

# Legal Challenges for Blockchain Projects and Cryptocurrencies in the Context of Sustainable Development: International Virtual Currency Market and Technology Dynamics

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**Abstract.** The rapid development of a comprehensive cryptocurrency marketplace in the context of digitalization poses a number of challenges that affect its changes. The study focuses on an overview of these challenges and their impact on the natural structure of computerized cash. A multifaceted approach was taken, including the study of real-world data, a review of blackmail and cybercrime cases, and an assessment of measures taken by the authorities. This can be seen as an advertising plan, theft and restriction configurations, and regulatory efforts, which differ fundamentally from one area to another. Such significant findings were shown by this study: For example, some of them include a decline of interest in online banking regulation driven by malpractices and cybercrimes, a rise in money laundering cases and offline validation of customers. To be specific, in 2021 alone more than \$14 billion worth of cryptocurrencies were lost as a result of hacking attacks and errors. Among the positive developments is the creation of the World Blockchain Chamber in Dubai, which focuses on promoting standards and oversight within the industry. The panelists suggested that, despite the fundamental dangers, cryptocurrencies, particularly bitcoin, can transform traditional financial systems and offer modern investment opportunities. Nevertheless, persistent challenges such as high volatility and general fears require reflection. In this case, the study reveals an understanding of the potential as well as the challenges associated with digital monetary mechanisms and emphasizes the need for a holistic approach to their analysis and regulation.

**Keywords:** coin virtual, electronic currencies, cyber criminality, deceit, washing money, government's actions, Bitcoin currency.

## INTRODUCTION

This is almost as developed and yet it wishes to be called active his mind. One advanced web-based networks website is a good choice for those who are interested in online games with great graphics and design standards. You can do anything you want from the game interface there! Such a service offers quick and effective communication between customers, enabling them to get immediate answers to their questions at any time of day or night. Their economic prospects depend on global capital markets which are themselves unstable due to

financial crises in these countries. Blockchain's innovative potential is highlighted by its influence in these various sectors, from financial services to supply chain management (Darlington, 2016). Blockchain technology has brought innovative solutions and it has also posed unique legal and regulatory challenges (Zhang et al., 2021). This is a clear indication for creating legal frameworks that are not only tailored to the specific features of blockchain and cryptocurrencies but also give an encouragement to sustainable development practices.

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The rising position of cryptocurrencies in the global financial market unquestionably shows the importance of this research. Referring to research conducted Wang et al. (2020), the authors stated that "cryptocurrencies have gained substantial traction, yet their regulatory landscape remains fragmented and underdeveloped" (p. 85). From the regulatory perspective, it is particularly alarming pedamentariae in the sustainable development environment since an insufficient legal framework may stop the advantages of these technologies.

While a fair amount of research has been undertaken in relation to the technological and economic realms of blockchain and cryptocurrencies, the literature still remains largely devoid of their legal concerns as relates to development that is sustainable (Blockchain: Legal and regulatory guidance (third edition), n.d.). Contemporary studies have tackled topics such as technological threats and money laundering regulations (Simsler, 2012), but comprehensive analyses connecting these issues to sustainability results are rare. "The intersection between blockchain technology and sustainable development frameworks is still underexplored, there is a need for integrated legal and regulatory analysis (Chalmeta Rosaleñ & Guede Tejedor, 2022; Gandal et al., 2018). This paper aims to bridge this gap by doing an analysis on blockchain legally significant challenges as well as cryptocurrency platforms impacting the sustainable development goals.

The main aim of this project is to analyze the legal problems that blockchain and cryptocurrencies have to face especially in regard to sustainable development. To that end, the focus of this research will be on these specific questions:

1. What are the most significant legal issues faced by blockchain projects and cryptocurrencies in international trade? The identification of such obstacles is an essential step towards formulation of appropriate regulations.

2. This paper seeks to explore the ways in which the applicable law may support or inhibit sustainability objectives through the incorporation of cryptocurrencies and blockchain technology. This study aims at establishing the relationship between legal limitations and achievements towards sustainable development targets.

3. Which policies could be introduced so as to mitigate these problems while encouraging new ideas and studies? The control is supposed finally to unite science with actual practices through practical suggestions.

This paper aims to offer a legal analysis regarding sustainable development facets which pertain to blockchain technologies and cryptocurrencies in order to provide answers the aforementioned research questions. The primary aim of this research is thus to present suggestions for aligning with technological progressions and sustainability purposes a regulatory mechanism.

### ***Research Problem***

The swift spread of blockchain technology and cryptocurrency across the global financial arena has triggered a number of legal concerns that current regulatory frameworks are unable to address effectively. These include jurisdiction, compliance, balance between innovation and regulation. The prospects of these seniors' sustainable development issues are not sufficiently tackled yet, which justifies the necessity of research that links legal and sustainability perspectives.

### ***Research Focus***

The legal problems which need to be solved in order to protect sustainable development through blockchain and cryptocurrency are analyzed in this research. In that connection, an identification of those regions without legal regulation is necessary for proposing solutions that can support both technological progress and sustainable development. Therefore, this paper focuses on examining how sustainability goals relate with the requirements of regulatory framework as a way of providing an insight into the difficulties to overcome.

## **LITERATURE REVIEW**

So far so good, we have been undergoing a great change in the way we develop and shape the economy with the help blockchain technology in the 21st century, covering almost every area of innovation, but mostly the one concerned with both economy and finance. A change of this nature is readily evidenced by the rapidity at which everything is changing.

Although digital currencies - a form of electronic currency that can act as an alternative or complementary currency - are the basis for many transactio(s) nowadays (Casey & Vigna,

2015). On the other hand, crypto coin values are pegged to fiat and often traded outside traditional financial systems (Huang et al., 2022).

Cryptocurrencies were first introduced by Bitcoin in 2009 with the authorship of an anonymous person, or perhaps a group under the pseudonym Nakamoto (2018). It is a digital currency that operates through peer-to-peer network without the need for central authority or intermediary, and designed to enable online payments directly from one party to another (Nakamoto, 2018). It is not just the first cryptocurrency, but also gave birth to all following digital monies based upon it.

There are significant gains in the cryptocurrency market on many fronts today (Cryptocurrency prices, charts and market capitalizations | coinmarketcap, n.d.) estimates that the number of cryptocurrencies is currently over 20,000. This number was around 1,500 just five years earlier (CryptoCompare, 2019). In fact, the rise of cryptocurrencies has been driven by rising awareness about digital currency and big strides in cryptocurrency technology.

Introduction of the cryptocurrencies was a significant innovation that has already significantly influenced global economy, including international trade. Cryptocurrencies reduce taxes and fees, take down the financial barriers as well simplify exchange root. It led to a new group of buyers and investors, some formation this has boosted the dynamic global trade growth (Williams-Grut, 2018). On the one hand, tax cuts and transaction simplification are helpful to promote economic globalization as widely known; on the other hand they bring about new challenges for financial systems and regulators (Wang et al., 2020). A review of the research in this area shows that virtual currencies are the subject of numerous academic papers by national and international authors. For example, Brown and Williams (2018) analyzed the impact of suspicious trading activity on bitcoin exchanges and identified potential threats to payment systems and traditional currencies. Chen and Li (2022) examine the global size of the virtual currency market, its market capitalization, and the volatility of bitcoin prices.

Wright (2008) tries to understand virtual currency markets as markets of spontaneous orders that form new identities and as political structures, even if participants do not consider themselves political actors.

Although a considerable number of research works have been carried out, predictions regarding bitcoin price as well as the general cryptocurrency market development is still not adequately researched. The reasons for this include not only fast-paced advancement in technology, but also diverse impacts it has on various national financial and legal frameworks.

## RESEARCH METHODOLOGY

### *General Background*

As it can be seen, with the emergence of an information economy, cryptocurrencies have emerged as one of the important aspects that need close look at blockchain technology and its influence on banking. As a result, this paper summarizes the evolution of cryptocurrency markets and their current status particularly alluding to Bitcoin- the most recognized digital currency. Thus it is necessary to investigate ways through which blockchain technology affects financial transactions and market dynamics due to its revolutionary nature. Thus, it was created in 1990s by Stuart Haber, Dave Bayer and W. Scott Stornetta as an elementary concept for decentralization (Haber et al., 2020). In this regard therefore, Bitcoin has acted as a trigger for further uptake of blockchain technology being the first decentralised cryptocurrency (Nakamoto, 2018; G20, 2018). Understanding what role Bitcoin plays in all this is crucial if we want to predict where cryptocurrencies are heading soon.

### *Sample / Participants / Group*

Study aims at a wide-ranging pool of stakeholders to give an all-encompassing perspective on the cryptocurrency market. The sample comprises:

- Academic Researchers: experts in blockchain technology, financial economics, and digital currencies. Their knowledge is important in crafting a theoretical framework for understanding cryptocurrency trends as well as technological advancements.

- Financial Analysts: they are responsible for examining how cryptocurrency is moving across the market, its performance financially and the effect it has on the wider economy. As such their analysis allows them to evaluate how markets behave and also find good investments opportunities.

- Policymakers & Regulatory Bodies: these individuals are charged with responsibility of formulating regulations concerning cryptocurrencies transactions whilst ensuring that they comply with laid down rules. This information is significant in understanding regulatory hurdles and issues relating to compliance when it comes to adopting cryptocurrencies.

Every group will be involved through specific interviews, surveys, and data collection so as to ensure an all-inclusive analysis. Their views will be part of the research concerning how to effectively understand the cryptocurrency market.

#### ***Instruments and Procedures***

With the focus of providing a comprehensive understanding into the cryptocurrency market dynamics as well as the blockchain technology, this study utilizes different data collection techniques and analysis methodologies that have been put in place for this study.

- Sources of information: historical data from cryptocurrency market aggregators (for example, Glassnode Studio), statistical databases, academic literature, industry reports and regulations. Specific measures include blockchain development, Bitcoin market capitalization, transaction volumes and price variations.

- Quantitative Analysis: regression analysis will be used to evaluate historical data and identify trends. This involves looking at the

## **RESULTS**

Here is the paraphrased text with both square and parentheses retained: in the current conditions of the information economy, there is a growing popularity of cryptocurrencies. Analysis of scientific research by both foreign and domestic experts proves that all cryptocurrencies function on the basis of blockchain technology, which distinguishes them from the classical understanding of electronic money. Bitcoin is one of the first and most famous cryptocurrencies and, as noted by N. Gandal, J. Hamrick and other researchers, can even replace traditional fiat currencies (Redirecting, n.d.). A blockchain is a digital, ever-growing list of data records organized into blocks that are linked chronologically and protected by cryptographic proofs. In the initial years of 1990s, the idea of blockchain

trends in blockchain growth, analyzing changes in Bitcoin ownership over time and examining how its market capitalization has altered. Different regression models such as linear, polynomial and logarithmic functions will be employed to predict the future developments in the number of Bitcoin users as well as market trends.

- Qualitative analysis: complementary qualitative methods include an extensive review of academic literature, industry reports and policy documents. The goal of this approach is to put cryptocurrency adoption into a larger context, understanding its effects.

- Data Verification: data accuracy shall be maintained through cross-referencing of several sources along with applying validation techniques. Statistical techniques shall be used to check for reliability of quantitative findings.

#### **Data Analysis**

The patterns in blockchain technology and Bitcoin's performance in the market will be identified using data from cryptocurrency aggregators, market reports, and academic writings. Number of documentation blocks on the blockchain, Bitcoin market value, and active addresses are the main variables that will be observed. Moreover, regulatory challenges and how technological advancement affects this cryptocurrency market will also be discussed in this analysis. In this way, it will provide a thorough understanding of quantitative tendencies as well as essential elements that influence cryptocurrency industry.

technology emerged through the research by people like Stuart Haber, Dave Bayer and W. Scott Stornetta who made use of cryptographic techniques to protect digital files against altering them (Blockchain technology, non-fungible tokens, and the future of exchange | TheCable, n.d.).

A history-changing endeavor that motivated both computer experts and cryptography fans, resulting in Bitcoin – the first of its kind system of digital money devoid of central authority. Developments in technology and ongoing investigations demonstrate how adaptable blockchain can be to a range of applications (Cui et al., 2020). Despite having existed before Bitcoin, blockchain is a fundamental element in most cryptocurrency networks. International organizations and experts note that Bitcoin will continue to be the

most influential cryptocurrency and strengthen its position in international markets, which is likely to lead to the politicization of money (BSV Association, 2021). According to recent research, one of the main problems associated with cryptocurrencies is fraud, which is closely linked to the uncertainties of payments and the risk of money laundering across borders (Redirecting, n.d.). This issue reflects ongoing concerns about the security and regulatory challenges of using cryptocurrencies (Wright, 2008) That ss why central banks around the world are cautious about Bitcoin as an uncontrolled and unpredictable type of currency, which slows down the mass adoption of

cryptocurrencies. The use of such financial instruments leads to loopholes in the bank's current data on monetary transactions and affects the inability to track economic activity, and thus reduces control. Studies of crypto and cyberspace suggest that they have become an independent force, temporarily suspending the activities of powerful financial governments.

Consequently, since the launch of Bitcoin in 2009, the introduction of cryptocurrencies into the new economy has become very visible to the public. This new type of currency is popular and viable due to its autonomy and ease of use (Table 1)

Table 1. Dynamics of the development of blockchain technologies in the period from 2009 to 2022

At the beginning of the year	Number of blocks in the blockchain	Annual growth, %
2009	16285	100
2010	32622	100,32
2011	100590	208,89
2012	160189	58,97
2013	214724	34,04
2014	278200	29,56
2015	337025	21,14
2016	391316	16,11
2017	446188	14,02
2018	502116	12,53
2019	556607	10,85
2020	610864	9,75
2021	664061	8,71
2022	716770	7,94

Source: Based on data created and calculated according to (Glassnode studio - on-chain market intelligence, n.d.)

Additionally, it is worth mentioning that 20,268 digital coins have aggregated a total of \$1.025 trillion USD in market cap. The most utilized cryptocurrencies include Bitcoin and Ethereum: presently, Bitcoin’s market capitalization exceeds \$420 billion USD. This amount is more than double to that of Ethereum (Howarth, 2021). This kind of cryptocurrency exhibits deflationary tendencies, has censorship-resistant capabilities and protects the privacy of user data including its storage, transfer or even hiding it. In the last three years, its value on the market has increased by 3000%. In comparison to commodities like gold, real estate or shares,

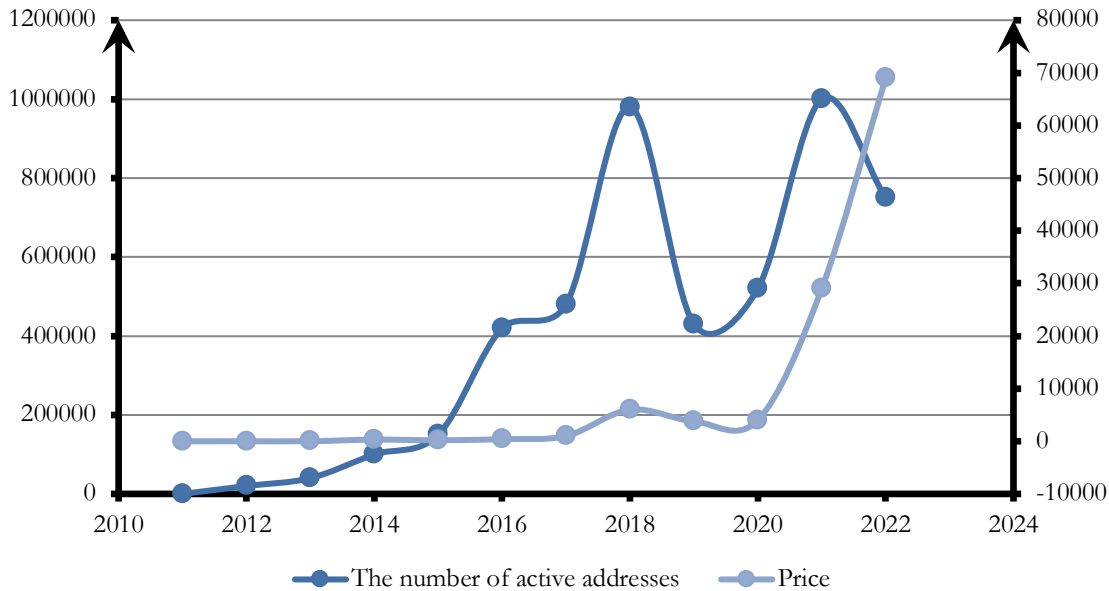
leading cryptocurrencies prices are increasing at a faster rate. This is made possible by their liquidity, demand and ease of purchase as well as safe transportation, remittance and storage. Today we are witnessing the Bitcoin Revolution unfold before our eyes. It’s essentially gold 2.0; hence cryptocurrencies gradually but certainly conquer the global financial arena thus being among the most advanced and hopeful investment tools tomorrow.

The largest number of cryptocurrency users is concentrated in the United States, India, Pakistan, Nigeria, and Vietnam. Approximately 8% of the US population trades in

cryptocurrencies, while in Asia the number of cryptocurrency users is more than 2.5 times higher than on any other continent.

As illustrated in Figure 1, global distributed proportion of Bitcoin which is known to be the most widely recognized

cryptocurrency. The data depicts how many distinct addresses have been used on the network by sending or receiving bitcoins and also trends in its pricing since January 1st of every year.



**Fig. 1.** Global Bitcoin ownership in 2011-2022 (Data as of January 1 of the current year)  
Source: developed according to (Glassnode studio - on-chain market intelligence, n.d.)

Prices for cryptocurrencies move like a weather front never remaining constant. In the month of April last year; Bitcoin's value for the first time hit \$63,285.57 which is the maximum of all time. Therefore, this month saw the highest bitcoin rate recorded. According to CoinGecko's statistics (a website that tracks virtual currencies), by April 2021, total

cumulative value of all cryptocurrencies was above \$3 trillion dollars. Thus implying that cryptocurrency is on an upward trend and will have more participants in the future. The annual growth trends for the number of active addresses against price of Bitcoin presented in Table 2.

Table 2. Trends in annual growth of active addresses and Bitcoin price, in %

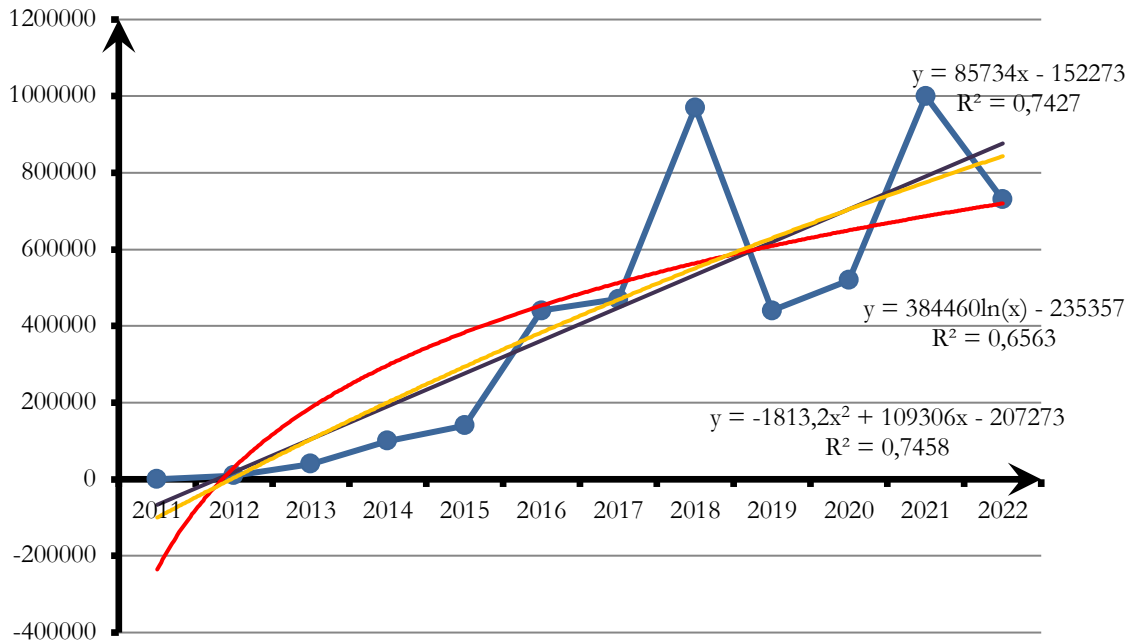
Year	Increase in the number of active addresses	Price increase
2011	100	100
2012	1244,30	760,00
2013	334,43	579,82
2014	251,73	5699,02
2015	149,12	41,68
2016	295,20	138,50
2017	111,28	228,99
2018	208,62	1349,13
2019	44,52	28,59
2020	121,31	187,44
2021	190,78	407,72
2022	74,29	161,29

Source: created and calculated according to (Glassnode studio - on-chain market intelligence, n.d.)

The analysis of the table shows a significant increase in the performance of Bitcoin as the leading cryptocurrency in the international market. The number of users as of January 1, 2011 was 903, and by the beginning of 2022 it reached 740,109 (an increase of almost 820 times). The price of Bitcoin in early 2011 was 0.3 USD, while at the beginning of 2022 it was 47,344.84 USD. (an increase of more

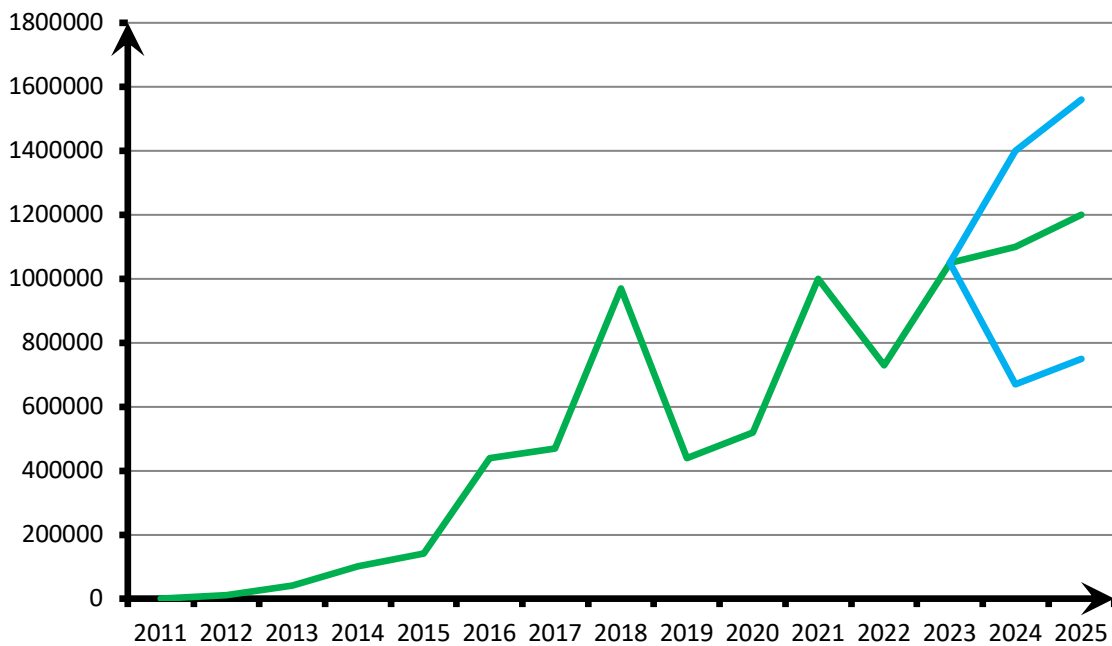
than 157 thousand times). The highest annual price growth rates (at the beginning of the year) were recorded in 2014 and 2018.

Below, Figures 2 and 3 provide a graphical representation of the growth trends in the number of active addresses and potential scenarios for Bitcoin ownership (number of active addresses) for 2023-2025.



**Fig. 2. The trend of increasing the number of active addresses**

Source: created by the authors



**Fig. 3. Prediction for the rise in active Bitcoin accounts by 2025**

Source: created by the authors

The analysis of Figures 2 and 3 shows that the growth lines almost coincide, and the accuracy of the approximation of all functions is

74-75%. It is highly likely that the number of Bitcoin cryptocurrency users will continue to grow by an average of 8-17% annually under a

realistic scenario. The forecasted data on the growth of the number of Bitcoin users were calculated using linear, polynomial and

logarithmic functions and are presented in the form of three development scenarios in Table 3.

Table 3. Projected growth scenarios for the number of active bitcoin addresses for 2023-2025

As of January 1	Forecast scenarios		
	Realistic scenario	Pessimistic scenario	Optimistic scenario
2022	740109	740109	740109
2023	1025518	660424	1390613
2024	1110666	745570	1475763
2025	119815	830715	1560914
Percentage of growth	+61,6	+12,2	+110,9

Source: created by the author

Worst-case scenario, the user base will only expand for at least Bitcoin. According to some predictions, Bitcoin will increase at a yearly rate of 61.6% from 2023 till 2025; this is the average increase in the whole activity. Basically, the last decade has been characterized by fast growth in global cryptocurrency networks.

However, it is worth noting that there are various forms of cryptocurrencies mostly not yet leading the financial market. According to market capitalization rankings according to Tipanov et al.(2021), the following cryptocurrencies are on top: Bitcoin (BTC), Ethereum (ETH), Tether (USDt), XRP and others. However, less known cryptocurrencies like Dogecoin (DOGE) also appreciated significantly in value during 2021 and show tendency for subsequent gains in 2022 (The Coin Times, 2022).

Along with the growth of the international cryptocurrency market in the context of digitalization, there are certain negative factors that affect its development. First, there is the problem of loss of confidence in digital currencies on the part of market participants. Recently, online platforms have become attractive to speculators trying to profit from short-term or long-term holding of cryptocurrencies. Since cryptocurrency is a form of cash, it attracts the attention of criminal

groups that can attack crypto exchanges, steal crypto wallets, and introduce viruses that hijack digital currencies. Hackers use methods such as phishing and malware, so potential investors should rely on robust computer security systems from both their own and third-party providers to protect their cryptocurrencies. In 2021 alone, more than \$14 billion worth of cryptocurrencies were stolen. Common types of attacks also include hacking exchanges and blockchain wallets.

Secondly, the problem of money laundering and privacy remains relevant. According to the data, money laundering through crypto exchanges, smurfing (distribution of large amounts of cash into small transactions) and non-fungible tokens (NFTs) is more than 43% (Table 4). At the G20 summit in Buenos Aires in 2018, leaders agreed on the need to regulate cryptoassets to combat money laundering and terrorist financing in accordance with FATF standards. Earlier, the UK Parliament published a report pointing to the lack of consumer protection and regulated cryptocurrency markets as the main shortcomings in this area. It is noted that anonymous transactions can facilitate money laundering, although the UK National Crime Agency estimates this risk as low (House of commons treasury committee, 2019).

Table 4. The most common cryptocurrency fraud schemes in the world

The most common fraud schemes	Percentage value
Money laundering through crypto exchanges and terminals	31
Fake investment fraud (counterfeiting tokens)	14
Smurfing (distribution of money for laundering)	10

Romantic scams	8
Fraud through blackmail	6
Black market	5
Cryptocurrency pump and dump (Pump & Dump)	5
Phishing, smishing and vishing	5
Fake crypto exchanges	4
The most common fraud schemes	Percentage value
Money laundering through art in NFTs	2
Other schemes	10

Source: created by the author based on Vuković (2019)

Privacy is a major motivation for the adoption of digital currencies. Many users, in addition to speculators, are looking for privacy opportunities Vuković (2019), whether to circumvent capital controls or to avoid regulatory measures by financial authorities (Sotirakopoulos, 2017). This is confirmed by recent developments, in particular, attempts to create stablecoins - cryptocurrencies that are supposed to reduce price volatility by pegging them to fiat currencies such as the US dollar, as in the case of Tether (Williams-Grut, 2018; Malik et al., 2019)

With regard to taxation of cryptocurrencies, there is a significant risk that individuals may try to evade tax liabilities by keeping money abroad anonymously. Many financial institutions, including banks, are subject to anti-money laundering (AML) and know your customer (KYC) regulations that require the collection of account holder data (HM Revenue & Customs, 2014). These institutions can be subject to sanctions and fines, so they have recently been investing in infrastructure to comply with these rules.

Mining digital currencies is the basis of blockchain technology and remains an attractive business because of the rewards in the form of transaction fees (for example, in February 2022, the Bitcoin fee was 6.5 BTC per block). Bitcoin mining has gone through two stages: first, desktop computers with GPUs were used until 2015, and then specialized ASIC miners were

used for faster mining (Earth, B. N, n.d.). At the first stage, the cost of energy exceeded the income, and at the second stage, miners are united in pools to distribute the mined Bitcoin. Given the use of fossil fuels, Bitcoin mining is costly and harmful to the environment, so many miners are switching to renewable energy sources.

The development of the international cryptocurrency market also depends on “mass education of digital skills” and reducing the level of digital illiteracy, which is currently around 40%. The digital skills gap will require extensive efforts to address this problem.

Cryptocurrencies, as an alternative to traditional currencies, have their own structural disadvantages, such as the lack of reliable financial institutions and regulated markets, as well as a legal framework for dispute resolution. Many regulators, including international financial institutions, consider cryptocurrencies a threat to their revenues and power. European countries do not yet ban cryptocurrencies, but are developing legislation in response to the rapid growth of transactions. Regulators around the world have not yet reached a consensus on the status of cryptocurrencies, and uncoordinated regulatory actions could lead to destabilization of financial flows (Table 5). In particular, the market capitalization of cryptocurrencies has reached almost USD 2.5 trillion, with Bitcoin's market capitalization exceeding USD 1 trillion in 2021 (Hammond & Ehret, 2021).

Table 5. Market capitalization of cryptocurrencies in millions of US dollars

At the beginning of the Market capitalization year	
2011	1.51
2012	42.28
2013	140.37

2014	9195.33
2015	4294.51
2016	6437.58
2017	16011.99
2018	225415.30
2019	67053.93
2020	130517.30
2021	545634.60
2022	900850.10

Source: created by the author based on (Glassnode studio - on-chain market intelligence, n.d.)

Privacy, being the main reason for creating digital currencies, is an essential thing that many users (other than speculators) want. For example, this could be seen from people trying to escape capital controls or financial regulators trying to evade regulations (Sotirakopoulos, 2017). Recent reports have shown a continuation of this trend by introducing “stablecoins”- cryptocurrencies tied to fiat currencies so as to stabilize prices. Among them, Tether is the most reputable cryptocurrency which is based in US dollars (Williams-Grut, 2018).

Another important issue is the taxation of cryptocurrencies. As a result, there are dangers involved when certain individuals evade tax rules like registering their Foreign bank accounts through an FBAR report by holding some cash outside as anonymous persons. In several locations, it is mandatory for banks and other financial institutions to abide by anti-money laundering (AML) and know-your-customer (KYC) guidelines that insist on gathering user information (HM Revenue & Customs, 2014). Such financial institutions may be subject to sanctions and fines. In recent years, significant resources have been allocated to building and maintaining the relevant infrastructure.

## DISCUSSION

Data gathered through research show a correlation with the development of modern and digital currency. Our analysis indicates that this area has received much attention from researchers as well as critical discussions due to high levels of volatility in Bitcoin. According to a survey carried out by Bank of America, 74%

Digital currency mining is yet another aspect of the ongoing development. It's a pretty lucrative activity as miners are able to earn commissions for each transaction they verify and the crypto protocols they enforce (for example, in February 2022, 6.5 BTC was paid as commission for every block generated in Bitcoin). The introduction of ASIC miners has raised mining to an advanced level since these devices have specific chips that enhance the speed at which Bitcoins can be mined. The development of Bitcoin mining has occurred in two phases:

- The first phase saw desktop computers with graphics processing units (GPU) being used to mine bitcoins till 2015; it took a long time to mine during those days.

- The second phase commenced after 2015 through the use of ASIC miners which are equipped with specialized chips meant for faster and more efficient processing.

In the early days of mining electricity rates were more than what they get in return but later when miners formed pools to aggregate their computing capacity and share the rewards, it became a profitable venture. For some time now many mine operators have relocated from fossil fuel countries because of expensive power as well as environmental degradation. Thus mining enhances power consumption alongside funding renewable energy ventures.

investors believe that it is only but a bubble waiting to burst under unfavorable economic conditions; hence it needs constant monitoring and evaluation (Goldston, Chaffer & Martinez, 2022). Conversely, there are some investors/analysts on other side who have been making profits out of cryptocurrency trade underscoring its resilience against decline and its

potential for financial investments. In such a circumstance, chances and dangers are interlinked (Duong, Chepurnoy, Fan, & Zhou, 2018). Notwithstanding these differences, our research presumes that the digital currency market will keep growing and provide extensive investment opportunities. A distinctive aspect of the digital currencies, particularly in this case for bitcoins, is creating an alternative framework for conventional thinking on finance and money transactions (Salman & Razzaq, 2018; Salman et al., 2019). These allow for new models as well as instruments which can modify the way financial as well as asset dealings are carried out.

Nevertheless, despite Bitcoin and other cryptocurrencies getting significant publicity along with capital inflow; different hurdles still remain that require more examination work. Managing virtual currencies is still one of the main issues people are grappling with. The unexpectedness and swift evolution of this technique illustrate how hard it is for authorities as well as regulatory bodies to come up with sound and equitable legal models. Nonetheless, Dubai government's establishment of the World Block Council is a commendable step taken in this regard. The council unites 500 entities, works on uploading standards and guidelines for cryptocurrencies, advances innovations, and implements cutting-edge technologies. Comparative Analysis Compared to Other Studies in the Field. Our findings can also be compared to findings obtained by previous researchers in the same domain. For example, studies Williams-Grut (2018), Hammond & Ehret (2021) partly cover the impact of digitization on the digital currency market and show how mobile platforms and distribution affect availability and availability of digital currencies. Our results confirm these findings and show that cryptocurrencies continue to be attractive and a long-term investment opportunity.

### ***Limitations of the Study***

Our study has several limitations that affect the generalizability of the results. Firstly, the methods may be altered rapidly due to the quick growth of digital currency technologies and market. Study outcomes may vary over time because the cryptocurrency market is very dynamic. Secondly, the different legal approaches to digital currencies in various states

However, contrary to other studies, for example (Williams-Grut, 2018; Sotirakopoulos, 2017; Mioten, 2022), the new economic models resulting from the development of digital currencies are not ignored. In our study we found out that, new business models may be created by means of cryptocurrencies and they may also change banks' and financial institutions' strategies which will affect traditional finance systems significantly. This is mainly due to fast advancing new technologies and macroeconomic environments that have not been addressed in previous studies consistently. A few of the outcomes from our research were shocking (Goodell & Aste, 2019; Frauenthaler et al., 2020). For example, the speed of development of mobile platforms for cryptocurrency trading is more important than previously thought (Novo, 2018; Ilham, Sintia, & Sinurat, 2022). This means that cryptocurrencies are more accessible and liquid than token. Cryptocurrencies are characterized by greater accessibility and liquidity compared to tokens (Finck, 2018; The search for a stable cryptocurrency, n.d.).

Telecommunication and distribution platforms can significantly influence the market by altering the availability and presence of resources, which in turn may lead to changes in how people interact with the market and create new opportunities for investors. A noteworthy and unexpected finding was the discovery of a significant impact of encryption on environmental issues. The demand for fossil energy resources, particularly in the context of Bitcoin mining, may lead to new environmental challenges. Despite some results Newar (2022, April 22), our data indicate that the problem requires deeper analysis. This is due to the fact that intensive use of fossil resources has long-term consequences for the environment, but there are also opportunities to introduce renewable energy sources and more efficient technologies.

may also produce an impact on our research results. This makes it difficult to generalize the findings to the world. Moreover, it should be mentioned that our study relies on such information which might be incomplete as a result of fluctuations in market and technology. This restricts comprehensiveness of picture concerning how digital currencies affect different sections of the economy and society.

Scholars and discipline While investigating mobile platforms and distribution channels, our research introduces new approaches that relate closely to accessibility as well as availability of crypto currencies. We underscore an urgency (need) for analyzing how scripts influence environment together with their possibilities to support renewable energy utilization. Such knowledge will give a clearer view of what digital currencies are capable of and the obstacles they present to their development. Our research further indicates that it is vital to investigate new economic models emerging under the influence of digital currencies and their implications for traditional financial systems. In this way, we can inform banks and other financial institutions about new business models and strategies as well as provide guidance to managers and decision makers. We also stress the necessity of studying social and economic consequences associated with different social classes' adoption of cryptocurrencies since these influences are critical in determining whether digital currencies reduce or aggravate socio-economic disparities, thus offering fresh economic opportunities while posing dangers. Overall, our research helps grasp better what possibilities and hurdles there are regarding digital currencies within present-day economies and societies. Aspects covered, such as the environmental impacts of factors related to cryptocurrencies that can greatly alter their development and capitalization

Based on the conducted examination, a few key conclusions can be drawn. The cryptocurrency advertise is experiencing quick advancement, to a great extent driven by expanded ubiquity and innovative developments, especially the execution of blockchain innovation. Bitcoin remains the pioneer among cryptocurrencies due to its most noteworthy advertise capitalization and level of security. Usually backed by the ceaseless development within the number of dynamic addresses and generally steady esteem.

Viable suggestions for showcase members incorporate the require for cautious observing of advertise patterns and mechanical progressions. Financial specialists ought to too consider the dangers related with showcase instability and be arranged for potential administrative changes. Furthermore, it is fitting to pay consideration to the potential of other cryptocurrencies, which may essentially affect the advertise within the future.

cryptocurrency mining, new economic models and the impact on traditional financial systems, provide valuable insights into further research and practical uses of the coins. digital. In order to have a better picture and the successful integration of these technologies into new economies, we need to continue researching and considering all of these factors. This process includes not only technical and economic analysis but also social research to help create a more balanced and equitable environment for the development of cryptocurrencies and digital assets. This explore centers on the worldwide cryptocurrency advertise in connection to digitalization; however there are some constraints to be thought of. To start with, the data utilized in this examination is based on information available at that time and major transformations may have taken place since then. The cryptocurrency market is extremely dynamic, and data may quickly become outdated. In addition, the major area of focus for this study is Bitcoin even though there are various cryptocurrencies with differing characteristics and market impacts. As a result, it could have an impact on how well we understand the evolution of the entire market through its evaluation. Thirdly, this research does not take into consideration all legal and regulatory within the market.

## CONCLUSIONS

### Suggestions for Future Research

Forecasting the future, it is important to study how global economic and political changes impact cryptocurrencies. Understanding the changes in globalization networks and political actions can give indications to possible alterations in digital currencies as well as their integration schemas. Moreover, it is essential that more localized studies be conducted so as to understand the environmental implications of cryptomining.

These should include both social consequences and environmental aspects related to these forms of extraction, hence the need for investigating new techniques aimed at this area such as preventing adverse impacts by using alternative mining technologies.

Ongoing evaluation is needed to assess the effectiveness of current financial standards and propose changes to support innovation while ensuring compliance and stability. Besides, it is

of prime importance to look on how the digital currencies affect socio-economics with an emphasis on social inequality as well as access to financial services. With respect to this subject matter, there has been a great growth in market capitalization of different blockchain technologies over the last ten years; showing that

cryptocurrencies have got financial potential even though they may also show speculative bubbles.

In these research areas, we will deepen our comprehension of emerging trends and manage any associated risks and opportunities better.

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