

DOI: <https://doi.org/10.17323/j.jcfr.2073-0438.16.2.2022.107-119>

JEL classification: G23, O30, Z23



New Financial Tools in Sport: NFTs and Fan Tokens

Ilia Solntsev

Doctor of Economics, Professor,
Head of Management and Marketing in Sports Department
Financial University under the Government of Russian Federation, Moscow, Russia,
Ilia.solntsev@gmail.com, [ORCID](#)

Anastasia Alekseeva

Assistant of Management and Marketing in Sports Department, Financial University under the Government of the Russian Federation, Moscow, Russia,
alekseeva.anastasiia110911@yandex.ru, [ORCID](#)

Yaroslav Susov

Author of sports.ru portal, Moscow, Russia,
yarosuso@gmail.com, [ORCID](#)

Abstract

In this article the authors consider the opportunities provided by digital assets and associated risks, their specifics for sports organizations, fan token allocation scheme, and finally provide relevant recommendations for Russian football clubs that were selected as the object of study due to the availability of the required data and the growing market. Research methodology involved the analysis of annual reports filed by football clubs and academic papers, as well as interviews with representatives of clubs and digital platforms. The authors analyzed the trading results of 47 foreign clubs, identified and quantified the factors that affect their returns. Based on foreign experience, authors provide suggestions for Russian sport clubs that are aimed at cooperation with digital platforms and issue of NFT tokens and NFT collections. Potential income from these instruments was estimated. It comprises two components: initial placement (ICO) and secondary market income. Suggestions and calculations provided by the authors could be applied in the development and implementation of digital assets by professional clubs from other sports and other sports industry subjects, i.e., equipment manufacturers, fitness clubs, sport facilities, etc. The authors specify a number of additional factors that can potentially affect fan profitability as items in need of further research.

Keywords: sports economics, sports finance, football economics, finance in football, digital assets in sports

For citation: Solntsev, I., Alekseeva, A., Susov, Y. New Financial Tools in Sport: NFTs and Fan Tokens. *Journal of Corporate Finance Research*. 2022;16(2): 107-119. <https://doi.org/10.17323/j.jcfr.2073-0438.16.2.2022.107-119>

The journal is an open access journal which means that everybody can read, download, copy, distribute, print, search, or link to the full texts of these articles in accordance with CC Licence type: Attribution 4.0 International (CC BY 4.0 <http://creativecommons.org/licenses/by/4.0/>).

Introduction

The coronavirus pandemic and the subsequent financial crisis exacerbated the need for additional revenues in all sectors of the economy, which became especially tangible in the entertainment industry. For example, sustainable financing has always been one of the major problems for museums and galleries [1]. However, recent technological advances revealed new sources of revenue that include digital assets, such as NFT and fan tokens (collections), which play an increasingly important role. Non-fungible tokens (NFT) may be described as a new environment that allows to possess any digital assets and trade in them [2]. Some authors define NFT [3] as a unique, indivisible and irreplaceable cryptographic token, which is a digital or physical asset linked to the blockchain.

In its turn, the blockchain is “a distributed immutable ledger maintained and verified in the network of peer nodes” [4] or, in simpler terms, a common database available for everyone. Blockchain stores information on all previous transactions within the system. An attempt to take out a snippet of information destroys it, thus making the blockchain secure for data storage. Cryptocurrencies like bitcoin or ether are records in the blockchain. NFT functions in a similar way and, just like any cryptocurrency, it may be stored in a crypto wallet, used to conduct transactions, purchased and sold [5].

NFT tokens are created by smart contracts that transfer assets automatically according to specified rules (or programs) in order to perform operations between users [6]. Tokens are a certificate that confirms the unique nature of the code, and they are assigned to a certain user (purchaser, token holder). They cannot be exchanged or replaced with other tokens, however, one may exchange or sell them to another person within the platform.

The NFT concept was presented for the first time in 2012 by Bitcoin's Colored Coins [7], tokens that represent any type of physical assets, for example, immovables, motor vehicles and bonds.

In spite of a growing interest in digital assets, only a small number of studies is dedicated to NFT. P. Kireyev and R. Lin (2021) developed a CryptoKitties valuation structural model [8]. D.-R. Kong and T.-C. Lin (2021) dedicated their paper to the CryptoPunks popular NFT collection [9]. M. Nadini et al. (2021) [10] collected data on all NFT transactions in OpenSea up to March 2021. N. Borri et al. collected data that covers almost the whole universe of NFT transactions and provides a comprehensive view of this market [11; 12]. A series of papers describes the evaluation of digital assets (Demir et al., 2022; Dowling, 2022a; Dowling, 2022b) [13–15]. A separate line of research is cryptocurrency. For example, A. Simanovsky (2018) considers the economic nature of cryptocurrency, analyzes the risks related to its use in the economic turnover and consequences of various ways of its possible legalization [16]. M. Scharnowski et al. studied fan tokens in their paper (2021) [17]. It should be noted that there are also very few papers dedicated to the football economy in general (2018, 2019) [18; 19]. In particular, these include studies by

I.V. Solntsev (2018, 2019) [18; 19] that consider financing models and approaches to the assessment of football club value.

Digital platform users may sell, exchange or collect tokens in their modern form. In the current format, NFTs were created in 2017 and gained popularity because of the CryptoKitties game (a game based on collecting similar to the digital version of Pokemon that entails breeding of virtual cats which may be exchanged or sold). This format quickly became widespread, and in 2021 virtual collections already appeared everywhere. For example, in December 2021 the Wikipedia online encyclopedia sold its first website version for \$750 000 [20] as an NFT, while the Hermitage Museum sold NFT tokens of paintings for RUB 32 million [21].

Sports organizations, deprived of a significant part of their income due to the pandemic, also develop digital business rapidly by issuing fan tokens and NFT collections – not just to attract additional funds, but also to drive up fan loyalty by affording them an opportunity to influence management decisions and feel involved with the club. The first sports organization to release tokens was Juventus, when the club tried to monetize fan support in exchange for influence on management decisions in 2019.

Fan and NFT Tokens of Sports Organizations

The coronavirus pandemic significantly changed the revenue structure in the sports business. So, according to UEFA [22], revenues of European football clubs in 2020 reduced by 10.4%, from €23.0 to 20.6 billion. In percentage terms, revenue reduction rates were as follows:

- fare revenue – 23%;
- revenue from sale of rights – 14%;
- sponsorship and trading income – 8%;
- merchandizing – 1%.

At the same time, revenues from contracts with a naming sponsor, on the contrary, grew by 6% due to the agreements concluded before the pandemic.

Falling revenue made the clubs look for new sources of revenue, and they solved this problem by using digital assets. At the initial stage clubs managed to gain revenue by means of signing sponsorship contracts with blockchain platforms. These transactions are most common in the USA, Turkey and Italy. The reason for the popularity of cryptocurrency and blockchain platforms in Serie A is largely due to the ban on betting firms' advertising, which resulted in a significant drop in trading income [23].

Blockchain platforms (“cryptocurrency exchanges”) are services that use smart contract technology in cryptocurrency in order to conduct transactions and that are created for purchase of digital assets (NFT, fan tokens) or cryptocurrencies. As a rule, platforms specialize in certain assets: cryptocurrencies (NFT (OpenSea), fan tokens (Socios)). Nevertheless, there are exceptions. For example, Binance, the largest cryptocurrency exchange, sells cryptocurrencies, NFT and fan tokens. The list of digital transactions of European football clubs is presented in Table 1.

Table 1. List of sports organizations that concluded sponsorship contracts with blockchain platforms or cryptocurrencies

Platform	Sports Organization
Plus500	Legia FC, Young Boys, Atletico, Atlanta, Brumbies Rugby Club
Bitget	Juventus FC, Galatasaray
Bitmex	Milan FC
DigitaBits	Roma FC, Inter FC, esports Team Dignitas
Crypto.com	World Football Championship, UFC, Serie A, the Italian Cup, Formula 1, Ice Hockey World Championship, esports organization Fnatic, Formula 1 team Aston Martin, HC Montreal Canadiens, basketball team Philadelphia 76ers, Paris Saint-Germain Football Club
Bybit	Esports organizations NaVi, Astralis, Virtus.Pro, Formula 1 team Red Bull
FTX	Major League Baseball, Formula 1 team Mercedes, esports organization TSM, Miami Heat basketball team, Washington Wizards, Washington Capitals hockey club, International Cricket Council (ICC)
Ankr	Sacramento basketball team
Learncrypto	Southampton FC
XBTO	Inter Miami FC
Coinjar	Brentford FC, Melbourne Demons (Australian football)
Dogecoin	Watford FC
Binance	Lazio FC, Porto FC, KHL, Formula 1 team Alpin
Socios.com	La Liga, about 19 NBA clubs, Legia FC, Manchester City, PSG, Arsenal, Aston Villa, Galatasaray, Roma, Atletico, Juventus, Barcelona, Apollon, Trabzonspor, Independiente, Novara, Young Boys, Istanbul, Sint-Truidense, Milan, Göztepe, Universidad de Chile, Fortuna Sittard, Valencia, Levante, Atletico Mineiro, Corinthians, Inter, Everton, Dinamo Zagreb, Alanyaspor, Samsunspor, Sao Paulo, Formula 1 teams Alfa Romeo and Aston Martin
NAGA	Sevilia FC
Floki Inu	Napoli FC, Cadiz, Kerala Blasters FC (India), Spartak
eToro	Bologna FC, Sassuolo, Udinese, Cagliari, Genoa, Sampdoria, Spezia, Hellas Verona, Salernitana and Arsenal
Tezos	Manchester United FC, Formula 1 teams Red Bull, McLaren, esports team Vitality and Misfits
Velas	Formula 1 team Ferrary

Source: Compiled by the authors.

However, sponsorship contracts are an indirect way for a sports organization to profit off digital assets. Leagues and clubs realized rather quickly that they can earn directly by issuing NFT tokens and collections. In Russia, such cases are still scarce. In the beginning of 2022, the Sochi hockey club issued NFT tokens at the Opensea marketplace. Two events were “digitized”: the first press conference of Andrey Nazarov as the head coach of Sochi and a fight between David Rundblad and Gleb Zyryanov.

Fan tokens provide three opportunities for their holders [24].

Participation in decision making. For example, token holders may use an application to choose the music played after a goal is scored, colour of the team bus, and the range of merchandise (Table 2). As a rule, fans’ decisions are made through polls on the blockchain platforms.

Remuneration. For example, an opportunity to win free tickets or T-shirts, to attend team practice.

Earnings. Some marketplaces (for example, Socios) offer an opportunity to trade tokens, turning them into a financial instrument.

Table 2. Examples of decisions made by fan token holders

Club	Decision influenced by fan tokens holders
Juventus FC	Fans chose the music played after a goal at the home stadium and the colour of the team bus
Milan FC	Fans voted for the team's official locker room slogan
Professional Fighters League (PFL)	Fans chose two fighters for one of the league fights
Galatasaray FC	Fans chose the entrance song for the players
Roma FC	Fans chose the player after whom a field was named in the club training center
Atletico FC	Fans chose the player to conduct an Instagram broadcast
Paris Saint-Germain FC	Fans chose a captain's band inscription

Source: Compiled by the authors based on [25; 26].

Fan tokens are issued based on cryptocurrency. Socios is a marketplace developed to integrate fans into sports and to monetize the interaction of sports organizations with fans through blockchain technology. In its turn, Chiliz is a payment and cryptocurrency platform used for blockchain services (including Socios). Chiliz' own token (CHZ) was used as the base currency used to purchase clubs' digital assets [27]. It means that prospective fan token buyers first had to obtain CHZ, and then could exchange them for fan tokens. One could buy or exchange tokens only in the Socios mobile application via a wallet where tokens are stored or at the Chiliz exchange, where tokens may only be exchanged for CHZ. By now tokens may also be purchased at other exchanges using cryptocurrencies other than CHZ. Apart from Socios, other suppliers entered the fan token market, first and foremost, Binance and Turkish suppliers Paribu and Bitci.

Fan tokens are issued as an initial offering similar to the initial cryptocurrency offering (ICO), which consists of the following stages:

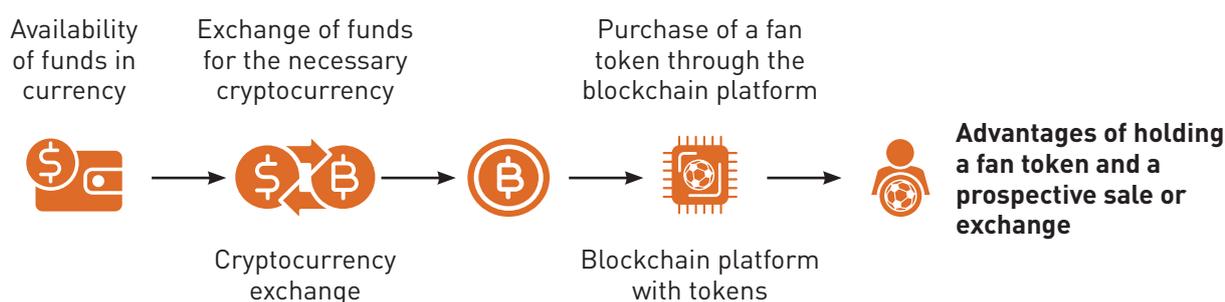
- 1) Signing an agreement between the marketplace (for example, Socios) and the club.
- 2) Approval of the total number of prospective tokens in circulation.
- 3) Approval of the offer price. As a rule, the price of tokens is the same for each club in a certain region,

and is usually set at one or two basic currency units (i.e. 2 euro, 2 US dollars, 2 pounds, 2 Swiss francs). For Turkish clubs the price is usually set at 10 Turkish liras.

- 4) Offering of a part of the total amount of tokens. The day of the offer is fixed and comprises two time intervals with a certain number of tokens offered during each. The first interval lasts 2 hours, the second – until all the offered tokens are sold. In the past it could last several minutes or several days. Nevertheless, Socios asserts that the final number of tokens available in the initial offer may be adjusted depending on demand, and may thus exceed the initially declared number. Each participant may buy a limited number of tokens (usually from 50 to 250 in both rounds), and this number is at least twice as large in the second round.

Each participant of the Socios marketplace may purchase fan tokens during the initial offer or at the secondary market at market prices. As a rule, there are several days between the offer and the first trading day at the Socios marketplace and Chiliz exchange. Trade in fan tokens at other exchanges, such as Binance, usually starts several days after the first trading day at the Chiliz exchange.

The general pattern of purchase, sale or exchange of a fan token is presented in Figure 1.

Figure 1. Pattern of fan token purchase

Source: Compiled by the authors.

The opportunity to trade tokens shapes the corresponding market that already has a pool of companies with the greatest capitalization. Only two companies from the TOP 20 in terms of capitalization are unrelated to football (Table 3). Table 4 consolidates the highest-capitalized organizations in other sports. It should be noted that the digital

capitalization of these companies is extremely volatile, and on some days it may fluctuate by 50%. Additional capitalization data is provided by various marketplaces, thus additionally increasing the uncertainty. So, data from Table 3 may be used solely in real-time, and they should be brought up to date for decision-making purposes.

Table 3. TOP 20 of sports organizations in terms of crypto market capitalization that have issued fan tokens

No.	Sport	Club	Blockchain platform	Number of fan tokens in circulation, million	Overall issue of fan tokens, million	Capitalization (million \$)
1	Football	Lazio	Binance	8.6	40	53.922
2	Football	PSG	Chiliz	3.22	20	50.664
3	Football	Manchester City	Chiliz	3.8	20	38.463
4	Football	Barcelona	Chiliz	3.5	40	33.474
5	Football	Porto	Binance	7.8	40	30.342
6	Football	Juventus	Chiliz	2.7	20	24.709
7	Football	Santos	Binance	4.5	30	22.022
8	Football	Galatasaray	Chiliz	3.901	10	19.661
9	Football	Inter	Chiliz	3	20	19.590
10	Football	Atletico Madrid	Chiliz	2.287	10	18.436
11	Football	Milan	Chiliz	3.244	20	18.362
12	Football	Trabzonspor	Chiliz	3.356	10	16.043
13	Football	Arsenal	Chiliz	4.054	40	14.270
14	Football	Roma	Chiliz	2.135	10	9.053
15	Football	Fenerbahche	Paribu	2.180	28	7.782
16	esports	OG	Chiliz	1.384	5	6.064
17	Mixed martial arts	UFC	Chiliz	2	20	5.340
18	Football	Flamengo	Chiliz	3.199	30	4.511
19	Football	Leeds United	Chiliz	0.983	10	4.218
20	Football	Göztepe	Chiliz	1.100	7	2.563

Source: Compiled by the authors based on the FanMarketCup data as at December 11, 2021.

Table 4. TOP 50 sports organizations in terms of crypto market capitalization that have issued their fan tokens (non-football clubs)

No.	Sport	Club	Block-chain platform	Number of fan tokens in circulation, million	Overall issue of fan tokens, million	Capitalization (million \$)
1	Football	Argentine Football Association	Chiliz	1.325	20	2.001
2	Motorsports	Alfa Romeo	Chiliz	1.405	10	1.785
3	Motorsports	Aston Martin	Chiliz	1.405	10	1.476
4	Football	National team of Portugal	Chiliz	1.753	20	1.318
5	Esports	Navi	Chiliz	1.007	5	1.208
6	Tennis	Davis Cup	Chiliz	0.385	10	0.823
7	Esports	Team Alliance	Chiliz	1.008	5	0.725
8	Combat sport	PFL	Chiliz	1.044	5	0.723
9	Esports	Team Heretics	Chiliz	0.432	5	0.462
10	Esports	Team Vitality	Chiliz	0.560	7	0.402
11	Motorsports	Roush Fenway Racing	Chiliz	0.525	5	0.372

Source: Compiled by the authors based on FanMarketCup data as at December 11, 2021.

NFT tokens in sports may also include digital autographs, pictures, digital objects (for example, digital skates or a minifigure of a sportsman), video segments.

One of the examples is the Top Shot platform launched by the National Basketball Association (NBA) in July 2019. The fans may trade on the platform in moment tokens from NBA basketball matches in the form of NFT. The price of one token varies from several US dollars to \$ 250,000. By March 2021, platform turnover amounted to \$305 million. At the same time, the details of the agreement between Dapper Labs and NBA and the financial model are not disclosed, therefore it is impossible to calculate the financial result for the league. In other cases, leagues and teams earn

royalty and small interest on each transaction in the secondary market.

Another large player in this market is the Sorare fantasy platform. In order to join, one has to assemble a team of five blockchain images. The players' images are sold in the Transfer Market using Ether cryptocurrency and/or a credit/debit card. Each player is ranked depending on the performance of purchased football players, bonus points, victories in global tournaments. Scarcity of assembled images and the real-life results of the selected players influence the winning. Spartak Moscow was the first Russian football club to join Sorare.

Apart from leagues and clubs, sportsmen also issue their own collections (Table 5).

Table 5. Sportsmen who have issued their NFT collections

Type	Sportsman	Sport	Card value
NFT cards in three categories (listed on Binance)	Konstantin Tszyu	Boxing	220 cards, card prices from RUB 10,953 to RUB 1,102,585
Collection cards (listed on OpenSea)	Khabib Nurmagomedov	Mixed martial arts	Card prices from \$2,900 to \$290,000 (starting price)
Crypto art cards (listed on OpenSea)	Floyd Mayweather	Boxing	11,111 cards, card prices start at approximately \$20
Highlights cards (listed on WavesDuck)	Petr Yan	Mixed martial arts	Card prices start at \$1,724

Type	Sportsman	Sport	Card value
Memorable moments collection (listed on Binance)	Oleksandr Usyk	Boxing	Card price start at \$254
A unique card (listed on Lympto)	Alexandra Trusova	Figure skating	Card prices start at \$11,022
A unique card (listed on Lympto)	Antanas Guoga	Poker	Card prices start at \$87,263
Art cards with career highlights (listed on Blockasset)	Alexander Ovechkin	Ice hockey	2,000 cards, available only in the secondary market
A card with sportsman's autograph (listed on DraftKings)	Wayne Gretzky	Ice hockey	Card prices start at \$12 to \$1500
Art cards portraying the sportsman (listed on Ethernity)	Lionel Messi	Football	Card prices start at \$80 to \$1,000,000 [5]

Source: Compiled by the authors based on data from blockchain platforms where sportsmen's tokens are sold.

Digital asset buyers may receive certain bonuses. For example, holders of Oleksandr Usyk assets may receive the sportsman's professional boxing gloves, while Diamond card owners may practice with Usyk (Table 6). Sportsmen

who place their cards in the Lympto platform divide their prizes into four levels of bets. It means that the greater the bet for the sportsman's card, the more bonuses a purchaser gets.

Table 6. Purchaser bonuses for buying a sportsman's card on the Lympto platform using Alexandra Trusova as an example

Bet for the NFT token	Bonuses received by the purchaser
\$5,000–\$15,000	A specially developed set of merchandise with the sportswoman's autograph
From \$15,000 to \$50,000	Previous-level bonuses plus a 30-minute phone chat with Trusova, a T-shirt with an autograph and a digital frame
From \$50,000 to \$100,000	Previous-level bonuses, sportswoman's skates and annual birthday video greetings from Alexandra
From \$100,000	Presence at Trusova's practice, a Meet and Greet and previous-level bonuses

Source: Compiled by the authors based on the Lympto platform data.

Risks Related to Issue of Digital Assets

Initially, the issue of NFT tokens is an opportunity to formalize one's rights to a certain asset, allowing to create an unrepeatably "original version" that cannot be copied and which provides royalty (on many platforms even after the sale of a digital asset, the author gets a percentage of sale). However, in reality this new technology does not come laden exclusively with advantages. One of the main risks is related to the intangible nature of digital assets. As a matter of fact, an NFT buyer does not get a real image or the rights to it, he/she only gets a file link.

At present there are a lot of marketplaces and blockchains that allow to mine (tokenize [28]) NFTs, and copies of collections or individual works may be stored on each of

them. For this reason, there is a risk of buying a counterfeit item that may simply disappear sometime in the future due to the violation of marketplace rules. Moreover, the purchased assets may disappear due to the specific nature of the blockchain. For example, when a person purchases an NFT, he/she gets a certificate with the file path. NFT marketplaces such as OpenSea, Rarible, Foundation, Nifty Gateway and many others do not store images. They only display the file with which the link you have purchased is associated. Therefore, if the server where the image's code snippet is stored is disconnected, the image may disappear. Since practically anyone may create an unverified marketplace account and display the image being sold free of charge (in this case the marketplace commission fee will be charged after it is sold to another person), swindlers sell images that do not belong to them. The OpenSea market-

place has already blocked such copies and reimbursed the losses in the amount of \$ 6.2 million to the holders, also limiting the number of tokens created by one user (not exceeding 50) [29].

Apart from that, NFT tokens are one of the mechanisms that propagate malicious programs which steal crypto wallets and engage in illegal mining. A code is embedded in the image of an NFT token that asks the victim to confirm the transaction, after which the criminal transfers the funds from their crypto wallet [30].

Finally, token-related transactions require a high degree of attention, including price formation and the structure of cryptocurrencies being used. For instance, a token from the Etherrock collection was sold for 444 wei instead of 444 ETH (\$1 million). A wei equals one quintillionth of ETH, so 444 wei costs less than one cent, which is not even enough to pay the commission fee for the transaction in the Ethereum network. The transaction was conducted in less than a second: the moment the order appeared in the market, a special bot which monitors NFT prices purchased it [31].

Different countries attempt to mitigate corresponding risks. However, at present there is no such regulation, which actually bears an additional risk. Russian legislation does not describe the status of NFT tokens. At the beginning of 2022, the Bank of Russia issued a report where it offered to prohibit the issue, circulation and exchange of cryptocurrencies and organization of such transactions account. The regulator also considers it necessary to forbid the mining of digital assets and to start monitoring Russian citizens' cryptocurrency investments on foreign trading platforms. At the same time, the Russian Government approved a road map that proposed regulation, rather than prohibition, of cryptocurrencies, identification of clients, responsibility for illegal circulation of digital assets and development of cryptocurrency value assessment methods [32].

Another problem is environmental harm. The mining hardware [33] required to launch an NFT often consumes a lot of energy. In its turn, this results in carbon dioxide emissions into the atmosphere, increasing the greenhouse effect [34]. Aware of this problem, new platforms focus on energy consumption, emphasizing that they support the environment. For instance, the Tezos crypto platform entered into a partnership with Manchester United FC [35]. The club's press release states that it is glad to cooperate with one of the most environmentally sound blockchains that uses energy-efficient technology: Tezos reduces carbon emissions. This is in line with the club's objectives aimed at the support of environmental sustainability [36]. Tezos is, in fact, a more environment-friendly crypto platform compared to others. According to a PWC report, Tezos' annual electricity consumption is approximately 0.001 TWhr, Bitcoin – 130 TWhr, Ethereum – 26 TWhr. High energy consumption results in another problem – high cost of NFT issue and related transactions. As noted by [37], each NFT-related transaction is more expensive than an ordinary cash transfer because smart contracts require computing resources and storage for processing. Thus, the

mining of an NFT token costs more than \$60, while an ordinary NFT transaction may cost \$60-100 each. High fees related to complex operations and high overload significantly restrict the propagation of the NFT technology.

It should be noted that fans do not always support the issue of fan tokens. For example, the fan association of the West Ham United football club opposed the club's plans to issue tokens, claiming that Socios.com tried to monetize fan participation, while it is obligated to do it for free. They even launched a campaign "Don't Pay to Have Your Say." Crystal Palace's fans acted in a similar way by hanging a banner "Morally bankrupt parasites Socios not welcome". This is related to the fact that since 2016 clubs have to meet their fans in order to discuss business issues in accordance with governance principles of the Department for Digital Technology, Culture, Media and Sport. This fan participation is now specified in codes of practice of the English Football League and Premier League [38].

There is also a risk of fraud with NFTs. For example, a Sacramento basketball player De'Aaron Fox launched an NFT project SwipaTheFox. Fans bought a Fox token and a season ticket to his virtual club, where they could talk to the player in a Discord channel, play computer games with him and participate in a drawing of merchandise. However, several months later the project was closed, token owners were not refunded, and the player said that he would get back to the project when he had more time [39].

Financial and other regulators are also concerned with potential risks related to fan tokens. For instance, on June 9, 2021 the Thailand Securities and Exchange Commission mentioned fan tokens directly in its notice that prohibited digital exchanges to render services related to certain tokens or cryptocurrencies [40].

Besides, the Advertising Standards Authority – the regulating body of Great Britain ruled on December 22, 2021 that the British football club Arsenal London ran a misleading advertisement without a clear statement of risks related to purchase of tokens. The regulator was especially concerned with the fact that to purchase a fan token one could just buy another cryptocurrency [41]. Finally, taxation of remuneration nominated in cryptocurrencies and, in particular, in fan tokens raises concerns [42].

Evaluation of Potential Income of Russian Clubs from Digital Assets

In this paper the authors attempt to assess the potential income of the leading clubs of the Russian Premier League (RPL) (Table 7) from placement of digital assets. Fan tokens provide an opportunity to profit both off the initial coin offering (ICO) and off the secondary market. Taking into consideration the fact that tokens are placed at a fixed price, it is first necessary to substantiate the volume of the issue.

The volume of placement of digital assets is largely defined by the fan base calculated based on the popularity rating of Russian football clubs on the Championat.com portal [43].

This rating is premised on monitoring of fans from 2001 to 2017 and compiled on the basis of a comprehensive system analysis of regional and federal poll data, media measurements, internet resource statistics and other field-specific studies that characterize the number, proactive attitude and club preferences of football fans. Unfortunately, there are no similar studies in terms of the number of applied criteria.

In the calculations presented in Table 7 we used the data of only the largest RPL clubs, which had been added to the sample. The value in the “Fan base” column is calculated as a ratio of the number of fans of a certain club to the total number of fans of the clubs added to the sample.

The median value of tokens in circulation (calculated on the basis of FanMarketCap open source data) with European clubs was used as the placement volume for Spartak FC, which has the largest fan base in Russia. We used a proportional value for other Russian clubs.

Then, based on the assumption regarding the token value of 2 euro, we deduced the initial (in case of ICO) club capitalization. According to unofficial data, the club gets about 70% of the price as royalty from the initial placement of tokens at the Socios marketplace. See the calculation results in Table 7.

Table 7. Club’s income from the initial offer of digital assets at the Socios marketplace

	Fan base, %	Potential token sales in the fan base, pc.	Capitalization in case of ICO (at a rate of 2 euro/token), euro	Club’s income from ICO if the club’s royalty is 70%, euro
Spartak FC	33	3,443,956	6,887,912	4,821,538
Zenit	27	2,794,438	5,588,876	3,912,213
CSKA	20	2,099,605	4,199,210	2,939,447
Lokomotiv	7	725,043	1,450,087	1,015,061
Krasnodar FC	7	709,938	1,419,877	993,914
Dinamo	6	634,413	1,268,826	888,178

Source: Compiled by the authors.

Then the authors calculated daily earnings in the secondary market. After an analysis of interviews with representatives of clubs and trading platforms [44–46], we revealed four factors that influence token price changes:

- 1) Stadium utilization in % (season 2021/2022).
- 2) Players’ transfer fees.
- 3) Gained points (as at April 8, 2022).
- 4) Social media followers (Instagram, Facebook, Twitter, TikTok, YouTube).

Values of adjusted initial offer price were calculated in several stages.

- 1) Based on the data of 47 foreign clubs, we calculated profitability since the placement of tokens whose median value equaled 86%.

- 2) Using the above factors, we adjusted profitability as follows: a club from the sample with the maximum value for each factor is assigned the coefficient of 1, the rest of clubs – proportionately to the maximum value. Then we multiplied this coefficient by the median profitability value (86%). After obtaining the resulting profitability we calculated the renewed token price and capitalization as at a certain moment of the season (taking into consideration the fact that the number of tokens in circulation is unchanged). The calculations are presented in Table 8.

Table 8. Calculation of token price change

	Transfer fee, million euro		Stadium utilization, %		Gained points		Subscribers, million persons		Total change of price, %	Resulting price of the token, euro
	X	K	X	K	X	K	X	K		
Spartak	118	0.72	13	38	27	0.55	6.02	0.91	11.7	2.23
CSKA	105	0.64	20	58	43	0.88	2.87	0.43	12.2	2.24
Krasnodar	85	0.52	21	61	36	0.73	0.93	0.14	2.8	2.06

	Transfer fee, million euro		Stadium utilization, %		Gained points		Subscribers, million persons		Total change of price, %	Resulting price of the token, euro
Zenit	165	1.00	22	65	49	1.00	6.62	1.00	55.8	3.12
Dinamo	105	0.64	34	100	46	0.94	1.05	0.16	8.1	2.16
Lokomotiv	87	0.53	19	56	37	0.76	1.85	0.28	5.3	2.11

X – quantitative value of each factor; K – adjustment coefficient.

Source: Compiled by the authors.

On the basis of open source data, one may presume that in the secondary market clubs may earn 25% of the platform's commission fee, which amounts to 10% of the turnover or 2.5% of 1 euro per transaction.

Clubs' daily income was calculated as a product of the adjusted capitalization and 2.5%. In order to obtain the total value for a season, this value was multiplied by 300 days

(the part of the season when games are conducted minus the summer and winter break: most of the income on a digital asset issue is earned within the period when clubs' sports results produce the greatest impact on the amount in circulation and the persons interested in purchasing digital assets are focused on them to the maximum extent). The calculations are presented in Table 9.

Table 9. Calculation of capitalization and potential daily earnings

	Current capitalization (after adjustments) in euro	A club's daily earnings in the secondary market, euro	Annual earnings in the secondary market in euro, 300 days (calendar club season)
Spartak FC	7,696,857	1,697	509,186
CSKA	4,709,815	1,039	311,578
Krasnodar	1,459,336	322	96,542
Zenit	8,708,841	1,920	576,134
Dinamo	1,371,935	303	90,760
Lokomotiv	1,527,241	337	101,035

Source: Compiled by the author.

At initial offering Spartak FC had the largest capitalization, however, considering its low sports results during the season, the token price (and consequently, capitalization) did not change dramatically. At the same time, capitalization of Zenit FC grew significantly due to superiority of the considered factors. Thus, we may assume that in case of an increase in the number of fans, attendance and utilization of stadiums as well as an improvement of sports results or reduction in the platform's commission fee the clubs will earn more.

Adopting Fan and NFT Tokens in Russian Sports

The performed evaluation shows that digital assets help Russian clubs to diversify revenues and, which is more important in the long-term, to assure their fans' loyalty. It proves the significance and relevance of the topic of this paper and allows the authors to formulate the following suggestions for clubs on the development and issue of NFT and fan tokens:

- 1) Make a list of unique elements for collection with regard to the scarcity and uniqueness criteria, including (but not limited to) additional bonuses for buyers – fan engagement (a special club outfit, game tickets, VIP services related to communication with sportsmen and access to closed stadium zones).
- 2) Choose a partner (platform) based on the following criteria: chance to cooperate with Russia under the current restrictions; observance of sustainable development principles; relevant experience (preferably in Eastern Europe); providing access to the maximum number of investors.
- 3) Coordinate the issue of fan tokens in advance with fan associations in order to avoid possible objections related to the sale of communication and loyalty instruments that the club has to provide free of charge.
- 4) Elaborate the list of bonuses and opportunities provided to the buyers of fan tokens. Free tickets, a chance to talk to sportsmen and other instruments are already rather widely used. The key aspect that could certainly interest any sports fan is the chance to

influence team composition and replacement during the game. However, one can hardly expect these options because of the position of the coaching staff which is responsible for the final result. Moreover, the collective intelligence of fans is unlikely to provide the expected efficiency. Thus, clubs will have to look for a balance between the need to attract fans with a new product and provide a proper level of independence in taking management decisions.

The results of the research show that in spite of all challenges and risks related to NFT tokens, the potential benefit from their use prevails. At the same time, Russian sports companies are not engaged in extensive cooperation with representatives of this sphere. Among other things, it is due to a hard peg to cryptocurrencies, whose legal status is undefined. The global restrictions imposed on Russia may have a multidirectional impact: on the one hand, access to international platforms for Russian players may be denied, on the other, cryptocurrencies may be a way out in the sphere of international settlement operations. In any case, organizations of the Russian sports industry should be more attentive to promising digital assets and develop corresponding instruments. The following encouraging lines of effort may be distinguished:

- 1) Sponsorship. Russian sports clubs and leagues (considering the number of fans and market volume, they are predominantly football clubs) could offer sponsorship cooperation opportunities to crypto exchanges if the country's cryptocurrency market is properly regulated.
- 2) Issue of fan and NFT tokens. The largest platform Socios.com has already announced the issue of a fan token with Spartak FC, however, there are no details regarding the dates and terms of issue. Besides, there are no obstacles for the clubs in creating their own NFT tokens and issuing them at Binance, OpenSea or other marketplaces. This was what Veles FC did [47]. Veles' revenues have not been declared officially, but may be assessed at approximately RUB 80,000 for a collection of eight cards (based on the RUB 10,000 value of cards on Binance).
- 3) Creation of its own platform with game mechanics and NFT objects. This may be relevant in case of a contract created by the author of similar successful projects – the best example in the market is Dapper Labs, creator of NBA Top Shot and a new NFT project for La Liga. The majority of NFT tokens are sold at the OpenSea marketplace, which is the largest marketplace for creators of such products. Other notable marketplaces include Lympto and Binance.

Limitations and Lines for Future Research

From the methodological point of view, the main restriction was the small number of studies on digital assets in general and specifically on their application by sports or-

ganizations. Another serious problem was the absence of official data required for an accurate assessment, including data on revenues of the clubs that have issued fan tokens and on exact marketplace conditions, for example, percentage of payments and commission fees. Alternative approaches to such studies include interviews with representatives of exchange marketplaces, clubs and federations, as well as an analysis of annual reports of the clubs that use digital assets widely. At the same time, one has to take into account that this requires an analysis of foreign experience, yet under the current circumstances it is problematic, as is the application of such experience by Russian organizations. Taking into consideration the continuing trend towards digitalization, one may hope that the number of studies in this field will increase, thus enhancing the methodological base. An important limitation is the absence of a clear position concerning corresponding regulation. Russian legislation does not contain the definition of a non-fungible token or NFT, and all tokens issued at foreign marketplaces are outside of the jurisdiction of the Russian legislation.

A range of factors that affect the change in token profitability was used in this research, and it may be expanded by the following indicators:

- stadium utilization percentage;
- government regulation of cryptocurrency settlements (expert evaluation: existence and development of laws and regulations that regulate the issue of cryptocurrencies in the country);
- fan token market regulation by sports leagues and federations (expert evaluation: existence and development of the regulations which limit this type of activity);
- number of days since the date of tokens' issue;
- number and relevance of fan votes in marketplace applications;
- purchasing power on a certain crypto market (number of tokens in circulation, evaluation of statistics on daily token issue).

The results of the research show that Binance marketplace, unlike Socios, is more efficient in terms of token sales. It may be related to its availability and popularity in other spheres unrelated to fan tokens: here a user may purchase not just sports organizations' tokens, but also other digital assets that have been issued by companies from other industries. In its turn, Socios is a specialized marketplace for sports assets that requires additional registration. Another advantage of Binance for Russia may be its initial adaptation in the Russian language. Risks and challenges related to fan token issue in various marketplaces and by clubs of various countries and monetary valuation of the effects produced by digital assets at the government level and level of individual sports industry organizations is another prospective line of further research. Finally, under present-day conditions, the development of offers for creating a Russian marketplace that offers NFT operations looks especially relevant.

References

1. Valeonti, F.; Hudson-Smith, A.; Terras, M.; Zarkali, C. Reaping the Benefits of Digitisation: Pilot study exploring revenue generation from digitised collections through technological innovation. In Proceedings of the EVA London 2018; BCS, The Chartered Institute for IT: London, UK, 2018; pp. 56–63.
2. Stromberg, M. How “Deaccession” Became the Museum Buzzword of 2020 Available online: <https://www.latimes.com/entertainment-arts/story/2020-12-29/deaccession-museum-art-auctions-2020> (accessed on 1 April 2021).
3. Crypto Collectibles, Museum Funding and OpenGLAM (note: web gallery, archive, library, museum): Challenges, Opportunities and the Potential of Non-Fungible Tokens (NFTs). Foteini Valeonti, Antonis Bikakis, Melissa Terras, Chris Speed, Andrew Hudson-Smith, Konstantinos Chalkias, combining papers by Bala and Nera, Regner and Lich
4. Alexey Korneev. Legendary Boxer Floyd Mayweather Set to Launch his NFT. RBC crypto. URL: <https://www.rbc.ru/crypto/news/609a9eea9a794741b5f40cc4>
5. Marat Seleznev. What are NFTs and Why do They Generate Millions. RBC Trends. 2021. URL: <https://trends.rbc.ru/trends/industry/604f3f139a794797b44b7a70>
6. Pavel Ryabtsevich. Self-Sufficiency and Security. How do Smart Contracts Work? RBC crypto 2020. URL: <https://www.rbc.ru/crypto/news/600bd6409a79473b23a6d3c4>
7. ForkLog. What is NFT? 2021. URL: <https://forklog.com/chto-takoe-nft/>
8. Kireyev, Pavel and Ruiqi Lin, In nite but Rare: Valuation and Pricing in Marketplaces for Blockchain-Based Nonfungible Tokens. Working Paper, 2021.
9. Kong, De-Rong and Tse-Chun Lin, Alternative investments in the Fintech era: The risk and return of Non-Fungible Token (NFT). Available at SSRN 3914085, 2021.
10. Nadini, Matthieu, Laura Alessandretti, Flavio Di Giacinto, Mauro Martino, Luca Maria Aiello, and Andrea Baronchelli, Mapping the NFT revolution: market trends, trade networks and visual features. Nature Scientific Reports, 2021.
11. Borri, Nicola and Kirill Shakhnov, Cryptomarket discounts,” Available at SSRN 3124394, 2018
12. Borri, N., Liu, Y., & Tsyvinski, A. (2022). The economics of non-fungible tokens. <https://economics.yale.edu/sites/default/files/files/Faculty/Tsyvinski/EconomicsNFTs.pdf>
13. Demir, E., Ersan, O., & Popesko, B. (2022). Are Fan Tokens Fan Tokens? Finance Research Letters, 102736.
14. Dowling, M. (2022a). Is non-fungible token pricing driven by cryptocurrencies? Finance Research Letters, 44, 102097.
15. Dowling, M. (2022b). Fertile LAND: Pricing non-fungible tokens. Finance Research Letters, 44, 102096.
16. Simanovsky A. Concerning the Issue of Economic Nature of Cryptocurrency. Voprosy Ekonomiki. 2018. No. 9. p. 132-142.
17. Scharnowski, Matthias, Stefan Scharnowski, and Lukas Zimmermann, Fan Tokens: Sports and Speculation on the Blockchain. Available at SSRN 3992430, 2021.
18. Solntsev I. Designing new funding models for Russian football clubs. Journal of Corporate Finance Research. 2019. T. 13. № 4. c. 59-73.
19. Solntsev I. Developing a Unified Approach for Evaluation of Football Club. Journal of Corporate Finance Research. 2018. Vol. 12. No. 1. pp. 77-90.
20. Christie's. NFT Version of the Fist Wikipedia Edit. 2021. URL: <https://mobile.twitter.com/christiesinc/status/1471218047524511764>
21. Mikhail Tetkin. The Hermitage has Sold NFT Tokens of Paintings from its Collection for RUB 32 Million. RBC crypto. 2021. URL: <https://www.rbc.ru/crypto/news/61376bd99a7947185cd5d967>
22. UEFA Report. The European Club Footballing Landscape. 2021. URL: https://editorial.uefa.com/resources/0272-145d8b8c8c5f-2d817c2474af-1000/master_bm_repor_midres_20220204170044.pdf
23. Ksenia Kuryshkina. Betting Firms are Forced out of Italian Football! Top Clubs are Losing Millions – Even the Treasury has Suffered. 2019. Sports.ru. URL: <https://www.sports.ru/tribuna/blogs/bettingtrends/2593620.html>
24. Scharnowski, M., Scharnowskia, S., Zimmermann L. (2021) Fan Tokens: Sports and Speculation on the Blockchain, <https://ssrn.com/abstract=3992430>
25. Habr. Are NFT Tokens a New Currency for Sports Fans? 2021. URL: <https://habr.com/ru/company/ligastavok/blog/578270/>
26. DeCenter. Fan Tokens: Football Clubs Enter the Crypto Market. 2020. URL: <https://decenter.org/ru/fan-tokeny>
27. IvanoTech. Academy. 2021. URL: <https://academy.moralis.io/blog/what-is-chiliz-socios-and-the-chz-token>

28. Phil Makarov. What is NFT? Vc.ru. 2021. URL: <https://vc.ru/crypto/214497-cto-takoe-nft>
29. Mikhail Tetkin. OpenSea Platform Compensated Users almost \$2 Million in Losses . RBC crypto. 2022. URL: <https://www.rbc.ru/crypto/news/61f788d29a79475d43ab9c74>
30. TJournal. NFT Tokens Became the Main Mechanism of Propagation of Malicious Software for Mining and Crypto Wallets Theft. 2022. URL: <https://tjournal.ru/news/533150-eset-nft-tokeny-stali-osnovnymi-mehanizmami-rasprostraneniya-vredonosnogo-podlya-mayninga-i-krazhi-kriptokoshelkov>
31. Mikhail Tetkin. Collector Sold Accidentally NFT Worth of \$1 Million for 1 Cent. RBC crypto. 2022. URL: https://www.rbc.ru/crypto/news/622b2f599a7947dde9177666?utm_source=app_ios_reader&utm_campaign&utm_medium=share
32. Alexey Korneev. The State Duma Named a Way to Regulate NFT Circulation in the Territory of Russia. RBC crypto. 2022. URL: <https://www.rbc.ru/crypto/news/61fa52419a7947e098b6a854>
33. Ilya Ilyinsky. Damage of Mining for the Environment. How Serious is it? RBC crypto. 2022. URL: <https://www.rbc.ru/crypto/news/60c33a009a79473c0e8e3753>
34. Media.sigen.pro. The Dark Side of NFT: Does a Mass Launch of Tokens Have a Negative Effect on Ecology? 2021. URL: <https://media.sigen.pro/longread/2415>
35. Soccer.com. MU Signed a Sponsorship Deal with Blockchain Platform Tezos. 2022. URL: <https://www.soccer.ru/news/1302744/manchester-yunayted>
36. Yaroslav Susov. Cryptocurrency will Pay MU 20 Million Pounds for a Jersey Logo. While the Players will not Wear Them at the Games. 2022. Sports.ru. URL: https://www.sports.ru/tribuna/blogs/redbullnekupil/3015451.html?p_a=click&p_n=top&p_p=post__1106560936
37. Wang, Q., Li, R., Wang, Q., Chen, S. (2021) Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges (Tech ReportV2), <https://arxiv.org/pdf/2105.07447.pdf>
38. Football Supporters' Association, 2020. West Ham end controversial blockchain partnership. URL: <https://thefsa.org.uk/news/west-ham-end-controversial-blockchain-partnership/>.
39. Sports.ru. NBA Star is Charged with Fraud with NFT. He Gained 1.5 million and Gave the Holders Signed Jerseys. 2022. URL: <https://www.sports.ru/tribuna/blogs/bankshot/3020115.html?sl=1>
40. Securities and Exchange Commission, 2021. Notification No. Kor Thor. 18/2564 Re: Rules, Conditions and Procedures for Undertaking Digital Asset Businesses (No. 11). URL: https://www.sec.or.th/EN/Pages/News_Detail.aspx?SECID=8994.
41. Advertising Standards Agency, 2021. ASA Ruling on Arsenal Football Club plc (A21-1121873 Arsenal Football Club plc). URL: <https://www.asa.org.uk/rulings/arsenal-football-club-plc-a21-1121873-arsenal-football-club-plc.html>.
42. Houben, R., van de Vijver, A., Appermont, N., Verachtert, G., 2021. Taxing professional football in the EU - A comparative and EU analysis. Publication for the Economic and Monetary Affairs Subcommittee on tax matters (FISC), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament.
43. Sergey Korytov. Who do Fans Pull for in Russia? Just Figures. 2017. Championship. URL: <https://www.championat.com/business/article-3315029-samyepopuljarnye-futbolnye-kluby-rossii--analiz-auditorii-rfpl.html>
44. Polina Zharkova. Sale of Beer may Generate 50-50 Million Roubles per Season. Chief Commercial Officer of Spartak about the Club Revenues. Vedomosti. 2022. URL: <https://www.vedomosti.ru/sport/football/articles/2022/06/27/928399-kommercheskii-direktor-spartaka-o-dohodah-kluba>.
45. Yaroslav Susov. NFT and Fan Tokens Invaded Sport. What are They? Where are Hundreds of Millions of Dollars from? What will be the Result of Cryptocurrencies Ban in Russia? Sports.ru. 2022. URL: <https://www.sports.ru/tribuna/blogs/redbullnekupil/3000928.html>
46. Joey D'Urso. Special report: Socios expects to make £150 from each fan who buys a token. 2022. The Athletic. URL: <https://theathletic.com/3140771/2022/04/29/special-report-socios-expects-to-make-150-from-each-fan-who-buys-a-token>.
47. Official Instagram of Veles FC. Publication of Digital Assets Allocation. 2022. URL: <https://www.instagram.com/p/CXyQVYzM8i1/>

Contribution of the authors: the authors contributed equally to this article. The authors declare no conflicts of interests. The article was submitted 31.01.2022; approved after reviewing 23.07.2022; accepted for publication 11.10.2022.