

# Analysis of Influencing Factors of Economic Benefits of Metaverse Digital Collections

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**Abstract.** In recent years, the metaverse industry has gradually expanded, and the economic benefits brought by the metaverse blockchain industry, including digital collections, have become more obvious. For this economic benefit, the researchers took the Opensea platform, which is representative of digital collections, as an example. They took the economic benefit index of the platform as an explanatory variable, comprehensively used the multiple regression model to analyze and test, and used the stepwise regression method to adjust and correct the model. The analysis results show that the economic benefit index of digital collections shows a clear proportional relationship with the number of NFT digital collections sold and the scale of people's consumption. From the perspective of economics, some economic law problems of the digital collection industry are explained, and some conclusions are made for the development of the digital collection industry and suggestions are given for reference.

## 1 Introduction

Since 2016, the state has successively introduced a number of policies to encourage the development and innovation of the metaverse industry. In 2021, the state proposed the Notice on Carrying out the National Supply Chain Innovation and Creating Application Demonstration Work, focusing on accelerating the integrated application of supply chain technologies such as the internet of things, big data, edge computing, blockchain, 5G, artificial intelligence, and augmented reality/virtual reality, and promoting the accelerated development of digital supply chain.[1] In 2022, the state once again proposed the '14th Five-Year Plan for the Development of the Digital Economy', 'Financial Technology Development Plan (2022-2025)', 'Notice on Carrying out the Pilot Work of Publishing Industry Technology and Standards Innovation Demonstration Project' and other industrial policies, which provided clear and broad market prospects for the development of the metaverse industry and a good production and operation environment for enterprises.[2] At the same time, 2021 as the 'first year of NFT'[3], a large number of NFT-related industry chain goods flooded into the market, in the application scenarios of these NFT-related industry chain goods. Okonkwo believes that NFT is the Coase's theorem in the field of economics applied to the field of digital assets, and is an economic tool to commercialize the wisdom achievements of intellectual property owners.[4] Digital collectibles were born with the development of NFT in unique scenarios. The NFT market is gradually expanding, and it continues to impact these existing industries and bring strong

economic benefits. According to some results from Xiaoli Wang's article and available from DuneAnalytics, Opensea's monthly trading volume has remained above US\$ 2 billion for 10 consecutive months since August 2021.[5] For the reality of the sky-high metaverse products (including digital collections) behind the scene, people mainly understand through news reports, and it is the same whether at home or abroad that there is currently a lack of actual academic content and data to understand the development of the industry. Therefore, in order to further understand the economic benefits brought by digital collections in such blockchains, this paper selects multiple factors that may affect the economic benefits of such products, and selects data from the representative Opensea platform in digital collections for investigation and analysis.

## 2 A Summary of Literature

According to some results from Wang Xiaoli's article and available from DuneAnalytics, Opensea's monthly trading volume has remained above US\$ 2 billion for 10 consecutive months since August 2021, and the increase in transaction volume should attract much attention.[5] Liu Shaojun (2023) pointed out that digital collections have the function of 'assigning value', since compared with the traditional digital works, which have the characteristic of being able to be infinitely copied and wirelessly disseminated, the uniqueness of digital collections determines their scarcity, and the number of digital collections sold affects their economic profits to a certain extent; Regarding the transaction method, there is a major difference between traditional digital copyright

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and digital collection copyright, including but not limited to the trading platform and price, and the user's transaction and consumption scale as well as the average transaction volume will not be limited by general products.[6] Through the analysis of the NFT market, it can be found that NFT collections tend to be visually homogeneous and most traders are more professional. NFT, as a new tool for processing digital assets, meets the needs of a large number of creators of digital works, trader groups, and there is no doubt that the number of trader groups also greatly affect the economic benefits of NFT.[7] Therefore, by investigating and studying many factors of the economic benefits of digital collections, this paper mainly analyzes the number of users, main audience groups, consumption degree and other factors of various digital collection platforms. Through SPSS, a multiple linear regression model is established to analyze the influence degree of each factor on the economic benefit of digital collections, regulate various influencing factors and achieve expected control, and finally achieve the purpose of understanding the relevant influencing factors on the economic benefits of digital collections.

### 3 Source and Acquisition of Data and Description of Related Symbols

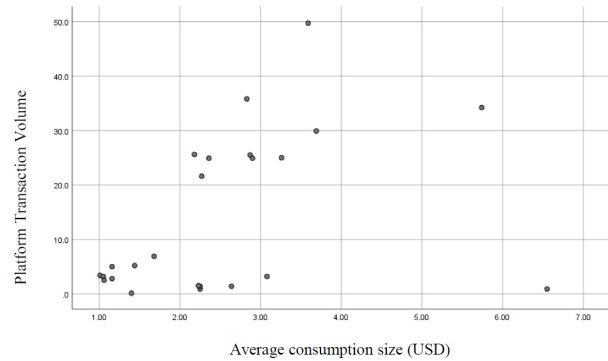
Combined with the data release, the data from 2021 to 2022 is selected, and the data comes from the blockchain research platform DuneAnalytics and the data previously reported by scholars. In order to unify the unit, this paper mainly uses US dollars as monetary units.

Y represents the economic efficiency index,  $X_1$  represents the platform trading volume,  $X_2$  represents the number of NFT sold on the platform,  $X_3$  represents the average consumption size,  $X_4$  represents the average number of user transactions, and  $X_5$  represents the total number of active traders.

### 4 Scatter Plot and Data Correlation Analysis

#### 4.1. Scatter Plot

A scatter plot can visually show the strength of the relationship between two variables and reflect the overall relationship trend between variables. In order to study the correlation between platform transaction volume and various influencing factors, this paper draws a scatter plot between platform transaction volume and each influencing factor in turn, and takes the scatter plot between platform transaction volume and average consumption size (see Figure 1) as an example.



**Figure 1.** Scatter plot between platform transaction volume and average consumption size

As shown in Figure 1, there is a certain linear trend between the economic efficiency index and the average consumption size, indicating that there may be a linear correlation between the two.[8]

#### 4.2. Data Correlation Analysis

Correlation analysis is a statistical analysis method that studies the correlation between two or more random variables in equal standing. Analyzing the linear correlation coefficient between the economic performance index and the number of NFT sold by the platform and the total number of active traders, the results are shown in Table 1.

**Table 1.** Correlation

		The number of NFTs sold by the platform	Total number of active traders
Platform economic benefit index	Pearson relevance	.753**	.647**
	Sig. (double tail)	.000	.001
	Number of cases	24	24

\*\* . At level 0.01 (double-tailed), the correlation is significant

The linear significance between the economic benefit index of the platform and the number of NFT sold by the platform is less than 0.01, and the Pearson correlation is 0.753, rejecting the null hypothesis. The change of the number of NFT sold by the platform has a significant effect on the economic benefit index, and the economic efficiency index has a moderate linear correlation with the number of NFT sold by the platform and is positive. Similarly, the linear significance between the economic benefit index and the total number of active traders is less than 0.01, and the Pearson correlation is 0.647, which rejects the null hypothesis, indicating that the change of the total number of active traders has a significant effect on the trading volume of the platform, and the economic efficiency index has a moderate linear correlation with the total number of active traders and is positive.

## 5 Multiple linear regression methods and analysis

### 5.1. Multiple Linear Regression Model

The basic principle of multiple linear regression is to model the relationship between multiple independent variables using the least squares method. General form of multiple linear regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \varepsilon$$

where Y represents the platform trading volume,  $X_i$  ( $i = 1, 2, \dots, k$ ) represents the relevant index, k is the number of indicators,  $\beta_0$  represents the regression constant,  $\beta_i$  represents the regression coefficient, and  $\varepsilon$  represents the random error term.[8]

### 5.2. Data Analysis and Processing and Model Building

In this paper, the economic benefit index is taken as the dependent variable, recorded as Y, and the platform trading volume and the number of NFT sold by the platform are taken as independent variables, and regression analysis is performed on all variables, and a regression model is established to obtain the model data and the regression coefficients of each variable (shown in Tables 2 and 3)

**Table 2.** Model Summary

Model	R	R square	Adjusted R Sq.	Errors in standard estimates
1	.902a	.814	.763	7.1218

- a. Predictors: (constant), total number of active traders, average number of trades by users, average consumption size, trading volume of the platform in the month, number of NFTs sold by the platform in the month
- b. Dependent variable: Economic performance index

**Table 3.** Regression coefficients for each variable

Model	Unstandard-ized coefficients		Standardized coefficients	t	Sig.	
	B	Standard error	Beta			
1	Constants	.713	7.752		.092	.928
	Platform trading volume	-.028	.021	-.294	-1.330	.200
2	The number of NFT sold on the platform	.263	.088	1.254	2.985	.005
	Average consumption size	3.954	1.341	.375	2.949	.004
	Average consumption size	-3.136	1.162	-.380	-2.699	.015
	Total number of active traders	-.114	.362	-.138	-.315	.756

- a. Dependent variable: Economic performance index

It can be seen from Table 2 that R and the adjusted R square are 0.902a and 0.814, respectively, and the degree of fitting is good; [8] its F value is 15.785, and its P value can be regarded as 0, passing the F test. At the significance level of 5%, only the P value of the number of NFT sold on the platform and the average consumption scale of the influencing factors are less than

0.05, that is, only these two factors passed the significance test, which is different from the expected results. So this paper decided to use the stepwise regression method to establish a model for research.[9]

Stepwise regression method: The basic idea of stepwise regression is to introduce variables into the model one by one, each introduction of an explanatory variable is to have an F test, and the selected explanatory variables are to have a t-test one by one. When the original introduced explanatory variables become no longer significant due to the introduction of later explanatory variables, then delete them. After doing so repeatedly, the optimal set of explanatory variables can be finally obtained.[10]

All the independent variables are imported and the stepwise regression method is used to obtain the model test results. See Table 4.

**Table 4.** Test results of each influencing factor (1)

Model		Unstandard-ized coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
1	Constants	-2.960	3.741		-.791	.437
	Number of NFT sold on the platform	.158	.029	.753	5.366	.000

- a. Dependent variable: economic performance index

Model		Unstandard-ized coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
1	Constants	-13.221	4.277		-3.092	.006
	Number of NFT sold on the platform	.156	.024	.741	6.446	.000
	Average consumption scale	4.168	1.212	.395	3.438	.002

- a. Dependent variable: economic performance index

**Table 5.** Test results of each influencing factor (2)

Model test results with constant terms removed

Model		Unstandard-ized coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
1	The number of NFTs sold by the platform	.138	.016	.879	8.826	.000

- a. Dependent variable: Economic performance index

- b. Linear regression through the origin

Model		Unstandard-ized coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
1	The number of NFTs sold by the platform	.112	.023	.711	4.850	.000
	Average consumption scale	1.553	1.023	.223	1.517	.143

- a. Dependent variable: Economic performance index
- b. Linear regression over the origin

As can be seen from Table 5, after removing the constant term, the p-values of all variables are less than the significance level of 0.05, which all passed the t-test, indicating that there was a statistical difference in the impact of these variables on the trading volume of the platform. By observing the coefficients of each variable,

it can be seen that the coefficients of the variables of platform trading volume and average consumption scale are positive, indicating that these two variables have a significant positive impact on the platform transaction volume, that is, the larger the values of these two variables are, the higher the value of the platform transaction volume is.

Eventually, the final model is evaluated by the above data, and the model data is shown in Table 6:

**Table 6.** Model Summary

Model	R	R squareb	Adjusted R square	Errors in standard estimates	Model
1	.856a	.733	.708	10.8048	1

a. Predictors: the number of NFTs sold by the platform, the average consumption scale

b. For regression through the origin (no intercept model), R squared measures the variable proportion of the dependent variable relative to the origin explained by this regression. This R square cannot be compared to the R square for models that contain intercepts.

It can be seen from Table 6 that R2 is 0.856 and adjusted R2 is 0.733, indicating that the fitting effect of the model is better.

## 6 Conclusion

By using multiple linear regression model and stepwise regression for classification, this paper concludes that the factors affecting the transaction volume of the platform mainly include the number of NFT sold and the average consumption scale. At the same time, combined with the correlation analysis results, it can be concluded that there is a certain linear positive correlation between the trading volume of the platform and the number of NFT sold and the total number of active traders. It is further inferred that the greater the number of traders participating in the NFT market and the average transaction scale of traders are, the bigger the economic benefits are brought by the NFT market. At the same time, the importance of the "scarcity" of digital collections accounts for a relatively small proportion of the economic level, and it can be seen from the data observation that the increase in the types of digital collections in the NFT market is conducive to further improving the economic benefits of their own platforms, and consumers are more enthusiastic about the emergence of a variety of different types of digital products. Since the number of traders is an uncontrollable factor, this article does not propose specific measures for this influencing factor.

Based on the above analysis, this paper believes that the following measures taken by digital collection platforms may be helpful to the platforms' revenue:

- (1) Appropriately increase the sales of new collections
- (2) Appropriately increase the price of collections

The limitation of this paper is that only the relevant data of one NFT platform is selected for research, and the research scope is small, and other new and more famous NFT platforms will be added in subsequent

research, so that the results of the study can be of reference value and be universal.

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