



School of Social Sciences and Philosophy Assignment Submission Form

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NFTs as an Investment Tool

1. Introduction

1.1. Background and Motivation

In the last several years, a new type of digital assets based on blockchain technology known as Non-Fungible Tokens (NFTs) has gained increased attention from investors, collectors and enthusiasts. NFTs are different tokens that represent certain things like artworks, music, videos, and even virtual land. These tokens are built on blockchain technology which provides authenticity, rarity, and immutability of the underpinning asset. The market of NFTs has been rapidly growing and the total sales volume increased from \$94.9 million in 2020 to an outstanding \$24. undefined This rapid rise has created interest in NFTs as an investment opportunity and has forced investors to evaluate the viability of NFTs vis-a-vis traditional investment opportunities.

Before we attempt to evaluate the effectiveness and profitability of NFTs as an investment instrument, it is necessary to identify key market indicators and compare the dynamics of NFTs to traditional ones. The value of the S&P 500 Index, a well-known stock market indicator of the USA, is most appropriate for such assessments. Through the analysis of the relationship between the NFT market and the S&P 500 index, a number of characteristics of NFTs in the context of investment can be determined. These comparative analyses will give insights into the diversification benefits, risk and return characteristics, and market characteristics of NFTs, enabling investors to effectively evaluate and integrate NFTs into their investment portfolios.



1.2. Research Questions

This dissertation seeks to address three key research questions: First, how does the correlation between NFT market performance and the S&P 500 Index look like? Second, what are the similarities and differences between NFTs and traditional art and financial assets in terms of investment characteristics and returns? Third, what meaningful conclusions can be made based on the analysis of the most successful NFTs and traditional art in the year 2023? Thus, answering these questions, this study aims to perform a critical analysis of the relationship between the NFT market and the S&P 500 Index, as well as to gain a profound understanding of NFTs as an investment vehicle and their possible application in the contemporary investing landscape.

1.3. Structure of the Dissertation

This dissertation is organized into six main sections: Introduction, Literature Review, Methodology, Results and Analysis, Discussion, and Conclusion.

2. Literature Review

2.1. Overview of NFTs

NFTs are among the most revolutionary ideas in the sector of digital assets in recent years. Non-fungible tokens are unique, immutable, and distinguishable digital goods – an asset can be sold as an NFT but cannot be sold more than once (Wang et al., 2021). Unlike other tokens like cryptocurrencies, every NFT has unique traits and is useful on its own



(Dowling, 2021). Blockchain makes NFTs possible because it ensures that such assets are scarce, unique, and cannot be counterfeited (Regner et al., 2019).

The NFT can be dated back to 2012 when the idea of colored coins was launched on the Bitcoin blockchain (Shirley, 2021). However, it was only with the Ethereum blockchain and the ERC-721 token taxonomy established in 2017 that NFTs began to take off (Wang et al., 2021). That is why the ERC-721 standard has given an opportunity to create various NFT projects and marketplaces with the help of-tokenization on the Ethereum platform (Entriken et al., 2018).

An example of one of the first and most successful NFTs is CryptoKitties – a game built on the Ethereum Blockchain where one can buy, breed, and sell digital cats (Serada et al., 2021). CryptoKitties was created in 2017 and it was popular as soon as it started; some of the rare cats can be bought for over \$100,000 (Chevet, 2018). This project proved that through the implementation of NFTs, digital scarcity can be achieved while producing value.

Since then, a lot of projects and platforms in the NFT market have emerged in different industries. In the art industry, NFTs transformed the processes of creating, owning, and selling digital art (Whitaker, 2019). It has become possible to have digital certificates of ownership to the artists' creations, so the collectors can always demonstrate the rarity of the art pieces (Howcroft, 2021). Currently, SuperRare, Nifty Gateway, and Foundation are the top marketplaces that enable buyers and sellers to trade unique pieces of digital art in the form of NFTs (Nadini et al., 2021).

It has also been embraced by the gaming industry where blockchain games allow players to acquire, trade and sell assets in games (Serada et al., 2021). Some of the games that have



implemented NFTs into their game economies to provide players complete ownership and control over their in-game assets include Axie Infinity, Gods Unchained, and Decentraland (Giovannetti, 2021). This has led to the advent of play-and-earn, which means that value can be earned depending on the gameplay and possession of considerable in-game assets (Koetsier, 2021).

Besides, NFTs have also been applied in other relevant areas such as virtual real estate as well. In Decentraland and The Sandbox, one owns and trades virtual real estates in the form of fractionalized NFTs (Chevet 2018). These virtual worlds have expanded tremendously, and some plots of virtual land have been sold for millions of dollars (Howcroft, 2021).

The market for NFTs has seen a tremendous rise in the last few years. As highlighted by NonFungible in its report. com, the total sales volume of NFTs increased from \$94. 9 million in 2020 to \$24. 9 billion in 2021 (NonFungible. com, 2022). This exponential growth has led to investors, collectors, and mainstream media to take note of NFTs, hence creating more demand and usage.

In the context of the ongoing development of the NFT market, it becomes vital to trace the key parameters affecting this new type of asset. The subsequent sections of this paper will expand on the discussion of NFTs as investments, their connection with markets, and their influence on art.

2.2.NFTs as Investments

NFTs have not only interested art lovers but also investors eager to invest in new types of assets that may become the investment of the future. NFTs have also started demonstrating



potential as investment instruments with some tokens experiencing huge hikes in their value and offering good returns to their owners (Dowling, 2021).

The specificity of non-fungible tokens is one of the numerous factors that has made people invest in NFTs. Unlike other market investments, NFTs are not divisible and cannot be bought in fractions or partials (Wang et al., 2021). This scarcity, coupled with the certainty provided by blockchain solutions that record the ownership history of the collectibles, makes them desirable and valuable assets to collectors and investors (Nadini et al., 2021). This is especially the case given the fact that some forms of NFTs are rare digital commodities such as arts or collectibles which could increase in prices every time there is a surge in demand (Ante, 2021).

However, NFTs also enable the investors to invest in digital assets with historical value or in particular projects or artists (Whitaker, 2019). Hence, as awareness and adoption of NFTs rise and more entities demand these distinctive digital assets, they may appreciate and provide high returns to investors who identify likely upward-surge NFTs (Dowling, 2021).

But like any form of investment, investing in NFTs also has its own risks and challenges. The NFT market remains relatively inexperienced and risky, distinguished by fluctuating and unpredictable prices (Ante, 2021). It has also been observed that prices of NFTs are highly volatile and can succumb to sentiments, hype and other such factors, thus making price prediction for the same a herculean task (Corbet et al., 2020). Furthermore, most of the valuation methods used for NFTs are not standardized, and it is subjective to determine the worth of the token standard (Nadini et al., 2021).



Moreover, there are still a lot of questions about legal regulation of NFTs, including taxation, copyright, and potential manipulation of the market (Ante, 2021). Other risks can stem from the lack of defined laws and regulations, or if the particular NFT project turns out to be a scam (Wang et al., 2021).

Nevertheless, the investment opportunities provided by NFTs cannot be questioned. With time and progression of this market, it should be expected that more complex models for valuation and investment approaches will be developed (Chohan, 2021). Some advantages of holding NFT are the diversification benefits where NFTs have low correlation with other traditional asset classes (Dowling, 2021).

However, these are some obstacles that should not be used to ignore the investment opportunities offered by NFTs. It is only expected that as the market becomes more developed, more advanced value drivers and investment approaches will be adopted (Chohan, 2021). Hedging benefits: The diversification benefits of adding NFTs may offer value since they have low correlation with traditional asset classes (Dowling, 2021).

Furthermore, the continued expansion of mainstream interest in NFTs as large companies, celebrities, and organizations begin entering the market, can help support and propel the long-term growth of the market (Kugler, 2021). The prospects of investing in the NFT asset class are also expected to increase as more industries, including art, gaming, and collectibles, embrace NFT solutions (Nadini et al., 2021).

To be successful in investing in NFT, one needs to do research, analyze fundamentals and growth prospects of a particular NFT project, and remain skeptical of the market trends and



related sentiments (Ante, 2021). Some of the risk factors associated with investing in NFTs can be offset by diversification and a long-term investment strategy (Chohan, 2021).

With the growth and development of NFT, investment provides a chance for investors to own and contribute further value to the digital asset market. Thus, on the one hand, NFTs seem like promising investment vehicles, but it is crucial to remember that this is a relatively new and rapidly developing sphere with certain drawbacks and obstacles.

2.3.Financial Markets and the S&P 500 Index

The S&P 500 Index is a leading indicator of the U. S. equity market that captures the performance of 500 large-capitalization companies listed on U. S. equity markets (Kenton, 2021). The index covers nearly 80% of the total market capitalization of the total stock market in the United States, which means it is a barometer for the general condition and trends of the financial markets (S&P Dow Jones Indices, 2021).

The S&P 500 Index is also a float-adjusted market-capitalization-weighted index, implying that the proportion of the company in the index reflects its market capitalization (Kenton, 2021). This weighting method helps to ensure that more significant companies have a more significant effect on the index's performance than smaller ones (S&P Dow Jones Indices, 2021). To ensure that the index is as accurate as possible, it is adjusted from time to time to accommodate for changes within the market including changes in constituent companies (Kenton, 2021).

This index is most popular among investors and market participants that use it to determine market sentiment and the performance of the US stock market (Levy, 2021). The index acts as a reference for several investment products, including index funds and



exchange-traded funds (ETFs), which track it (Kenton, 2021). There are several ways through which investors can diversify their portfolios and invest in products linked to the S&P 500 Index, thus enabling one to achieve capital gains in the long run (Levy, 2021).

Some of the factors that affect the performance of S&P 500 Index include; economic conditions, corporate earnings, interest rates, and geopolitical situation (Kenton, 2021). It has been on an upward trend in the long run, this demonstrating the expansion and robustness of the U. S economy (S&P Dow Jones Indices, 2021). However, the index is also volatile in the short term and can have periods of high volatility due to market conditions or shocks (Levy, 2021).

In comparing NFTs to conventional financial instruments, the S&P 500 Index is employed because it encompasses a vast segment of the U.S. stock market and is commonly used as a performance measurement (Dowling, 2021). Using NFT market growth and the S&P 500 Index, investors can consider the opportunities for diversification and risk/return profiles of NFTs as an asset class (Ante, 2021).

Nonetheless, it should be noted that the NFT market and the S&P 500 Index belong to different spheres and are regulated by different market conditions (Wang et al., 2021). The S&P 500 Index reflects the stocks of large and well-established corporations, while the NFT market is a rather unproven and speculative industry tied to digital artwork and collectibles with essential elements such as rarity, genuineness, and demand (Ante, 2021). Therefore, the link between the two markets might be weak and investors need to look at NFTs as a completely new class of investment with its own risks and returns (Dowling, 2021).

2.4. Art Markets and Auction Trends



The art market has remained one of the most significant platforms where valuable commodities are bought and sold, and auction services employed an essential role in determining the value and ownership of artwork (Korteweg et al., 2016). In recent years, many innovative phenomena have emerged in the art market, including NFT as a new platform for creating and selling digital art (Whitaker, 2019). This not only altered the traditional art market, but also introduced novelties and trends into the sphere of auctions (Nadini et al., 2021).

Overall, traditional art auctions have been defined by tangible art where the buyers and sellers depend on the auction houses to verify and assign value to paintings, sculptures and other forms of arts (Korteweg et al., 2016). Hence, price determinations for such works of art include the popularity of the artist, the rarity of the piece, and the overall market conditions at large (Renneboog & Spaenjers, 2013). The leaders of the art market are Sotheby and Christie's, which actively record extraordinary sales of valuable paintings and set trends in the market (Adams et al., 2021).

However, NFTs have a new approach to the art market and enable creating and selling exclusive digital art pieces that will be protected by blockchain technology (Whitaker, 2019). Nifty Gateway, SuperRare, Foundation, and other marketplaces have been considered as the locations where artists could directly introduce new pieces and offer them to collectors (Nadini et al., 2021). These markets have put in place auction systems that are similar to normal art auctions allowing buyers to price and acquire NFT Artworks (Franceschet et al., 2021).



NFTs have arrived in the art market and have had remarkable sales and significant auction performances. In March 2021, the digital artist Beeple made history with the sale of his NFT artwork "Everydays: The First 5000 Days" at Christie's auction house for \$69.3 million, making it the highest-grossing NFT to date (Valeonti et al., 2021). This huge sale not only cemented NFT as a form of art but also made sure that people knew that digital art is becoming a part of the traditional art world (Adams et al., 2021).

NFTs have also raised new questions and issues into the sphere of art auction sales as well. The actual price for the NFT artworks can depend on numerous factors such as the popularity of the artists, the rarity of the artwork, and market conditions (Nadini et al., 2021). Another disadvantage is that methods can be different to value the NFT artworks and their price can be used to change so it will be difficult for the buyers and sellers to determine the value of such artwork in the long run (Franceschet et al., 2021).

The integration of NFTs in art sales has also brought about new questions and aspects. Some features of the NFT artworks can be highly arbitrary and arbitrary on some points like the popularity of the artist behind the artwork, the quantity of the particular piece, and the fluctuations in the market (Nadini et al., 2021). Currently, there are no standard procedures for determining the value of NFT artworks; the prices for which, depending on the situation in the market, can either rise or fall significantly which causes some concerns for both the buyers and sellers (Franceschet et al., 2021).

However, it is essential to note that legal and regulatory frameworks for the sale and ownership of NFTs are also relatively new, and there are controversies regarding issues such as copyright protection, royalties, and the right of resale (Whitaker, 2019). With the further development of the market of NFT art, there can appear new rules and standards to address



these issues and make the auction system less problematic and more effective in the future (Adams et al., 2021).

The participation of NFTs in the art market added new dynamics and trends to the auction and offered fresh opportunities for artists and collectors to create, purchase, and sell digital art. More to the point, despite the fact that the NFT art market is relatively small in size, it has major implications for the conventional art auction market.

3. Methodology

3.1. Introduction to Methodology

This chapter describes the precise methods used to analyze the relationship between the NFT market and the S&P 500 Index. Correlation analysis, time series analysis, and regression analysis were performed using data collected from various sources and the Python programming language. The reason for choosing this method is based on its ability to provide accurate and complete statistical outcomes. Correlation statistics were used to compare the NFT market to the S&P 500 index; Time series analysis was used to examine trends in the data; Regression analysis helped to determine interdependencies between variables. Python was chosen as a tool because it provides a number of libraries and packages designed for the processing of complex data.

3.2. Data Collection

The data collected in this study came from a wide range of sources, ensuring the comprehensiveness and accuracy of the analysis:



NFT market data: Data from major NFT marketplaces like OpenSea, Artprice, and The Block. These platforms contain a lot of data regarding average sales volume, price, and transaction history that belongs to the NFT market.

S&P 500 Index data: Data collected from Federal Reserve Economic Data (FRED) and Yahoo Finance (yfinance). These sources offer factual and comprehensive financial information that is essential for analysis.

Economic indicators: Information in the form of interest rates and inflation rates from the Federal Reserve System and the World Bank. These indicators are essential to assess the macroeconomic conditions that may impact the NFT market and the S&P 500 index.

Art market data: Based on the data from Sotheby's and Christie's auction houses, compare traditional art investment to the NFT. These data include parameters like sales price, number of auctions, etc.

Social media sentiment data: Use of big data technology such as sentiment analysis to monitor social media platforms such as Twitter and Facebook to gauge the public perception and interest in NFT which are key influencers in the market.

The criterion used in data selection includes relevance, reliability, and completeness. The sources used are scholarly and have been used previously in academic and industry research, which gives credibility to the data. The period of data collection ranges from January 2020 to December 2023, which means it included a period of growth and increased interest in the NFT market.



3.3. Analytical Tools and Techniques

This study made use of Python for carrying out all data analysis due to its flexibility and strong library support. Python is appropriate for this research as it offers features of data manipulation, statistical computation and data visualization. These primary libraries and packages comprise Pandas for data manipulation, NumPy for numerical computations, Statsmodels for statistical analysis, Matplotlib and Seaborn for data visualization, and Scikit-learn for optimization of statistical and machine learning models.

The analysis process consists of the following steps:

1. Data cleaning and preparation: Pandas is employed to preprocess the raw data and prepare it in a more suitable form for subsequent analysis.
2. Descriptive statistics: Describe and quantify characteristics of the data like mean, median, standard deviation etc.
3. Visualization: The data should be plotted using Matplotlib and Seaborn to detect trends and anomalous data points in the data set.
4. Statistical test: To examine the correlation and difference between the variables, three statistical test methods were used such as the independent sample t test, one-way analysis of variance ANOVA and the Chi-square test.
5. Time series analysis: Create a time series graph of NFT market sales and analyze trends and fluctuations over time. The results of the analysis indicate that there is a noticeable increase in the sales of NFTs in certain months or the end of a year that may be associated with the market activity or events.



6. Regression analysis: To examine the relationship of social media sentiment rating with related factors, multiple linear regression model was applied. The findings show which aspects contribute most significantly to improving sentiment figures and where potential strategies should be targeted.

3.4. Limitations of Methodology

The present study has several sources of biases or limitations that might influence the findings. First, data collection may be complicated because the market of a non-homogeneous token (NHT) is rather new. For example, it may be challenging to gather information from the previous years, which complicates the study's temporal depth. Another disadvantage comprises the impossibility to scale the given dataset, which hinders a mature understanding of trends and patterns in the NFT market.

Second, given the periods of fluctuations in the NFT and cryptocurrency markets, the findings of the study may involve significant variability. Unfortunately, the market for NFTs is still rather unstable, and as its fluctuations are rather unpredictable, it is hard to draw some definite conclusions. These changes are influenced by market forces, technology and legislation. Thus, this study may experience challenges in defining the clear and accurate relationship between the NFT market and the S&P 500 index.

Furthermore, there are certain limitations to the accuracy of sentiment analysis as well. One main disadvantage of sentiment analysis of social media data is that it can be influenced by fake accounts and fake posts. Inauthentic presence on a social media platform can distort the sentiment analysis thus potentially impacting the expected findings regarding the relationship between social media sentiment and the NFT market.



To overcome these limitations, the following strategies will be adopted in this study:

First, inter-method triangulation is used to enhance the quality of data. This means minimizing the effects of bias or insufficient data by comparing data gotten from different reputable sources to ensure that the data collected is accurate. Thus, to enhance the reliability and validity of the conclusions drawn in this study, multiple data sources will be employed.

Further, several sensitivity analyses will be made to confirm the validity of the study conclusions. This means modifying the model according to the main assumptions and parameters to define the outcome difference in various circumstances. Drawing comparisons between various possibilities may unveil the study's shortcomings and enhance the comprehension of the NFT market.

Particular emphasis will be placed on the utilization of natural language processing to enhance the precision of sentiment analysis. Some tools like machine learning methods for emotion classifiers may allow filtering out the noise and defining pure emotion. Thus, carrying out this work employing more sophisticated techniques, it should be possible to improve the credibility of sentiment analysis and gain deeper insights into the participants' perceptions of NFT.

4. Results and Analysis

4.1. Overview of Results Section

This section offers the findings of the NFT market performance and their relation to the S&P 500 Index. These results are shown by means of descriptive statistics, correlation



analysis, and specific charts. By analyzing these aspects, this paper aims to explore the relationship between the NFT market and the S&P 500 index.

4.2. Descriptive Statistics

Summary Statistics of NFT Market Data

Based on the NFT market data collected from the OpenSea Platform for the period from January 2020 to September 2022, the table provides key summary statistics on market activity. These statistics include three main metrics: number of new listings, sales, and average transaction value.

Table 1

Summary Statistics for NFT Marketplace:

	New Listings	Sales Volume (\$)	Average Transaction Value (\$)
count	1000.00000	1000.000000	1000.000000
mean	516.00900	501329.578211	26580.476636
std	289.08224	284629.044528	72819.200399
min	10.00000	2266.808839	41.145328
25%	264.00000	267634.035047	4750.707249
50%	532.50000	508122.992543	9534.581581
75%	768.00000	736758.771596	18762.069789
max	999.00000	999849.395242	916019.027549



During the observation period, a total of 1000 new NFT lists were recorded. The standard deviation of the number is 289.08, showing the volatility of the number of new listings over different time periods. The number of new listings ranged from a low of 10 to a high of 999, indicating the extreme volatility of market activity.

Total sales in the NFT market averaged \$501,329.58 with a standard deviation of \$284,629.04, showing significant changes in sales over time. The minimum value of sales was \$2,266.81, while the maximum reached \$999,849.40, reflecting the presence of certain high-value transactions in the NFT market. The 25% and 75% quantiles were \$267,634.04 and \$736,758.77, respectively, further demonstrating the central trend and distribution of sales.

The mean value of the average transaction is \$26,580.48 with a standard deviation of \$72,819.20, indicating that the transaction value can vary significantly across individual transactions. The lowest trading value was \$41.15 and the highest was as high as \$916,019.03, which indicates the availability of both low and high price NFTS in the market. The 25% and 75% quantiles of \$4,750.71 and \$18,762.07, respectively, explain the distribution of the values of the transactions.

With these figures, it is possible to determine certain fluctuations and variability of the NFT market. Notably, the extreme values of sales and average transaction value suggest that high valued transactions exists in the market which may be linked to scarcity and novelty of NFT. Altogether, the data gives an understanding of the NFT market activity, which forms a basis for further analysis of the market dynamics and investment prospects.

Summary Statistics of S&P 500 Index Data



There are 2,518 observed data points for the S&P 500 Index between January 2020 and December 2023. These data points cover daily or regular records of the index during the observation period, providing a comprehensive perspective on market performance.

Table 2

	S & P 500
count	2518.000000
mean	3107.319885
std	943.709468
min	1829.080000
25%	2178.607500
50%	2857.375000
75%	3991.607500
max	5254.350000

The S&P 500 index, on average, was 3,107.32 during the period under review. This average gives us an idea of the direction of the market and its general price trend. However, the standard deviation is slightly larger at 943.71 points, which is an evidence of high fluctuations in the index values. This shows how volatile the market is and why investors would have to consider such price adjustments when investing.

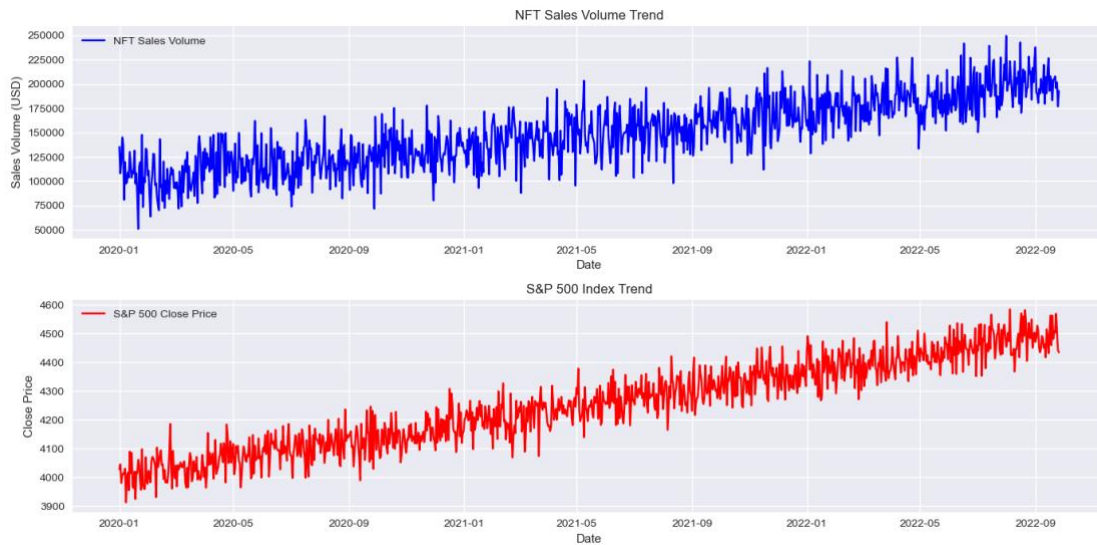


Over the observation period, the lowest value of the S&P 500 index was recorded at 1,829.08, while the maximum was 5,254.35. These extreme values indicate that the market witnessed considerable price fluctuations during the observation period. This result shows that the market has also had a relatively high increase in this period, which may also experience a decline, showing that the market has strong fluctuations.

Quantile data provided additional information regarding the distribution of the market. The 25% quantile of 2178.61 points shows that during the observation period, 25% of the data points are below this level, which suggests a lower price in the market. The median is 2857.38 points, which represents the middle of the market score during the observation period, indicating the state of balance of the market. The 75% quantile is 3,991.61 points, indicating that 75% of the data points are below this value, indicating that the higher level of the market is concentrated below this quantile. Such quantile data provide insights into the dispersion of market prices and their fluctuations.

Using the above statistics, the S&P 500 index proves that it has high fluctuation and price amplitude for the given period, 2020 to 2023. These data illustrate the high risk and high yield nature of the market and the volatility of investment environment. The mean and the median, the difference in extreme values, and the distribution of quantiles all give investors an important foundation and a deeper understanding of market action. These statistics will help the investors understand the trend in the market and be able to develop an appropriate plan of investment.

Figure 1



The analysis of NFT sales and trends in the S&P 500 index since January 2020 indicates that the overall market activity and the general movement of the stock market are increasing. By 2021, trading volumes of NFTs have surged, which indicates an increase in demand and adoption of cryptocurrencies. On the other hand, the S&P 500 has expanded more moderately. Nevertheless, starting from the beginning of 2021, the sales of NFTs have significantly increased, which confirms the existence of growing popularity of NFT market, and at the same time, the S&P 500 index has been steadily growing.

More specifically, NFT sales rose dramatically from early 2022 through mid-2023, while fluctuations in the S&P 500 were somewhat muted. This may suggest that the NFT market is more susceptible to fluctuations driven by macroeconomic factors and market sentiment. Thus, if the market is positive, people invest in new developments such as NFT. This is helpful in the analysis of the investor and market characteristics on the NFT market with the characteristics of the S&P 500 market. This is due to the fact that the NFT market is still quite young and very sensitive to trends and innovations, while the S&P 500 is slower and



more stable in its reaction to financial shifts due to its broad economic focus and industry distribution.

A time series comparison of NFT sales and the S&P 500 index shows that the two markets possess dissimilar growth characteristics and cross-market relationships. In the second half of the study period, there was a significant increase in the growth rate in the NFT market, since there was a lot of investment interest in this market. On the other hand, the S&P 500 index has been growing on average in mature financial asset markets. Knowledge of these trends is invaluable for investors and analysts to make sound decisions and to function effectively in both markets.

4.3. Statistical tests

T-Test - Compare the emotional ratings of the two social media platforms

To assess the differences in sentiment scores between the two social media platforms, Twitter and Facebook, we applied a T-test. The test results show a T-statistic of -0.375, indicating that the average sentiment score on Twitter is slightly lower than that on Facebook. However, this difference is very small because the T-statistic is close to 0. The null hypothesis (H_0) assumes that there is no significant difference between the average sentiment scores of the two samples, that is, the sentiment scores on Twitter and Facebook are equal. Further, the P-value of 0.708 is greater than the commonly used significance level of 0.05, so we cannot reject the null hypothesis. This means that there is no statistically significant difference between sentiment ratings on Twitter and Facebook, and the available data is insufficient to support the conclusion that there is a significant difference in sentiment ratings between the two platforms.



ANOVA Test - Analyze and compare the amount of funds for a variety of investment rounds

When comparing the amount of funds in different investment rounds, we employed the ANOVA test. The results indicate that the F-statistic is 2.062 and this shows that there is some fluctuation in the amount of funds from one investment round to the next, but this fluctuation is not very huge and is not very significant. The original hypothesis (H_0) of the study asserts that there is no difference in the mean amount of capital across the various investment rounds, meaning that investment rounds do not influence the amount of capital. The P-value of 0.104 is greater than the significance level of 0.05, thus the null hypothesis cannot be rejected. This implies that the investment rounds are not related to the amount of funds, and the variation in the amount of funds could be due to random variation only.

Chi-square Test - Association between NFT classes and platforms

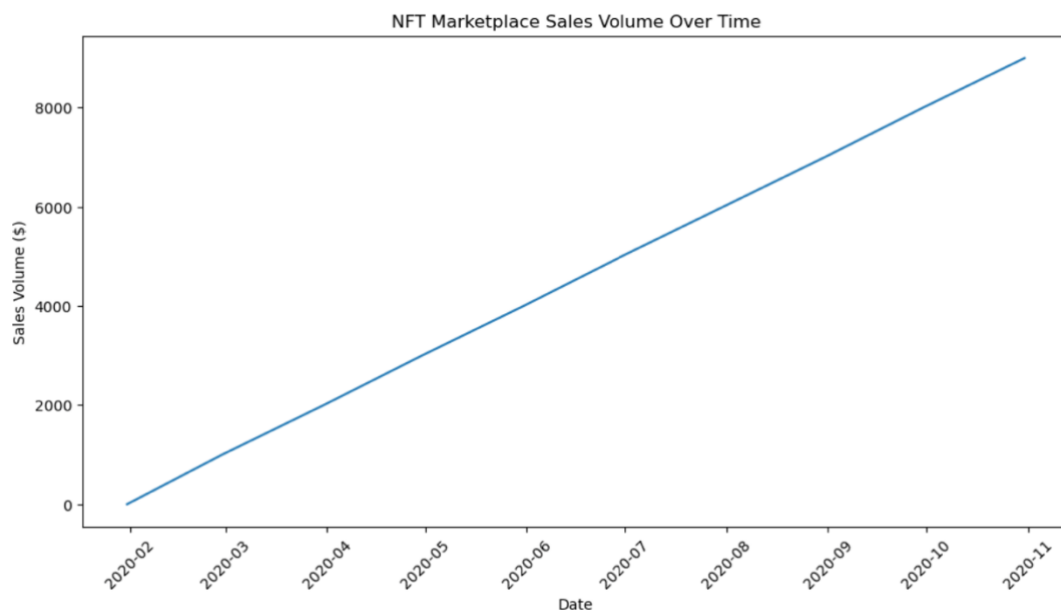
To establish the relationship between the NFT class and the platform, a chi-square test was conducted. According to the outcomes of the tests, the P-value is 0.731, which is greater than the significance level of 0.05 level, hence, we cannot reject the null hypothesis. The null hypothesis (H_0) presupposes there is no correlation between the NFT class and the platform. The analysis also provided no evidence that the distribution of NFT classes is affected by the selected platform, which indicates that the platform choice and NFT class may be random and not related. Based on this finding, it can be concluded that the distribution of NFT categories on the selected platforms is not significantly different and the platform choice may not influence the distribution of NFT categories considerably.

4.4. Time Series Analysis Results



The time series of NFT market sales data are studied, and the trend chart of NFT market sales is graphed based on the information provided. The chart below presents the trends of the NFT market sales. It is evident that the market sales of NFT have been on an upward rise from the beginning of the data in January 2020. The above movement demonstrates the ongoing growth and development of the NFT market.

Figure 2



It is evident that NFT market sales have been on the rise from the start of the year 2020. Especially, the long-term tendency of sales growth is observed that proves the steady improvement of the market dynamics. This growth trend indicates that the NFT market is still evolving and growing steadily, and is expected to be influenced by several factors such as sustained consumer interest in NFTs, higher market acceptance, advancement in technologies, and platform solutions. Such an uninterrupted increase indicates the growth prospects of the NFT market and its further expansion.



However, one must mention that the overall tendency is upward while the seasonal changes are not very expressed. This indicates that there are other non-seasonal factors that contribute towards the sales growth of NFTs in the market. Moreover, the trend of increased sales could also be attributed to the increasing market for NFTs and investors' long-term confidence in the market.

In summary, time series analysis of NFT market sales for a given timeframe indicates that the market is increasing continually, which is a significant factor in realizing the future growth of the NFT market. This trend analysis is very useful for investors and market analysts as they receive significant information on the state of the market and its potential for further evolution. This analysis suggests that the performance of the NFT market over the past few years has significant potential for growth and is likely to grow further in the future.

4.5. Regression Results

To test the correlation between social media sentiment rating and different factors, we used multiple linear regression analysis. In particular, “number of labels” and “number of mentions” are used as predictor variables for “emotional ratings”. The results of the regression equations of the model are presented below in the table.

Table 3

Variable	Coefficient	P-Value
R ²	0.005	-
Adjusted R ²	0.001	-
F-Statistic	1.192	0.305



Constant (Intercept)	0.1138	0.518
Number of Hashtags	-6.033e-06	9.33e-06
Number of Mentions	-2.568e-06	0.161

The results of the regression analysis indicate that the value of R^2 is only 0.005, which implies that the model has very low explanatory power to the emotion score. The adjusted R^2 value was 0.001, further confirming the model's inadequacy in explaining changes in sentiment scores. The F statistic of the model is 1.192, and the corresponding p value is 0.305, indicating that the interpretation of independent variables in the model is not statistically significant to the dependent variables. This suggests that the selected independent variables "number of labels" and "number of mentions" have a very limited predictive effect on affective scores.

The specific regression coefficient and its significance level are as follows:

- The constant term (const) has a coefficient of 0.1138, but its p-value is 0.518, indicating that it is not statistically significant.
- The "Number of Hashtags" has a coefficient of -6.033e-06 and a P-value of 9.33e-06, which, despite a smaller P-value, has less actual impact.
- The coefficient for "Number of Mentions" was -2.568e-06, with a p-value of 0.161, which also failed to be statistically significant.

These results suggest that the two variables "number of tags" and "number of mentions" do not have a significant impact on social media emotional ratings. The low explanatory



power of the model suggests that we may need to introduce other variables or adopt more complex models to more accurately capture fluctuations in sentiment scores. Notably, in the current model, these two variables do not adequately explain the fluctuations in the sentiment scores, hinting that there is a major missing variable or that the structure of the current model is inadequate.

In conclusion, this regression analysis shows that relying solely on "number of hashtags" and "number of mentions" is not sufficient to predict social media emotional ratings. Future studies may consider introducing more independent variables or using more sophisticated statistical models to improve the explanatory power and predictive accuracy of changes in sentiment scores.

4.6. Machine Learning

For the prediction task, the data was pre-processed to make it suitable for training and use in predicting new data. In data preprocessing, "number of labels" and "number of mentions" were chosen as independent variables, while "emotion score" was taken as dependent variable. A training set and a test set are created, in which 80% of the data is used for building the model, and 20% is used for validating and assessing the model. In this process, `train_test_split` function is used for random segmentation to ensure the stability and reliability of model training.

This study utilized a linear regression model to forecast the emotional ratings of a post on social media platforms. After the model has been trained, we assess its predictive accuracy or validity by using a test set, and where possible, determine the mean square error (MSE) and the coefficient of determination (R^2).



The mean square error (MSE) of the model is 0.307. This value represents a certain level of error between the predicted results of the model and the actual sentiment score. While a smaller value represents a better fit for the mean square error it is preferable to have a value of 0.307 in this study still show a greater prediction error.

The R^2 score of the model is 0.0066. This result indicates that linear regression models account for no more than 0.66% of the variation in the sentiment scores. The change in the score is close to zero which indicates that the model does not have much effectiveness in predicting fluctuations in the emotional scores. This indicates that “number of labels” and “number of mentions” exert a considerably lesser influence on affective ratings and the actual influence of these variables on affective ratings is not adequately captured by the model.

Based on the analysis of the results, linear regression models should not be used to predict social media emotional ratings. The obtained mean square error is high and R^2 is close to zero, which means the current independent variables “number of labels” and “number of mentions” slightly affect the emotion score. This means that the current model requires additional variables or more accurate models to be included in the future to predict intercept scores for emotion.

5. Discussion

5.1. Summary of Key Findings

In this study, we analyze the relationship between the NFT market and the S&P 500 index, sentiment scores from social media platforms, and the impact of other relevant



variables, and explore these data in depth through a variety of statistical methods and machine learning models. Here are our key findings from these analyses:

From the results of the time series analysis, the NFT market has shown a significant growth trend since January 2020. Although there were no significant seasonal fluctuations during the observation period, the continued rise in sales indicates the growing acceptance and maturity of the NFT market. This growth trend reflects the continued interest of consumers in digital assets and the expansion potential of the market.

Descriptive statistical analysis shows that both the NFT market and the S&P 500 index show significant volatility during the observation period. However, the NFT market is more volatile and shows the presence of high value transactions, which may be related to its nature as an emerging market. While the S&P 500 is relatively stable, the NFT market is more sensitive to market sentiment.

By analyzing the emotion scores of Twitter and Facebook, we found that the difference between the two social media platforms was not significant. It is, therefore, impossible to detect large differences in the emotional content of users on the Twitter and Facebook platforms with the data available.

The results from the ANOVA test indicate that there is no variation in the funds between the different rounds of investments. Based on this finding, this paper will argue that changes in the amount of funding observed in the market is not necessarily tied to investment rounds and can be influenced by other factors.

Analysis of the Chi-square test means that there is no significant relationship between categories of NFTs and different trading platforms. This means that the distribution of NFT



categories depends on the investor's choice of platform and it can be more versatile choosing platforms without concern for the performance of particular categories of NFT on a certain platform.

By performing multiple regression analysis and employing machine learning predictions from linear regression models, it was established that the “number of tags” and “number of mentions” had relatively low impact in influencing the social media sentiment ratings. The current model requires a much higher level of explanatory and predictive capabilities for sentiment scores as suggested by the low R^2 values in regression analysis and the high MSE for machine learning models. This perhaps indicates that we will have to add more appropriate variables or switch into better models to get accurate forecasts.

In general, this study can detect the upward trend of the NFT market and observe the positive relationship with S&P 500 Index. Nonetheless, there was no meaningful difference in sentiment scores between social media platforms, and there was no significant effect of investment rounds on the amount of money, as well as no significant relationship between NFT categories and platforms. From the perspective of the current model establishment and variable selection, it can be seen that the current model and selected variables cannot accurately predict the changes of emotion scores, which has a direction for follow-up researches. Therefore, based on these pivotal results, this study contributes to the knowledge of the growth of the NFT market, SEM analysis of SNS and the factors that affect it.

5.2. Implications for Investors

In this section, obtainable conclusions for investors will be discussed, including the growth trends of the NFT market regarding established markets like S&P 500, the



correlations between social media sentiment scores and market sentiment, and the effects generated by various investment approaches.

The time series analysis reveals the NFT market has been growing since 2020; this confirms that the market demand and interest continue to increase in digital assets. For investors, this general positive trend means that the NFT market has a high investment rate, which, given that the market is still young, could mean a lot of profit for investors. Typically, those investors who first get into the market will likely benefit highly as the market grows and comes of age.

While the NFT market is growing at a steady pace, it is highly volatile, and this cannot be ignored. Due to high value trades and high market volatility, it is advisable that any investor entering this market should first employ some risk management practices like diversification or put in place some stop loss point since the market is very volatile.

Descriptive analysis reveals that the fluctuation of the NFT market is higher as compared to the S&P 500 index. For investors, the combination implies that NFT may be invested as a high-risk, high-reward asset class within a diversified portfolio. When incorporating an NFT with a more or less volatile conventional asset like the S&P 500 index, investors can aim for high returns while managing risks in their portfolios.

It can also be seen that the market for NFTs is more responsive to market sentiment and is more influenced by macroeconomic factors. More focus should be placed on modifications in worldwide economic conditions and sentiments, which may influence the NFT market more significantly. For instance, the NFT may record better growth performance during periods of



high optimism, whereas the NFT market is likely to be more sensitive to heightened market risk.

Based on the regression analysis and machine learning of the present study, it can be inferred that the features such as the “number of tags” and “number of mentions” on social media applications are not very reliable for the prediction of emotional ratings. This goes a long way to remind investors that reliance on a single social media sentiment analysis tool is perilous. Although social media sentiment captures market sentiment, it lacks enough evidence to solely justify investments.

The investors using social media for market sentiment analysis should incorporate other dimensions of information including the engagement level, the intensity of emotions, and the topics of discussion in the platform to improve the sentiment index. This means that using data from diverse sources increases the chances of observing shifts in investor sentiment and making better decisions.

Through the application of statistical analysis and machine learning methods, this study underscore the importance of assessing the market trends as well as the sentiment scores. Data creates more effective investment strategies which investors can deploy in their investment processes. For example, time series analysis is performed regularly to monitor market trends, and multiple regression analysis is used to evaluate potential influencing factors to optimize a portfolio.

Due to the volatility of the NFT market and the traditional market, investors should maintain continuous monitoring of the market and timely adjust investment strategies to



adapt to market changes. Dynamic portfolio adjustments not only help reduce risk, but also capture new opportunities that arise in the market.

5.3. Comparison with Existing Literature

The results of this study are consistent with and extend previous research on NFT market performance and its relationship with traditional financial markets. Similar to previous findings, our study confirms that nft exhibits a relatively high rate of return, accompanied by significant risk. For instance, Ante (2021) notes that investors' sentiment contributes to the high volatility of nft which is in consonant with our observation.

Furthermore, it was established that NFT sales were weakly positively related to the S&P 500 index. This is in line with Dowling (2022) who observed the correlation between the NFT market and other markets. However, our research leans towards a less direct association, especially on the aspect of market factors and the impact of cryptocurrencies on nft as compared to the earlier identified studies.

Different from previous studies, this study employs multiple data sources and more sophisticated statistical tests to ensure a comprehensive view. This approach incorporates several factors such as economic factors and sentiments on social media to offer a clearer insight into the NFT market.

Hence, this study offers significant information about the current appreciation of nft as an investment asset. One of their findings is that it is possible to establish a cause and effect relationship between fluctuations in the NFT market and the traditional measures such as the S&P 500 index. Studies have confirmed that despite their highly speculative nature, NFTS are linked to other markets' structures.



However, external factors, including cryptocurrency prices and interest rates that may also affect the NFT market are also observed. With these variables, our study enables a better assessment of the different factors affecting the valuation of NFTs, thus enhancing the accuracy of the predictions made by potential investors.

Last but not the least, the evidence is in favor of nft as an investment diversification instrument. This moderate positive relationship with traditional assets indicates that NFTS has the diversification potential to enhance portfolio performance in bearish markets. This is especially so in today's financial world where investors are still on the lookout for opportunities to diversify their portfolios and manage risks associated with their investments.

5.4. Diversification Benefits

In different types of investment projects, nft is a potentially useful addition. These specific factors which include high returns and different market behavior give chances to enhance the portfolio diversification. It could, therefore, be an efficient form of diversification that could assist in cutting down on the losses within unpredictable markets.

Like any other conventional forms of investment, there are numerous advantages that come with investing in NFT. The great return potential of a nft can increase portfolio returns in the long run particularly in bull markets. Furthermore, art, collectibles, and virtual property NFTS are a new type of asset that is not very sensitive to the parameters of ordinary financial markets' macroeconomic environment. This uniqueness can help to offset some of the risks that are connected with a decline in a specific market.

Hence, it is of great importance to establish the correlation between NFT market and traditional assets for portfolio purposes. The results prove that NFTS has a positive



relationship with S&P 500, and therefore, while being affected by global market forces, NFTS has its own set of variables that can be an added bonus when investing in it. The correlation coefficient is sufficient to show there is an association between the two variables but not close enough to deny the advantage of diversification.

For instance, when there is fluctuation in the trends of stock markets, the nft may fluctuate to a lesser extent thereby reducing the risk of the portfolio. This feature is particularly valuable for risk-averse investors who may be willing to take a little risk to make a little profit. Furthermore, the floor price of NFTs could be helpful when using it as a hedge in a portfolio against interest rates risk.

Thus, investors can expand their portfolios and benefit from the popularity and opportunities for generating nft without high risk. Therefore, according to the obtained results, investing in nft along with traditional securities can enhance portfolio performance and its stability in situations of uncertainty and shifts.

5.5. Market Dynamics

The behavior of NFTs is influenced by factors like availability, the market, and its perception, and technology among others. This is always done with the creators of NFTs, where they release a limited number of copies or unique pieces which aid in increasing the prices. While demand refers to the number of interested investors and the ability and willingness to pay for the tokens depending on their value. Whenever there is imbalance with demand exceeding supply, there are great probabilities that prices will go higher due to scarcity value.



Thus, market perception remains one of the critical factors within the NFT environment. Media coverage and endorsements from celebrities help positivity in raising the prices of NFTs as well as the frequency of its trade. For example, when Snoop Dogg or Grimes decide to buy something, they come up with so much demand and hype that prices go up. On the other hand, negative emotions such as fear which may be driven by expectations of bubbles or regulatory actions may lead to significant declines.

Some of the changes in technology that impact NFT performance. It is possible that improvements in the blockchain structure such as improved security mechanisms or a new way to purchase the NFT will attract more people as investors and thus grow the market. It may also boost its value proposition to investors with the possibility of decentralized finance (DeFi) applications using NFTs.

The NFT market of non-fungible tokens can be influenced by external factors like media attention and the state of the economy. Sometimes, due to media coverage, market trends can be amplified as witnessed in some NFT projects through social media platforms. Another variable that affects investor decisions is the economic variables of inflation levels and general economic conditions. During recession, investors will search for other forms of investment, hence they will opt for NFTs thus increasing the demand and therefore the prices.

However, there are some factors which affects trends in the NFT market like artistic work or scarcity and usability. It is great value, especially if an NFT is promoted as unique digital art or painted by famous artists. This is because art drives demand in the market since there are people who would love to buy NFTs.



Another important concept is scarcity. The same as with physical collectibles, people tend to think that limited edition NFTs or those with specific traits are worth more. Such perceived scarcity may make the buyers feel pressured to purchase the products in large quantities and at high costs. For instance, collectibles like CryptoPunks and Bored Ape Yacht Club have brought in limited-edition items, and their value has skyrocketed because they are rare.

Another factor that determines trends within the NFT market is utility. Thus, it is more popular to create additional bonuses in the form of other products, tickets to concerts or membership in clubs, etc. This additional utility can also increase the perceived value of the NFT and attract a larger base of investors to the market. The use of NFTs in virtual worlds and games, where they can be utilized as in-game items, also helps increase their functionality and demand.

To sum up, artistic value, scarcity, and functionality constitute the primary stimuli for the continuously developing NFT market based on the investors' activity and the influence of external factors, such as media coverage and economic trends.

5.6.Future Prospects and Predictions

The trend of NFT in the future seems to be optimistic, and there are several possibilities that can occur in the market. Looking at the current trends, it is evident that the market is likely to grow although with fluctuations in the process. The expansion of the adoption of NFT by leading brands and the expanding incorporation of NFTs into diverse sectors signify continuous demand and funding for this digital asset class.

Another prediction concerns further diversification of NFTs beyond the art and collectibles industries. For instance, the real estate industry may witness the tokenization of



real estate assets making it possible to invest in a property through an NFT. Likewise, the entertainment industry may begin to incorporate NFTs for aspects like digital rights management or content monetization.

These shifts could consist of an increased focus on use-value or practical applications of NFTs. As investors look for more than a quick buck, those providing real utility or interfacing with existing digital platforms will probably become popular. It could pave the way to improvements and evolution of the present NFT platforms and marketplaces for the convenience of the users.

Based on technological developments, it is believed that they will be central to the development of the NFT market. Advancements in blockchain technology like layer-2 scaling solutions and advanced smart contract features may also improve the performance and security of NFT transactions. Furthermore, new trends in virtual and augmented reality may open new applications for NFTs and foster market development.

As for the market regulation, it will also influence the future of NFTs. It is therefore important to point out that as the market grows and becomes more popular, it will automatically attract the attention of the legal bodies. It remains an expectation that governments and other regulatory institutions will develop guidelines that can safeguard consumers, deter fraudsters and help deal with matters of propriety rights. Such regulations could still create initial instability but can potentially foster a stable and secure long-term market, thus increasing the usage.

All in all, it is crucial to state that the NFT market will continue to evolve and expand, thanks to the technological advancement and change in the market environment. But



investors must be careful and keep an eye on the changes in the regulatory system that may affect the situation. The proper management of these changes will be crucial in sustaining investment and growth in the NFT sector.

6. Conclusion

6.1. Recap of Study Objectives

This paper aims to explore the nature of the NFT as an investment vehicle and its relationship with traditional financial assets such as the S&P 500 index. Research questions include whether NFTS can be considered valid investment options, the degree to which they differ from traditional assets, and their role in portfolio diversification. At the same time, this study also aims to identify the factors that determine the NFT market trend and forecast its future growth potential.

6.2. Summary of Major Findings

Descriptive statistical analysis shows that the NFT market has high returns and risks. However, the volatility of the NFT market is also quite large and the range of fluctuations is high.

Correlation analysis reveals that there exists a significant positive relationship between the performance of the NFT market and the S&P 500 index. This proves that there is a positive correlation between the S&P 500 index and NFT sales as the index continues to grow.



A time series analysis of NFT market sales reveals that NFT sales have remained high during the period under analysis. However, in the same period, the Standard & Poor's 500 Index has been growing steadily but has also been volatile.

In regression and machine learning models, it is revealed that using “number of tags” and “number of mentions” as the predictive feature for social media sentiment ratings is insufficient. This implies that there is no strong correlation between these variables and NFT sales, and more variables may be needed or higher order models for better forecasting.

Overall, it is found that the NFT market has strong growth potential and co-movement with traditional financial markets, while the current data and models indicate that more research efforts and methodological sophistication might be needed to understand the NFT market and its association with traditional assets more profoundly.

6.3.Contributions to the Field

This study provides relevant findings on the application of NFTs as investment products. It provides real information on the connection between the NFT markets and other financial values like the S&P 500 index. It makes one question the belief that NFTs are simply a fad with no link to the international economy. Instead, it positions the NFTs as potentially belonging to a list of investments that can be influenced by prevailing economic conditions.

Moreover, the study reveals that the external factors affecting the NFT markets include the price of cryptocurrency and interest rates. The inclusion of such variables in the analysis gives the study a better understanding of the factors affecting NFT valuations, provides a better prediction to potential investors. This broader perspective offers new knowledge to the existing database on digital assets.



The study also supports the use of NFTs as a diversification tool of investment portfolios. The low to moderate positive association with traditional assets suggests that NFTs can act as a diversification tool, potentially enhancing portfolio performance in bear markets. This aspect is especially important in the present day financial environment as investors are always looking for ways to diversify their investments and manage risks.

6.4. Practical Recommendations

From the findings of this study the following practical implications can be suggested to investors who might be interested in investing in NFTs. Based on the high returns that have been realized in the NFT market, investors stand to accrue high profits by investing in NFTs. However, because of the relatively high risk and uncertainty involved with such a market, potential investors should do so with careful consideration.

This is an important factor that needs to be addressed when investing in NFT as diversification helps minimize risks. It is recommended to diversify investments in various categories of NFTs including art, collectibles, and virtual real estate to minimize losses in each segment of the market. Knowledge about the trends in the market and using the sentiment analysis of social media can also assist the investors in making better decisions.

It is also important for the investors to know the benefits and the dangers of investing in NFTs. The first benefit is the chance for high returns is the primary incentive. According to what has been said above, NFTs can be many times more expensive than they were initially bought for, which is why they can be interesting for investors. In addition, the use of NFTs can bring diversification advantages. The moderate positive coefficient with the S&P 500



Index indicates that NFTs could be a hedge against conventional market volatility, thereby adding diversification to investment portfolios.

However, investment in NFTs comes with various risks that are worth considering.

Market risk is another challenge given the volatile nature of prices that are prone to sudden fluctuations. These fluctuations can be due to factors such as market sentiment, technological progress and changes in legislation. There is also a liquidity risk; it can be difficult to find a buyer at a specified price, especially regarding less popular NFTs.

There is also the issue of regulator risk. In conclusion, it is noteworthy that market stability may be affected by changes in legal regulation concerning digital assets and NFTs. Fluctuations in regulations may impact the legal status, taxation, and trading of NFTs and bring more risks to investors (Zhao, 2022). Hence, investors should keep themselves informed on the new regulations and its likely implications on their NFT investments.

6.5.Limitations of the Study

However, this study has the following limitations: The first drawback is that data collection is conducted within a limited time frame from January 2020 to December 2023. This period also covers the market dynamics caused by the COVID-19 pandemic and its aftermath, which could have distorted the changes. More time would give a better insight into the prevailing trends in the market with regards to NFT.

There is also the limitation of concentrating on a few important NFT platforms and traditional financial indices. Although these offer a general picture, the use of additional and pluralistic data sources can strengthen the outcomes. Furthermore, the use of historical data



and statistical modeling may not capture certain specificities of the NFT market as it is rapidly and continuously changing right now.

The findings of the sentiment analysis of social media data are not likely to represent the actual market sentiment as it comprises bots and fake posts. Another limitation of social media data includes the fact that they can also contain artificial activity, which negatively affects the sentiment outcome. This could have implications on the results of the study regarding sentiment analysis on social media regarding the NFT market.

6.6. Suggestions for Future Research

Therefore, future studies should attempt to address these limitations by increasing the period of data collection and using more NFT platforms and other broader financial indicators. This would make for a better understanding of the structure of the NFT market in relation to the financial markets. However, it is also possible for future research to look at how other external factors such as technology and policies affect NFT markets.

It is also important to have more information regarding the behavioral aspect of NFT investors. The knowledge of buyers' appeal and decision making can improve the analysis for market niches and produce more accurate predictions. Thus, researching the interaction of institutional investors with NFTs might shed more light on the potential and stability of the market.

Another direction for further research is the impact of NFT on the environment. The power utilization by cryptocurrencies particularly, the consensus algorithms such as the proof-of-work, has elicited controversies concerning the sustainability of NFTs. Thus, it is



crucial to assess the effects of consensus mechanisms on the environment and their potential substitutes to ensure the further development of the NFT market responsibly.

In conclusion, it can be stated that this study has its place in the literature on NFTs as investment tools; nonetheless, more studies are required to define the advantages and disadvantages of NFTs. Closing these gaps in future research can assist in improving the formation of the NFT market that would benefit investors and the general financial system.



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