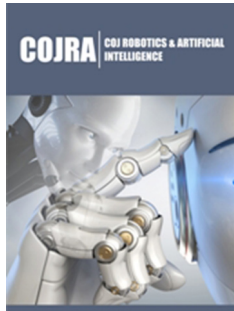# Exploring Market Dynamics: Analyzing the Correlation Between NFT, Bitcoin, Ethereum Growth Rates and NASDAQ Performance

Mfon Akpan*

Assistant Professor of Accounting at Methodist University, USA

*Corresponding author: Mfon Akpan DBA, CGMA Assistant Professor of Accounting at Methodist University, USA

Abstract

This study provides a comprehensive analysis of the growth rates and correlations among Non-Fungible Tokens (NFTs), Bitcoin (BTC), Ethereum (ETH) and the NASDAQ Composite Index from 2018 to 2021. Utilizing data from Statista, CoinMarketCap and Yahoo Finance, this study examines annual growth rates, standard deviations and Pearson correlation coefficients to understand the dynamics of these diverse markets. The findings reveal significant volatility in the NFT and cryptocurrency markets, with NFTs experiencing an unprecedented growth rate of 5,552% from 2018 to 2019, followed by stabilization. In contrast, BTC and ETH exhibit notable fluctuations, reflecting the speculative nature of cryptocurrencies. The NASDAQ Index, representing traditional financial markets, displayed more consistent growth and lower volatility. Correlation analysis indicated a negative relationship between NFT growth rates and BTC and ETH, whereas a moderate positive correlation was observed between NFTs and the NASDAQ Index. These results suggest a complex interplay between the digital and traditional asset classes. This study highlights the importance of understanding market volatility and correlation patterns for investors and policymakers and emphasizes the need for adaptive investment strategies and regulatory frameworks in the evolving landscape of digital assets. Future research should focus on the causal factors influencing these market dynamics and the role of investor behavior in shaping market trends.

Introduction

The emergence of Non-Fungible Tokens (NFTs) has introduced a new paradigm in the digital asset landscape, intersecting the worlds of art, technology and finance [1,2]. NFTs, unique digital assets verified on blockchain technology, have not only captivated the interests of investors and collectors but also raised intriguing questions about their impact on and relationship with traditional financial markets and established cryptocurrencies such as Bitcoin (BTC) and Ethereum (ETH) [3]. This study explores these dynamics by examining the growth rates and correlations between the NFT market and established financial entities. The rapid ascent of NFTs, especially in art and collectible space, has been paralleled by significant fluctuations in the cryptocurrency market [4]. Bitcoin and Ethereum, the two most prominent cryptocurrencies, have experienced their own volatility and growth trajectories [5]. Understanding the relationship between these markets is crucial because it can provide insights into investor behavior, market sentiment, and the interplay between emerging digital assets and traditional financial systems [6]. A comparison with the NASDAQ Composite Index, a benchmark for the stock market's overall performance, offers a perspective on how these novel asset classes align or diverge from the traditional market trends [7].

This study contributes to the growing body of literature on digital assets by quantitatively analyzing the growth rates of the NFT market, BTC, ETH and NASDAQ Composite Index [8]. This analysis aimed to uncover patterns and correlations that could shed light on the broader implications of the rise of NFTs and their place within the global financial ecosystem [9]. The findings of this study are intended to inform investors, market analysts and enthusiasts about the evolving dynamics of NFTs in relation to established financial markets. As the digital asset landscape evolves, it becomes imperative to understand the dynamics between emerging and traditional markets. This leads to the following pivotal research question [10].

"What is the nature of the relationship between the growth rates of the NFT market and established financial markets, specifically Bitcoin, Ethereum and the NASDAQ Composite Index?" By addressing this question, this study aims to provide insights into the correlation between the growth rates of these markets. Are NFTs moving in tandem with traditional financial markets represented by the NASDAQ or do they align more closely with the volatile nature of cryptocurrencies? Understanding these relationships can provide valuable insights into investors' behavior, the risk profile of these markets, and the potential impact of digital assets on traditional financial systems [9,11].

Literature Review

Non-Fungible Tokens (NFTs) have recently gained widespread interest owing to instances of high selling prices at the height of their popularity [12]. As the name implies, NFTs are non-fungible, meaning that each token is unique and cannot be easily exchanged for or replaced by another equivalent NFT [13]. In contrast, popular cryptocurrencies such as Bitcoin (BTC) and Ethereum (ETH) are fungible; any individual Bitcoin or ether token can substitute for another, identical one in financial transactions or exchanges [14]. Similarly, most corporate stocks are fungible. For example, any single share of Meta (Facebook) common stock confers ownership rights identical to any other share, including equal financial valuation and voting rights per share at shareholder meetings. NFTs tend to behave as distinctive assets analogous to collectibles, conventional cryptocurrencies, and stocks, exemplifying fungible financial instruments interchangeable with one another. Fungibility remains an important differentiator across emerging digital asset classes for researchers and policymakers.

The interrelationship between emerging digital assets, such as NFTs and cryptocurrencies and traditional financial markets represented by the NASDAQ has become increasingly relevant in the current economic landscape. As decentralized blockchain-based technologies continue to gain adoption across borders, regulators are globally grappling with the implications of digital assets that operate independently from centralized financial systems and governance models [12]. Understanding the growth trajectories and correlations between novel asset classes, such as NFTs, established cryptocurrency markets and stock indexes, can inform more effective policies and frameworks for investor protection, risk management, taxation and fostering responsible innovation. Beyond policymaking, these insights also provide strategic value for investment managers, researchers and consumers navigating the rapid proliferation of digital currencies and tokenized assets against the backdrop of legal financial systems. Analyzing the market dynamics between NFTs, Bitcoin, Ethereum and the NASDAQ offers data-driven perspectives on the evolving interplay between emerging decentralized technologies and traditional institutions amid the growing mainstream adoption of blockchain-powered innovation [15].

Evolution and Growth of Cryptocurrencies

Cryptocurrencies emerged in 2008 with the Bitcoin whitepaper released by Satoshi Nakamoto [16]. Bitcoin introduced several groundbreaking innovations, including a decentralized ledger powered by blockchain technology and a consensus mechanism based on computational "mining" to validate transactions without reliance on a central authority [17]. In the years following Bitcoin's launch, alternative cryptocurrencies built on similar principles began gaining traction. One prominent example is Ethereum, proposed in 2013 by Vitalik Buterin and launched in 2015 [18].

Ethereum expanded Bitcoin's model by enabling Decentralized Applications (dApps), smart contracts and self-executing agreements encoded on the blockchain [5]. This opened up possibilities for cryptocurrencies to power more complex financial transactions and decentralized computing functions beyond peer-to-peer payments. As a result, Ethereum grew to become the second-largest cryptocurrency behind Bitcoin in terms of market capitalization, cementing its status along with Bitcoin as a leading pioneer in the cryptocurrency space [19].

Both Bitcoin and Ethereum adoption accelerated greatly starting around 2016, as cryptocurrency exchanges expanded and options for buying, selling and trading digital assets continued to improve in sophistication and user friendliness [19]. This supported the increased integration with mainstream finance, including large banks, payment processors and investment firms developing cryptocurrency offerings and services. For example, PayPal added the ability for users to buy, sell, and hold Bitcoin and other cryptocurrencies starting in 2020 [20]. Leading stock exchanges like Nasdaq and CBOE began Bitcoin futures trading as far back as 2017, allowing speculators to bet on Bitcoin prices without directly handling the asset.

These developments have opened cryptocurrency investments in more significant consumer markets beyond technologists and early adopters [21,22]. Further milestones adding legitimacy include El Salvador adopting Bitcoin as a legal tender in 2021 [23]. More recently, major financial institutions, such as Mastercard, announced support for selecting cryptocurrencies on their networks [24]. Despite volatility, the overall market value of prominent coins, such as Bitcoin and Ethereum, demonstrated impressive growth before cooling in 2022, sparking increased calls for regulation globally. Understanding the evolution of foundational cryptocurrencies, such as Bitcoin and Ethereum and their integration into mainstream finance and payment systems provides a helpful context for their complex, interdependent relationship with traditional institutions.

Non-Fungible Tokens (NFTs) Segments

The world of Nonfungible Tokens (NFTs) is vast and diverse, encompassing various segments from collectibles and art to gaming, metaverse and utility tokens. Each segment exhibits unique characteristics and market dynamics, contributing to the rich tapestry of the NFT ecosystem [25,26].

Collectibles

NFTs have revolutionized the collectible market by introducing digital scarcity and verifiable ownership. Popular examples include digital art pieces, trading cards and virtual pets, with some

items fetching high prices at auctions due to their rarity and the reputation of their creators.

Art

The art world has embraced NFTs, offering artists a new medium for expression and monetization. Digital art NFTs provide artists with more control over their work, including the ability to receive royalties for secondary sales, which is a significant departure from traditional art market practices.

Gaming

NFTs in gaming have led to the emergence of 'play-to-earn' models, where players can earn tangible rewards, often in the form of cryptocurrencies or other NFTs, for participating in the game. This has opened new economic models within the gaming industry, allowing players to own, buy, sell and trade in-game assets across platforms.

Metaverse

In virtual worlds and metaverses, NFTs are used to represent ownership of digital real estate, virtual goods and other assets. This led to the creation of entirely new digital economies and experiences within these virtual spaces.

Utility tokens

Beyond collectibles and art, utility NFTs have emerged as a significant segment. These tokens provide functional use such as access to services or events, memberships and other digital rights or privileges.

Each segment contributes to the overall growth and evolution of the NFT market. As the technology and applications of NFTs continue to develop, they are likely to intersect with and influence traditional financial markets and industries.

Cryptocurrencies and Traditional Financial Markets

Interaction with traditional assets like S&P 500

The relationship between cryptocurrencies and traditional financial markets, particularly assets such as the S&P 500, is a subject of increasing interest among investors and researchers. Cryptocurrencies such as Bitcoin and Ethereum have shown varying degrees of correlation with traditional stock markets [27]. In some periods, cryptocurrencies moved independently, suggesting that they could be a diversification tool in a broader investment portfolio. Conversely, during market stress or economic uncertainty, they have shown a higher correlation with traditional assets, behaving similarly to risk-on-assets such as stocks.

Recent studies have explored the impact of major economic events on both cryptocurrencies and stock markets. For instance, during the COVID-19 pandemic, both markets experienced significant volatility, although the recovery trajectory for cryptocurrencies was notably different from that for traditional stocks [28]. This divergence offers insights into how digital assets might respond to global economic shocks compared with established financial markets.

Comparative analysis of market behaviors

A comparative analysis of market behaviors between cryptocurrencies and traditional assets, such as the S&P 500, reveals intriguing dynamics. Cryptocurrencies are known for their high volatility, which can be attributed to several factors including regulatory news, technological advancements, and changes in investor sentiment [27]. In contrast, traditional stock markets, while also subject to volatility, are generally more influenced by economic indicators, corporate earnings, and monetary policies [29].

The liquidity and market depth of cryptocurrencies differ significantly from those of the traditional markets. The around-the-clock trading nature of digital assets, retail investor participation, and the cryptocurrency market's relative youth contribute to distinct market behaviors. These differences can lead to unique opportunities and risks for investors and require different analytical approaches to understand market movements and trends [28].

The interaction between cryptocurrencies and traditional financial markets, particularly assets such as the S&P 500, is complex and multi-faceted. Understanding these relationships involves analyzing correlations, market behaviors, and the impact of external economic events. This comparative analysis is crucial for investors seeking to navigate digital and traditional asset classes effectively.

Risks and Regulatory Challenges

Volatility and security concerns

The volatility of digital assets, particularly cryptocurrencies, is well-documented. According to Gkillas K et al. [30] extreme price fluctuations in cryptocurrencies such as Bitcoin and Ethereum present significant risks for investors. These fluctuations are attributed to factors such as market sentiment, investor behavior, and regulatory news. Furthermore, security concerns, particularly in the realm of NFTs and cryptocurrencies, are a major issue. [31] highlighted the risks associated with cyber-attacks and the theft of digital assets, emphasizing the need for robust security measures in blockchain technology.

Regulatory landscape and its impact

The regulatory landscape of digital assets is evolving continually. Foley S [32] discuss the challenges regulators face in keeping up with the rapid development of cryptocurrency markets. They argue that the lack of a unified regulatory framework leads to uncertainty and poses challenges to both investors and authorities. In addition, the impact of regulations on market dynamics is significant. Dwyer GP [33] noted that regulatory actions in various countries have led to notable shifts in cryptocurrency markets, affecting their valuation and adoption.

Societal and Ecological Impacts

Societal implications

The societal implications of digital assets, particularly NFTs, extend beyond financial considerations [34]. NFTs redefine digital ownership and create new forms of digital interaction and value.

This transformation has implications for how society perceives value and ownership in the digital context. Furthermore, Catalini C et al. [35] discussed the broader societal impact of blockchain technology, emphasizing its potential to create more transparent and efficient systems for various societal transactions.

Environmental concerns related to energy consumption

Environmental concerns, particularly regarding the energy consumption of blockchain technologies and cryptocurrencies, are increasingly prominent [36,37] analyzed the energy consumption of Bitcoin mining, highlighting its significant environmental impact. They argued that the energy-intensive process of mining cryptocurrencies challenges global efforts to reduce carbon emissions. Similarly, Truby J [36] called for regulatory frameworks to address the environmental impact of blockchain technology, suggesting that sustainable practices should be integrated into the development of digital assets.

Future Trends and Potential Solutions

Emerging trends in the crypto and NFT market

The landscape of cryptocurrencies and NFTs is evolving rapidly, with new emerging trends that could shape the future of these markets. [8] explore the increasing institutionalization of cryptocurrencies, suggesting a trend toward mainstream acceptance and stability in the crypto market. [38] discussed the growing diversification of NFT applications beyond digital art, including real estate and intellectual property, indicating a broadening scope and potential for NFTs.

Potential solutions to current challenges

Addressing the challenges in crypto and NFT markets requires innovative solutions. Cong & He, (2019) proposed blockchain-based solutions to enhance transparency and security in digital asset transactions, potentially mitigating some of the risks associated with these markets. Additionally, Tapscott A et al. [39] suggested that developing new regulatory frameworks and technological advancements could provide more stability and security for investors and users in the digital asset space. Exploring the digital asset landscape, particularly cryptocurrencies and Non-Fungible Tokens (NFTs), has uncovered a rapidly evolving field. The literature reveals significant risks and regulatory challenges, highlighted by the volatility and security concerns discussed by Gkillas K et al. [30]. The evolving regulatory landscape, explored by [32], adds a layer of complexity, impacting market dynamics and investor confidence. In addition, the societal implications of these technologies, as indicated by Catalini C [35] & Wessel L et al. [40] suggest a transformative shift in digital ownership and value creation.

Environmental concerns, particularly regarding the energy consumption of blockchain technologies, are a critical aspect of this landscape. Truby J [36] & Krause MJ et al. [37] emphasized the need for sustainable practices and regulatory interventions to address these concerns. In the future, the literature suggests a trend toward increasing institutionalization and diversification within these markets. Potential solutions to current challenges, as proposed

by and Tapscott A [39] include technological advancements and regulatory reforms that could stabilize and secure these markets. As the field continues to evolve, it is likely to be shaped by technological innovation, regulatory actions, and societal perception and adoption shifts.

Methodology

Data collection

This study conducted a quantitative analysis of the growth rates of Non-Fungible Tokens (NFTs), Bitcoin (BTC), Ethereum (ETH), and the NASDAQ Composite Index from 2018 to 2021. The data are sourced from Statista, CoinMarketCap, and Yahoo Finance. The year-over-year growth rate for each market was calculated based on the changes in market capitalization.

Data analysis

The analysis involved two main statistical methods: calculation of the standard deviation and Pearson correlation coefficients using Microsoft Excel. In this study, we conduct a comprehensive analysis of market dynamics by utilizing historical market capitalization data for Non-Fungible Tokens (NFTs) sourced from Statista (2023), alongside data for Bitcoin (BTC) and Ethereum (ETH) from CoinMarketCap (2022), and data for the NASDAQ Composite Index from Yahoo Finance (2022). This approach provides a multifaceted view of the market trends from 2018 to 2021.

Standard deviation

This measure assesses the volatility of each market and provides insights into the variability of each market's growth rates around their mean. A higher standard deviation indicates greater market volatility and investment risk, whereas a lower standard deviation suggests greater stability.

Correlation coefficients

The Pearson correlation coefficients, calculated using Excel's CORREL function, determined the strength and direction of the linear relationships between the growth rates of NFT, BTC, ETH, and the NASDAQ Composite Index. Values close to +1 or -1 indicate strong positive or negative linear relationships, respectively, whereas values around zero suggest no linear relationship.

Ethical considerations

Given that this study involved secondary data from publicly available sources, ethical concerns related to data privacy and participant consent were not applicable. The study adhered to ethical standards of accuracy and reliability in data reporting and analysis.

Results

Growth rate analysis

The analysis of the annual growth rates revealed significant fluctuations across markets. In the NFT market, an extraordinary growth rate of 5,552% was observed from 2018 to 2019, (Table 1) followed by a substantial increase of 139.6% from 2019 to 2020. However, 2020 to 2021 showed a marginal decline of approximately

-0.12% (Table 2). The BTC market experienced a decrease of -46.9% in growth rate from 2018 to 2019, followed by a sharp increase of 306.7% from 2019 to 2020, and a decrease of -46.0% from 2020 to 2021. The ETH market has shown a consistent increase in growth rates over the years, with a notable surge of 608.6% from 2020 to 2021. The NASDAQ Composite Index was more stable, with growth rates of 48.5%, 30.7%, and 47.7%, respectively (Table 2).

Table 1: Market capitalization data (2018-2021).

Year	NFT Market Cap (Million USD)	BTC Market Cap (Billion USD)	ETH Market Cap (Billion USD)	NASDAQ Composite Index (Trillion USD)
2018	2.5	276.63	13.8	6.8
2019	141.3	146.9	15.6	10.1
2020	338.7	597.2	67.4	13.2
2021	338.3	322.44	477.7	19.5

Note: Market capitalization data for NFT, BTC, ETH and NASDAQ from 2018 to 2021. Market capitalization data for NFTs from 2018 to 2021 are sourced from Statista (2023). Data for Bitcoin (BTC) and Ethereum (ETH) market capitalizations for the same period were sourced from CoinMarketCap (2022). NASDAQ Composite Index data from 2018 to 2021 obtained from Yahoo Finance (2022).

Table 2: Annual growth rates for NFT, BTC, ETH and NASDAQ (2019-2021).

*Year	NFT Market Cap Growth (%)	BTC Market Cap Growth (%)	ETH Market Cap Growth (%)	NASDAQ Growth (%)**
2019	5552	-46.9	13.0	48.5
2020	139.6	306.7	332.1	30.7
2021	-0.1	-46.0	608.6	47.7

Note: The table shows the year-over-year growth rates in percentages for NFT, BTC, ETH and the NASDAQ Composite Index from 2019 to 2021. Growth rate calculated as Current Year Value-Previous Year Value)/Previous Year Value×100% (Current Year Value-Previous Year Value)/Previous Year Value×100%.

Standard deviation analysis

Standard deviation analysis indicates varying levels of volatility across markets. The NFT market exhibited the highest volatility with a standard deviation of 2776.45%, followed by ETH at 295.67%. The BTC market showed a standard deviation of 176.85%, while the NASDAQ Composite Index demonstrated the least volatility with a standard deviation of 8.85% (Table 3).

Table 3: Mean growth rates and standard deviations for NFT, BTC, ETH and NASDAQ (2018-2021).

Market	Mean Growth Rate (%)	Standard Deviation (%)
NFT	1845.83	2776.45
BTC	71.27	176.85
ETH	318.23	295.67
NASDAQ	42.30	8.85

Note: This table presents the mean growth rates and standard deviations, calculated as percentages, for the annual growth rates of NFT, BTC, ETH and NASDAQ from 2018 to 2021. The mean growth rate represents the average annual growth, whereas the standard deviation indicates the volatility of the growth rates for each market.

Correlation analysis

The Pearson correlation coefficients revealed diverse relationships between the market growth rates. There was a moderate negative correlation between NFT and BTC growth rate (r=-0.4827) and a strong negative correlation between NFT and ETH growth rate (r=-0.8959). Interestingly, a moderate positive correlation was observed between NFT growth rates and the NASDAQ Composite Index (r=0.5153). BTC growth rates showed an extremely strong negative correlation with the NASDAQ Composite Index (r=-0.9993), indicating almost inverse movements (Table 4).

Table 4: Pearson correlation coefficients among NFT, BTC, ETH and NASDAQ Growth Rates.

	BTC Growth	ETH Growth	NASDAQ
NFT Growth	-0.4827	-0.8959	0.5153
BTC Growth	NA	0.0435	-0.9993
ETH Growth	NA	NA	-0.0810

Note: The table displays the Pearson's correlation Coefficients (r) between the annual growth rates of NFT, BTC, ETH and NASDAQ from 2018 to 2021. Values range from -1 to +1, where values close to +1 or -1 indicate strong positive or negative linear relationships, respectively and values around 0 suggest no linear relationship.

Discussion

Interpretation of growth rates

The extraordinary growth rate observed in the NFT market from 2018 to 2019 (5,552%) suggests a burgeoning interest in this new asset class, potentially driven by its novelty and growing popularity of digital art and collectibles. The slight decline in the growth rate in 2021 (-0.12%) may indicate market saturation or normalization following the initial surge of interest [41]. In contrast, the BTC and ETH markets exhibit significant volatility. The sharp fluctuations in BTC growth rates, with notable decreases in 2019 and 2021, align with previous findings on cryptocurrencies' susceptibility to market sentiment and regulatory news [42]. ETH's consistent

growth, culminating in a 608.6% increase in 2021, may reflect its increasing utility and adoption, particularly in Decentralized Finance (DeFi) and NFT transactions [43]. The NASDAQ Composite Index showed more stable growth, underscoring its nature as an established and diversified market. The comparative stability of the NASDAQ suggests that traditional financial markets, while not immune to fluctuations, are less volatile than relatively new cryptocurrency markets.

Volatility and market dynamics

The high standard deviation in the NFT market indicates its high volatility, which can be attributed to the market's nascent stage and ongoing development. This finding is crucial for investors and market analysts, as it highlights the riskier nature of investing in NFTs compared to more established markets, such as NASDAQ, which exhibited the lowest standard deviation [8].

Correlation Insights

The negative correlation between NFT growth rates and BTC and ETH growth rates, and particularly the strong negative correlation with ETH, is intriguing. This suggests that growth in the NFT market may occur independently or at the expense of established cryptocurrencies, possibly due to shifting investor focus or speculative trading behavior [44]. The moderate positive correlation between NFT growth rates and the NASDAQ Composite Index is unexpected, indicating that, despite being a novel asset class, NFTs may still be influenced by broader economic factors that affect traditional stock markets.

Implications and future research

Our findings have several implications. For investors, understanding volatility and correlation patterns can inform portfolio diversification and risk-management strategies. For regulators, insights into market dynamics can guide the development of frameworks that ensure investor protection, while fostering innovation. Future research could explore the causal factors behind these markets' volatility and growth patterns, particularly by examining the impact of technological advancements, market regulations and macroeconomic factors. Additionally, qualitative studies can provide deeper insights into investor behavior and sentiment in these markets.

Conclusion

This study embarked on an exploratory journey to understand the dynamic interplay between emerging digital assets such as NFTs and established financial markets, including cryptocurrencies, and the NASDAQ Composite Index. The findings reveal a complex landscape in which traditional financial principles intersect with novel characteristics of digital assets. The extraordinary growth observed in the NFT market, particularly between 2018 and 2019, underscores the rapid pace at which digital assets can capture market interests. However, the subsequent stabilization in growth rates suggests a maturing market that aligns more closely with traditional market behaviors. In contrast, the volatility observed in the BTC and ETH markets reaffirms the speculative nature of

cryptocurrencies, influenced by a myriad of factors, ranging from regulatory changes to technological advancements and investor sentiment.

The correlation analysis provided insightful results. The negative correlation between NFT growth rates and those of BTC and ETH might suggest a diversification trend among digital asset investors, in which the rise of one asset class does not necessarily bolster the others. Conversely, the positive correlation between NFTs and the NASDAQ Composite Index suggests an intriguing connection between digital assets and traditional financial markets, possibly driven by broader economic factors. These findings have significant implications for investors, market analysts and policymakers. For investors, the high volatility in digital asset markets, especially NFTs, calls for cautious investment strategies that emphasize the importance of diversification and risk assessment. Understanding the correlation patterns between these diverse asset classes is crucial for market analysts to provide accurate market forecasts and investment advice. Policymakers and regulators face the challenge of adapting existing financial regulations to accommodate the unique characteristics of digital assets, while ensuring market stability and investor protection.

Future research should investigate the causal mechanisms underlying these market dynamics. Longitudinal studies could provide a more comprehensive view of how these markets evolve, especially in response to technological innovation and regulatory changes. Additionally, qualitative research focusing on investor behavior and market sentiment could offer valuable insights into the human factors that drive market trends in digital assets. The world of digital assets is evolving rapidly, presenting both opportunities and challenges. As this market matures, it is essential to continually adapt investment strategies, market analyses, and regulatory frameworks to effectively navigate this novel and dynamic financial landscape

Appendices

Appendix A: Annual growth rates of NFT, BTC, ETH, and NASDAQ (2018-2021)

This appendix provides detailed calculations of the annual growth rates for NFT Market Capitalization, BTC Market Capitalization, ETH Market Capitalization, and the NASDAQ Composite Index from 2018 to 2021. The growth rate is calculated using the formula: (Current Year Value-Previous Year Value)/Previous Year Value×100% (Current Year Value-Previous Year Value)/Previous Year Value×100% (Table 5).

Table 5: Annual growth rates.

NFT Market Capitalization Growth Rate
2018 to 2019:
Growth Rate = (141.3-2.5)/2.5x100=5,552%
2019 to 2020:
Growth Rate = (338.7-141.3)/141.3x100≈139.6%
2020 to 2021:
Growth Rate = (338.3-338.7)/338.7x100≈-0.12%

Source: Market capitalization data for NFTs sourced from Statista (2023) for BTC and ETH from CoinMarketCap (2022) and for the NASDAQ Composite Index from Yahoo Finance (2024).

Appendix B: Market capitalization data (2018-2021) (Tables 6-8).

Table 6: Market capitalization data.

BTC Market Capitalization Growth Rate
2018 to 2019:
Growth Rate = (146.9- 276.63)/276.63x100 ≈ -46.9%
2019 to 2020:
Growth Rate = (597.2-146.9)/146.9x100 ≈ 306.7%
2020 to 2021:
Growth Rate = (322.44-597.2)/597.2x100 ≈ -46.0%

Source: Market capitalization data for BTC from CoinMarketCap (2023).

Table 7: Market capitalization data.

ETH Market Capitalization Growth Rate
2018 to 2019:
Growth Rate = (15.6-13.8)/13.8x100 ≈ 13.0%
2019 to 2020:
Growth Rate = (67.4-15.6)/15.6x100 ≈ 332.1%
2020 to 2021:
Growth Rate = (477.7-67.4)/67.4x100 ≈ 608.6%

Source: Market capitalization data for BTC from CoinMarketCap (2023).

Table 8: Market capitalization data.

NASDAQ Composite Index Growth Rate
2018 to 2019:
Growth Rate = (10.1-6.8)/6.8x100 ≈ 48.5%
2019 to 2020:
Growth Rate = (13.2-10.1)/10.1x100 ≈ 30.7%
2020 to 2021:
Growth Rate = (19.5-13.2)/13.2x100 ≈ 47.7%

Source: Market capitalization for the NASDAQ Composite Index from Yahoo Finance (2024).

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