryptocurrency market is directly associated with another major issue, namely its role in undermining global financial stability through the shadowing of national economies and the laundering of illicitly obtained funds, including those derived from explicitly criminal activities.

Fourthly, the global cryptocurrency market reveals another critical flaw: the exchange of cryptocurrency assets for fiat money outside the formal financial system and without proper documentation. Consequently, the subsequent integration of such funds into the legal financial system for laundering purposes often necessitates the involvement of so-called "money mules". These individuals, often unwittingly, play a role in laundering operations by facilitating the transfer of illegally obtained funds between bank accounts and across national borders.

In the fifth instance, the operation of the international cryptocurrency market is inextricably linked to a pivotal obstacle to global financial advancement: the generation of virtually boundless prospects for economic entities to evade prevailing tax regulations and erode tax bases. This is chiefly concerned with the practice of anonymous fund storage in offshore accounts, in conjunction with the difficulties encountered by banking institutions and financial intermediaries in complying with anti-monev laundering (AML) and counterregulations (CTF) terrorist financing across multiple jurisdictions. These challenges include the implementation of the "Know Your Customer" (KYC) principle, which requires financial institutions to collect user data, and the filing of the Report of Foreign Bank and Financial Accounts (FBAR), which mandates the disclosure of foreign financial accounts exceeding 10,000 USD in accumulated funds. Consequently, transactions executed within the cryptocurrency asset market substantially diminish the efficacy of these regulatory instruments, thereby engendering considerable threats to global financial stability and security.

Sixthly, another significant issue affecting global financial equilibrium and security is the process of cryptocurrency mining itself. The process of mining encompasses not only the systematic validation of financial transactions but also the maintenance and powering of cryptocurrency protocols, including those employed for Bitcoin and Ethereum. It is important to note that the global cryptocurrency industry, in close collaboration with infrastructure providers, has increasingly been able to generate substantial rewards in the form of transaction fees. For instance, as of February 2022, the mining reward for Bitcoin was 6.5 BTC per block. This development signifies that the mining sector has attained a sophisticated level of professionalisation within the prevailing economic framework.

This evolution is underscored by unprecedented growth in investment inflows into the cryptocurrency sector of the global financial market, driven by a substantial increase in the number of initial public offerings (IPOs) by private companies and the corresponding rise in capital commitments from institutional investors. This phenomenon underscores the strategic significance of mining as a pivotal element of the cryptocurrency market's infrastructure and its expanding influence on the broader financial ecosystem.

4 Conclusions

Over the past decade, the cryptocurrency segment of the global financial market has become one of the most innovative instruments of the global digital economy. Based on blockchain technology, cryptocurrency assets have gained widespread recognition among international investors and entrepreneurs worldwide and are having a significant structural impact on the functioning of the global financial system, as well as on the national banking and payment systems of many countries.

Despite some common features that link cryptocurrencies to electronic money, these financial instruments are fundamentally different in terms of key attributes, such as their exchange mechanisms with traditional fiat currencies, their inclusion in the calculation of national monetary aggregates and their use in consumer banking services.

The primary global imperatives driving the development of the cryptocurrency segment within the world financial market are as follows: the issuance of national digital currencies by numerous countries; the increasing concentration of the cryptocurrency market with Bitcoin's unequivocal dominance; the rapid growth of commercial payments utilizing cryptocurrency assets; and the widespread adoption of digital currencies as payment instruments by entrepreneurial and business entities in their corporate payment systems for goods and services.

Moreover, the dynamic growth in the market capitalisation of alternative coins, utility tokens, governance tokens and stablecoins further highlights this transformative trend. The confluence of these factors is catalyzing a global Bitcoin revolution, situating Bitcoin as a quasi-global asset ("Gold 2.0") and a pivotal object of trade and speculative interest. This gradual process is concomitant with its emergence as a viable alternative to traditional fiat currencies in the global financial arena.

The continuous growth in the market capitalisation of cryptocurrency assets has resulted in a marked increase in interest from international payment systems and various gaming companies in integrating blockchain technologies into their operational frameworks. Nevertheless, this accelerated growth concomitantly introduces considerable risks to global financial security and stability. In order to address these risks, a coordinated set of measures is required at the national, regional, and international levels. Such measures should include the regulation of cryptocurrency trading, the development of unified legal approaches to defining the status of cryptocurrency assets, and the mitigation of factors that could destabilise cross-border capital flows, amongst other initiatives.

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