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Non-fungible tokens as an area of entrepreneurial activity: Global perspective and potential directions of change

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ABSTRACT

Objective: The objective of the article is to identify the intensity of the interest in non-fungible tokens (NFTs) in a spatial and temporal frame of reference (regions of the world in the period January 2021 – May 2022) and the project changes based on Internet users' queries for the keyword 'NFT.'

Research Design & Methods: The basic research material under consideration consisted of spatial-time series generated from Google Trends. The data generated were subjected to relational and ratio analysis relying on clusters, correlation, and regression. The analytical tools used allowed for a cross-regional comparative analysis in a dynamic frame and a simplified prediction of the interest in NFTs on a global scale.

Findings: The biggest interest in NFTs is found in 'the heart of today's fastest-growing economy in the world' consisting of Hong Kong, China, and Singapore. The dynamic growth of NFT collection and transactions in 2021 translated into the culmination of the interest in NFTs in January 2022. However, this interest was short-lived and significantly dropped in the next few months. Regardless of the region of the world, the trends of exchange in this field coincide. The NFT market will probably develop, but the dynamic growth that took place in 2021 will no longer occur.

Implications & Recommendations: The results of the study have practical implications for creators, investors, institutions and governments, as well as those interested in understanding the growing NFT branch as a part of the new global digital economy and the dynamically growing market of digital assets. In particular, it is necessary to take into account the currently discussed vision of introducing digital currencies and abandoning cash. From the theoretical perspective, the article complements the NFT analyses and the research instruments used.

Contribution & Value Added: The conducted study is pioneering in terms of the cognitive plane, i.e. analysis of the interest in NFTs on a global scale. The analytical process based on data generated from Google Trends, together with the research instruments used, is not reflected in the current scientific output. As assets that are objects of trade, NFTs fit into the new and rapidly evolving phenomenon. It is a cognitive area embedded in a very modest scientific output. The article enriches theoretical and cognitive research in the field of artificial intelligence.

Article type:	research article
Keywords:	artificial intelligence; cryptocurrencies; entrepreneurship; Google Trends; NFT; non-fungible token
JEL codes:	L26, D81, G15

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INTRODUCTION

The evolution of the Internet gradually moves areas of human activity, including entrepreneurship, to the global network. The COVID-19 pandemic caused a very rapid movement of the education and science sector to the virtual space, alongside communication and information. At the same time, another area of the Internet that is dynamically expanding is the one directly related to the broadly understood

financial market. In this context, attention should be drawn to the cryptocurrency market and non-fungible tokens (NFTs) created based on the market's technological concept. They are a new asset category, different from cryptocurrencies (Dowling, 2022b), which combines IT technologies and human creativity (so-called creative economy) (Mazieri *et al.*, 2022).

Living in an AI-powered era fosters creativity inherent in entrepreneurial attitudes. At the same time, problems long forgotten by many, such as pandemics, conventional wars, and high inflation, are coming back. Irrespective of these disruptions, it is common to strive for prosperity. In this context, it is necessary to consider the new investment areas created by, among other things, NFTs (Carayannis *et al.*, 2022). Anyone can make a non-fungible token, even using a free platform. Regardless of the risk and vague rules, currently, new digital products appear to be equally attractive to investors looking for a safe haven, investors interested in a big and quick profit, creators of these new virtual solutions, as well as intermediaries seeking profit from the activity of all stakeholders of the new market, including fraudsters. It is a very receptive market absorbing entrepreneurial initiatives rooted in artificial intelligence and, at the same time, based on classic business models. Given the global nature of NFTs and the lack of public registers, it is currently impossible to determine where in the world there are the most creators, intermediaries and, finally, investors.

In 2021, NFTs gained global popularity. However, researchers suggest that no region is a clear leader in the NFT market (Grauer *et al.*, 2022). In this context, the research problem took the form of the need to specify in which regions of the world the interest in NFTs is the greatest and how this interest changed over time in the period January 2021 – May 2022. The analysis was based on data obtained from Google Trends which were subjected to relational and ratio analysis relying on the analysis of clusters, correlation, and regression.

The article is of theoretical and cognitive nature and contributes to the academic literature on NFTs as regards the interest in this type of asset from a spatial and temporal perspective. The analytical material obtained and reviewed, along with the statistical tools used, is an innovative approach and meets the criterion of an empirical scientific experiment. The practical implications include the increasingly frequent discussions about the vision of abandoning cash in favour of digital currencies and the development of business activity carried out in virtual space that spans national borders and is ahead of legislative processes.

The article is divided into sections. It begins with an introduction to the topic of non-fungible token. Then, the latest literature was reviewed. The next part of the article explains the research methodology. The main part of the article are the results of empirical research. The last section will contain the main conclusions and limitations of this research and directions for future studies.

LITERATURE REVIEW

A non-fungible token is a special type of cryptographic token that represents the originality of a digital asset, which is a declaration that a given file exists only in a single copy. This solution makes it possible to create digital intellectual property, so NFTs are digital assets in the form of multimedia. These include images, videos, music, texts, games, game footage, avatars, virtual creations, virtual sports cards, virtual real estate, or even virtual body parts of famous people available primarily on the Ethereum blockchain. The two main sources of NFTs are digital games and artworks (Vasan *et al.*, 2022). Currently, NFT is one of the most significant public successes of blockchain technology (Dowling, 2022a) which has dominated modern programming techniques (Jain *et al.*, 2022). The NFT transactions are based on a mechanism of exchanging the ownership of a digital file and are subject to copyright. Just like artwork, they can be sold or just shared. The blockchain itself stores the entire traffic and transaction history (Leonard & Ariawan, 2021). Non-fungible tokens are revolutionising the crypto landscape, becoming popular among investors and the general public (Umar *et al.*, 2022).

The use of NFT was pioneered by creative industry entrepreneurs who tried to generate new streams of revenue and ways of engaging stakeholders. Subsequently, NFTs took advantage of the cultural need for new content, new experiences, new entertainment and new conversation topics, especially at a time when activity was restricted due to the pandemic (Agrawal & Sandhu, 2022). Despite the rapid increase

in popularity, there were concerns related to the legal ownership of NFT assets and the prevalence of speculation and fraud connected to the NFT trade (Chalmers *et al.*, 2022). Cryptocurrencies and NFTs are associated with a separate culture, philosophy, and a world with faithful followers. The credibility of this financial instrument relies, for example, on advertisements featuring celebrities, *e.g*. Hollywood stars and the world's leading athletes. This mechanism is not new. It is also a part of dangerous assets such as pyramid schemes (Leonard & Ariawan, 2021). The investment creativity of Bernard Madoff based on this criminal scheme was also endorsed by many people from the world of business, politics, and culture. It seems that economic education cannot keep up with the real problems of the modern financial market. In this context, the importance of conducting general research and analyses of NFTs seems to be very high, regardless of the risk and potential failure inherent in entrepreneurship.

Cryptocurrencies and NFTs attract more and more attention from entities such as investors, neobrokers, decision-makers, regulatory bodies and portfolio managers (Maouchi *et al.*, 2021). Among all the stakeholders of these new digital projects, there are many entrepreneurial units representing all the above-mentioned professional groups and creators. While the scientific output on cryptocurrencies is rather rich, although certainly not exhaustive, the literature on NFTs is in the early stages of development (Umar *et al.*, 2022). Today, NFTs are one of the most exciting, fastest-growing areas of the cryptocurrency world and have become especially popular among retail investors (Grauer *et al.*, 2022).

Investing in times of uncertainty and global unrest, which undoubtedly describes the world of the COVID-19 pandemic, Russia's military aggression against Ukraine and two-digit inflation is very difficult and involves high risk. In view of this, many analysts point to the potential of blockchain markets, in particular of NFTs and DeFi tokens (connected with decentralised finance), which are evolving rapidly (Maouchi *et al.*, 2021). Since the introduction of revolutionary technology in 2008, the phenomenal growth of blockchain markets has led the future digital markets. Analysts also point to NFTs as a remarkable public success of blockchain technology (Dowling, 2022a) with its unique mechanism of transferring rights via digital resources. The dynamic growth of NFTs left investors with a dilemma: is this a boom on new assets or maybe a speculative bubble (Maouchi *et al.*, 2021)?

The literature review provides evidence that there is a demand for diverse studies concerning NFTs, including empirical research on their continuous evolution (Pinto-Gutiérrez *et al.*, 2022). Taking into account the issues addressed, along with the research instruments used, the presented results should be regarded as pioneering on a global scale. Of course, the area selected for the analysis is but a small part of the complex topic that is NFT.

Non-fungible Tokens as a New Asset on the Financial Market and Research Hypotheses

In the past, people invested in real estate, foreign currencies, stocks, bonds, bank deposits, and gold, among other things. Today, many people are investing in digital products including cryptocurrencies and NFTs. While digital currencies are a fairly well-recognised product, the term NFT has only recently become popular. The trend of looking for new opportunities to invest funds and earn money based on the scenario inherent in the traditional stock market is not revelatory. The new investment area connected with the potential benefits of NFT creators and users can be modelled in conjunction with the cryptocurrency market, which in practice is a source of funding for digital images. Over the past five years, the global financial industry has witnessed a revolution in digital assets in terms of market trends and the use of visual features (Nadini *et al.*, 2021).

The role of cryptocurrencies in the global financial system is growing every year. Data from December 2021 shows that the market capitalisation of cryptocurrencies exceeded USD 2.25 trillion. For years, the most popular cryptocurrency has invariably been Bitcoin. However, its dominance has been steadily declining largely in favour of Ethereum-based tokens such as NFTs and decentralised finance assets (DeFi) (Yousaf & Yarovaya, 2021; Chowdhury *et al.*, 2022).

Enthusiasm in the NFT market led to huge growth in the industry in 2021. The very high growth of NFT collections (Grauer *et al.*, 2022) increased the recognition of the crypto-art market. Analysts associate 2021 with a bull market (Arslanian, 2022; Maouchi *et al.*, 2021). This situation was caused by a very large increase in the prices of major cryptocurrencies between 2020 and 2021 (Pinto-Gutiérrez *et al.*, 2022; Przyłuska-Schmitt *et al.*, 2022) and an extreme increase in NFT trading volumes (Ante, 2021b).

However, while cryptocurrencies significantly affect the pricing of NFT transactions, the opposite relationship does not hold (Dowling, 2022a). At the same time, NFT pricing is inefficient due to market immaturity (Dowling, 2022b; Ante, 2021a). The turnover of the NFT market reached USD 17.7 billion and in Q1 2022 the value of NFT turnover was close to USD 7.9 billion (NonFungible, 2022). The global market capitalisation of NFTs in 2021 was USD 7 billion. Sales of digital tokens oscillate around USD 2 billion per month. In 2021, users sent cryptocurrencies worth more than USD 44.2 billion to ERC-721 and ERC-1155 contracts, two types of Ethereum smart contracts linked to NFT markets and collections (Grauer *et al.*, 2022). However, unregulated NFT transactions and the investment euphoria surrounding them can lead to high demand volatility (Agrawal & Sandhu, 2022). The vast majority of NFT transactions take place at the retail level, meaning cryptocurrency worth less than USD 10 000. The NFT market is much more retail-oriented than the traditional market. At the same time, it should be noted that the number of intergovernmental transactions has increased in the recent period (Grauer *et al.*, 2022).

The development of NFTs is a global project. Interest in this new product is determined by the level of socio-economic development of a given region, including the prevalence of cashless payment systems. In this context, the diverse level of technological development in different areas of the world creates an area for new entrepreneurial activity that brings together investors, creators, and business intermediaries. However, each party has different intentions and expectations when it comes to participating in the creation, investment, and service of NFTs. The anonymity of activity in the global network makes it difficult to accurately determine in which regions of the world NFT is developing in these three areas. However, there is a possibility of identifying the level of interest in NFT in a spatial system based on Internet users' queries.

The research process consisted in the verification of three hypotheses:

H1: Most of the NFT-related activity takes place in regions that are technologically advanced and where cryptocurrencies and blockchain are very popular.

H2: Changes in the interest in NFTs happen on a global scale.

H3: Interest in NFTs stays at a relatively constant level with a tendency to decrease slightly over time.

Noteworthy, with technological advances including the emergence of new financial products, such as NFTs, there arise new potential criminal acts that pose a real operational threat (Leonard & Ariawan, 2021). Digital space and digital assets can facilitate criminal behaviour in the current regulatory environment. The conversion from physical to virtual space obscures criminal activity, so facilitating the anonymity of perpetrators and creating new challenges for the legal and regulatory environment (Dupuis *et al.*, 2021). Therefore, regardless of the potential valuable artistic and financial opportunities for creative entrepreneurs, NFTs should be approached with caution (Chalmers *et al.,* 2022). This concerns not only criminal activities, but also security gaps, lack of regulatory solutions, and the global nature of NFTs.

As NFTs began to rapidly gain popularity in 2020-2021, it is currently impossible to predict what the future will look like. The exceptionally positive results of NFT transactions seem to indicate the beginning of a new crypto bubble. Therefore, researchers and policymakers should continue to analyse the behaviour of this market segment (Agrawal & Sandhu, 2022). Projection is very difficult in this case due to limited information resources, notwithstanding the fact that since the global financial crisis, advances in blockchain technology and the associated broad spectrum of digital assets have been gaining momentum in global financial markets (Umar *et al.*, 2022).

RESEARCH METHODOLOGY

The use of artificial intelligence to create NFTs is part of the solutions of the future, the practical application of which is becoming increasingly common. Artificial intelligence is also big data, which is where Google Trends fits in. It is a free online tool developed by Google LLC in 2008 that allows users from anywhere in the world to analyse big data. This application is constantly evolving, and the scope of its use is expanding very rapidly as it is used in business and scientific analyses (Jun *et al.*, 2018). The useful-

ness of this tool has been confirmed by numerous studies, including those with a socio-financial dimension (Jegorow, 2018). The use of data from Google Trends is becoming increasingly common, including its application in the case of cryptocurrencies and NFTs (Maouchi *et al.*, 2021). Furthermore, the choice of the research tool was dictated by the fact that most of the Bitcoin price analyses, in mid-2010, have reported a significant relationship between the Bitcoin price and the factors (*e.g.* search volume and media exposure) extracted from the social network service-based statistics (Lee & Rhee, 2022).

Google Trends interprets the information and normalises the data to be between 0 and 100. The numbers represent the search interest relative to the highest point based on the location and time of the query. A value of 100 represents the highest popularity of a keyword. Analysing large datasets using Google Trends provides information that goes beyond public as well as commercial datasets. The application enables the geographical mapping of searches for specific information (Wang *et al.*, 2022).

Two main datasets covering weekly quotes from 1 January 2021 to 31 May 2022 were extracted from Google Trends. However, the adopted starting point was shifted to February 2021 in part of the analyses, because the number of searches for the keyword NFT before this period was so small compared to the other results recorded in the adopted time frame that it did not exceed a value of 1 in the vast majority of regions. The first dataset shows the global interest in NFTs by region (static frame) and the second includes all regions with the search index for the keyword NFT of at least 25 (dynamic frame).

The classification of regions was based on cluster analysis. The comparison of individual time series values was based on a correlation analysis in which the Pearson correlation coefficient was used. The research problem related to the projection of interest in NFTs was included in a regression analysis of the truncated time series of global search indices for the keyword NFT. The time series covering the period from mid-January 2022 to the end of May 2022 included the change in the trend from upward to downward. The estimation of the curve was based on eight analytical models to determine the theoretical value of the dependent variable NFT_t, in which t is the independent time variable (week):

$$NFT_t = \alpha_0 + \alpha_1 t \tag{1}$$

$$NFT_t = \alpha_0 + \alpha_1 \ln t \tag{2}$$

$$NFT_t = \alpha_0 + \frac{\alpha_1}{t} \tag{3}$$

$$NFT_t = \alpha_0 + \alpha_1 t + \alpha_2 t^2 \tag{4}$$

$$NFT_t = \alpha_0 + \alpha_1 t + \alpha_2 t^2 + \alpha_3 t^3 \tag{5}$$

$$NFT_t = \alpha_0 t^{\alpha_1} \tag{6}$$

$$NFT_t = \exp\left(\alpha_0 + \frac{\alpha_1}{t}\right) \tag{7}$$

$$NFT_t = \alpha_0 \exp(\alpha_1 t) \tag{8}$$

where:

(1) – Linear; (2) – Logarithmic; (3) – Inverse; (4) – Quadratic; (5) – Cubic;
(6) – Power; (7) – Power; (8) – Exponential.

RESULTS AND DISCUSSION

The global distribution of searches for the keyword NFT showed a clear dominance of Asia and North America. The highest search rates for the keyword NFT between January 2021 and May 2022 were recorded in: Hong Kong (100), China (97), Singapore (94), and Taiwan (59). These regions form a distinct cluster. Another cluster was formed by 10 countries, of which the three highest ranked are in Asia: the Philippines (52), South Korea (50), United Arab Emirates (50), Canada (50), Nigeria (49), Australia (48), New Zealand (48), Lebanon (47), Venezuela (45), and the United States (44). This means that the greatest interest in NFTs, which is not the same as a homogeneous geographical distribution, was in Asia. The above-mentioned countries were followed by Australia, New Zealand, North America, Europe, and South America (Figure 1).

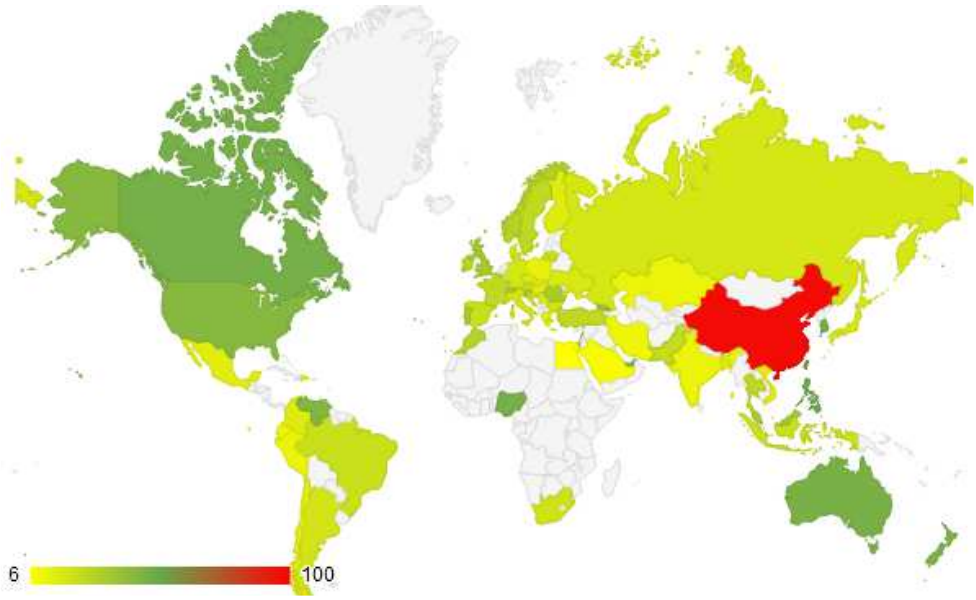

Figure 1. NFT keyword search index according to Google Trends data (January 2021 – May 2022)
Source: own elaboration.

The distribution of the index values for the keyword NFT by region shows a clear right-skewed asymmetry (most regions of the globe are below average) and a clear clustering of results around the mean ($\bar{X} = 29;\ Q_2 = 24;\ SKE = 1.95;\ K = 4.56$). At the same time, it is important to note the large dispersion ($CV = 66.62\%$) caused by the high gap between the two clusters of the highest-ranked regions of the globe. Among the regions with the highest search rates for the 'NFT' keyword, technologically advanced countries dominate. This result allows for positive verification of H1. Nigeria and Venezuela did not meet this criterion. Taking into account the state of their economies, social development and cultural heritage, the interest in NFTs in both of these countries should be linked to other determinants. In Nigeria, these are investment issues and artistic activity. In turn, in Venezuela, it is mainly due to very high inflation and the search for alternative savings and investment systems.

The convergence of the searches of the keyword NFT between different regions of the globe was confirmed by the results of the correlation analysis (Table 1). The obtained results confirmed H2. In the frame of reference formed based on the two aforementioned clusters of regions with the highest value of the index analysed, the values of Pearson's correlation coefficients indicated the existence of a clear and very clear relationship in most of the pairs compared. The only country that did not follow this pattern was Venezuela, where the correlation was not confirmed when juxtaposed with Taiwan and Nigeria. In the remaining pairs, the relationship was average.

In the vast majority of regions, the culmination of the interest in NFT was in January 2022. The highest values for the NFT search index were first recorded in August/September 2021 in Turkey and Venezuela, and in Thailand in late November 2021 (Figure 2). Following the global culmination of the interest in NFT in January 2022, the next highest values of the index analysed were recorded successively in Turkey, South Korea, and Nigeria in early April 2022.

The highest value of the NFT keyword search index at the end of May 2022 was recorded in China and amounted to 50 points. This was followed by Georgia with a score of 45 points and South Korea – 38 points. Thus, the dominance of Asia was clear at the time.

Regression analysis indicated a high level of fit for all models (independent variable: time) (Table 2, 3). The cubic model (cubic polynomial) showed the highest goodness-of-fit to empirical data. The large declines in NFT keyword searches recorded in January and February 2022 entered a phase of stabilisation in the following two months only to go back to a downward trend in May 2022, although not as strong as it was at the beginning of the year.

Table 1. Event study estimates for monetary policy responses to the Covid-19 crisis – Czechia

Pearson Correlation	World	Hong Kong	China	Singapore	Taiwan	Philippines	South Korea	United Arab Emirates	Canada	Nigeria	Australia	New Zealand	Lebanon	Venezuela	USA
Hong Kong	0.941**														
China	0.824**	0.872**													
Singapore	0.977**	0.932**	0.809**												
Taiwan	0.871**	0.919**	0.772**	0.854**											
Philippines	0.767**	0.735**	0.736**	0.792**	0.658**										
South Korea	0.786**	0.769**	0.833**	0.759**	0.759**	0.615**									
U.A. Emirates	0.978**	0.945**	0.858**	0.957**	0.869**	0.792**	0.787**								
Canada	0.966**	0.851**	0.680**	0.940**	0.793**	0.706**	0.698**	0.911**							
Nigeria	0.595**	0.669**	0.751**	0.557**	0.598**	0.498**	0.608**	0.658**	0.459**						
Australia	0.980**	0.894**	0.775**	0.975**	0.818**	0.770**	0.739**	0.947**	0.971**	0.533**					
New Zealand	0.957**	0.875**	0.752**	0.966**	0.760**	0.764**	0.694**	0.927**	0.943**	0.493**	0.969**				
Lebanon	0.948**	0.948**	0.833**	0.935**	0.884**	0.714**	0.738**	0.961**	0.870**	0.641**	0.904**	0.891**			
Venezuela	0.404**	0.326**	0.383**	0.494**	00.217	0.571**	0.282*	0.391**	0.417**	0.097	0.494**	0.502**	0.295*		
United States	0.947**	0.806**	0.653**	0.907**	0.754**	0.685**	0.708**	0.888**	0.989**	0.435**	0.952**	0.921**	0.831**	0.402**	
Georgia	0.770**	0.853**	0.877**	0.725**	0.803**	0.567**	0.773**	0.823**	0.611**	0.742**	0.681**	0.657**	0.839**	0.066	0.576**
Israel	0.915**	0.858**	0.835**	0.877**	0.799**	0.694**	0.878**	0.908**	0.848**	0.583**	0.870**	0.846**	0.878**	0.341**	0.856**
Switzerland	0.987**	0.939**	0.816**	0.959**	0.885**	0.755**	0.787**	0.960**	0.955**	0.572**	0.968**	0.928**	0.928**	0.406**	0.938**
Netherlands	0.978**	0.936**	0.768**	0.960**	0.889**	0.718**	0.742**	0.950**	0.960**	0.538**	0.957**	0.923**	0.942**	0.382**	0.930**
Great Britain	0.986**	0.908**	0.765**	0.962**	0.823**	0.744**	0.732**	0.953**	0.982**	0.547**	0.982**	0.956**	0.917**	0.421**	0.965**
Malaysia	0.954**	0.942**	0.836**	0.964**	0.893**	0.779**	0.789**	0.949**	0.885**	0.603**	0.931**	0.915**	0.939**	0.383**	0.847**
Romania	0.967**	0.916**	0.822**	0.932**	0.829**	0.700**	0.780**	0.959**	0.914**	0.591**	0.931**	0.921**	0.953**	0.290*	0.901**
Portugal	0.978**	0.916**	0.790**	0.954**	0.827**	0.733**	0.754**	0.961**	0.938**	0.553**	0.953**	0.951**	0.945**	0.399**	0.924**
Slovenia	0.933**	0.870**	0.725**	0.904**	0.775**	0.723**	0.676**	0.916**	0.927**	0.506**	0.921**	0.894**	0.880**	0.432**	0.911**
Norway	0.979**	0.924**	0.792**	0.957**	0.852**	0.739**	0.757**	0.961**	0.951**	0.583**	0.962**	0.947**	0.939**	0.380**	0.930**
Morocco	0.946**	0.909**	0.791**	0.922**	0.858**	0.743**	0.766**	0.949**	0.887**	0.565**	0.910**	0.897**	0.932**	0.310**	0.874**
Belgium	0.989**	0.946**	0.815**	0.964**	0.874**	0.742**	0.783**	0.964**	0.953**	0.599**	0.963**	0.934**	0.952**	0.365**	0.933**
Ireland	0.957**	0.873**	0.697**	0.925**	0.806**	0.681**	0.663**	0.920**	0.965**	0.503**	0.949**	0.927**	0.900**	0.342**	0.950**
Thailand	0.867**	0.807**	0.860**	0.873**	0.757**	0.852**	0.799**	0.868**	0.793**	0.592**	0.860**	0.834**	0.813**	0.545**	0.792**
Sweden	0.982**	0.923**	0.764**	0.952**	0.858**	0.735**	0.751**	0.949**	0.969**	0.557**	0.962**	0.938**	0.921**	0.374**	0.953**
Turkey	0.736**	0.718**	0.796**	0.720**	0.615**	0.615**	0.727**	0.754**	0.671**	0.673**	0.728**	0.692**	0.671**	0.504**	0.659**
France	0.967**	0.928**	0.841**	0.937**	0.836**	0.730**	0.797**	0.972**	0.896**	0.628**	0.930**	0.922**	0.950**	0.353**	0.882**
Austria	0.951**	0.906**	0.799**	0.913**	0.819**	0.690**	0.761**	0.945**	0.900**	0.591**	0.920**	0.895**	0.941**	0.300*	0.882**

Notes: ** Correlation is significant at the 0.01 level (two-tailed). * Correlation is significant at the 0.05 level (two-tailed).
Source: own elaboration in SPSS.

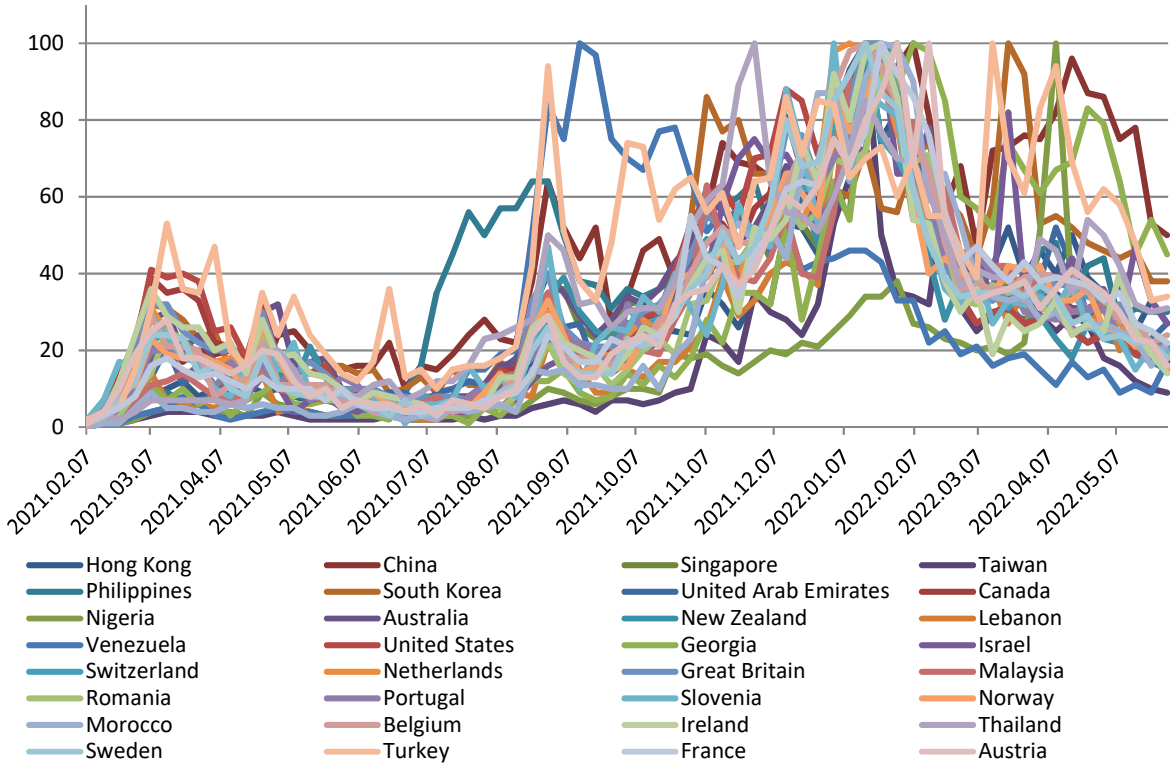

Figure 2. The search index of the 'NFT' keyword according to Google Trends data (February 2021 – May 2022)

Note: Data from January 2021 were excluded from the analysis, because the 'NFT' keyword search index was less than 1 in most regions. The list includes regions with a total search index of 25+.

Source: own elaboration.

Table 2. Regression results: Model summary

Equation	Model fit		Analysis of variance			
	R Square	Std. Error	F	df1	df2	Sig.*
Linear	0.746	12.133	52.750	1	18	<0.001
Logarithmic	0.925	6.599	221.159	1	18	<0.001
Inverse	0.766	11.626	59.016	1	18	<0.001
Quadratic	0.906	7.596	81.751	2	17	<0.001
Cubic	0.972	4.285	183.732	3	16	<0.001
Power	0.912	0.133	185.985	1	18	<0.001
S	0.659	0.261	34.740	1	18	<0.001
Exponential	0.850	0.173	101.980	1	18	<0.001

Note: * Acceptable level: Sig. <0.05.

Source: own elaboration in SPSS.

The strong downward trend in the value of the NFT keyword search index with respect to the maximum value recorded in early 2022 is reflected in the theoretical model based on a linear function. However, this model has the lowest fit to empirical values, while having the largest estimation error. The inverse model has a similar low level of fit between the theoretical model and the actual data. In this case, however, the prediction should be based on the assumption of an invariant value of the NFT keyword search index, both in the short and long term.

The projection of a downward trend in the value of the NFT keyword search index was not confirmed only by the quadratic model. Other estimates indicated a downward trend of decreasing magnitude over time. This means that the interest in NFT reached a relatively sustainable level with a slight downward trend (Figure 3). The above results (graphic illustration and regression analysis) confirmed H2.

Table 3. Regression results: Parameter estimates

Equation	$\propto_0$	$\propto_1$	t	Sig.*	$\propto_2$	t	Sig.*	$\propto_3$	t	Sig.*
Linear	82.632	-3.417	-7.263	<0.001						
Logarithmic	105.393	-27.704	-14.871	<0.001						
Inverse	30.253	91.709	7.682	<0.001						
Quadratic	106.373	-9.892	7.981	<0.001	0.308	5.378	<0.001			
Cubic	127.338	-20.590	-10.932	<0.001	1.551	7.540	<0.001	-0.039	-6.117	<0.001
Power	124.968	-0.511	-13.638	<0.001						
S	3.463	1.579	5.894	<0.001						
Exponential	86.331	-0.068	-10.099	<0.001						

Note: * Acceptable level: Sig. <0.05.
Source: own elaboration in SPSS.

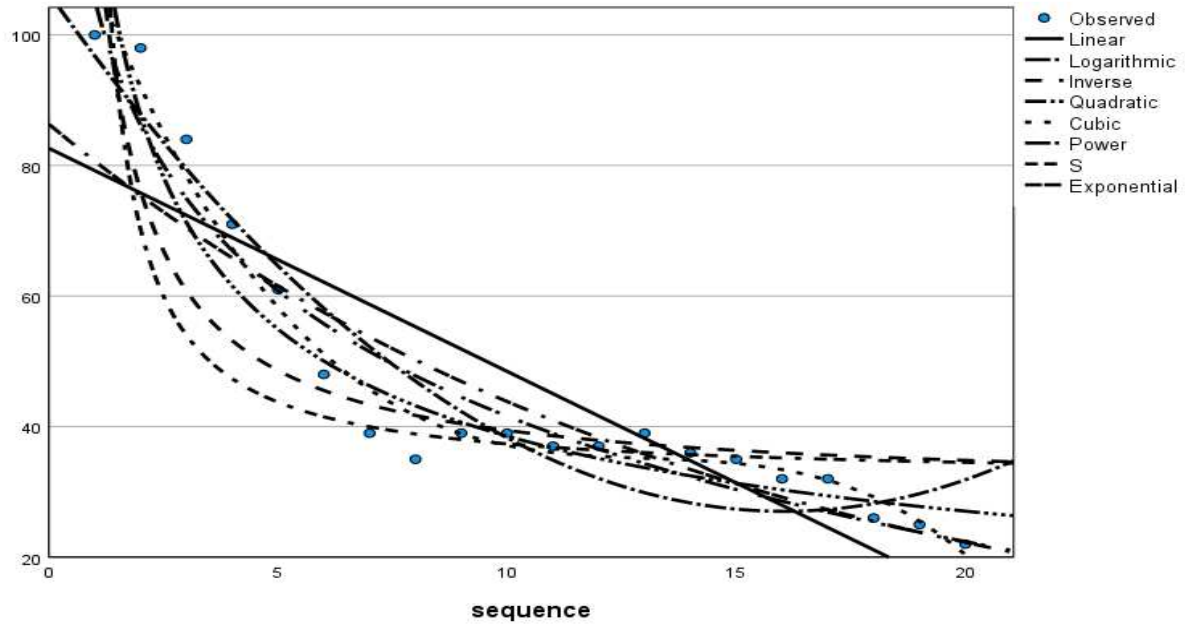

Figure 3. Global interest in NFT: Curve estimation (January – May 2022)
Source: own elaboration.

In general, NFT sales rose sharply in 2021, although there were signs of a slowdown by the end of the year. In contrast, the pronounced interest in NFT observed in late 2021/2022 began to fade rather quickly. The increased interest in NFT was due to its real presence among financial assets and potential earning opportunities mainly from the perspective of creators, investors, and intermediaries. This raises the questions of whether NFTs can regain the widespread public interest they reached in 2021, whether there will be increased transaction activity in the future, and whether the price of popular NFT collections will increase (Grauer *et al.*, 2022).

The May 2022 declines in digital currency quotes, currently described as historic, will certainly have an impact on the developing NFT market. Regardless of attempts to mitigate the reaction of disappointed investors by pointing to the high risk associated with the young cryptocurrency market, the financial losses are real. At the same time, an investment in digital currencies allowed many investors to multiply their funds invested many times over. The COVID-19 pandemic crisis proved to be a short-lived trigger for the collapse of rapidly rising unit prices. As a result, despite pronounced price fluctuations, it is cryptocurrencies that have proven to be a far more efficient capital investment than gold in 2019-2021 (Przyłuska-Schmitt *et al.*, 2022). In contrast, the attractiveness of NFT transactions during the COVID-19-induced market collapse can be attributed to a short-term effect due to asymmetric information, market frictions, differences in investors' risk appetite/aversion to certain asset classes,

etc. (Umar *et al.*, 2022). Noteworthy, NFT transactions can bring diversification benefits in turbulent times, as seen during the COVID-19 crisis and especially around the big market drop in March 2020 (Aharon & Demir, 2021). In the context of these potential benefits of this new digital asset, it is extremely important to conduct multifaceted theoretical and empirical research so that the opportunity does not turn into a loss of life savings and, in extreme cases, loss of possessions combined with debt. The economics of imaginary entities cannot replace the economics of real values and assets.

CONCLUSIONS

Artificial intelligence is a potential area for entrepreneurial development in the creation of completely novel innovative application solutions, including financial instruments and research tools. The originality and novelty of these solutions made the testing phase transfer to business and research practice. This phenomenon falls under the NFT market, both from the perspective of creators, intermediaries or investors and researchers with limited access to primary information. An analogous approach should be taken with regard to data obtained from Google Trends.

The financial market is opening up to an increasing number of services carried out with cryptocurrencies, while more and more attention is being paid to investments in more categories of electronic assets, such as NFTs. Cryptocurrency exchanges, neo-brokers, crypto developers, and NFT trading platforms have experienced a spectacular boom over the past two years. At the same time, the huge drops in cryptocurrency prices in 2022 associated with the bear market should be highlighted. Such drops, although not as significant, were also observed in the NFT market. In both cases, there was no shortage of products that showed an upward trend regardless of the clear drop in the overall market.

The obtained results indicate that the biggest interest in NFTs is found in 'the heart of today's fastest-growing economy in the world' consisting of Hong Kong, China and Singapore. The credibility of the obtained results is high while being limited by research constraints. The main ones are the lack of official databases, data dispersion, and the possibility of data manipulation in computer systems.

The dynamic growth of collections and transactions in the NFT market in 2021 certainly translated into a culmination of interest in NFT in January 2022. However, this interest was short-lived and significantly dropped within several months. Regardless of the region of the world, the trends of changes in this field coincide, as confirmed by correlation analysis. Analysts agree that the NFT market will continue to grow but the dynamic growth observed in 2021 will no longer occur. The waning interest in the NFT market may result in a smaller influx of developers and investors in the future, which does not imply a potential reduction in the market but rather its saturation.

The NFT technology has rapidly conquered the art market and is finding more and more business applications, for example among luxury goods brands. The results of the completed study have practical implications for developers, investors, institutions, and governments interested in understanding the growing NFT industry as part of the new global digital economy, the booming market for digital assets and, in particular, the discussed vision of widespread introduction of digital currencies and abandonment of cash. From the theoretical perspective, the article complements the NFT analyses along with the research instruments used.

Research on this new asset is extremely important due to the limited access to official databases and its high potential combined with very high investment uncertainty. Future research, in addition to quantitative studies that assess the NFT market in terms of the participation of stakeholders and finances, should focus on a qualitative context, including but not limited to the impact of buying and selling decisions of NFTs (market psychology), the impact of NFT valuation in various markets, technological and legal security of NFTs, the role of financial institutions (exchanges) in the NFT market, and the impact of NFTs on culture and art.

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